Khandesh College Education Society's

Moolji Jaitha College, Jalgaon

UGC honoured "College of Excellence & ISO 9001 : 2008 Certified",
NAAC Re-Accredited "A" Grade (CGPA 3.63),
Dept. of Biotechnology Ministry of Science & Technology honoured "Star College"

A Compendium : Volume 5 (2014)

Research Articles by Budding Researchers

(Under Research Promotion Scheme)

A Compendium of

Research Articles by Budding Researchers

VOL - 5 (2014)

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MESSAGE

It am pleased to see a 5th volume of research article by budding researchers which has resulted from the collaborative and conscious efforts from both the students and the teachers. This is an innovative leap to bridge the void long since neglected between formal education and research with a prime objective of improving participation of students in interdisciplinary research activities in basic and applied sciences.

In developing countries like India, the pace of research needs to be accelerated to cater the needs of growing population. Long since research had been under-funded, unpublished and un-consulted in India. On this background, the present volume is a small but appreciable effort to provide a common platform for especially students and teachers to get involved in research projects which yield socially applicable results and promote science in human face.

I admire the volume for the effort of creating research conducive environment in the institution and motivating students community to participate in research. Secondly, the volume brings together a spectrum of research articles on various themes belonging to life, earth, chemical, computer sciences and information technology that touch upon current burning issues of great concern.

I hope that this volume proves to be a trendsetter and similar innovative activities encouraging research in all the fields of human concern follow. I appreciate the efforts of the students, researchers, teachers, project coordinator and other people involved in bringing out this volume.

I congratulate all the research supervisors & members of the editorial board of this volume and extend best wishes to budding researchers.

(Shri. N. G. Bendale)
Hon'ble President
KCE Society, Jalgaon

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MESSAGE

I am happy to know that M.J.College, Jalgaon is going to publish ***A Compendium of Research Articles by Budding Researchers***-Vol.5.

College is providing a platform to the budding researchers who are Undergraduate and Postgraduate students. I appreciate the efforts of the college in promoting new talents, encouraging and inspiring the young undergraduate and postgraduate students to bring into light the state of art research results to disseminate their knowledge. It motivates the students and creates in them an urge to learn and aspire for greater things.

My best wishes to the Vol.5 of "***A Compendium of Research Articles by Budding Researchers***."

(Prof.Sudhir U.Meshram)
Vice-Chancellor

ISO 9001 : 2008 Certified
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FOREWARD

It gives me immense pleasure that KCE Society's Moolji Jaitha College is publishing the fifth volume of compendium of abstracts of the research oriented projects undertaken by students of Under Graduate / Post Graduate departments in the Faculty of Science, Commerce and Arts. The college has been conferred with the status of "College with Potential for Excellence" (CPE) by University Grants Commission, New Delhi in the year 2004-05 in the Ist phase. In the IInd phase of CPE status under the special initiative, the Post Graduate students have been provided with golden opportunity to undertake multi-disciplinary projects and thereby get the exposure to the scientific and methodological research. Its a matter of pride that college has been honoured as "College of Excellence" by UGC. This is result of collective efforts of students & staff, visionary management & great societal support. The contribution of students & teachers in the form of this activity also has been recognised in this process. In the context of present academic curricula, hardly there is chance of real research orientation for the students. It is the glaring lacuna of the present education system. Unfortunately, the course structure and contents do not change with the expected frequency and thereby useless knowledge. Besides, the teaching methodology do not provide sufficient room for application and research orientation. In turn, the students find it difficult to get proper and just employment. To break this vicious cycle, the initiative under above stated scheme is laudable.

The multidisciplinary nature of all the research topics is a welcome attitudinal change. All the students who have participated in this project are really the budding researchers with bright future. I am sure that they will blossom into the renowned scientist in the time to come. I wish that they extend their research oriented activity and pursue advanced research for the doctoral thesis. I am hopeful that the industry shall look to this attempt to hunt the young talent. As a principal of the College, I, hereby, express my firm commitment for such endeavour on sustainable basis for the years ahead.

Best wishers

Anil Rao
Principal

Knowledge is Power

Message

Modern sciences, as training the mind to an exact and impartial analysis of facts, is an education specially fitted to promote sound citizenship. Sciences has been the impetus for technological growth and development. In the drive to provide basic needs and to raise the quality of life of our people, create wealth and to be competitive in an increasingly technologically sophisticated world, harness our natural resources and protect the environment in a sustainable manner. We recognize the central role of science and technology. The investments in science today will pay back our technology needs tomorrow.

Therefore the Indian government is promoting the training of young minds to do science and other allied subject through the UGC. The UGC has recognized few colleges and institutions for having achieved excellence or striving for excellence in variety of fields. It is pleasing to know that Moolji Jaitha College, Jalgaon is one such centers for education. The college undertook the activity of doing projects both at graduate and undergraduate level in verity of subjects ranging from computer application to molecular biology. I felt very happy to observe that the young collegians besides their usual examination oriented studies devoted their time to do something useful or better. All the results and interpretations are given in this volume as research papers. Of course even writing a project report is itself a training. I congratulate all the teachers, students who participated in this activity. Similarly, the efforts and motivation on the part of authorities of the college i.e. principal and his supporting staff must be appreciated.

This volume no. 5 consist of Sixty five research papers from Arts, Commerce & Science faculty including chemical sciences, life sciences, computer sciences including IT, earth sciences, commerce & management, economics, politics, sociology, sanskrit, etc. respectively. The readings of these papers indicate that these students are well exposed to modern instrumentation, new methodologies and current problems.

In this computer age, the new generation is getting enriched because of the speed and facilities created by simulation and computational methods. The ingeniousness of the students can be noted in reading the paper on network device detector. Similarly the question of new knowledge about remote sensing technique is reflected in some papers in the section of earth sciences.

It is certain that the activity of project described in this volume will elevate the spirit of scientific attitude amongst other students as well. The other colleges will also initiate such an activity for their students. I wish that the college will perish the research as well utilize the grants for infra-structure creation so that many students and hence the population get benefited by doing 'Science'.

12/4

Prof. D. G. Hundiwale
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Grade (CGPA 2.88)

Dr. V.L. Maheshwari
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Professor & Director
School of Life Sciences

Message

I am very happy to learn that M.J. College, Jalgaon is publishing the "Compendium of Research Articles by Budding Researchers-Vol 5". The volume has articles based on the research work carried out by the budding researchers (the UG and PG students of the college) under the guidance/mentorship of one or more than one faculty member of the college. I am told that the activity was initially funded by UGC under the CPE scheme but for the last 2 years it is being funded by the college.

The activity certainly provides a platform for the ideas, small or big, of the budding researchers to materialize/fructify and offer vents for creativity and innovations which are keys to wealth generation for the society and nation in the era of knowledge based economy.

I take this opportunity to congratulate all the 'Young Scientists' for their hard work and good presentations and hope that many of them will get motivated to opt for research career after completing their PG programs. I am sure that the College will sustain this innovative activity in future too.

Prof. V.L. Maheshwari

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From the Desk of Editor

Research plays important role in the overall development of the world. Many scientists all over the world are actively engaged in research. In general research is done after Post Graduation during Ph.D. No undergraduate & post graduate students are aware of research methodology. To understand the research methodology & basic concepts of research for the students of UG & PG classes, Moolji Jaitha College, Jalgaon has initiated a unique scheme "Research Promotion Scheme for budding researchers" since 2009-10.This is a golden opportunity for the students to experience research at college level. Initially it was funded by UGC under the scheme of "College with Potential for Excellence" till 2010-11. After that college has funded for this scheme. Every year we are receiving overwhelming response of students for this scheme. This year 150 students from 18 departments completed 65 research projects under the guidance of 48 teachers from faculty of science. From faculties of Arts, Commerce & Management 26 students from 6 departments completed 13 research projects under the guidance of 10 teachers. Their projects & presentations based on them were evaluated by senior faculty from the North Maharashtra University & affiliated colleges. The prizes were given to the students.

In this 5th volume of compendium of Budding Researchers there are total 59 research papers from the Life Sciences, Chemical Sciences, Physical Sciences, Earth Sciences, Computer Sciences including IT, Mathematical Sciences, Commerce & Management, Economics, Political Sciences, Social Sciences, Psychology & Sanskrit. Students have undertaken diverse problems and prepared detailed report which was well presented by them.

As a coordinator of this scheme I am thankful to visionary President of Khandesh College Education Society, Jalgaon, Mr. N. G. Bendale for encouraging & supporting this activity. I am also thankful to Prin. A. G. Rao for allowing the students to use all the research facilities in the college & for funding this activity. Thanks are also due to examiners viz Dr. B. L. Chaudhari, Dr. K. S. Vishwakarma, Dr. Ajay Patil, Dr. Deepak Dalal, Dr.S. B. Attarde, Dr. Srikant Chaudhari from North Maharashtra University, Jalgaon. Dr. Nisar Patel, Patel college, Amalner, Dr. R. T. Potdar,Bendale College, Jalgaon, Dr. D. M. Tekade, P O Nahata College, Bhusawal, Dr. Y. D. Mahajan, Institute of Management and Research, Jalgaon & Prof. Bhagyashri Bhalwatkar, who with lot of patience examined the projects & evaluate the students.

I am very much thankful to my team members for their great involvement in this endevour. Last but not least this activity wasn't become successful without all Heads of the Departments, research guides & students. So I acknowledge them also. Any suggestions regarding this volume are welcome.

Dr. Mrs. G. M. Rane
Coordinator
Research Promotion Scheme
Moolji Jaitha College,
Jalgaon

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SECTION A

SCIENCE

Phytochemical screening and antioxidant activity of stem bark of *Terminalia arjuna* Linn.

Yogesh Deoraj, Sachin Yadav, Armadas Pawara, G. M. Chaudhari*
Department of Biochemistry, Moolji Jaitha College, Jalgaon (M. S.), India.

ABSTRACT

The stem bark of medicinally important plant *Termanalia arjuna* was successively extracted with different solvents with increasing polarity hexane, ethyl acetate , methanol and water. These different extracts were used for phytochemical screening to identify the different classes of secondary metabolites like carbohydrates, protein & amino acids, tannin, steroids, glycosides, flavonoids, saponin, gums & mucilage and oils & fats. Further extracts were analyzed for total phenolic content using folin ciocalteu method and antioxidant activity by phosphomolybdenum assay.

INTRODUCTION

The medicinal plants *Terminalia arjuna* (Roxb, Wight Arn) is a large evergreen tree with butteressed trunk. It belongs to *Combretaceae* family, is an important cardiotonic plant described in the Ayurveda (Tripathi 1986). It is found throughout the South Asian region. Ancient Indian physicians used the powdered tree bark of *Terminalia arjuna* for alleviating "Hritshool" (angina) and other cardiovascular conditions. Stem bark used as Astringent, cooling, aphrodisiac, cardiotonic, expectorant, alexiteric, in fractures, ulcers, diabetes, anemia, cardiac disorders, cough, tumor, excessive perspiration, fatigue, asthma, bronchitis, intrinsic hemorrhage, otalgia, diarrhea associated with blood, cirrhosis of liver, hypertension and skin disorders. Fruits used as Tonic and deobstruent**.** Leaves are used as Juice for earache. Bark of *T. arjuna* contains phenols, flavonoids, tannin, saponin, alkaloids, glycosides, phytosterols and carbohydrate (Ghani, 2003).

Antioxidants are micronutrients that have gained importance in recent years due to their ability to neutralize free radicals or their actions. Free radicals have been implicated in the etiology of several major human ailments, including cancer, cardiovascular diseases, neural disorders, diabetes and arthritis (Devasagayam et al., 2004). Most of the antioxidant compounds in a typical balanced diet are derived from plant sources with a wide variety of biological and chemical properties (Scalbert et al., 2005). Plants are rich sources for natural antioxidants, the best known are tocopherols, flavonoids, vitamin C and other phenolic compounds (Landrault et al., 2001). Antioxidant compounds like phenolic acids, polyphenols and flavonoids scavenge free radicals such as peroxide, hydroperoxide of lipid hydroxyl and thus inhibit the oxidative mechanisms that lead to degenerative diseases (Subramanion et al., 2011). Therefore, the present study was undertaken to evaluate and compare the antioxidative activities of different solvent extracts of *T. arjuna* in different methods.

MATERIALS AND METHOD

Collection of Plant material

Terminalia arjuna was obtained from local area of Vaghur dam about 25km on Aurangabad highway from Jalgaon city. The sample was authenticated for its botanical identity by Botanist, Mr. Tanvir Khan, Iqara College, Jalgaon.

Extraction and Yield

Extraction of plant secondary metabolite of *Terminalia arjuna* stem bark was done by Soxhlet extraction method.

The yield of dried extracts based on dry weight basis.

Qualitative phytochemical analysis

Phytochemical screening for alkaloids, carbohydrates, protein, amino acids, tannin, steroids, glycosides, flavonoids, saponin, gums, mucilage and oils & fats were performed using standard procedures (Trease and Evans, 2008).

Determination of total polyphenolic content (TPC)

TPC in methanolic extract of selected medicinal plants was determined with the Folin-Ciocalteu phenol (FC) reagent based colorimetric assay described by Singleton and Rossi (1965) with slight modification. TPC was expressed as mg of gallic acid equivalents (GAE) per gram of extract.

Determination of total antioxidant capacity (TAC)

The antioxidant activity of methanolic extract of selected medicinal plants was evaluated by phosphor-molybdenum method according to the procedure of Prieto et al. (1999) Total antioxidant capacity was expressed as mg of ascorbic acid equivalents per gram of extracts.

RESULTS AND DISCUSSION

Table 1 - Percentage yield of different solvent extracts of stem bark of *T. arjuna* Linn.

Extracts	Percentage yield (%)	TPC (mg/g, GAE)	TAC (mg/g, AAE)
Hexane	1.84	46.19±3.37	31.27 ± 1.63
Ethyl acetate	1.92	89.57 ± 4.12	83.19 ± 2.14
Methanol	22.17	829.73 ± 24.51	505.49 ± 12.29
Water	18.20	657.11 ± 16.43	486.81 ± 6.72

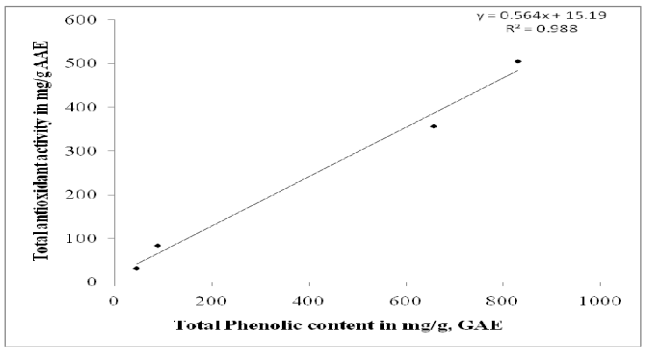
Values are the mean of duplicate experiments and represented as mean ± SD.

Table 2 - Phytochemical screening of different solvent extracts of stem bark of *T. arjuna* Linn.

Test	Hexane	Ethyl acetate	Methanol	water
Carbohydrates	+	+	+	+
Steroids	+	+	-	-
Flavonoids	+	+	+	+
Saponin	-	-	+	+
Oils	+	+	+	+
Tannin and phenolic compounds	+	+	+	+
Proteins and amino acids	+	+	+	+

Positive test + Negative test -

Figure 1 Relationship between the total antioxidant capacity and the total phenolic content



Methanol extract of *T. arjuna* was found to possess the highest total phenolic content and antioxidant capacity (Table 1). Total phenolic content and antioxidant capacity of the extracts was found to decrease in the following order: Methanol extract > water extract > ethyl acetate extract > n-hexane extract (Table 1). Phytochemical analysis shows the presence of carbohydrates, protein & amino acids, tannin, steroids, glycosides, flavonoids, saponin, gums & mucilage and oils & fats. A linear correlation appeared between the total antioxidant capacity and the total phenolic contents of the extract and fractions with good correlation coefficient (R2 = 0.988). TPC and TAC of *T. arjuna* different extracts were found to be positively correlated with correlation value is 0.99. There is a strong positive correlation among TPC and TACThe results suggested that the phenolic compounds contributed significantly to the antioxidant capacity of the *T. arjuna* extracts (Figure 1).

CONCLUSION

Based on the results of the present study, it can be suggested that the extracts of *T. arjuna* possess antioxidant effects. Almost all extracts exhibited potential antioxidant activity. Methanol and water extracts showed highest antioxidant activity.

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Comparison of antibacterial activity of Silver Nanoparticles synthesized using plant latex and by chemical method

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ABSTRACT

Antibacterial activity of silver nanoparticles synthesised using plant latex and by chemical method was checked against the bacteria *Echerchia coli* (NCIM 2931), *Staphylococus aureus* (NCIM 2079), *Pseudomonas aureginosa* (NCIM 5029), and *Basillus subtilis* (NCIM 2545). Paper disc diffusion and Borer well method were used for antibacterial activity of silver nanoparticles. From zone of inhibition, it was clear that silver nanoparticles synthesised using plant latex had better antibacterial activity as compared to silver nanoparticles syntesised by chemical method.

Key-words: Silver nanoparticles, plant latex, antibacterial activity

INTRODUCTION:

Nanoparticles is a special group of materials with unique features and extensive applications in diverse fields (1). Nanoparticles display completely unique properties in comparison with their bulk size counterparts (2). A large number of materials which were considered to be safe develop toxicity at nano size ranges (3) which is mainly related to the increased specific surface area and high reactivity of nano size materials (4). A larger surface area (as in case of nanoparticles) ensures an increased range of probable interaction with bio-organics present on the viable cell surface (5). Medicinal and preservative properties of silver have been known for over 2,000 years. The ancient Greek and Roman civilizations used silver vessels to keep water potable. Since the nineteenth century, silver-based compounds have been widely used in bactericidal applications, in burns and in wound therapy, etc. (6). Today nanotechnology has many applications in fields of medicine, health, electronics, food, fuel cells, solar cells, space, waste water treatment, to reduce pollution and many other fields.

Over the last decades silver has been engineered into nanoparticles. Silver nanoparticles have attracted much attention and have found applications in diverse areas, including medicine (7), textile engineering (8), biotechnology and bioengineering (12), water treatment (7), electronics (9) and optics (10). Furthermore, currently silver nanoparticles are widely used as antibacterial/antifungal agents in a diverse range of consumer products: air sanitizer sprays, socks, pillows, slippers, respirators, wet wipes, detergents, soaps, shampoos, toothpastes, air filters, coatings of refrigerators, vacuum cleaners, washing machines, food storage containers, cellular phones, etc. (11).

The current research work was undertaken to compare antibacterial activity of silver nanoparticles synthesized using plant latex and by chemical method.

MATERIALS AND METHODS

A) Chemical Method:

Silver nanoparticles were synthesized by the method given by Ratyakshi and R.P. Chauhan 2009 (13) with slight modifications using silver nitrate and trisodium citrate.

B) Biological Method:

Silver nanoparticles were synthesized by the method given by Amal Kumar Mondal et al 2011 (14) with slight modifications using crude latex of *Calotropis gigantea*.

C) Characterization of Ag nanoparticles:

Ag nanoparticles were characterized by Scanning Electron Microscopy (SEM) from UDCT, North Maharashtra University, Jalgaon.

D) Antibacterial activity:

Paper disc diffusion and Borer well method were used to determine the antibacterial activity of silver nanoparticles (15). Antibacterial activity was checked against the bacteria *Echerchia coli* (NCIM 2931), *Staphylococus aureus* (NCIM 2079), *Pseudomonas aureginosa* (NCIM 5029), and *Basillus subtilis* (NCIM 2545).

RESULTS AND DISCUSSION:

Silver nanoparticles were characterized by SEM.

Chemical method:

Figure 1 gives clear idea regarding size and shape of Ag nanoparticles. Particles size ranges from 29.9 nm to 203 nm. Particle shape is roughly sperical.

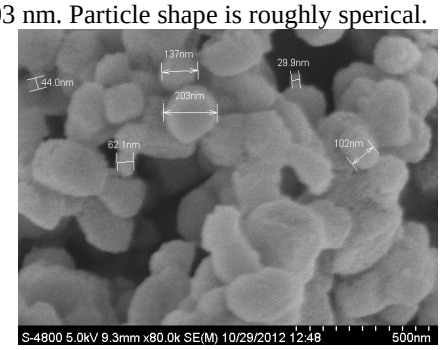
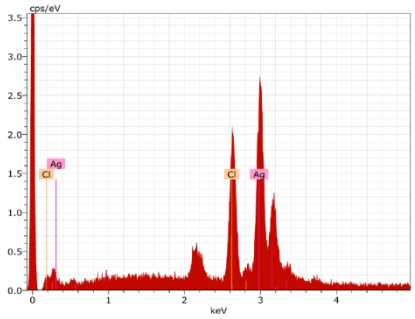


Figure 1: SEM-Ag nanoparticles



Graph 1: SEM graph- Ag nanoparticles

Graph 1 and Table 1 obtained after SEM shows composition of Ag nanoparticles and their component weight percentages. From graph and table it is clear that Ag particles were made up of only Ag and there were traces of chlorine might be from water used.

El	AN	Series	unn. C [wt.%]	norm. C [wt.%]	Atom. C [at.%]	Error (1 Sigma) [wt.%]
Cl	17	K-series	7.15	18.24	40.43	0.30
Ag	47	L-series	32.07	81.76	59.57	1.09
		Total:	39.22	100.00	100.00	

Table 1: SEM calculated weight percentage of Ag and Cl

Biological method:

Figure 2 gives more clear idea regarding size and shape of Ag nanoparticles synthesised using plant latex of *Calotropis gigantea*. Particles size ranges from 9.10 to 14.4 nm. Particles shape is roughly sperical.

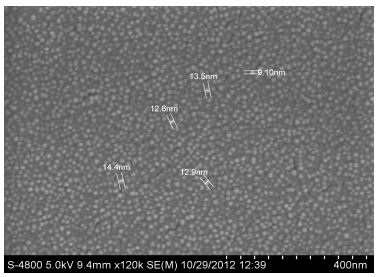
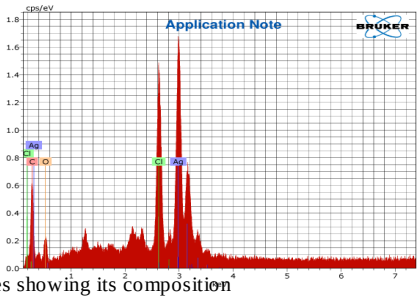


Figure2:SEM picture of Ag nanoparticles



Graph 2: SEM graph of Ag nanoparticles showing its composition

El	AN	Series	unn. C [wt.%]	norm. C [wt.%]	Atom. C [at.%]	Error (1 Sigma) [wt.%]
C	6	K-series	3.36	18.39	50.67	0.63
O	8	K-series	1.59	8.71	18.01	0.40
Cl	17	K-series	2.61	14.31	13.35	0.12
Ag	47	L-series	10.70	58.59	17.97	0.37
		Total:	18.26	100.00	100.00	

Table 2: SEM calculated weight percentage of Ag

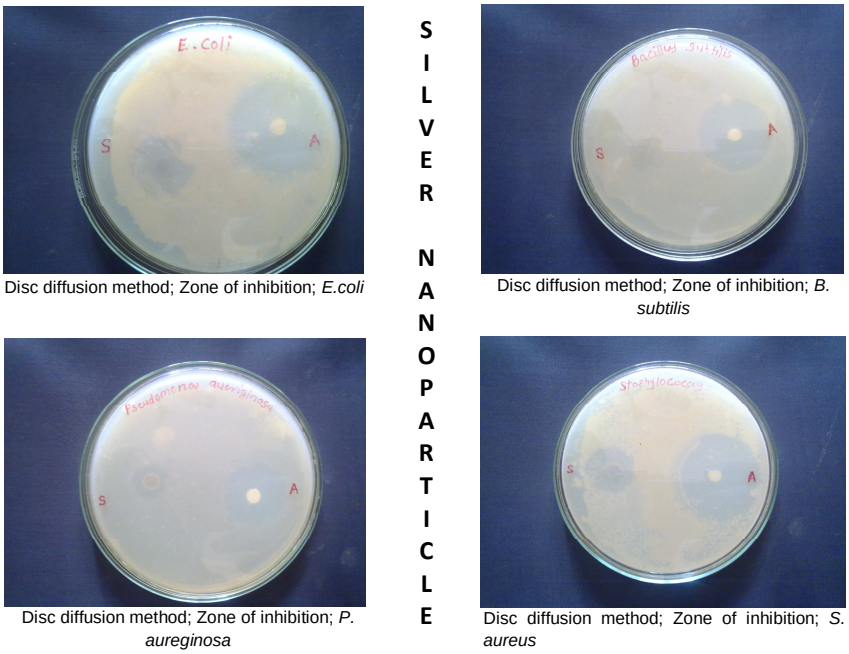
Composition of Ag nanoparticles and their component weight percentages as shown in the given in the tabulated and graphical forms (Table 2. Graph 2) As per the graph and table, it is clear that Ag (Silver) particles were made up of only Ag and there were traces of chlorine might be from latex used.

As seen in the images, table and graphs, biologically synthesized nanoparticles are more efficient smaller in size and very delicate as compare to chemically synthesized silver nanoparticles. As compare to chemically synthesized nanoparticles, the silver nanoparticles synthesized using plant latex generates are smaller in size, almost uniform in size and shape.

Antibacterial activity:

Antibacterial activity of Ag nanoparticles shown in the figure 1, and 2, and zone of inhibition is shown in table 1 and 2. S = Ag nanoparticles synthesised by chemical method and A = Ag nanoparticles synthesised using plant latex.

From the diameter of zone of inhibition, it is clear that Ag nanoparticles synthesised using plant latex are more bactericidal as compared to Ag nanoparticles synthesised by chemical method. Diameter of zone of inhibition of Ag nanoparticles synthesised using plant latex was almost double as compared to the Ag nanoparticles synthesised by chemical method. One of the reasons behind larger zone of inhibition for Ag nanoparticles synthesised using plant latex is the smaller size and almost uniform in shape and size as compared to Ag nanoparticles synthesised by chemical method.



Disc diffusion method; Zone of inhibition; *E.coli*

Disc diffusion method; Zone of inhibition; *B. subtilis*

Disc diffusion method; Zone of inhibition; *P. aureginosa*

Disc diffusion method; Zone of inhibition; *S. aureus*

Figure 1: Antibacterial activity of Ag nanoparticles by disc diffusion method.

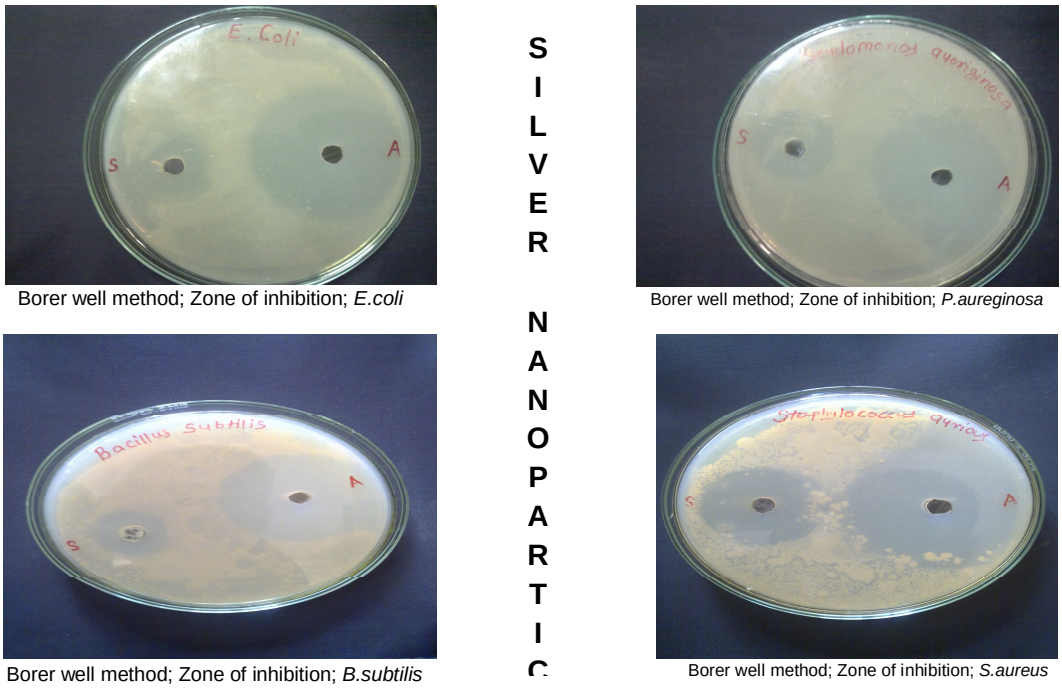


Figure 2: Antibacterial activity of Ag nanoparticles by borer well method

Table 1: Zone of inhibition obtained by disc diffusion

Sr. No.	Name of bacteria	Zone of inhibition (dia. in mm)	
		Ag nanoparticles synthesised by chemical method and	Ag nanoparticles synthesised using plant latex.
1	*Escherchia coli*	17	30
2	*Staphylococus aureus*	19	27
3	*Pseudomonas aureginosa*	14	23
4	*Basillus subtilis*	12	28

Table 2: Zone of inhibition obtained by borer well method

Sr. No.	Name of bacteria	Zone of inhibition (dia. in mm)	
		Ag nanoparticles synthesised by chemical method and	Ag nanoparticles synthesised using plant latex.
1	*Escherchia coli*	20	36
2	*Staphylococus aureus*	30	38
3	*Pseudomonas aureginosa*	19	30
4	*Basillus subtilis*	22	34

Acknowledgment:
We are very grateful to Hon'ble President of KCE Society, Mr. N.G. Bendale and Mr. A.G. Rao, Principal of Moolji Jaitha College, Jalgaon for their support. We are grateful to "Star College Scheme" DBT, New Delhi for their financial assistance.

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Comparison of Silver Nanoparticles synthesized using plant latex and by chemical method

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ABSTRACT
Silver nanoparticles synthesised using plant latex and by chemical method were characterised with scanning electron microscope (SEM). Crude latex from green stems of *Calotropis gigantea, Musa paradisica* and *Alstonia scholaris* and fruits of *Achras sapota* used for silver nanoparticles synthesis. Chemically Ag nanoparticles were synthesized using silver nitrate and trisodium citrate. Size, shape and composition of Ag nanoparticles were compared and found good results in case plant latex method.
Key-words: Silver nanoparticles, plant latex, silver nitrate

INTRODUCTION

Nanotechnology (1) is defined as the study of manipulating matter on the atomic and molecular scale. Nanotechnology is the design, characterization, production and application of structures, devices and systems by controlling shape and size at the nano-scale. Nanoparticles have one dimension with 100nm or less in size. Bionanotechnology is the integration between biotechnology and nanotechnology for developing biosynthetic and environmental friendly technology for the synthesis of nanomaterials. The use of nanoparticles is increased in present century due to its defined chemical, optical and mechanical properties. There are various methods for synthesizing silver nanoparticles.

Over the last decades silver has been engineered into nanoparticles (2). Silver nanoparticles have attracted much attention and have found applications in diverse areas, including medicine (3), textile engineering (7), biotechnology and bioengineering (8), water treatment (4), electronics (5) and optics (6). Furthermore, currently silver nanoparticles are widely used as antibacterial/antifungal agents in a diverse range of consumer products:(7) air sanitizer sprays, socks, pillows, slippers, respirators, wet wipes, detergents, soaps, shampoos, toothpastes, air filters, coatings of refrigerators, vacuum cleaners (8) washing machines, food storage containers, cellular phones, etc. (9). Numerous synthesis approaches were developed to obtain silver nanoparticles of various shapes and sizes, including laser ablation (10), gamma irradiation (11), electron irradiation (12), and chemical reduction by inorganic and organic reducing agents (13), photochemical methods (14), microwave processing (15), and thermal decomposition of silver oxalate in water and in ethylene glycol (16).

The current research work was undertaken to compare silver nanoparticles synthesized using plant latex and by chemical method.

MATERIALS AND METHODS

A) Chemical Method:

Silver nanoparticles were synthesized by the method given by Ratyakshi and R.P. Chauhan 2009 (17) with slight modifications using silver nitrate and trisodium citrate.

Reaction:

$$4Ag^{+} + C_6H_5O_7Na_3 + 2H_2O \rightarrow 4Ag^{\circ} + C_6H_5O_7H_3 + 3Na^{+} + H^{+} + O_2\uparrow$$

B) Biological Method:
Silver nanoparticles were synthesized by the method given by Amal Kumar Mondal et al 2011 (3) with slight modifications.

Latex was collected from following plants:

1. *Calotropis gigantean*
2. *Musa paradisica*
3. *Achras sapota,*
4. *Alstonia scholaris* .

Collection of Latex:
Crude latex was obtained by cutting green stems of *Calotropis gigantea, Musa paradisica* and *Alstonia scholaris* and fruits of *Achras sapota* and were stored at -20°C until use .

C) Characterization of Ag nanoparticles:
Ag nanoparticles were characterized by Scanning Electron Microscopy (SEM) from UDCT, North Maharashtra University, Jalgaon.

1) Calotropis gigantea

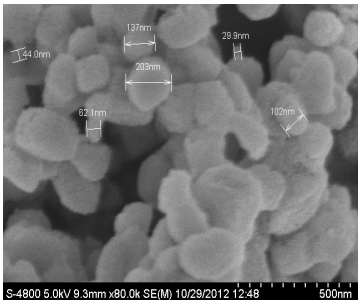
2) Musa paradisica

3)Achras sapota,

4)Alstonia scholaris

RESULTS AND DISCUSSION:
Silver nanoparticles were characterized by SEM.

Chemical method:
Figure 1 gives clear idea regarding size and shape of Ag nanoparticles. Particles size ranges from 29.9 nm to 203 nm. Particle shape is roughly sperical.



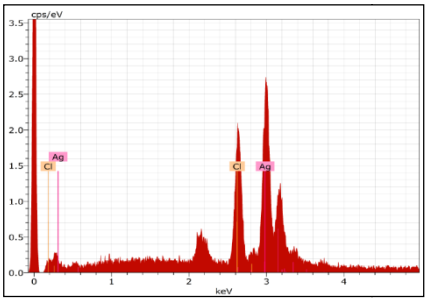


Figure 1: SEM-Ag nanoparticles **Graph 1: SEM graph- Ag nanoparticles**

Graph 1 and Table 1 obtained after SEM shows composition of Ag nanoparticles and their component weight percentages. From graph and table it is clear that Ag particles were made up of only Ag and there were traces of chlorine might be from water used.

El	AN	Series	unn. C [wt.%]	norm. C [wt.%]	Atom. C [at.%]	Error (1 Sigma) [wt.%]
Cl	17	K-series	7.15	18.24	40.43	0.30
Ag	47	L-series	32.07	81.76	59.57	1.09
		Total:	39.22	100.00	100.00	

Table 1: SEM calculated weight percentage of Ag and Cl

Biological method:

Figure 2, 3, 4 and 5; Graph 2, 3, 4 and 5; and table 2, 3, and 4 depicts size and shape; composition of Ag nanoparticles and weight percentage of elements presents respectively.

As seen in the images, table and graphs below, biologically synthesized nanoparticles are more efficient smaller in size and very delicate as compare to chemically synthesized silver nanoparticles. As compare to chemically synthesized nanoparticles, the silver nanoparticles synthesized using plant latex generates are smaller in size, almost uniform in size and shape.

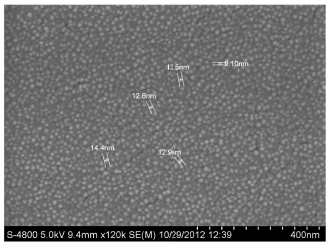


Figure 2: SEM-Ag nanoparticles from *Calotropis gigantea*

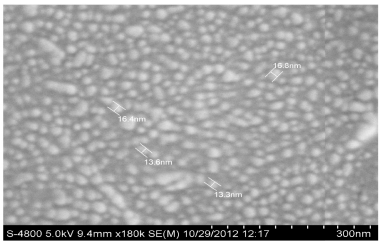


Figure 3: SEM-Ag nanoparticles from *Musa paradisica*

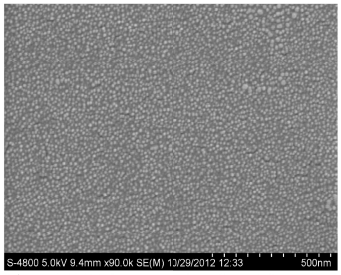


Figure 4: SEM-Ag nanoparticles from *Achras sapota*

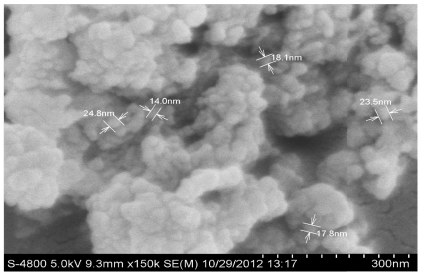
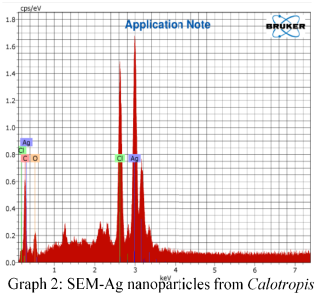
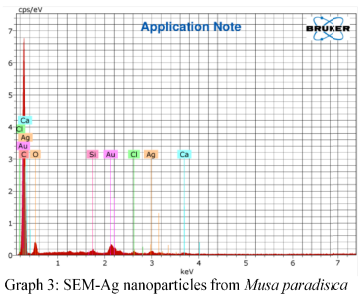


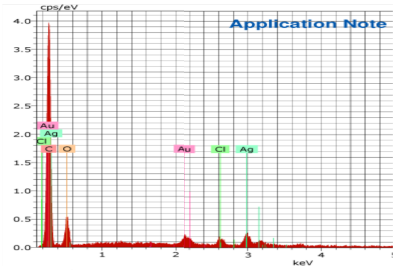
Figure 5: SEM-Ag nanoparticles from *Alstonia scholaris*



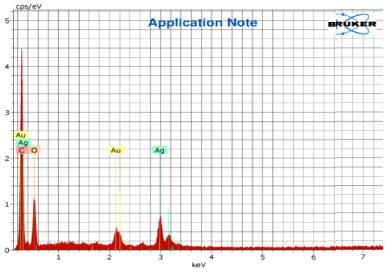
Graph 2: SEM-Ag nanoparticles from *Calotropis gigantea*



Graph 3: SEM-Ag nanoparticles from *Musa paradisica*



Graph 4: SEM-Ag nanoparticles from *Achras sapota*



Graph 5: SEM-Ag nanoparticles from *Alstonia schelaris*

El	AN	Series	unn. C [wt.%]	norm. C [wt.%]	Atom. C [at.%]	Error (1 Sigma) [wt.%]
C	6	K-series	3.36	18.39	50.67	0.63
O	8	K-series	1.59	8.71	18.01	0.40
Cl	17	K-series	2.61	14.31	13.35	0.12
Ag	47	L-series	10.70	58.59	17.97	0.37
		Total:	18.26	100.00	100.00	

Table 2: SEM calculated weight percentage of elements from *Calotropis gigantea*

El	AN	Series	unn. C [wt.%]	norm. C [wt.%]	Atom. C [at.%]	Error (1 Sigma) [wt.%]
C	6	K-series	51.67	75.59	88.11	6.34
O	8	K-series	7.66	11.21	9.81	1.46
Si	14	K-series	0.38	0.56	0.28	0.05
Cl	17	K-series	0.47	0.69	0.27	0.05
Ca	20	K-series	1.14	1.67	0.58	0.09
Ag	47	L-series	2.47	3.61	0.47	0.13
Au	79	M-series	4.57	6.68	0.47	0.22
		Total:	68.36	100.00	100.00	

Table 3: SEM calculated weight percentage of elements from *Musa paradisica*

El	AN	Series	unn. C [wt.%]	norm. C [wt.%]	Atom. C [at.%]	Error (1 Sigma) [wt.%]
C	6	K-series	27.87	47.03	68.58	3.78
O	8	K-series	14.84	25.04	27.41	2.45
Ag	47	L-series	12.29	20.74	3.37	0.45
Au	79	M-series	4.26	7.19	0.64	0.22
		Total:	59.27	100.00	100.00	

Table 4: SEM calculated weight percentage of elements from *Alstonia scholaris*

Acknowledgment:

We are very grateful to Hon'ble President of KCE Society, Mr. N.G. Bendale and Mr. A.G. Rao, Principal of Moolji Jaitha College, Jalgaon for their support. We are grateful to "Star College Scheme" DBT, New Delhi for their financial assistance.

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Isolation of Agriculturaly important bacteria from root nodules of *Trigonella foenumgraecum*

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ABSTRACT

In the present investigation 39 bacterial isolates were isolated from *Trigonella foenum- graecum* nodule sample collected from farmer. Characterization of these bacteria was done by colony characterization, citrate utilization test and amylase production test. TF1, TF11, TF14, TF15, TF18, TF23, TF28, TF31, TF34 isolates have efficiency to solubilize the phosphate. TF2, TF3, TF4, TF11, TF14, TF18, TF23, TF24, TF25, TF34, TF38 utilize citrate. This study reveals that, the bacterial isolates may be useful as agriculturally important bacteria for better growth of crop plants.

Keywords Phosphate solubilizers, biofertillizer, nitrogen fixing bacteria, *Rhizobium*, *Agrobacterium*, *Bacillus*,agriculture

INTRODUCTION

Rhizobium spp. form nitrogen fixing nodules were obtained from the roots of legumes. Wherever a given legume is native, its specific rhizobia symbionts are also indigenous soil inhabitants. As crops were introduced into new regions, microorganisms harbored by the plants might also have been disseminated. Little is known about the mechanisms by which *Rhizobium* and other bacteria are geographically scattered. Most probably man has contributed to their dispersion and seeds may be carriers of both pathogenic(1). Legumes can engage in a symbiosis with soil bacteria of the genera *Rhizobium*, *Azorhizobium*, *Sinorhizobium* and *Bradyrhizobium*, resulting in the formation of nitrogen-fixing root nodules. These 'rhizobia' trigger the nodule developmental programme via the secretion of mitogenic lipo-chitin oligosaccharides, called LCOs, as reviewed by In plant roots, LCOs also trigger hair deformation, preinfection thread formation, cortical cell division, flavonoid induction and secretion, and induction of nodulin and cell cycle genes (2). Members of the genus *Agrobacterium* constitute a diverse group of organisms, all of which, when harbouring the appropriate plasmids, are capable of causing neoplastic growths on susceptible host plants. The agrobacteria, which are members of the family *Rhizobiaceae*, can be differentiated into at least three biovars, corresponding to species divisions based on differential biochemical and physiological tests (3).Here is an attempt to isolate different bacteria from nodules of *Trigonella foenumgraecum* for checking its agricultural importance as phosphate solubilization study and some biochemical characters. Phosphorus (P) is a major growth-limiting nutrient and unlike the case for nitrogen, there is no large atmospheric source that can be made biologically available. Microorganisms enhance the P availability to plants by mineralizing organic P in soil and by solubilising precipitated phosphates(4).

MATERIALS AND METHODS

Isolation of bacteria Selected plants were washed under tap water to remove soil and separated into stems, roots and nodules. Stems and roots were cut into sections 2-3 cm long.The tissue was put in beaker, soaked in distilled water and drained. The root nodules were carefully removed along with some parts of roots. It was rinsed in 70% ethanol for 30 seconds and then sterilized with 0.1% $HgCl_2$ for 3minutes. The tissue was then washed ten times with sterile water. Nodules were crushed in sterile distilled water. Loop full of suspension was streaked on mannitol yeast extract agar supplemented with 1% cango red solution. Incubated for 48 hours. Then indvidual colony was purified and characterized (Table 1) on same media and maintained on YEMA slant at 4^0C. Individual isolate was screened for phosphate solubilizing activity on Picovasky medium (Figure 1), amylase production (Figure2) on starch agar plate, citrate utilization test (Figure3) on Simmon's citrate agar medium slants (Table 2).

CONCLUSION

Present study reveals efficiency of isolates to solubilize phosphate which is beneficial for plant growth. Amylase screening tests indicates capability of isolates TF 7,TF18,TF19,TF21 for use of starch as a carbon source. TF37 is the most potent isolate for phosphate solubilization among the isolated bacteria. Out of 39 isolates 11 bacteria utilize citrate.

NO.	Isolate	SIZE	SHAPE	MARGINE	ELEVATION	OPACITY	CONSISTANCY
1.	TF1	2 mm	Circular	Entire	Concave	Opaque	Sticky
2.	TF2	1 mm	Eliptical	Undulate	Concave	Translucent	Mucoid
3.	TF3	Pinpoint	Circular	Entire	Concave	Translucent	Mucoid
4.	TF4	Pinpoint	Circular	Entire	Concave	Translucent	Sticky
5.	TF5	Pinpoint	Circular	Entire	Concave	Translucent	Sticky
6.	TF6	3 mm	Eliptical	Undulate	Flat	Opaque	Mucoid
7.	TF7	1 mm	Circular	Entire	Concave	Opaque	Mucoid
8.	TF9	1 mm	Circular	Entire	Flat	Opaque	Mucoid
9.	TF12	2 mm	Circular	Entire	Flat	Translucent	Mucoid
10.	TF16	1 mm	Circular	Entire	Concave	Opaque	Mucoid
11.	TF20	Pinpoint	Irregular	Zig-Zag	Flat	Translucent	Sticky
12.	TF21	1 mm	Circular	Entire	Concave	transluscent	Sticky
13.	TF22	Pinpoint	Circular	Entire	Flat	Translucent	Sticky
14.	TF24	Pinpoint	Circular	Plane	Flat	Translucent	Sticky
15.	TF25	1 mm	Circular	Entire	Concave	Opaque	Sticky
16.	TF26	2 mm	Irregular	Zig-Zag	Flat	Opaque	Sticky
17.	TF27	Pinpoint	Circular	Entire	Flat	Translucent	Sticky
18.	TF28	1 mm	Circular	Entire	Flat	transluscent	Sticky
19.	TF29	Pinpoint	Circular	Entire	Flat	Translucent	Sticky
20.	TF32	Pinpoint	Circular	Entire	Flat	Translucent	Sticky
21.	TF33	2 mm	Eliptical	Entire	Flat	Opaque	
22.	TF36	Pinpoint	Circular	Entire	Flat	Opaque	
23.	TF37	1 mm	Circular	Entire	Concave	transluscent	
24.	TF38	1 mm	Circular	Entire	Concave	Opaque	

Table 1 Colony characterization of isolates

Sr. No.	Isolate	Citrate utilization	Amylase production	Phosphate solubilization
1	**TF1**	-	-	+
2	**TF 2**	+	-	-
3	**TF 3**	+	-	-
4	**TF 4**	+	-	-
5	**TF 5**		-	-
6	**TF 6**		-	-
7	**TF 7**		+	-
8	**TF 8**		-	-
9	**TF 9**		-	-
10	**TF 10**		-	-

11	**TF 11**	+	-	+
12	**TF 12**		-	-
13	**TF 13**		-	-
14	**TF 14**	+	-	+
15	**TF 15**		-	+
16	**TF 16**		-	+
17	**TF 17**		-	+
18	**TF 18**	+	+	+
19	**TF 19**		+	-
20	**TF 20**		-	-
21	**TF 21**		+	-
22	**TF 22**		-	-
23	**TF** 23	+	-	+
24	**TF 24**	+	-	-
25	**TF 25**	+	-	-
26	**TF 26**		-	-
27	**TF 27**		-	-
28	**TF 28**		-	+
29	**TF 29**		-	-
30	**TF 30**		-	-
31	**TF 31**		-	+
32	**TF 32**		-	-
33	**TF 33**		-	-
34	**TF 34**	+	-	+
35	**TF 35**		-	-
36	**TF 36**		-	-
37	**TF 37**		-	-
38	**TF 38**	+	-	-
39	**TF 39**		-	-

Table 2 Biochemical characterization of isolates

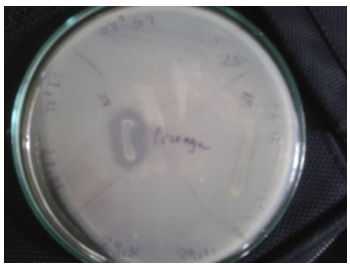

Figure 1 Phosphate solubilization

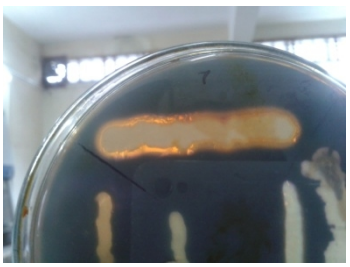

Figure 2 Screening for amylase

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Preliminary phytochemical screening of some antioxidant plants

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ABSTRACT
In the present investigation nine solvents from nonpolar to polar are selected for extraction of secondary metabolites of two plants. Plant sample powders are extracted with the solvent by maceration technique for seven days. Phytochemicals are screened using Horborne methods for secondary metabolites. Two plants samples i *Allium sativum*(bulb*)* ii *Zingiber officinale* (rhizome) were macerated with solvents hexane, toluene, acetone, propanol, methanol, ethanol, chloroform, petroleum ether, acetic acid, and water .Presence of flavonoid may be responsible for antioxidant property.
Keywords *Allium sativum*, *Zingiber officinale*, extract, phytochemical screening

INTRODUCTION :

Plants used in traditional medicine contain a wide range of bioactive compounds that can be used to treat infectious diseases. The most important of these bioactive compounds of plants are alkaloids, flavonoids, tannins and phenols. Knowledge of the chemical constituents of plants is desirable because such information may provide a prototype for synthesis of chemical substances related to antioxidant property .(1,7). There is an abundant medicinal plants throughout the world but only small amounts are investigated for its biological activity, Nevertheless, today there is a wide range of medicinal plant parts which include the flowers, leaves, stem, fruits and root extracts are used as powerful raw drugs possessing a variety of antimicrobial and healing properties (3,4)

Collection and identification of plant material

Zingiber officinale, *Allium sativum* were collected from farmer. Plant samples were identified by Dr.G.S.Chaudhari, Principal, PGCSRT college.

Preparation of plant extract and phytochemical screening(1-2)

Five grams of plant powders were macerated for 7 days with occasional shaking with solvents (Ethanol, methanol, hexane, propanol, chloroform, water) separately. The extracts were filtered through Whatman's No. 41 filter paper and the extracts were collected and stored in the refrigerator at 4^0C. The extracts were concentrated and subjected to phytochemical analysis as per the method given by Horborne (2)

Test for amino acids

Extract was treated with ninhydrin solution and heated in water bath , blue colour indicates presence of amino acid.

Test for alkaloids

A The alcoholic extract was evaporated to dryness and the residue was heated on a boiling water bath with 2% hydrochloric acid. After cooling, the mixture was filtered and treated with a few drops of Mayer's reagent. The samples were then observed for the presence of turbidity or yellow precipitation.

Test for steroids and terpenoids

To the extract 2ml of chloroform was added. Concentrated H2SO4 was added carefully to form a layer. A reddish brown coloration of the interface indicates the resence of the terpenoids whereas red ring indicates presence of steroid(Figure 1).

Test for saponins

To one drop of blood drop of extract was added .Agglutination indicates presence of saponins(Figure 2,3)

Test for tannins

To 0.5 ml of extract solution 1ml of water and 1- 2 drops of ferric chloride solution was added. Blue color was observed for garlic tannins and green black for catecholic tannins.

RESULT AND DISCUSSION

The presence of phytochemical constituents in different extracts in is reported in table 1.Nine extracts were prepared for checking availability of five phytoconstituents (9*5=45). Two plants were extracted for phytochemical purpose (45*2=90) evident in all extracts. Since ancient times, plants have been used to cure various ailments caused by microorganisms. Moreover, the potential of higher plants as a source for new drugs is still largely unexplored. The phytochemicals present in the plants may supply novel medicines. The chemical constituents in the plants or crude extracts are known to be biologically active ingredients. Some chemical constituents are considered as secondary metabolites components. They are directly responsible for different activity such as antioxidant, antimicrobial, antifungal and anticancer (5,6).In the present study ,+we found that most of biologically active compounds are present in methanol extract of the investigated plants .Both the plants *Allium sativum, Zingiber officinale* (Table 1,2, Figure 1) serve as least tannins and phenolics source. None of the reports are available on acetic acid, propanol , toluene extracts . Propanol is the poor solvent for the secondary metabolites.

Plant name	Phytochemical	Hexane	Petroleum ether	Tolu-ene	Chloro form	Ace-tone	Propa-nol	Etha-nol	Metha-nol	Water
Allium sativum	Amino acid	-	-	-	-	-	-	+	+	+
	Steroids and terpenoids	+	+	+	+	+	-	+	+	+
	Saponins	-	+	-	+	-	+	-	+	-
	Flavonoid	-		-	-	+		+	+	+
	Tannins and phenolic compounds	-	-	-	-	-	-	-	+	+
	Alkaloid	-	-	-	+	+	-	+	+	+

Table 1 Preliminary phytochemical screening of *Allium sativum*

Figure 1 Test for steroid

Figure 2a Foam test for saponin

Figure 2b Foam Test for saponin

Plant name	Phytochemical	Hexa ne	Tolu-ene	Ace-tone	Prop anol	Etha nol	Metha nol	Acetic acid	Water	Ethyl acetate
Zingiber officinale	Amino acid	+++	+	+	+	++	++	++	+++	-
	Steroids and terpenoids	+	++	+++	+	+++	++	++	++	+
	Saponins	+	-	+	+	+	+	-	+	-
	Flavonoid	+	+	+	+	+	+	+	+	+
	Tannins and phenolic compounds	-	-	-	-	-	-	-	-	-

Table 2 **Preliminary phytochemical screening of *Zingiber officinale***

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Bioenergy potential of regional weed biomass

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ABSTRACT
Weeds are available as a source of lignocelluloses in ample amount all over in country. Weeds are the most economic sources of lignocelluloses available for the Bioenergy production. Potential of four local weeds were studied in the present investigation. Out of these *Ipomia fistula* was found to have highest total solid (~30%) and volatile solid (~95%) with high calorific value (4487 Kcal/kg), which supports its efficiency in Bioenergy production processes like ethanol, methane, brackets *etc.*
Key words: weed biomass, total solid, volatile solid, calorific value

INTRODUCTION

In recent decades, the search for alternatives fuels is increasing globally. High international prices of oil and its derivates and concerns about the environment motivate this process. Moreover, there is great expectation on the possible economic benefits from the clean development mechanism projects coming from the use of renewable sources in the agricultural sector, such as bioethanol from sugarcane and eucalyptus timber for coal substitution. There is also a possibility of obtaining energy from plant biomass that could be transformed to charcoal (Fiusa *et al.*, 2010).

Indian agricultural sector is potentially suffered by various weeds produced in the fields and the side by land area. These are fast growing plants responsible for the production of notable amount of lignocelluloses. Those lignocelluloses can be used as alternative energy source like carbon feedstock for ethanol, methane production or for bracketing (Ghosh *et al.*, 2012).

METHODS AND MATERIALS

Four local weed samples were collected from various fields of Jalgaon region. Samples were collected as a whole plant and proceed for the experiments. For estimation of volatile solid and calorific value estimation biomass was sun dried and powdered by ball milling.

Figure 1: Collection of Weed sample

Parthenium hysterfera
(Gajar Gawat)

Ipomea fistula
(Beshrmi)

Calatropis gigantia
(Rui)

Typha Indica
(Pankanis)

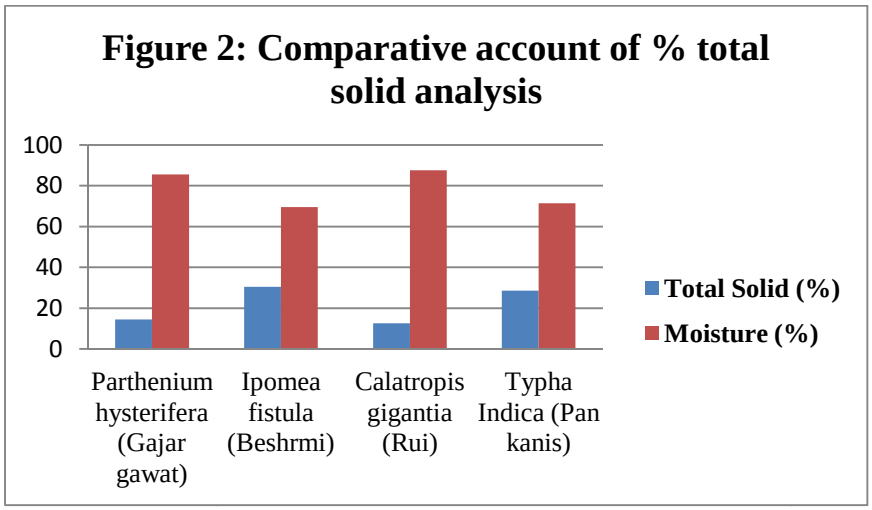
ANALYSIS

All weed samples were subjected for the physical analysis like the estimation of total solid, volatile solid, moisture and ash. All the analysis was done by analytical procedure developed by National Renewable Energy Laboratory, USA (Sluiter *et al.*, Mar 2008; Sluiter *et al.*, Jan 2008). Also calorific values of the

samples were estimated by using Bomb calorimeter. 1 gm of sample was subjected for the estimation of calorific value, and estimated in terms of kcal/kg of biomass on dry weight basis (Sanathi *et al.*, 2009).

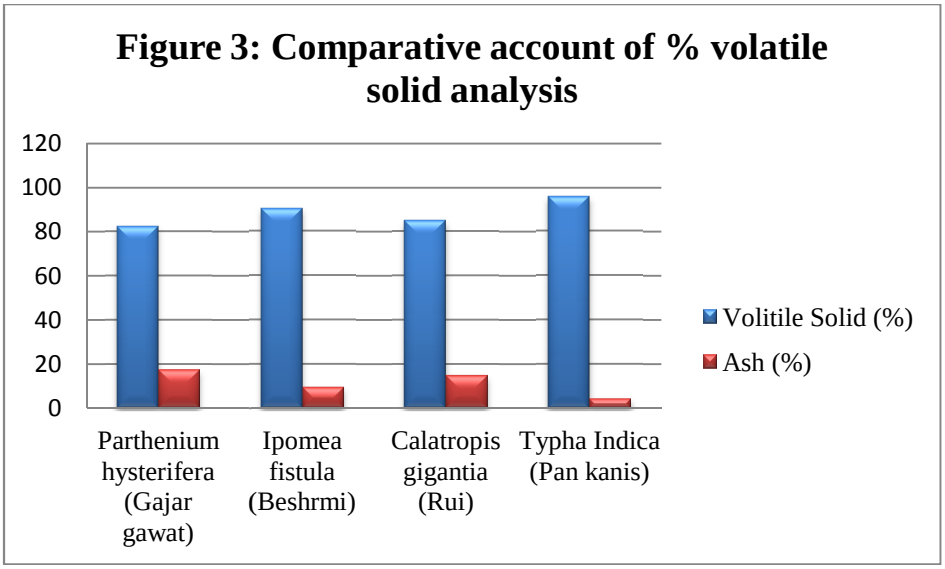
RESULTS

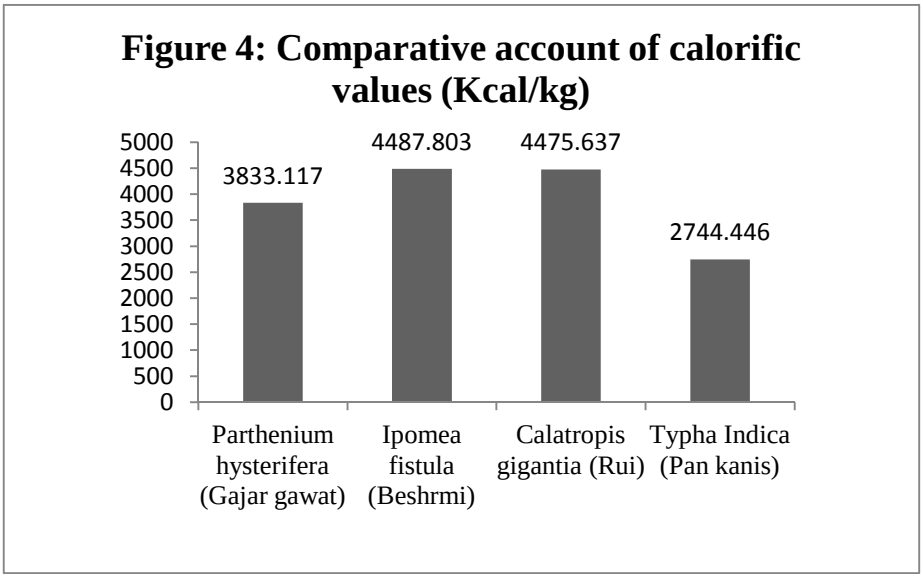
Weed biomass was collected as green harvested lignocellulosic material. Hence percentage of total available biomass on dry weight basis was estimated by total solid and moisture analysis (Figure 2).



Out of 4 local weed samples, Beshmi was found to have highest total solid content (~30%). Followed to Beshrmi, pan kanis was also has estimated more than 28% of total solid.

Total available biomass has some amount as ash content which was practically not useful for Bioenergy production. It was estimated by volatile solid analysis. Out of all subjected samples *Typha indica* (Pan kanis) was found to have maximum volatile solid (95%) followed by *Ipomia fistula* (Beshrmi) as 90% (Figure 3).





Thermal analysis of biomass was done by estimation of calorific values where *Ipomia fistula* (*Beshrmi*) was detected to have highest calorific values as 4487 Kcal/kg which was found to comparable to coal indices (4000- 7000 Kcal/kg).

CONCLUSION

Bioenergy potential of weed samples was studied by physical and thermal analysis of the biomass. Local weed like *Ipomia fistula* and *Typha indica* are found have total solid > 25 % which reflect comparison between different substrates for actual amount of lignocelluloses on dry weight basis available for the energy production. Volatile solid estimation of biomass sample helps to compare % amount of biomass fraction actually available for the energy production. In the present research *Ipomia fistula* and *Typha indica* biomass recorded > 94% volatile solid. Calorific value estimation is useful to screen biomass on the basis of their energy efficiency on the basis of burning abilities, where all samples except *Typha indica* are found to be potential. *Ipomia fistula* may serve as potential source of biomass for Bioenergy production based on our observations.

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Dye reducing potential of algal biosynthesized silver nanopartilces

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ABSTRACT

The present study reports the biological synthesis of silver nanoparticles (AgNPs) using aqueous algae extract for the reduction of Ag+ ions. Bioreduction of Ag+ to silver nanoparticle was observed when aqueous extract amplified with silver nitrate ($AgNO_3$) and kept at different reaction conditions. These silver nanoparticles are further characterized by ultraviolet-visible spectroscopy and FTIR. The optimum pH for nanopartical synthesis is 7.0 and in case of temperature, as temperature increase Optical Density of nanoparticle solution may be associated with reduction of silver nitrate. Additionally, the dye reducing activity of synthesized nanoparticles was studied. It found for the methyl orange,methyl blue,& malachite respectively.

Key words: Algae, Silver nanoparticle, Dye reducing activity methyl orange

INTRODUCTION

The field of nanotechnology is one of the most active areas of research in modern materials science. The exploitation of various biomaterials for the biosynthesis of nanoparticles is considered as green technology . The recent development and implementation of new technologies have led to new era, the nano-revolution which unfolds role of plants in bio and green synthesis of nanoparticles which seem to have drawn quite an unequivocal attention with a view of synthesizing stable nanoparticles. Although nanoparticles can be synthesized through array of conventional methods biological route of Synthesizing are good competent over the physical and chemical techniques (Kavitha, 2013). There is an increasing commercial demand for nanoparticles due to their wide applicability in various areas such as electronics, catalysis, chemistry, energy, and medicine (Velavan S). Biological synthesis of nanoparticles has received a tremendous attention due to their high chemicals and, thermal stability. Promising applications in medicinal field are also due to its environmental friendly approach and low cost techniques (Edhaya, 2013). Nanoparticles (NP) are defined as particles with a diameter smaller than 100 nm, are increasingly used in different applications, including drug carrier systems and to pass organ barriers such as the blood-brain barrier. Because of their unique properties Nanocrystals (quantum dots) and other Nano-particles (gold colloids, nanobars, dendrimers and nanoshells) have been receiving a lot of attention for potential use in Therapeutics, Bioengineering and therapeutics drug discovery (Abhilash, 2010).

MATERIAL AND METHODOLOGY

Collection of algae Algae were collected from two areas viz, Tapi and Girna river, located in Bhusawal, during the end of summer season (April 2013) when the algae were at their peak biomass (0-2 m in depth). Freshly collected algae were washed thoroughly in water to remove epiphytes, small invertebrates and extraneous matter. The samples were separated into two portions: one was used for morphological identification and the other was freeze-dried.

Identification of algae Algae are identified by made the guidance of expert Phycologist, Bhusawal Arts, Science and P.O.Nahata Commerce College, Jalgaon.

Extraction of algae for non particle synthesis Algae are freeze in deep freezer and crushed into mortar and pestle in phosphate buffer. The crushed extracts were filtrate through the 4 layer of muslin cloth. The

filtrates were centrifuged in cooling centrifugation at 4^0C for 10 min. The supernatant were used as algal extract for nanoparticle synthesis.

Synthesis of Nanoparticles from algal extracts silver nanoparticles were synthesized by add 1ml of pure algal extract into the 9ml of 1mM of silver nitrate solution . The reaction mixture was kept at room temperature under mechanically stirring on rotary shaker. The color change was noted and nanoparticles formation was monitored using UV-vis Spectrophotometer periodically.

Characterization of Nanoparticles The reaction of silver nitrate solution with algal extract was optically measured using single beam UV-Visible Spectrophotometer (Systronic) in the different wavelength range of 340 nm to 700 nm. The synthesized silver nanoparticles were centrifuged at 10,000 rpm for 20 min, and collect the pellet. The pellet was washed with distilled water for several times to remove impurities and dried to get powder. The FTIR analysis was carried out in a Shimadzu instrument. The dried silver nanoparticles were grinded with KBr pellets and measured at the wavelength range from 4000 to 400cm.

Effect of pH and temperature on Nanoparticle synthesis To study effect of pH and temperature on nanopracticle synthesiz, 2.5 ml of extractwas mixed with 50 ml of 1mM $AgNO_3$. Separate experiments were done for different reaction conditions like pH (2,4,6,7,8,9 and 10) and temperature (4, 20, 40, 60, 70, 80, 90 and 100^0C).

Dye reducing activity of Nanoparticles Reducing activity of synthesized nano particles were determined by inoculating 1ml of synthesized nano-particles in 25 ml 1% dye solution by using 1mM $AgNO_3$ as negative control. Three dyes are used for estimating dye reducing activity of synthesized nanoparticles.viz Methyl orange, methylene blue and methyl green absorption was measured at 440, 668 and 617 nm respectively after 6 days.

RESULTS

The species of alga obtained from Tapi (Bhuswal) and Girna river (Sakegaon) were identified as *Chara sp. and Oedogonium sp.*

Synthesis of Nanoparticles from algal extracts

Sliver nanoparticles are synthesized from both algal extract. Although, quick color change were observed in *Oedogonium* than *Chara* extract. The synthesized nanoparticles are named as NP2 (*Oedogonium*) and NP3 (*Chara*) Since for further studies *Oedogonium* extract were used and studied with reference to optimum pH, temperature and partially characterized.

Characterization of Nanoparticles

The reaction of silver nitrate solution with algal extract was optically measured using Single beam UV-Visible Spectrophotometer (Systronics) in the different wavelength range of 340 nm to 700 nm.

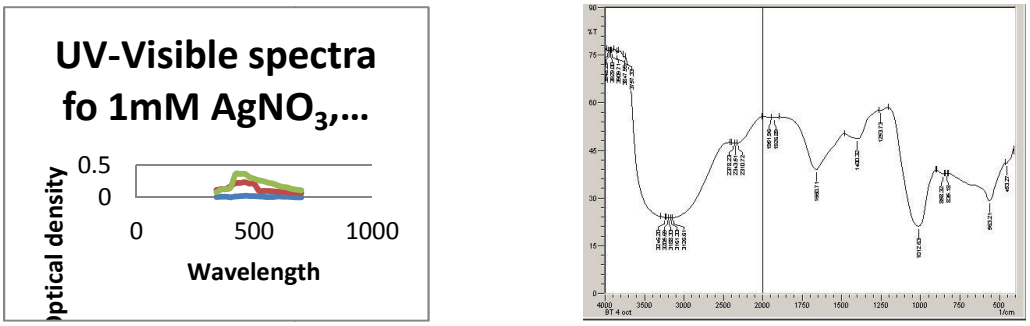

Figure 2UV-Vis and FTIR spectra of 1mM AgNO3, NP2 and NP3

Note: Low Optical density absorption peak= 1mM $AgNO_3$, Moderate Optical density absorption peak = NP2, High Optical density absorption peak = NP3

The FTIR spectrum of silver nanoparticles indicates that the nanoparticles manifest absorption peaks at about 1253.73, 1400.32 and 1660.32 cm which represent amide linkages groups. Furthermore, the peaks near 3126.61 to 3246.20 cm-1 were assigned to OH stretching. The band at 1660.71 cm corresponds to amide I due to carbonyl stretch in protein. The peak at 1012.63 cm corresponds to C-N stretching vibration of amine. The results are similar to those of silver nanoparticles synthesized from fungus *Penicillium citrinum* (Honary et al., 2013).

Effect of Temperature on Nanoparticle synthesis from Oedogonium

It was interpreted that algae extracts incubated at 100^0C temperature have more number of silver nanoparticles as compared to those from lower temperature. It was observed with increase with temperature conditions from 4^0C to 100^0C results in increase in number of silver nanoparticles were observed may be due to their property of Surface Plasmon Resonance (Dubey and et al., 2010).

Effect of pH on Nanoparticle synthesis

It was interpreted that extracts with pH 7 prepared from algal extract produced more number of silver nanoparticles as compared other. It was observed that with increase in pH conditions there was change in colour and absorbance increased till pH 7 and afterward it reduces.

In accordance to above reported results, Dubey and et al., (2010) and many others had shown that alkaline pH solutions proves stability in synthesis of nanoparticles as compared with acidic pH solutions. Also it can be said that at acidic pH, the particle size are comparatively larger than the basic pH, as blue shift clearly reported in the SPR spectra.

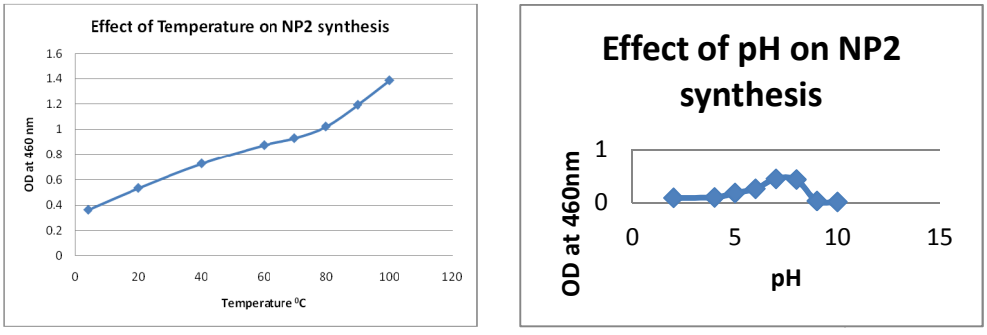

Figure 5 Effect of pH and Temperature on NP2 Synthesis

Dye reducing activity of Nanoparticles

After dye reducing activity of synthesized nanoparticles was studied for Methyl orange, methylene blue and methyl greenby measuring absoption at 440, 668 and 617 nm respectively. After 6 days of incubation it was concluded that synthesized silver nanoparticles, dye reducing activity has increased from 239.09% (NP2) and 221.21% (NP3) by using 1mM $AgNO_3$ as control. The silver nanoparticles were able to decolorize Congo red dye up to 50% while Mordant Black 17 was minimally decolorized which may be due to their complex structure (Swetha 2013). The *Pleurotus* sajor caju silver nanoparticle effectively decolorized the dye within 24 hours of incubation when compared with its plain culture (*Pleurotus* sajor caju) which takes more than 48 hours for the same process (Nithya, 2011).

Table 3 Dye reducing activity of synthesized Nanoparticles

Sr. No.	NP synthesized from algae	Dye reduction (%)			Average (%)	Relative activity (%)
		Methyl orange	Methylene blue	Malachite green		
1	1mM $AgNO_3$	41.1	50.0	14.28	35.12	100.00
2	NP2	90.4	76.92	84.61	83.97	239.09
3	NP3	93.1	64.74	72.24	77.69	221.21

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Phytotoxicity and Biostimulating activity of fresh water microalgae

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ABSTRACT

The objective of this study is to screen the cultivable microalgae for growth promoting activity. Four axenic microlage (Chlorophyta) strains from three genera (*Chlorella, Scenedesmus* and *Claymodomonas*) were analyzed for endogenous growth promoting activity. The microalgae strains are subjected for phyto-toxicity and phyto-stimulation. All the microalgae shows phyto-stimulating activity and do not have phyto-toxic activity. Cytokinin-like activity was detected using the excised cucumber cotyledon bioassay. Out of 4 strains, two showed high cytokinin-like activity and two strains, low cytokining-like activity. Although tested algae are not subject for auxin like activity, but RB2 shows high root stimulation in dark condition. From all tested sample RB2 has both high root and shoot stimulating activity.

Keywords: Microaglae, Cytokinin, growth promoting, chlorella, Scenedesmus and chlaymodomonas

INTRODUCTION

Growth hormones are group of plant growth regulators (PGRs) and can be exploited in agriculture for both pre-harvest and postharvest management of leafy vegetables, fruits and cut flowers. Algae produce plant growth regulators (PGRs), similar to higher plants. To study this feature, freeze-dried and ultrasonicated algal biomass was applied to support the development of certain orchids (Emese, 2011). planktonic bacteria isolated from littoral and pelagial zones of lake Jeziorak in spring and summer have been carried out. 62.5% of bacteria isolated in summer, and 12.5% of bacteria isolated in spring were able to produce cytokinin-like substances (Donderski, 2000). Elena and Werner (2005) worked on Growth promoting and inhibiting effects of extracellular substances of soil microalgae and cyanobacteria on *Escherichia coli* and *Micrococcus luteus*. A elaborate review on phytohormones of algae was written by Tarakhovskaya et al., in 2007. María and Adriana worked on bioactivity of Scytonema hofmanni (Cyanobacteria) in *Lilium alexandrae* in vitro propagation (2006).

MATERIAL AND MATHODOLOGY

Collection of algae Total four strains of algae are obtained from two places, two samples are obtained from BIT, Messer, Ranchi (Chlorella sp. and Chlamydomonas sp.) and two are obtained from Moolji Jaitha College, Jalgaon (Chlorella sp. and Senesdusmus sp.).

Cultivation of algae The isolated algae are cultured in TAP medium and incubated at room temperature under continuous light. After 5 days the growth of algae were measured by following methods.

Growth estimation of algae By measuring chlorophyll content: 5 ml of algal culture were subjected for ultra-sonication and centrifuged at 8000 rpm and 4^0C for 10 minutes. Supernatant were subject for chlorophyll content at different wavelength.

The estimation of phyto-toxicity and phyto-stimulation activity The activity was held by means of test on cucumber seeds. Forthe experiment on toxicity the cumcuber seeds were put into the moist chambers (Petri plates with filter paper and cottonwool), in each chamber there were 5 seeds, which were moistened with suspension of 0,5 g of experimental biomass of microalgael communities. Seeds, processed with suspension, were couched in luminostat during 3 days. Check seeds were soaked in sterile distilled water.

To determine toxicity of suspension for plants: i) the number of sprouted seeds was calculated; ii) the length of root and stem in cucumber seeds was measured to determine phyto-stimulation activity of suspension; and iii) the ability of microalgael sp. communities-base suspension to promote growth was calculated (as % of the control response).

Cucumber cotyledon bioassay To conduct cumber cotyledon bioassay, the cucumber seeds were purchased from local market. Sees were germinated on tissue paper saturated with autoclaved distilled water in the Petri plates. For germination seeds were incubated at room temperature in dark for 7 days following the guidelines reported by Fletcher et.al (1992). Cotyledons were excised from cumber seedlings (7 day old) that were grown in the dark condition. By weighing cotyledons were added in Petri dishes containing the crude (100 %) cell free broth of respective algal isolates. A negative control with sterile distilled water alone and a positive control with commercially available synthetic cytokinin 6-Benzylaminopurine (BAP) was used in the assay for comparison following guidelines given by Fletcher et al. (1992). The concentration of BAP in positive control was 25 ppm.

Extraction and quantitative estimation of chlorophyll content Cucumber cotyledon samples along with positive and negative control were incubated under fluorescent tube light for 3.5 hours at 22^0C. After the incubation, the cotyledons were collected and ground with 80% acetone with mortar and pestle. The chlorophyll extracts were collected and then centrifuged at 4000 rpm for ten minutes. The derived supernatant was analyzed for total amount of chlorophyll estimation using spectrometer (wavelength 663nm and 645 nm)

RESULTS AND DISCUSSION

Cultivation of algae The collected algae are cultured in TAP medium and incubated at room temperature under continuous light.

Growth estimation of algae The cultured algae are subjected for chlorophyl estimation and the results are reported in following figure 1. Data interpret that RB2 has highest growth rate and RB1 has lowest growth rate.

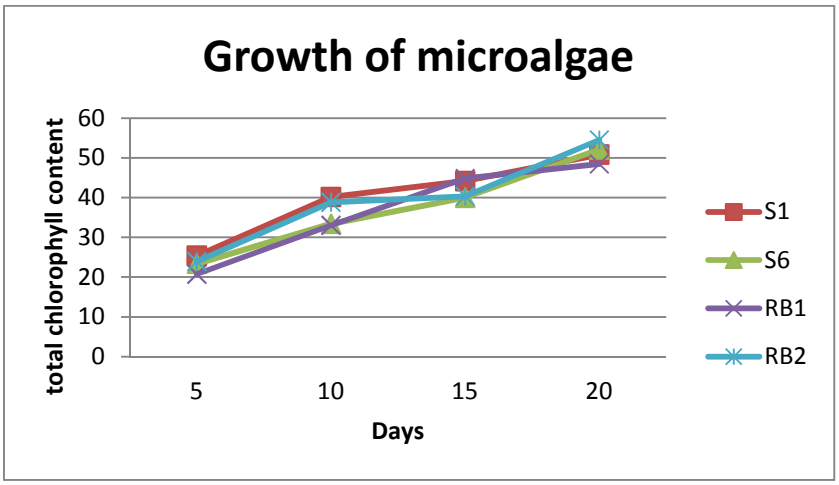

Figure 1 Growth rate of microalgae

The estimation of phyto-toxicity and phyto-stimulation activity The data received from the studying of phyto-toxicity and phyto-stimulation activity are clear and encouriching. Since none of test microalgae were found to be toxic for cucumber seeds and shows same results to that of distilled water. In case of phytostimulatroy activity was displayed by all microalgae. The highest phytostimulation activity was displayed by RB2 i.e, 187% and 163% in terms of root and shoot respectively. The highest root stimulating activity 208% was shown by SS6 and shoot 163% shown by RB2. The phyto-stimulation activity in concerned with fibrous roots were shown by RB2 (374.73%) and SS6 (332.63%) in dark and in light it decreases to some extent RB2 (192.0 %) and SS6 (112.0 %).

Table 1 Toxicity of microalgae in the bioassay with cucumber seeds

Sample number	Number of sprouted seeds out of 5	Length of cucumber seedlings % of the control response		Number of fibrous roots present	
		Root	Stem	Dark	Light
Dw	5	100	100.00	100	100
RB1	5	164.5	112.2	185.26	101.3
RB2	5	187.5	163.15	374.73	192.0
SS1	5	175	163.15	294.73	157.3
SS6	5	208.3	100.00	332.63	112.0

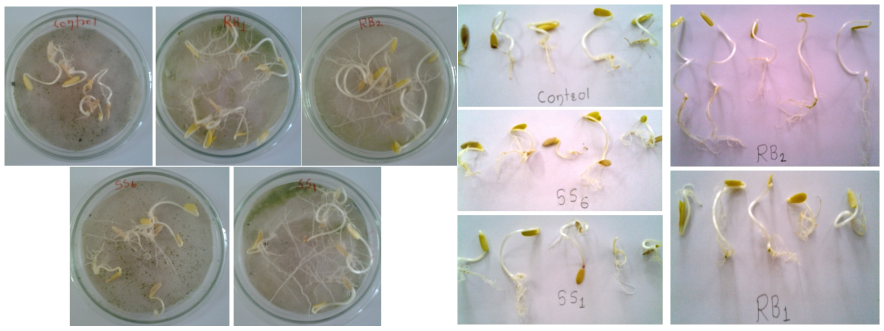

Figure 2 Toxicity Phyto-stimulation of microalgae in the bioassay with cucumber seeds

Cucumber cotyledon bioassay

The crude free broth of each isolated putative microalgae isolates was tested using CCGB to identify cytokinin-like compound producing isolates. All the microalgae showed positive result in CCGB. The results of CCGB are depicted in Table 5. The total amount of chlorophyll content in cucumber cotyledons which were exposed to microalgae was more than negative control.

Table 4 Cucumber cotyledon bioassay

Sample number	Number of sprouted seeds	% of the control response	Length of seedlings		% of the control response	
			Roots	Stem	Roots	Stem
Dw	3	100	1.8	3.4	100	100
RB1	4	133.3	2.1	3	116.6	88.23
RB2	5	166.6	3.2	6	177.7	176.47
SS1	4	133.3	2.9	4.2	161.1	123.52
SS6	4	133.3	3	2.4	166.6	70.58
BAP	4	133.3	2.6	2.8	144.4	82.35

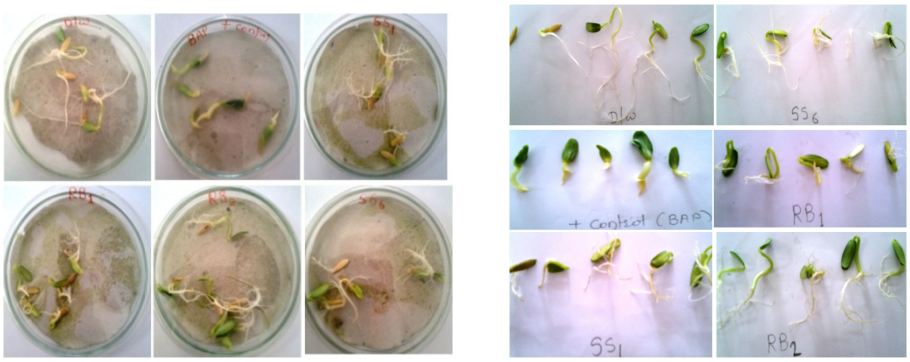

Figure 4 Cucumber cotyledon bioassay and Germinated seedling of Cucumber

A similar work was conducted by Stirk et al. (2002) to determine cytokinin like activity using CCGB to screen microlagae. The CCGB was also used to determine the cytokinin and auxin-like activity of the microlagae strains by Zhao et al. (1992).

Table 5 Chlorophyll content of cotyledons in Cucumber cotyledon bioassay

Sample number	OD at 663	OD at 645	Total chlorophyll content
Dw	0.836	0.813	23.40
RB1	0.496	0.123	10.99
RB2	1.753	0.556	39.86
SS1	1.216	1.468	36.33
SS6	1.301	0.305	28.72
BAP	1.363	0.950	35.14

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Screening and Isolation of plant Growth Promoting Rhizobacteria

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ABSTRACT

Plant growth promoting *Rhizobacteria* (PGPR) are an attractive eco-friendly alternative to chemical fertilizers in agriculture. While the rhizospheres of crop plants have been well studied with the objective of screening PGPR, play an important role in maintaining ecological balance. Plant growth promoting *Rhizobacteria* (PGPR) are a group of bacteria that can be found in the rhizosphere, in association with roots which can enhance the growth of plant directly or indirectly. The study describes the characterization of Rhizobium isolated from root nodules of Corn (*Zea mays*). Each isolates were morphologically and biochemically characterized. Each microorganism were tested for plant growth promotion assays including indole acetic acid (IAA), ammonia, NaCl variation assay, to select for ones possessing multi-trait plant growth promoting (PGP) properties.The present study shows the antifungal activity of *Rhizobacteria* and *azotobacter* against the some fungal spp.The *Rhizobacteria* were gram negative rod shaped and mucous producing. It utilizes glucose and starch as a carbon source.

INTRODUCTION

Biological nitrogen fixation

A number of bacterial species belonging to genera *Azospirillum*, *Alcaligenes*, *Arthrobacter*, *Acinetobacter*, *Bacillus*, *Burkholderia*, *Enterobacter*, *Erwinia*, *Flavobacterium*, *Pseudomonas*, *Rhizobium* and *Serratia* are associated with the plant rhizosphere and are able to exert a beneficial effect on plant growth (Tilak et al 2005). The important role is played by plants in selecting and enriching the types of bacteria by the constituents of their root exudates. Thus, the bacterial community in the rhizosphere develops depending on the nature and concentrations of organic constituents of exudates, and the corresponding ability of the bacteria to utilize these as sources of energy (Curl et al 1986). PGPR are commonly used as inoculants for improving the growth and yield of agricultural crops and offers an attractive way to replace chemical fertilizers, pesticides, and supplements (Ashrafuzzaman et al 2009). The use of bio-fertilizer and bioenhancer such as N_2 (nitrogen) fixing bacteria and beneficial micro-organism can reduce chemical fertilizer applications and consequently lower production cost. Utilization of PGPR in order to increase the productivity may be a viable alternative to organic fertilizers which also helps in reducing the pollution and preserving the environment in the spirit of an ecological agriculture (Ştefan , et al 2008).

Rhizobium

When rhizobia colonize the roots from non-legume plant in a non specific relationship the strains from this genus may behave as PGPR. It has been proven that plant productivity increases when the Rhizobia are present in rhizosphere. It provides the major biological source of fixed nitrogen in agricultural soils (Shahzad et al 2012).

Azatobacter

The family Azotobacteriaceae comprises of two genera (Tchan et al, 1984a)namely, *Azomonas* (non-cyst forming) with three species (*A. agilis, A. insignis* and *A. macrocytogenes*) and *Azotobacter* (cyst forming) comprising of 6 species (Tchan YT et al 1984b.), namely, *A. chroococcum, A. vinelandii, A. beijerinckii, A. nigricans, A. armeniacus* and *A. Paspali. Azotobacter* is generally regarded as a free-living aerobic nitrogen-fixer. *Azotobacter* strains could affect seed germination and seedling growth in a plant. It has been shown that wheat yield increased up to 30% with *Azotobacter* inoculation (Gholami et al 1992.).

Plant growth producers

There are many species of soil bacteria which are reported to promote plant growth by producing growth regulators, inducing root exudation and enhancing the availability of nutrients to plant besides control of

soil born plant pathogenic fungi. PGPR may induce plant growth promotion by direct or indirect modes of action. The mechanism involved in PGPR-mediated plant growth promotion is directly by production of plant growth regulators (auxins, cytokines, gibberellins) and facilitation of the uptake of nutrients (nitrogen fixation, solubilisation of phosphorus). The indirect promotion of plant growth occurs when PGPR lessen or prevent the deleterious effects of plant pathogens on plants by production of inhibitory substances (antibiotics, antifungal metabolites, iron-chelating siderophores, cell wall-degrading enzymes and competition for sites on roots) or by increasing the natural resistance of the host (induced systemic resistance).

MATERIALS AND METHODS

Screening, Isolation and identification of *Azatobacter* species

The soil sample was collected from agricultural field of Dharangaon, Maharashtra, India. The soil sample was suspended in 10 ml autoclaved distilled water and serially diluted up to 10^{-8}. 0.1 ml of each dilution was spread on sterile Ashby's agar plates and plates were incubated at 30^{o}C for 48-72 hr. After incubation well isolated colonies were randomly selected on the basis of colony morphology and maintained on sterile Ashby's agar slants. Each isolate was characterised by gram staining and motility.

Morphological Characteristics

Morphological characteristics of bacteria were observed by using Gram staining technique as described by Arora, 2003 and observed under low power microscope.

Biochemical Tests

All the isolated strains were biochemically characterized viz, Catalase Test, Indole Production Test, Methyl Red Test, Vogas Proskaure Test, Citrate Utilisation Test as described by (Lowe et al,1962) Starch hydrolysis Test and motility test as mentioned by Arora,2003.

Isolation of *Rhizobium* from Corn roots

The fresh root nodules of Corn were collected from the plants grown in the field from Malakapur (Buldana) Maharashtra. The collected nodules were surface sterilized with 75 % and 0.1% ethanol and mercuric chloride respectively and washed thoroughly with distilled water. The root nodules were crushed and the suspension was streak on YEM (Yeast Extract Mannitol pH 7.0) agar plates and incubated at 29.4°C for two days Aneja 2003. After two days of incubation, *Rhizobium* colonies were obtained. Isolates colonies were used for morphological and biochemical tests.

Morphological Characteristics

The morphological characteristics comprised colony morphology, colony morphology parameters were diameter, form, transparency and colour Aneja,2003. Motility and Gram staining was performed to evaluate type of strain.

NaCl variation Assay

Rhizobium cultures were grown in triplicates on YEM medium of different concentrations of NaCl ranging from 0.4 to 0.6% (w/v). Growth was determined by measuring the optical density (O.D) at 600nm after 48 hours of inoculation.

Gelatin Hydrolysis

To determine capability of *Rhizobium*, to determine gelatinase enzyme as use gelatin as media source. Degradation of gelatin indicates the presence of gelatinase enzyme (Aneja, 2003). The actively growing culture were inoculated in nutrient gelatin medium (5g/L peptone, 3g/L beef extract, 12g/L gelatine) and incubated for 48 hours. On subjecting the growing culture to low temperature treatment at 4^{o}C for 30 to 60 minutes, the cultures which produce gelatinase remain liquefied while others due to presence of gelatin become solid.

Starch Hydrolysis

The test was performed to determine capability of *Rhizobium* to use starch as a carbon source (de Oliveira, 2007). Starch agar medium (5g/L peptone, 3g/L potato starch, 3g/L beef extract, 15g/L agar, pH

7.0) were inoculated with culture and incubated at 29.5^{o}C for 48 hours. In the presence of starch the production of extra cellular enzymes occurs indicating the potential of the organism to use starch as carbon source. Drops of Iodine solution (0.1 N) were floaded on 48 hours old incubated Petri plates. Formation of blue colour indicates non ionization of starch and vice versa.

Catalase Test

This test was performed by adding 2-3 drops of 3% hydrogen peroxide in fresh YEM broth cultures of isolates. Transfer a colony on microscope slide and add the drop of 3% hydrogen peroxide. If catalase is present, the hydrogen peroxide is broken down into the water and oxygen, which result in the immediate formation of gas bubbles.

Antagonistic activity of *Azatobacter*

The *Azatobacter* isolates were grown at 30^{o}C on a rotary shaker (170rpm) in 250 ml flasks with 100 ml production medium containing (g l^{-1}): Sucrose, 20; Yeast extract, 0.5; K_2HPO_4, 0.2; $MgSO_4.7H_2O$, 0.2; $FeCl_3$, 0.0016 and Na_2MoO_4, 0.001 for 72 Hrs. The bacterial cells were separated by centrifugation at 10,000rpm for 30 min. Agar well diffusion method was used to check the presence of antifungal metabolites. The 0.1 ml suspension of *Fusarium oxysporum* was spreaded on potato dextrose agar plates. The 0.1 ml of cell free supernatant (CFS) was added in well and the plates were incubated at 30^{0}C and observed the zone of inhibition around the well.

Morphological Characteristics

Rod shaped, mucoid, opaque, motile colony was observed under low power microscope. Similarly using Gram staining technique pink coloured Gram negative rods were observed.

Biochemical Tests

All the isolated organisms were biochemically characterized through different biochemical tests viz, Catalase Test, Indole Production Test, Methyl Red Test, Vogas Proskaure Test, Citrate Utilisation test, Starch hydrolysis test as mentioned by (Arora,2003).

Sugar Fermentation Tests:

The isolates were also examined for fermentation of the various sugars including Glucose, Mannitol, Galactose, and Maltose. 1% aqueous stock solution of the test sugars were prepared in small tubes while for sialicin 4% sugar solution was prepared and sterilized as mentioned by (Hugh, 1953).

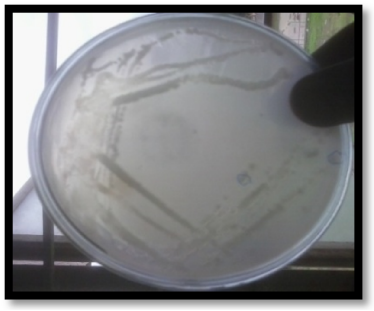
Antagonistic activity of *Rhizobium*

Antagonistic activity of *Rhizobium* was determined by method mention for azatobacter.

RESULTS AND DISCUSSION

Isolation of *Azatobacter* species

Isolated *Azatobacter* sp. were selected on the basis of their colony morphology. The isolated *Azatobacter* sp. was gram negative, motile, produce large mucoid, opaque and yellow colour colonies on Ashby's agar plate.

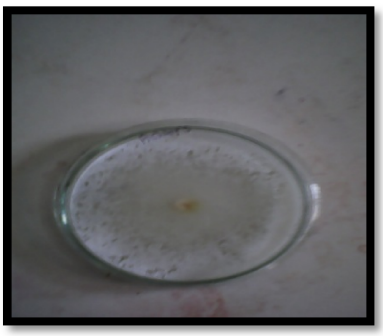


Colony Characteristics:

Shape	Circular
Size of colony	2.5 mm
Colour	Yellow to green
Elevation	Convex
Margin	Entire
Opacity	Opaque
Motility	Motile
Gram character	Gram negative

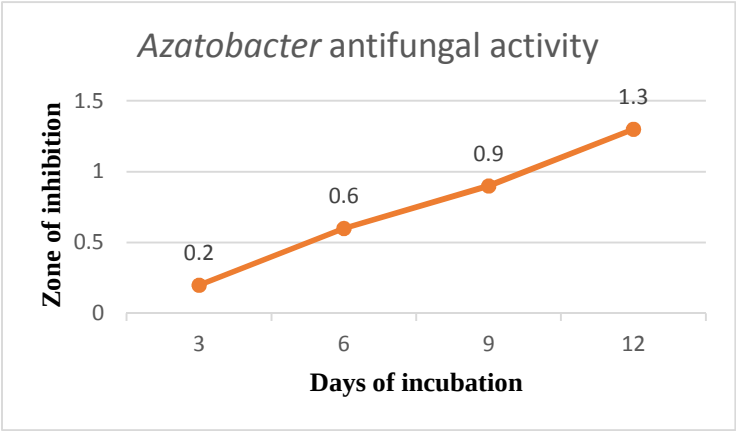
Zone of inhibition in antagonistic activity of *Azatobactor*:

The isolated *Azatobacter* sp. as showed maximum zone of inhibition against *Fusarium* sp. in antagonistic activities.



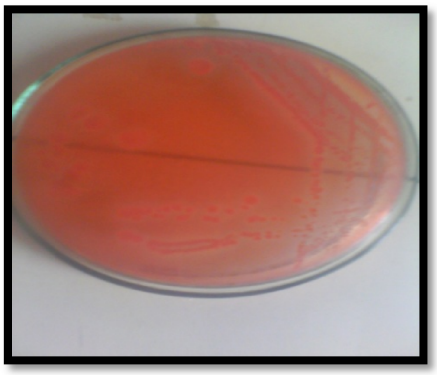
RESULT AND DISCUSSION:

Effect of incubation period on antifungal activity of *Azatobacter* species



***Rhizobium species*:**

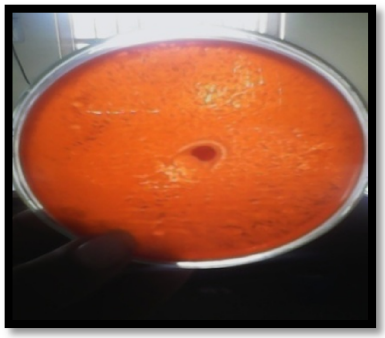
Colonies of Rhizobium were obtained on YEM agar medium after incubation at 29.4°C for two days.Isolated Rhizobium spp were selected on the basis of their colony morphology. The isolated *Rhizobium* sp. was gram negative, motile, producing large mucoid, opaque and yellow colour colonies on yeast mannitol agar plate.



Colony Characteristics

Shape	Circular
Size of colony	3 mm
colour	White to pink
Elevation	Convex
Margin	Entire
Opacity	Opaque
motility	Motile
Gram character	Gram negative

Zone of inhibition in antagonistic activity of *Rhizobium*:



The isolated *Rhizobium* sp. as showed maximum zone of inhibition against Fusarium sp. in antagonistic activities.

NaCl variation assay of *Rhizobium*

Conc. Of NaCl (%)	O.D. at 600 nm.
0.4	1.703
0.5	1.927
0.6	1.904

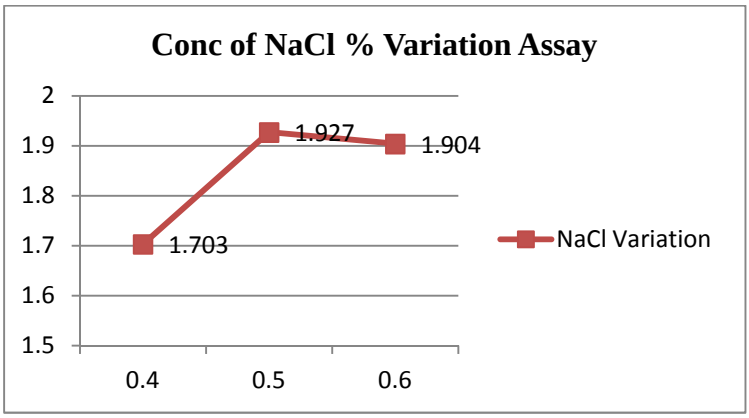


Fig: Effect of NaCl % on *Rhizobium* species

Biochemical tests of *Rhizobium* species

Sr. No.	Tests Performed	Results
1	Catalase test	Positive
2	Motility test	Positive
3	Methyl red test	Negative
4	Voges- proskauer test	Negative
5	Indole test	Negative

Sugar fermentation Tests

Sr. No.	Test	Result
1	Glucose	Positive
2	Galactose	Positive
3	Maltose	Positive
4	Mannitol	Positive

Morphological and sugar fermentation tests for identification of *Azotobacter* species

Test	Result
Grams nature	Negative, blunt rods
Motility	Motile
Pigmentation	Yellow green
Amylase production	Negative
Mannitol	Negative
Galactose	Negative
Maltose	Negative

CONCLUSION

From this present study,the screening and isolation of rhizobacteria and azotobacter on their selective medium.We analysed the various plant growth promoting assays for their growth promoting activity. It can be concluded that the *Rhizobacteria* showed bio control characteristics. *In vitro* fungal growth inhibition assay showed antagonism against *Fusarium oxysporus.*

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Isolation of *Agrobacteria* from root nodule of *Trigonella foenum-gracecum*

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ABSTRACT

A total of 40 colonies of bacteria was isolated from the root nodule of leguminous plant *Trigonella foenum* by using yeast extract mannitol agar (YEMA) as an enrichment medium. All the colonies were belonged to *Agrobacterium* species. Bacteria were characterized by using different tests such as yellow colouration on lactose agar indicates positive result for 3-ketolactose test given by Tf-3, Tf-4, Tf-9 and Tf-10 isolates. TF1 to TF10 isolates are nonphosphate solubilizers. All the isolates shows characteristics growth on PDA slants and in ammonium ferric citrate test shows black pigmentation of the colonies.
Keywords *Agrobacterium*, *Rhizogenes*, Leguminous plants

INTRODUCTION

Bacteria within the genera *Agrobacterium* and *Rhizobium* have the unique capacity to induce prolific root formation, nitrogen fixing root nodules and autonomous crown-gall tumors on many higher plants including most dicots, some monocots and some gymnosperms . *Agrobacterium* is a Gram negative, aerobic soil borne bacteria has worldwide distribution *Agrobacterium* spp. are commonly known as bacteria that infect dicotyledonous plant from over 90 different plant families including economically important fruit and nut crops, grapes ornamental and landscape plants. *Trigonella foenum* plant is used as herbs. That seeds contains high level of palmitoylethanolamide is an endogenous lipid more than 25%. It is natural analgesic and anti-inflammatory compound. *Trigonella foenum* is a forage legume, used as agreen manure and source of medicinally important steroid sapogenins. This used to produce transformed hairy root cultures via agropine type(Maheshwari 2004,Damiano 1998). It is used to produce specific secondary metabolites.

MATERIAL AND METHODOLOGY

Isolation of *Agrobacterium* The nodules were detached carefully and sterilized thoroughly as per the standard procedure of Sharma 2005. The nodules were kept immersed in 0.1% acidified mercuric chloride solution for 5 min. and washed repeatedly with sterile distilled water. Then they were immersed in 70% ethyl alcohol. This treatment was followed by repeated washing with sterile distilled water. These sterilized root nodules were crushed simply with pestle and mortar and extracted with sterile distilled water. *Agrobacterium* isolates were isolated by using serial dilution and pour plate techniques. The root nodule extract was serially diluted up to 10^{-6} with sterile distilled water and 1 ml of diluted sample was inoculated into sterile Petri plates and poured with the sterilized YEMA medium, plates were incubated at 28°C for 2 to 3 days. This medium supports the growth of *Agrobacterium* and *Rhizobium* (Figure 1). After incubation, the bacterial colonies were purified by streak plate technique(Figure 2).

Growth in YEMA medium with congo red

The YEMA medium was prepared in addition of congo red solution (2.5 ml/1000 ml). The rhizobial isolates were inoculated on the medium and incubated at 30 $\pm$ 2°C for 48 hr. The growth and colony characters were observed and recorded (Hahn 1996).

Characterization of Agrobacterium Isolates: The *Agrobacterium* isolates was characterized based on the cultural, biochemical and physiological characteristics such as Congo red test , *Agrobacterium* specific tests such as growth on potato dextrose agar (PDA), 3-ketolactose test (Gaur 1973), growth and pigmentation in

ferric ammonium citrate broth test and citrate utilization test were also carried out. These test was carried 10 isolates (Murugeson,2010)

RESULT AND DISCUSSION

Most of the literature available on isolation of *Rhizobium* spp from root nodules of *Trigonella foenum* . In the present study 200 bacteria were isolated by enrichment technique. Colony morphology (Table 1) of TF 1 to 10 was studied using YEMA media. In YEMA medium, the agrobacteria absorbed Congo red, but the rhizobia were not and the colony morphology of agrobacteria was similar to that of rhizobia. The isolates showed wel lcharacteristic growth in PDA agar. Yellow colouration was found in lactose agar with Benedict's reagent. Based on the above observations *Agrobacterium* was identified (Table 2).

Name	Size	Shape	Margin	Elevation	Colour
TF1	2mm	Circular, cocci	Entire	Umbonate	Pink
TF 2	Pin point	Circular	Entire	Convex	Pink
TF 3	1mm	Circular	Entire	umbonate	pink.
TF 4	1.5mm	Circular	Entire	Umbonate	Light pink
TF 5	0.8mm	Circular	Entire	pulvinate	Pink
TF 6	Pin point	Circular	Entire	convex	Dark pink
TF 7	1mm	Circular	Entire	pulvinate	Pink
TF 8	2mm	Circular	filamentous	Rhizoid	Light pink
TF 9	1mm	Circular	Entire	Convex	Pink
TF 10	2mm	Circular	Entire	Convex	Pink

Table 1 Colony chararcterization of isolates

Figure 1 Bacterial isolates from nodules

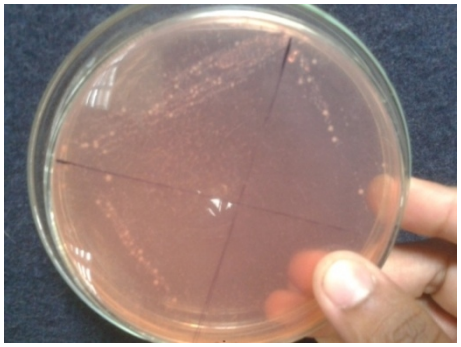

Figure 2 Pure isolate

Sample	Congo red test	3-ketolactose test	Ammonium ferrous citrate test	PDA test	Phosphate solubilizing test
TF1	+	-	+	+	-
TF 2	+	-	+	+	-
TF 3	+	+	+	+	-
TF 4	+	+	+	+	-
TF 5	+	-	+	+	-
TF 6	+	-	+	+	-
TF 7	+	-	+	+	-
TF 8	+	-	+	+	-
TF 9	+	+	+	+	-
TF 10	+	+	+	+	-

Table 2 Biochemical characteriazation of isolates

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Isolation & characterization of biosurfactant producing microbial strains from oil & sewage contaminated soil samples

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ABSTRACT
Biosurfactants are the surface active compounds which reduces surface tension of the aqueous solutions and hydrocarbon mixtures. In the present study biosurfactant producing bacteria were isolated form oil contaminated soil samples collected from different places. To confirm production of biosurfactant tests drop collapse test and blood haemolysis test were conducted. Three cultures showed the potency for production of biosurfactant. The biosurfactant was then extracted by treating supernatant with chloroform: methanol. Crude biosurfactant was obtained as white colored sediment. The dry weight of crude biosurfactant produced by OCS1 and SCS2 strain was found 0.67g and 0.50g respectively.
Key words: Biosurfactant, Microbial enhance oil recovery

INTRODUCTION

Biosurfactant are amphiphillic compound produce on living surfaces mostly on microbial cells surface or excreted extracellularly and contain hydrophobic and hydrophillic moieties. They are structurally diverse group of surface active molecules synthesized by microorganisms (Muthusamy 2008). Biosurfactant may have one of the following structures: mycolic acid, glycolipids, polysaccharide-lipid complex, lipoprotein or lipopeptide, phospholipid etc. Some examples of this group of biosurfactant are rhamnolipids which are produced by different *Pseudomonas spp*. Surfactants are key ingredients used in detergent, shampoo, toothpaste, oil additives and number of other consumer and industrial products. Biosurfactant have special advantage as lower toxicity, biodegradable nature and effectiveness at extreme temperature and pH salinity. Potential applications in several industries such as agriculture, food, textiles, cosmetics, petrochemical and petroleum production.

MATERIAL AND METHODS

Soil Samples The soil samples were collected from different places in & around Jalgoan. Two soil samples were collected. viz OCS1 & SCS2 were screened for potent biosurfactant producing isolates tabulated in table 1.

Sr. No.	Soil Sample	Location	Contamination
1.	OCS-1	Oil depo	Oil
2.	SCS-2	Household	Sewage

Table 1 Soil samples

Enumeration of soil microbial counts

The total number of cultivable aerobic bacteria per gram of sample was determined by using nutrient agar medium (Haung *et* al.2008). The bacterial population were enumerated as colony forming units (CFU) from a serial dilution of the soil suspension. The colonies were counted after incubation (3days at 300).

Screening for biosurfactant producing isolates

Soil samples were screened for biosurfactant producing bacteria isolated by using the following procedure (Bodour *et al*, 2003). Five gram of each soil sample (OCS1, SCS2) were separately incubated into mineral salts medium (MSM) containing 2% glucose as a energy source. The MSM broth culture were incubated with shaking at 200rpm for 7 days at 23^0C.

Qualitative screening for biosurfactant producing isolates by beta-hemolytic activity
Since the beta-hemolytic activity is indicative to surface activity, qualitative screening for biosurfactant producing isolates was carried out using the blood agar medium. The soil samples were subsequently inoculated on blood agar plates and were incubated 37^0C. After 24 hour the presence of hemolytic activity was observed (Youssef *et. al*; 2004: Rodriguez *et al*; 2006).

Characterization of all the biosurfactant producing isolates.
All the biosurfactant producing isolates were identified up to level by studying phenotypic characters like gram staining, motility and biochemical characteristics test (Table 2). The method described by Cappuccino (1999) were followed for all the procedure. All these results were compared with Bergay's manual of determinative bacteriology to determine the genus (Holt *et al* 1994).

Extraction of biosurfactant
The culture was inoculated in 50 ml of MSM medium with 1ml of ground nut oil.The culture was incubated at 25^0C for 7 days with shaking condition. After incubation the bacterial cells were removed by centrifugation at 5000 rpm. 25^0C for 20 minutes. The pH of the supernatant was adjusted to 2ml with 1M H_2SO_4. Equal volume of chloroform: methanol (2:1) was added. This mixture was homogenized by mixing, incubated over night for evaporation. White colored sediment was obtained as a result which is the "Biosurfactant"

Dry weight of biosurfactant
Weight of sterile petriplate measured now the sediment was poured on the plates. They were placed on hot air oven for drying at 100^0C for 30 minutes. After drying the plates were weighted (Table 3). The dry weight of the biosurfactant was calculated by the following formula.
Dry weight of biosurfactant = Weight of plate after drying - weight of empty plate

RESULTS
Enumeration of soil microbial counts
The average standard microbial count was 2.81 X 10^{-5} CFU/ml.

Oil spreading technique
Two isolated bacteria OCSb1 and SCSb1 showed zone of displacement in the oil (figure1).

Blood haemolysis test
Positive strains showed good beta-hemolytic activity on blood agar . Both bacteria (OCSb-1, SCSb-1) showed beta-hemolytic activity (figure 2).

Characterization of biosurfactant producing organisms
The biosurfactant producing isolates determined by quantitative studies were identified up to genus level by studying phenotypic characters. All these results were compared with Berge's Manual of Determinative Bacteriology to determine the genus (Hole. *Et. al.*, 1994).

Test	OCSb-1	SCSb-1
1)Gram staining	Gram negative ,rod	Gram positive , cocci
2)Motility	Motile	Motile
3)Glucose	+	-
4)Maltose	+	-
5)Citrate	+	-
6)Urease	+	+
7)Sugar	+	+

Table 2 Characterization study of bacterial cultures

3.6 Extraction of Biosurfactant
White sediment of crude biosurfactant was obtained.

3.7Dry weight of Biosurfactant

The dry weight of Biosurfactant were measured and estimated.

Sr. No.	Sample	Empty plate weight(g)	After drying of biosurfactant in plate(g)	Dry weight of biosurfactant(g)
1.	OCSBS-1	89.530	90.20	0.670
2.	SCSBS-1	82.798	83.300	0.502

Table 3 Weight of crude biosurfactant

Figure 1 Drop collapse test

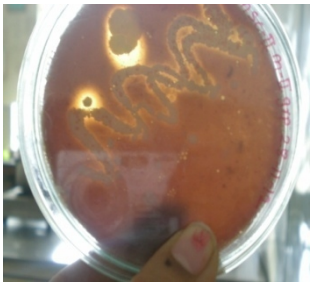

Figure 2 Beta hemolytic activity

CONCLUSION

- The present study is an attempt to screen biosurfactant producing bacteria in these places of contaminated soil.
- A potent biosurfactant producing bacteria shows both beta-hemolytic activity on blood agar and oil displacement, with low surface tension and low surface activity.
- A potent biosurfactant producing bacteria are grown and choose as an research target for biosurfactant production to be described in a further work.

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Isolation and Characterization of Bacterial Cellulose

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ABSTRACT
Microbial polysaccharides also known as bacterial cellulose have multiple functions and can be divided into intracellular polysaccharides, structural polysaccharides and extracellular polysaccharides or exopolysaccharides (EPS). Recent approaches are carried out to replace the traditionally used plant gums by their bacterial counterparts. Current and potential applications of bacterial cellulose in food, pharmaceutical and other industries are also presented. Present study objective was to isolation, production and its characterization. First isolate the *Rhizobacteria* species *Azotobacter* species.The yield of cellulose produed by *Rhizobacteria*, *Azotobacter*, and *Gluconobacter species* were 3,4 and 6 gm/ ltr of cellulose in batch culture.On comparing FT-IR report of isolated cellulose with the standard bacterial cellulose reveals that the exopolysaccharide produced by the organisms were cellulose.
Keywords: Exopolysaccharide, *Gluconobacter*, FT-IR.

INTRODUCTION

Bacterial cellulose (BC) is a nanomaterial produced by various strains of *Acetobacter* species and also strains of Pseudomonas, Achrobacter, Alcaligene, Aerobacter, Azotobacter. Acetobacter xylinum (or Gluconacetobacter xylinus)is one of the species capable to produce cellulose in large scale in culture medium containing carbon and nitrogen sources in either static or agitated environment. BC is formed by a network of ribbon-shaped cellulose fibrils that are less than 100 nm wide and made of microfibrils 2–4 nm in diameter In terms of the molecular formula, BC is identical to cellulose of plant origin—apart from alien groups such as carbonyl and carboxyl units in the latter as a result of the plant cellulose processing. However, important structural features and properties, significant for practical application of BC, are quite different from wood cellulose: high purity, high degree of polymerization (up to 8000), high crystallinity (of 70 to 80%), high water content to 99%, and high mechanical stability.(Hernane S et al 2011)

Rhizobium

This is the most common biofertilizer as stated earlier. ***Rhizobium*** lives in the root.The bacterium was reported in Bergey's Manual of Determinative Bacteriology under the genus ***Rhizobium.*** The name ***Rhizobium*** was established by Frank in 1889. A new classification has been established for ***Rhizobium.*** That is 'slow growing rhizobia' known as ***Bradyrhizobium*** and the other group is 'fast growing rhizobia' called ***Rhizobium.***

Azotobactor

Azotobactor is a heterotrophic free living nitrogen fixing bacteria present in alkaline and neutral soils. ***Azotobactor chrococcum*** is the most commonly occurring species in arable soils of India. Apart from its ability to fix atmospheric nitrogen in soils,

Gluconobacter

It is known for more than a century that the Gram-negative, rod-shaped aerobic bacteria of the strain *Gluconacetobacter roseus* produce cellulose (bacterial cellulose, BC) when fed with carbohydrates. The bacterial cellulose has been found to have a unique structure, composed of very thin fibers that form an ultrafine network. Cellulose produced by *G. xylinusis* chemically pure, free of lignin and hemicelluloses in contrast to wood celluloses, and has a high degree of polymerization. In nature, cellulose producing bacteria are found in rotten fruits and vegetables with more than thirty cases having been reported. The

reason why the microorganisms convert glucose into the high-polymeric cellulose has been a puzzle for biologists

MATERIAL AND METHOD

Isolation, screening and identification of *Azatobacter* species

The soil sample was collected from agricultural field of Garkheda, Maharashtra, India. The soil sample was suspended in 10 ml autoclaved distilled water and serially diluted up to 10^{-8}. 0.1 ml of each dilution was spreader on sterile Ashby's agar plates and plates were incubated at 30^{o}C for 48-72 hr. After incubation well isolated colonies were randomly selected on the basis of colony morphology and maintained on sterile Ashby's agar slants. Each isolates was characterised by gram staining, motility.

Morphological Characteristics

Morphological characteristics of bacteria were observed by using Gram staining technique as described by (Arora, 2003) and observed under light microscope,

Biochemical Tests

All the isolated samples were biochemically characterized through different biochemical tests viz, Catalase Test, Indole Production Test, Methyl Red Test, Vogas Proskaure Test, Citrate Utilisation test and starch hydrolysis test and motility test as mentioned by (Arora,2003).

Isolation, screening and identification of *Rhizobium* from soil

The soil sample was collected from agricultural field of Garkheda, Maharashtra, India. The soil sample was suspended in 10 ml autoclaved distilled water and serially diluted up to 10^{-8}. 0.1 ml of each dilution was spreader on sterile Ashby's agar plates and plates were incubated at 30^{o}C for 24-48 hr. After incubation well isolated colonies were randomly selected on the basis of colony morphology and maintained on sterile yeast extract mannitol agar slants. Each isolates were characterised by gram staining.

Morphological Characteristics

Morphological characteristics of bacteria were observed by using Gram staining technique as described by (Arora, 2003) and observed under light microscope,

Biochemical Tests

All the isolated samples were biochemically characterized through different biochemical tests viz, Catalase Test, Indole Production Test, Methyl Red Test, Vogas Proskaure Test, Citrate Utilisation test and starch hydrolysis test and motility test as mentioned by (Arora,2003).

Sugar Fermentation Tests

The isolates were also examined for fermentation of the various sugars 6 including Glucose, Mannitol, Galactose, and Maltose. One percent 0.1% aqueous stock solution of the test sugars was prepared in small tubes.

Identification of Phenotypic Characterization of Isolates

The morphological traits evaluated comprised colony morphology and colony morphology parameters were diameter, form, transparency and color (Aneja,2003). Motility and Gram staining reaction was performed to evaluate type of strain.

Gluconobacter

We have collected the *Gluconobacter roseus* and *Gluconobacter melanogenus* having the NCIM No.2050 & 2048 respectively, from NCL (National Chemical Laboratory) Pune, for the comparison of bacterial cellulose produced from *Azotobacter & Rhizobium* with bacterial cellulose produced from *Gluconobacter roseus* and *Gluconobacter melanogenus* as a standard.

Production of Bacterial cellulose from *Azotobacter*

Isolated colonies of Azotobacter were inoculated in Ashbey's broth Mannitol-15.0g, $CaCl_2 \cdot 2H_2O$- 0.2g, K_2HPO_4 - 0.2g, $MgSO_4 \cdot 7H_2O$ - 0.2g, MoO_3 (10% solution)- 0.1mL, $FeCl_3$ (10% solution- 0.05mL pH 7.2 ± 0.2 at 25°C for 10-15 day's at 120rpm.

Production of bacterial cellulose from *Rhizobium*

Yeast extract manitol (gm/lit) Isolated colonies of Rhizobium were inoculated in YEM Broth KH_2PO_4=0.5 gm, $MgSO_4.7H_2O$=0.12 gm, NaCl=0.1 gm, Manitol=1gm,Yeast extract=20 gm, Distilled water= 1000 ml. at 27^0C for 10-15 day's. at 120rpm.

Production & recovery of bacterial cellulose from *Gluconobacter* species

All isolated microorganism and standard strain of *Gluconobacter* species were inoculated in Hestrin-Schramm medium (2% glucose, 0.5% peptone, 0.5% yeast extract, disodium phosphate 0.27%, 0.115% citric acid; pH adjusted to 6.0 at 30°C for 10-15 days at 120rpm). After incubation time the produced pellicle was filtered & purified with distilled water to remove adherent and media ingredient and further treated with 0.1M NaOH and heated at 90^0C for half an hour, wet and dry weight of bacterial cellulose monitored**.**

RESULTS AND DISSCUSION

***Rhizobium* species**

We isolate bacterial colonies and identified on the basis of their colony morphology. The isolated *Rhizobium* sp. was gram negative, motile, producing large mucoid, opaque and white colour colonies observed on yeast mannitol agar plate.

Colony Characteristics

Shape	**Round**
Size of colony	5 mm
Colour	White to pink
Elevation	Convex
Margin	Regular
Opacity	Opaque
Motility	Motile
Gram character	Gram-ve

***Azotobacter* species**

We isolate bacterial colonies and identified on the basis of their colony morphology. The isolated *Azatobacter* sp. was gram negative, motile produce large mucoid, opaque and yellow colour colonies on Ashby's agar plate

Colony Characteristics

Shape	**Round**
Size of colony	2.5 mm
Colour	White
Elevation	Convex
Margin	Regular
Opacity	Opaque
Motility	Motile
Gram character	Gram-ve

Biochemical tests of *Rhizobium* species

Sr. No.	**Tests**	**Results**
1	Catalase test	Positive
2	Motility test	Positive
3	Methyl red test	Negative
4	Voges-proskauer test	Negative
5	Indole test	Negative

Sugar fermentation Tests

Sr. No.	**Test**	**Result**
1	Glucose	Positive
2	Galactose	Positive
3	Maltose	Positive

Production

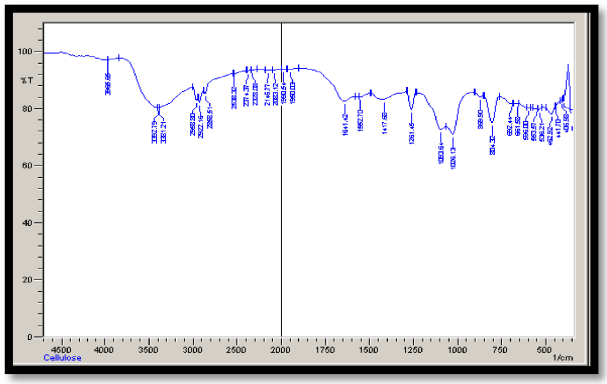
After incubation time the produced pellicle was filtered & purified with distilled water to remove adherent and media ingredient and further treated with 0.1M NaOH and heated at 90^0C for half an hour, wet and dry weight of bacterial cellulose monitored

Fig shows BC pellicle produced by isolates

Yield of Bacterial Cellulose

Organism	Pellicle weight After washing with D/W gm/Ltr	Dry Weight of pellicle in gm/Ltr
Azotobacter	4	2.0
Rhizobium	3	1.5
Gluconobacter	6	3.1

FT-IR Analysis:-



The figure shows the band of 2922 cm-1 is attributed to CH2 stretching. The band at 1093 cm-1 could be associated with ether (C-O-C) functionalities. The band at 3392 cm-1 is attributed to the presence of hydroxyl groups (-OH). Comparison of the FT-IR spectrum of standard bacterial cellulose as found in literature with standard bacterial cellulose indicated appropriate coincidence which proved that the component produced by our isolates was cellulose**.**

Conclusion and future aspect

In conclusion it is suggest that the Azotobacter and Rhizobium species were compared with the Standard Gluconobacter spp for the production of cellulose,and results shows that production of cellulose was higher in the gluconobacter spp.So some of improvement is required for the maximum production of cellulose. Production media optimization for maximum cellulose using the cheap and easily available raw materials. Characterization of BC by SEM, XRD,DLS. Effect of temperature and pH on cellulose production ,Crude drug manufacturing in bacterial cellulose as a nanomaterials that is used in wound healing process.

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Aeromycological studies of Golani Market in Jalgaon City Maharashtra.

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ABSTRACTS

Aerobiology is study of airspora, like air borne fungus spores, pollen grains and other microorganisms. It includes dispersion of insect populations, fungal spores, pollen, bacteria, and viruses. Jalgaon District is located in the north-west region of the state of Maharashtra. It has centrally located multistoried Golani market in the basement of which 50 different sellers of fruit, vegetables and flower are there. The fungal spores present in air are deposited on these perishable materials and reduce their quality and shelf life. Petriplates containing nutrient medium were exposed to the 3 sections of the market during summer, rainy and winter season. Total 10 genera an d 43 species were isolated from 3 seasons and from vegetable, flower and fruit section of the Market Deuteromycotina members and among them *Aspergillus* was dominant. There was seasonal variation observed in this study. During summer season 7 genera and 19 species were isolated. During rainy season 6 genera and 7 species were isolated while during winter season 8 genera and 24 species were isolated. The aerobiological survey of Golani Market, Jalgaon reveled diversity of fungi in the market environment. The fungal population followed a definite seasonal variation. Vegetable, Flower and Fruit which are directly used by human beings should be available in clean environment therefore it is important to know the status of various types of allergic and pathogenic spores in the market and their role causing health hazards to human beings.

Key Words : Aeromycology, Fungi, Perishables, Degradation

INTRODUCTION

Study of biologically significant materials that are transported in the atmosphere along with gases and other particles is called Aerobiology. Aerobiology is the term 1st come into use during 1930 as a collective term for studies in airspora, like air borne fungus spores, pollen grains and other microorganisms. Jacobs (1951) elaborated the term and included dispersion of insect populations, fungal spores, pollen, bacteria, and viruses. Fungi molds are frequently contaminants of fresh vegetables, fruits and flowers. These air borne fungi play significant role in damaging them under storage as well as on shelf. It they settled on the vegetables and fruits they may secrete mycotoxins which are hazardous to health.The people in the vicinity of market are exposed to these pathogenic fungi and get infected. High concentration of these fungi in market environments may causative agents of respiratory diseases of the people in the market & also damage the perishables. Various studies on aerobiology of markets have been done by several workers like Sumbali & Badyal (9091), Shastri (1998), Kakade & Saoji (2001), Sawane & Saoji (2004), Sadaabi (2011), Sharma et. al. (2013) etc from India & Abroad. Still the main vegetable, fruits & flower market of Jalgaon city that is Golani Market is remain unexplored as far as the aeromycological studies are concerned so present investigation have been undertaken.

MATERIAL AND METHODS

Aeromycological studies of the Golani market had been carried out during summer, rainy and winter season by using Expose Plate Method. The culture media used were Czapek Dox Agar (CzDA) & Lactose Yeast Extract Agar (LYEA). Petriplates containing Czpak Dox Agar and Lactose Yeast Extract Agar media were exposed for 10 minutes in each compartment of vegetable fruit & flower sections of Golani market. The petriplates were incubated at 28°C for four days. The colonies were observed from diameter, surface & reverse coloure of colony, exudates, etc. The colonies were transferred on slants of Czpak Dox Agar medium for pure culture. The semi permanent slides were prepared.

STUDY AREA

Jalgaon district is located between 20^0 and 21^0 North latitude and $74^0$55' and $76^0$28' East longitude Jalgaon District is located in the north-west region of the state of Maharashtra. Jalgaon is rich in volcanic soil which is well suited for cotton production. It is a major business centre for tea, gold, pulses, cotton and bananas. It hosts a population of about 4 million in an area of about 11,700 sq km. Jalgaon city is located in the centre of the district. It is thickly populated and the population is around 5.5 lakhs. There is only one vegetable flower and fruit market called Golani market and many area wise vegetable, flower and fruit sellers are also located in the city. Golani market is biggest and centrally located multistoried shopping complex in Jalgaon city. It is divided into six wings, in the basement of market there are fruits, vegetables and flower market. These are highly perishable materials so many fungal spores are responsible for their deterioration which are present in market air. These fungal spores are deposited on these perishable materials and reduce their quality and shelf life. Many people purchasing these materials from this market and used for consumption. So it is harmful to human health. To reduce this problem we have selected Golani market as a study area.

RESULTS AND DISCUSSION

The aerobiological survey of Golani Market, Jalgaon reveled diversity of fungi in the market environment. From the present investigations it is observed that the members of Deuteromycotina were dominant and *Aspergillus* was most commonly encountered genus. The observations are similar with the reports of Pandey et.al.(2012), Shastri (1981), Kakde & Saoji (1996), Sahney & Purwar (2002), Thom & church (1926), Ghani & Ghani (1996). The most dominant genus was *Aspergillus* which was represented by 19 species followed by *Penicillium* with 7 species, *Curvularia* with 6 species, *Fusarium* with 4 species, *Dreschlera* and *Mucor* with 2 species, *Alternaria*, *Phoma*, *Rhizopus* and *Torula* with 1 species.Total 10 genera an 43 species were isolated from 3 seasons and from vegetable, flower and fruit section of Golani Market. There was seasonal variation observed in this study. During summer season 7 genera and 19 species were isolated. During rainy season 6 genera and 7 species were isolated while during winter season 8 genera and 24 species were isolated. The zygomycotina were represented by 2 genera namely *Mucor* and *Rhizopus* while Deuteromycotina was represented by *Alternaria, Aspergillus, Curvularia, Fusarium, Dreschlera, Penicillium, Phoma* and *Torula.* No members of Ascomycotina & Basidiomycotina were isolated. *Aspergillus* was frequently occurring genus in our studies while Saadabi encountered *Cunninghamella* sp, *Rhizopus* sp, *Aspergillus niger* & *Penicillium digitatum* more frequently. The species like *Alternaria, Curvularia*, *Drechslera*, *Fusarium*, *Rhizopus*, *Torula* etc.are market pathogenic genera causing various diseases to vegetable & fruits. These results are similar the results of Pande et.al. (2012) & Saoji & Sawane (2001).

The fungal population followed a definite seasonal variation in the weather these results are similar with the results of Kakde & Kakde (2012) prevailing over the market environment. The higher incidence of fungi was observed during winter season. The seasonal pattern of fungi are govern by the availability of dead and decaying organic matter and their prevalence throughout the year was because of abundant substrates available for their growth in all seasons in the market. The more no. of fungi were isolated from vegetable section than from fruit section followed by flower section.

Sr. No.	Name of fungus	Vegetables section			Flower section			Fruit section	
		S	R	W	S	R	W	S	R
1.	*Alternaria longipes* (Ellis & Everch.) Mason	-	-	-	+	-	-	-	-
2.	*Aspergillus awamori* Nakazawa	-	+	+	-	+	+	-	+
3.	*A. candidus* Link	-	-	-	-	-	-	+	-
4.	*A. citrinus* Von Honel	+	-	-	-	-	-	-	-
5.	*A. citri* Ellis & Pierce	-	-	-	+	-	-	-	-
6.	*A. clavatus* Desm	-	-	+	-	-	-	-	-

Sr. No.	Name of fungus	Vegetables section			Flower section			Fruit section	
		S	R	W	S	R	W	S	R
7.	*A. effuses* Tiradoschi	+	-	+	-	-	+	-	+
8.	*A. flavus* Link	+	+	-	-	+	+	+	-
9.	*A. foetidus* Nakazawa	-	-	-	-	+	-	-	-
10.	*A. fumigatus* Varhelvola	-	-	-	-	-	-	+	-
11.	*A. fumaricus* Wehmeri	-	-	-	-	-	+	-	-
12.	*A. luchuensis* Link	-	-	+	-	-	-	-	-
13.	*A. nanus* Montagne	-	+	+	-	-	-	-	-
14.	*A. ochraceus* Wilhelm	-	-	-	-	-	-	+	-
15.	*A. oryzae* Ahlvurg. Cohn	-	+	-	-	-	+	-	-
16.	*A. parasiticus* Speare	-	+	-	-	-	-	-	-
17.	*A. sulphureus* Thom & Church	+	-	-	-	-	-	-	-
18.	*A. sydowii* Thom &Chrch	+	-	-	-	-	-	-	-
19.	*A. tamari* Kita	-	+	-	-	-	-	-	-
20.	*A. terreus* Thom	-	+	+	-	-	-	-	+
21.	*C. intermedia* Boedijn	-	+	-	-	-	-	-	-
22.	*C. lunata* Boedijn	-	-	+	-	-	-	-	-
23.	*C. pallescence* Boedijn	-	-	-	-	-	-	-	+
24.	*C. prasadii*R. L. & B. L. Mathur	-	+	-	-	-	-	-	-
25.	*Dreschlera austrolielsis* M. B. Ellis	-	-	-	-	-	-	+	-
26.	*D. hawaiiensis* M. B. Ellis	-	-	-	-	-	-	+	-
27.	*Fusarium aurantiacum* Cordaexfries	-	-	-	-	-	-	-	-
28.	*F. chlamydosporum* Wr. &Rg.	-	-	-	-	+	-	-	-
29.	*F. lateritium* Nees Ex Fries	-	-	+	-	-	-	-	-
30.	*F. poae*Peck Wr	-	-	+	-	-	-	-	-
31.	*Mucor racemosus* Fraesinius	+	-	+	-	-	-	-	-
32.	*Penicillium atramemtosum* Thom	-	+	-	-	-	-	-	-
33.	*P. corylophilum* Dierckx	-	+	-	-	-	-	-	-
34.	*P. expansum* Link	-	-	-	+	-	+	-	-
35.	*P. glyocladium* Westling	+	-	-		-	-	-	-
36.	*P. italicum* Wehmer	+	-	-	-	-	-	-	-
37.	*P. oxalicum* Currie &Thom	+	-	-	-	-	-	-	-
38.	*P. javanicum* Beyma	-	-	+	-	-	-	-	-
39.	*Phoma nebulosa* Persoon	-	-	+	-	-	-	-	+
40.	*Rhizopus nigrieanus* Ehrenverg	-	-	+	-	-	-	-	-
41.	*Torula herberum* Pers Link ex Fries	-	-	-	+	+	+	-	-
42.	White strile mycelium	+	+	+	+	+	+	+	+
	Total	**11**	**13**	**15**	**05**	**05**	**08**	**07**	**06**

CONCLUSION

The fungi isolated from air of Golani Market show diversity of fungi *Aspergillus* was dominant genus followed by *Penicillium, Curvularia, Fusarium, Dreschlera, Mucor, Alternaria, Phoma, Rhizopus* and *Torula*. Winter is found to be most suitable season for these fungi to grow while summer season doesn't support the growh. Vegetable, Flower and Fruit which are directly used by human beings should be

available in clean environment therefore it is important to know the status of various types of allergic and pathogenic spores in the market and their role causing health hazards to human beings.

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Vermicompost: Quality V/S Substrate

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ABSTRACT

Inorganic fertilizers are causing damage to the soil qualities while organic fertilizers improve the soil quality. The cultivation of earthworm for decomposing organic waste into nutrient rich manure is called as vermicompost .It minimizes the need of chemical fertilizers and makes the soil fertile with high N, P, and K content. It provides good quality of organic manure. It increases soil fertility and water holding capacity of soil. In present study three different types of substrates i.e. coir (husk of coconut), dried leaves of plants and sugarcane baggases are used. The species of earthworm *Eisenia foetida* is used for present study.It is observe that maximum numbers of worms are observed in coir followed by dried leaves and then in baggases.The good quality of vermicompost is obtained from coir.

Keywords: Earthworm, *Eisenia foetida*, Vermicompost, Substrate.

INTRODUCTION

Today we are facing a serious problem of solid waste management. The increasing quality of solid waste is one of the aspect and environment crises. Solid waste is organic and inorganic waste materials produced by different waste. It has been estimated that India as a whole generates about 25 million tons of urban solid waste of diverse composition per year(Asha et al) (2008).Per capita waste generated in India is about 0.4 kg/day. Earthworms are the hermaphrodite animals which are well known as" friend of farmers". Charles Darwin (1881) first studied the role of earthworms in breaking down the residues of dead plants and animals in soil. Later in 1925 Salisbury also proved that earthworms are very important for maintaining fertility of soil. Thus in recent era organic farming came into existence which enhances the demand for earthworms. Earthworm uses different substrate for their growth such as dried leaves, cow dung, other soil waste etc. Different workers in India well studied vermicomposting viz. Nagavallemma et ai (2004) Jadia and Fulekar (2008), Aalok et al (2008), Gaurav and Pathade (2011) etc. In present studies three different substrates namely sugarcane bagasses, coir and dried leaves are used. Most common practice is uncontrolled dumpimg which causes water pollution. Most scientific and appropriate method of solid waste management is vermicomposting or earthworm farming which converts solid waste into compost (Ghosh 2004). The use of vermicompost improves soil structure, fertility and moisture holding capacity.

MATERIALS AND METHODS

Vermibox of size 1m*1m*0.5m was used for making vermicompost. At the bottom of vermibox thick layer of cow dung is placed. Above it layer of substrate 3kg each of coir, bagasses and dried leaves in three different boxes were added. Earthworm's species *Eisenia foetida was* added in equal quantity i.e. 65 gms in each vermibox. Thin layer of cow dung is placed over it. On it again thin layer of garden soil is spread. To prevent loss of moisture top layer is covered by gunny bag cloth. Water was sprinkled regularly on top layer of cloth. These boxes were kept in shed for 60 days.

RESULTS

After 60 days it is observed that weight of earthworms is increased in all three substrates as 55 gm in coir, 51 gm in dried leaves and 45 gm in bagasses respectively. chemical analysis of this vermicompost is given in table. Vermicompost generated from coir has pH 6.54,% of Organic Carbon is 135 and % of organic matter is 232.74. Vermicompost generated from dried leaves has pH 7.15, % of Organic Carbon is 54 and % of Organic Matter is 203.04. While vermicompost generated from bagasses has pH 5.9 , % of organic carbon is 174 and % of Organic Matter is around 300. It is observed that best quality of

vermicompost was obtained from bagasses even though the weight of earthworms has not been increased as compared to coconut husk and dried leaves.

Table : Weight of earthworms and Chemical Composition of Vermicompost.

Increased Wt. of earthworms			Chemical Composition of vermicompost		
Substrates Used	**Initial Wt. of earthworms**	**Final Wt. of earthworms after 60 days**	**pH**	**% of Organic Carbon**	**% of Organic Matter**
Coconut Husk	65	120	6.54	135	232.74
Dried Leaves	65	116	7.15	54	203.04
Bagasse	65	110	5.9	174	299.97

CONCLUSION

1. Best growth of earthworms is found in coconut husk.
2. Vermicompost obtained from bagasses of best quality.
3. All the substrates used are cheap and easily available so can be used in commercial production.
4. It is the cheapest method as raw material is easily available throughtout the year in bulk quantities.

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Isolation and Identification of Thermophilic Soil Fungi From Dhule District

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ABSTRACT

Soil is a complex medium and consists of mineral matter, water, air, organic matter and the living population of micro-organisms. Soil contains more genera and species of micro-organisms than other microbial habitats like air water etc. Microorganisms play a very important role in nature and contribute a lot for plants, animals and human beings. The soil environment governs the population of soil microorganisms. Among which temperature, pH, available nitrogen, available phosphorus and chemical composition have direct influence on their growth. Comparative to other organisms fungi show ability to grow in advance conditions especially in wide range of temperature so they are widely used in biotechnology. These fungi may termed as mesophilic, when they grow at 10° to 40°C, thermophilic when they grow at above 40^{o}C to 55^{o}c or thermo tolerant depending upon their occurrence at different temperatures..The numbers of fungi may vary from a thousand to a million or more per gram of soil. During present investigation total 21 species of 11 genera of thermophilic fungi were isolated from different soils of Dhule District.

INTRODUCTION

Thermophilic fungi serve as biodegradants in nature in converting ammonia to microbial protein in the processing of chocolate and tobacco (Chatt. 1953). Decomposition of municipal refuse in the cities due to the presence of certain pathogenic thermophile fungi has also been reported (Waksman et al 1939). Thermophilic fungi are now being widely used in industrial fermentation of various biomolecules as well as for the production of antimicrobial substances like penicillin and in several other enzyme productions. Therefore it is necessary to isolate & identify them correctly. In present investigation an attempt has been made to study thermophilic fungi from soils of Dhule district. Various workers have studied the thermophilic fungi of soils from different regions Cooney and Emerson (1964), Eggins et al (1972), Venugopal Rao et. al (1984), Abdula et. Al (1986), J. Cardo et. al (2003), Mouchacea (2007) Sreelatha et.al (2013) etc. They published lists of thermophilic fungi from respective soils. No earlier studies on thermophilic fungi of soils of Dhule district were made so present investingation has undertaken

STUDY AREA

Dhule district is located in North Maharashtra comprises of 4 tehsil viz. Dhule, Shirpur, Shindkheda and Sakri. The total geographical area of the district is 8063 sq. KM. The Panzara and Tapi are the main rivers flowing through the district. The highest temperature goes up to 45°C in summer where as minimum temperature is observed up to 8°C in winter season.

MATERIALS AND METHODS

Soil sample were collected during the month May 2013. Two soil samples each from four different types of soils namely cultivated soil, uncultivated soil, river soil and forest soils were collected. Soil samples from 6 inches depth were collected in sterile polythene bags and brought to the laboratory. Waksman's serial dilution plate method (1916) was used for isolation. Yeast Glucose Agar by Cooney and Emerson (1964) and Soil extract agar (SEA) by Apinis (1963) were used for isolation. Streptopenicillin was added to avoid bacterial contamination. The dilution plates are incubated at 50°C temperature for 3 to 5 days and after incubation, fungal colonies were counted and identification done. The semi-permanent slides were prepared using cotton blue and lactophenol. Photomicrographs were taken. Identification of fungi was done using relevant literature.

RESULTS AND DISCUSSION

From different localities of Dhule district 21 species of 11 genera were isolated of thermophilic fungi. 3 members of zygomycotina, 2 members of Ascomycotina & 6 members of Deuteromycotina were isolated out of these *Aspergillus* were represented by 6 species, *Chaetomium* & *Rhizopus* by 3 species each, *Cunninghamella* 2 species & *Absidia*, *Acrophialophora*, *Cladosporium corynoascus*, *Humicola*, *Paecilomyces* & *Torula* with one species each were isolated.

Temperature is one of the most important factors influencing life process of fungi and is a concern of all the living organisms. Among the eukaryotes, protozoans have an approximate temperature (56^0C) limit in comparison to algae (55^0C – 60^0C) and fungi (60^0C – 62^0C). According to Cooney and Emerson (1964) the failure of fungi to grow below 20^0 C and even more than the capacity to grow at or above 50^0 C may be considered the real hallmark of thermophile. Careful use of appropriate media and sampling procedure allows maximum growth of thermophiles Christensen (1946) and Christensen and Gorden (1948). Cooney and Emerson (1964) stated that thermophilism arose repeatedly among different genera of Eumycota Our results are similar with their results as we also have isolated thermophilic fungi from the three above mentioned classes. During present study among all fungal isolates, *Aspegillus fumigatus* shows its dominance as it is isolated from most of the localities. Mieche (1907a) included it in psychrotolerant category because it readily tolerates temperature below 20^0 C even though 50^0 C or slightly higher. But Cooney and Emerson (1964) excluded it from the list of thermophilic fungi and treat it as doubtful thermophiles as it grows in the range of mesophiles. Among Zygomycotina, *Rhizopus* was present at the base of graph of thermophilic fungi i. e. growing optimally at the range of 50 – 52^0 C Cooney and Emerson (1964). We also got similar results as we isolated 3 species of *Rhizopus* at 50^0 C. Rage (1927), Waksman (1939) observed growth of *Humicola*, *Penicilium* on cellulose degrading medium. Our results are similar with them as we also isolated *Humicola grisea* from the forest soils rich in humus. Cooney and Emerson (1964) tried to isolate thermophilic fungi from steam boat springs water. For this they used 'bits' of cellophane, leaves and onion skin. But no fungi were appeared in the plate after several days of inoculation. Contrary to this we isolate 7 species of Panzra river soil and 6 species from Tapi river soil. This may be due to use of special media.

From the result mentioned above, it is clear that soils of Dhule district shows diversity of thermophilic fungi.

Table

Occurrence and distribution of isolated Thermophilic fungi from different soils & Dhule district.

Sr. No.	Name	C1	C2	U1	U2	R1	R2	F1	F2
1.	*Absidia corymbifera* (Cohn) Sacc. and Frott	+	+	-	+	-	+	-	+
2.	*Acrophialophora levias* Samson and Tariq	-	+	-	+	+	-	-	+
3.	*Aspergillus candidus* Link: Fr	+	+	+	-	-	+	-	-
4.	*A. flavus* Link	+	+	-	+	-	-	+	-
5.	*A. fumigates* Fres	-	+	+	-	+	+	-	-
6.	*A. nidulans* (Eidam) Vuillemin	+	-	-	+	-	-	+	-
7.	*A. niger*Van Tieghem	-	+	-	+	-	-	+	+
8.	*A. terrus* Thom	+	-	+	-	-	-	+	+
9.	*Caldosporium cladosporioides* (Fresen) de vries	-	-	+	+	-	-	+	-
10.	*Chaetomium rectopilium* Fergus and Amelung	+	-	-	-	+	+	-	-
11.	*C. subcurvisporum* Abdullah and Al-Bader	-	-	+	-	+	+	-	-
12.	*C. thermophile* La Touche	+	+	-	+	-	-	+	+
13.	*Corynascus sepedonium* (Emmons) Von Arx	-	+	+	-	+	+	-	-
14.	*Cummimgamella echinulata* (Thaxter)	-	+	+	-	+	-	+	-

Sr. No.	Name	C1	C2	U1	U2	R1	R2	F1	F2
15.	*C. elegalas* Lendner	+	-	+	+	-	+	+	-
16.	*Humicola grisea* Traaen	+	+	-	+	-	-	+	+
17.	*Paecilomyces variotii* Bainier	+	+	-	-	+	+	+	-
18.	*Rhizopus chinensis* (Saito) Schipper &Stalpers	+	-	+	+	-	-	+	+
19.	*Rhizopus nigricans* Ehrenb.	-	+	-	-	+	-	-	+
20.	*Rhizopus stolonifer* Lind	-	+	+	-	+	-	+	-
21.	*Torula themophila* Ex Fries	+	-	-	+	+	-	+	-
22.	Black Sterile mycelium	-	+	-	-	+	-	-	+
TOTAL		**12**	**14**	**10**	**11**	**11**	**08**	**13**	**09**

C1 – Raipur Cultivated Soil; C2 – Shindkheda Cultivated Soil;
U1 – Balsane Uncultivated Soil; U2 – Chimthane Uncultivated Soil;
R1 – Panzara River Soil; R2 – Tapi River Soil;
F1 – Laling Forest Soil; F2 – Sangavi Forest Soil

CONCLUSION

1. Total 21 species belonging to 11 genera of thermophilic fungi were isolated.
2. Species of Deuteromycotina and *Aspergillus* were dominant.
3. Sangavi forest soil show maximum thermophilic fungi while minimum were was observed in Tapi river soil.
4. Being thermophilic, during summer season good number of fungi isolated from these soils.

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Colchicine mediated mutagenesis in *Capsicum annum* L.

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ABSTRACT
Present studies have been carried out on induced morphological and anatomical mutation in *Capsicum annum L*, with the help of colchicine a chemical mutagen. During these studies seeds of cultivar variety were treated with different doses of colchicine. They were planted in shade net till hardening of plantlets were took place. Later on the plants were grown in the field and allowed self pollination to rise M1 generation. Characteristic variations were observed in parameters like height of plant, number of leaves, number of branches, number fruit per plant, fruit girth, fruit length,stomata count, chlorophyll content as compare to control respectively.
Key words:*Capsicum annum,*Colchicine,mutagenesis.

INTRODUCTION

Chilli *Capsicum annum* is an important vegetable spice crop grown in almost tropical and sub tropical region of the world. It belongs to the family solanaceae and genus Capsicum. Origin of this crop is south and Central America. The present study is carried out for mutational changes in *Capsicum annum* local variety of chilli. Mutation may arise spontaneously and induced by using physical (radioactive elements) and chemical mutagens. Colchicine is one of the chemical mutagen (Siddiqui & Khan 1983.) which induces higher proportion of point mutation. It arrest the spindle fibre formation in late metaphase stage in mitosis and doubles the chromosome number (Blackeslae and Avery, 1973). (Tuyl, 1990) When concentration wise treatment of colchicines is given to them. These plants shows morphological and anatomical variation in height of plant, number of leaves, number of branches per plant ,number of fruits per plant, fruit length, fruit girth, number of stomata, chlorophyll contents (Wahua et al Jan.2013 and Jabeen and Mirza,2004).

METHODOLOGY

Colchicine treatment of seeds :-

Preparation of colchicine solution.
Take 200 mg colchicine added in 20ml Distilled water (stock solution). It was diluted to respective concentrations (0.01, 0.1 and 0.15). Seeds were kept in respective solution for 1 hour. Washing of treated seeds with tap water were done. Seeds were sown in soil . There are 4 plots on the basis of concentration each with 50-70 seeds per plot were sown. Those were 0.01, 0.1, 0.15 and control.

Cultivation, spraying and water management:
Plantlets were transferred in 10m×10m green shade net. Plantlets ware grown in Randomise Block Design (RBD) method. Distance between two plants was 2.5 × 2.5 ft and distance between rows was 4 × 4 ft. Drip irrigation system is used for water management. Per day four litres of water was given to these plants. (Zende , July 2008)

Spraying and fertilizers:
Three times spraying was done during 45 days.

1. **At Developmental stage**
   Confider 5ml/20lit.water. (insecticide , pesticide)
   Tonal 5ml/20lit.water.(growth promoter.)
   Humic acid 10ml/20lit.water.(root promoter)
   19:19:19 (NPK) 5gm/20lit.water.

2. **At Flowering stage:-**
   13:00:45(NPK) 10mg/20lit.water.
   P-stem (nitrobenzene) 5ml/20lit.water.
3. **At Fruiting stage:-**
   00:00:50 (NPK) 10g/20lit.water.

Following three dosages of fertilizers were given during 45 days.
Phosphate 2gm/plant is added at sowing time. Macronutrients :- urea, potash, phosphate.(20gm/plant). Micronutrient:-Plantomicro (Zn, B, Fe, Mo, Ca, Mg, S etc.) are added every 20 days before sowing. (5gm/plant)

RESULTS AND DISCUSSION

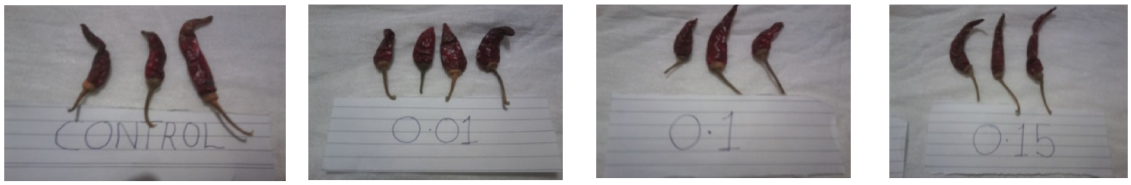
Table :- Mean values of mutated plants as compared to control

Concentrations	Height of plant(cm)	Number of leaves	Number of branches	Number of fruits/plants	Length of fruits(cm)	Fruit girth(cm)
Control	44.5	53	4	5	6.6	2.8
0.01	36	42	09	06	7.04	3.6
0.1	47.7	87	20	11	4.2	2.9
0.15	42.4	44	12	08	5.4	4.8

DISCUSSION

In present study we have compared colchicine treated plants with control (not treated with colchicine). We had calculated mean values of morphological parameters such as height of plants, number of leaves, number of branches per plants, number of fruits per plant, length of fruits, girth of fruits etc. These parameters were also used Jabeen and Mirza,2004. The mean values of these parameters show variation which is similar to the observations of Tyul,1990. We had observed that the number of branches per plant, number of fruits per plant, girth of fruits were maximum in mutant plants compared with control. The height of plant and number of leaves were maximum in 0.1 and 0.15 concentration as compared with control but it has less in 0.01 concentration. Maximum length of fruits seen only in concentration 0.01 compared with control and other mutants. These results are similar with the results of Jabeen and Mirza, 2004. All the above cultivation practices, fertilizers, spraying and water management had also been used by Zende, 2008. We had followed these practices. The concentration wise treatment of colchicine given was similar with work of Siddiqui and Khan,1983. These all morphological variations had mostly studied in mutations breeding programmes.

PHOTOGRAPHS OF FRUITS MORPHOLOGY



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Customer Relationship Management

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ABSTRACT

Customers play a very important role in performance growth of a firm or an industry. So it is very essential that admin of a particular firm has to take necessary measures to build and get along a good relationship with his customers. This is one such project which helps in good customer relationship management. This is a web based project. Total quality control with several stringent tests even at the tail end, and customer satisfaction with very prompt sales after service backup are our main cause for our wide reputation. Superior technology with most advanced features, periodically up gradation of technology and reliability is our top most priority. This paper provides all the information about customer details, servicemen details in database. The main aim of the paper is to maintain good relationship of the customers of an industry. Relationships define the feedback of the product from the industry and also providing service to the customers according to the details maintained in database. This paper provides good communication dealing with customers for the industries.

Keywords : Web-based, Communication

INTRODUCTION

A CRM is a collection of people, processes, software, and internet capabilities that helps an enterprise manage customer relationship effectively and systematically. The goal of CRM is to understand and anticipate the needs of current and potential customer to increase customer retention and loyalty while optimizing the way product and services are sold.CRM is defined as "Customer relationship management (CRM) is a business strategy to acquire and manage the most valuable customer relationships. CRM requires a customer-centric business philosophy and culture to support effective marketing, sales and service processes. CRM applications can enable effective customer relationship management, provided that an enterprise has the right leadership, strategy and culture."

CRM stands for Customer Relationship Management. It is a strategy used to learn more about customers' needs and behaviors in order to develop stronger relationships with them. After all, good customer relationships are at the heart of business success. There are many technological components to CRM, but thinking about CRM in primarily technological terms is a mistake. The more useful way to think about CRM is as a process that will help bring together lots of pieces of information about customers, sales, marketing effectiveness, responsiveness and market trends. The objective is to capture data about every contact a company a company has with a customer through every channel and store it in the CRM system to enable the company to truly understand customer action. CRM software helps an organization build a database about its customer that management, sales people, customer service provider and even customer can access information to access customer needs with product and offering.

METHODOLOGY:

The implementation of a customer relationship management (CRM) solution is best treated as a six-stage process, moving from collecting information about customers and processing it to using that information to improve the marketing and the customer experience.

1) Stage one - Collecting information:

The priority should be to capture the information which needs to identify our customers and categories their behavior. Those businesses with a website and online customer service have an advantage as customers can enter and maintain their own details when they buy.

2) Stage two - Storing information:
The most effective way to store and manage the customer information is in a relational database - a centralized customer database that will allow us to run all our systems from the same source, ensuring that everyone uses up-to-date information.

3) Stage three - Accessing information
With information collected and stored centrally, the next stage is to make this information available to staff in the most useful format.

4) Stage four - Analyzing customer behavior
Using data mining tools in spreadsheet programs, which analyze data to identify patterns or relationships, we can begin to profile customers and develop sales strategies.

5) Stage five - Marketing more effectively
Many businesses find that a small percentage of their customers generate a high percentage of their profits. Using CRM to gain a better understanding of our customers' needs, desires and self-perception, we can reward and target our most valuable customers.

6) Stage six - Enhancing the customer experience
Just as a small group of customers are the most profitable, a small number of complaining customers often take up a disproportionate amount of staff time. If their problems can be identified and resolved quickly, our staff will have more time for other customers.

This project consists of 4 modules:
a) Administrator module.
b) Customer Registration Module.
c) Service employee Registration module.
d) Customer Feedback module.

a) Administrator Module:
In this module, the administrator has the full authority of maintaining the database of the software.

b) Customer Registration Module:
This module provides all the information regarding the customers of the industry. This information consists of contact details, Purchase details, Billing Details, and other information which helps for this project.

c) Servicemen Registration Module:
In this module all the details of the servicemen will be saved. This information will help to send the servicemen to clear the customer service problems. This module contains all the details of service men like contact details, work experience detail, salary details, commission details, and also conduct details dealing with customers. This helps to make the service men job permanent to admin. According to this detail he will get to know all the details of employment whether he should recruit or give training to the existing servicemen.

d) Customer Feedback Module:
In this module admin will get all the details of servicemen, about their work, communication and problem solving.

RESULTS AND DISCUSSIONS
CRM is a strategy used to learn more about customer’s needs and behaviors in order to develop stronger relationships with them. Good customer relationships are at the heart of business success. So this application will help in building good customer relation with customer.

With the help of this project , the organization will be able to managing customer data in effective way. Proper management of sales and customer data will provide facility of obtaining customer details time to time on the basis of which organization can make marketing and sales plan effectively.

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e-Herbarium

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ABSTRACT
In day to day life, we see many Plants but we don't know their Other information. So we have developed for the identification Software to classify the plants by their Vernacular Names, Botanical Names, Habits and Other Morphological characters.

INTRODCUTION

This is a system that is known as e-Herbarium. So first thing Is that what is mean by e-Herbarium? "The Herbarium is collection of dried Pressed plants in a specifically manners using systems of plants classification."

In this software There are 5 search criteria's are available that is By common name, By Botanical name, By Habit. By shrub by tree. The plant classification according to their Habit is given by father of botany that is Theophrastus if u want search any information Related to plants, u just have to one click on that criteria. And then All information related to plants are displayed (i.e. Common name, botanical name, herb, shrub, tree, images)

Information Related Botany

- Botany is invented by therophrastus (c.371-287BC) was born in 370 BC and was student of Aristotle.He was scholar botanist, biologist, physist.
- Botany is branch of science which deal with study of plants i.e. algae fungi brayophyte, gymenspem, anigospem we study about taxonomy, phyology, histrochemistry

This project is useful for botany students, Research purpose and many things also…

This project is developed by using v.b 6.0.

Main objective of this project is to storing all information about all plants for getting the information of any plant quickly which is stored in database.

Other Important Objectives are:-

- To help the students in working easily and efficiently.
- To manage all data about effectively.
- To perform analysis on plants.
- To help the getting information about plant that is encountered frequently during Manual operations by concurrently updating the data stored in many places.
- To provide all fields to anyone for accessing the information of plants.
- Provide a fast mechanism for getting or updating information.

Botany students use Herbarium to study the plants. The Herbarium is collection of Dried, Pressed plants. So if the Students want to study the plant then they have to search the Herbarium from many Herbarium sheets. Second thing is that they also find herbarium information from college library. And they also find in many books but these books are not available. So this is the very time consuming task.

So we have developed this system to reduce these efforts. You can get the Information of plants on a single click.

METHODOLOGY:

The implementation of a "e.Herberium" is best treated as a five-stage process, moving from collecting information.

4.1 Different Stages Are:-

4.1.1 Stage one - Collecting information

The priority should be to capture the information you need to identify your customers and categorise their behaviour. Those businesses with a website and online customer service have an advantage as customers can enter and maintain their own details when they buy.

4.1.2 Stage two - Storing information

The most effective way to store and manage your customer information is in a relational database - a centralised customer database that will allow you to run all your systems from the same source, ensuring that everyone uses up-to-date information.

4.1.3 Stage three - Accessing information

With information collected and stored centrally, the next stage is to make this information available to staff in the most useful format.Identified and resolved quickly.

4.5. DFD:

A DFD is a graphical technique that depicts the information flow and transform the data that moves from input to output. The DFD is also known as "DATA FLOW CHART OR BUBBLE CHART".

RESULTS & DISCUSSION:

e-Herbarium is project that is useful to learn the classification of plants and their morphological characters.

With the help of this project, we can get all the information about plants on the single click. This project helps to botany students to study the plants.

Herbarium is basically the collection of plant and information of plants. This Herbarium is useful for study the plants. We are happy to say that the Project e-Herbarium is successfully completed. In this project our future scope is we can implement this software as Android Application.

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Rcast:A Randomized Communication Scheme for Improving Energy Efficiency in MANETs

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ABSTRACT

In a typical wireless mobile ad hoc network(MANET) using a shared communication medium, every node receives or overhears every data transmission occurring in its vicinity. However, this technique is not applicable when a power saving mechanism(PSM) such as the one specified in IEEE 802.11 is employed , where a packet advertisement period is separated from the actual data transmission period. When a node receives an advertised packet that is not destined to itself , it switches to a low-power state during the data transmission period , and thus , conserves power. However, since some MANET routing protocols such as Dynamic Source Routing(DSR) collect route information via overhearing, they would suffer if they are used with the IEEE 802.11PSM. Allowing no overhearing may critically deteriorate the performance of underlined routing protocol. This paper proposes a new communication mechanism , called RandomCast or Rcast,via which a sender can specify the desired level of overhearing in addition to the intended receiver. Therefore, it is possible that only a random set of nodes overhears & collect route information for future use. Rcast improves not only the energy efficiency, but also the energy balance among the nodes, without significantly affecting the routing efficency.

Keywords: Energy balance , energy efficiency, mobile ad-hoc networks , network lifetime , overhearing ower saving mechanism.

INTRODUCTION

A major concern in mobile ad hoc networks (MANETs) is energy conservation due to the limited lifetime of mobile devices. Since wireless communication could be responsible for more than half of total energy consumption, a great deal of effort has been devoted to develop energy-aware network protocols such as Power-aware routing and transmit power control (TPC)-based algorithms. Essentially, they have concentrated on reducing energy spent for active communication activities. However, wireless radios still consume energy during the period of inactivity. In fact, idling listening usually accounts for a larger part of the total energy consumption because radios remain inactive for a longer duration. Therefore, many radio hardware support low-power sleep state, during which substantially low energy is consumed but no communication is allowed . For instance, Lucent's Wave LAN-II consumes 1.15 Watt and 0.045 Watt in the idle listening and low-power sleep state, respectively. More than 25 times smaller energy cost clearly presents the benefit of using the low-power sleep state. IEEE 802.11 exploits this hardware capability to support the Power Saving Mechanism (PSM) in its medium access control (MAC) layer specification. Each radio can be in one of two power management modes: active mode (AM) or power save (PS) mode. A device in AM stays awake all the time. It can communicate at any moment but wastes energy during idling. A device in PS mode periodically wakes up during the packet advertisement period, called Ad hoc (or Announcement) Traffic Indication Message (ATIM) window, to see if it has any data to receive. It puts itself into the low power sleep state during the subsequent data transmission period if it is not addressed, but stays awake otherwise to receive an advertised packet. However, 802.11 PSM is originally designed for single-hop wireless LANs and further research is required to efficiently use it in a multihop MANET.

METHODOLOGY

Proposes a new communication mechanism, called Random Cast, via which a sender can specify the desired level of overhearing, making a prudent balance between energy and routing performance. In addition, it reduces redundant rebroadcasts for a broadcast packet, and thus, saves more energy. Random

Cast is highly energy-efficient compared to conventional 802.11 as well as 802.11 PSM-based schemes, in terms of total energy consumption, energy good-put, and energy balance.

Program is developed to show how routers does work how they find shortest path among the nodes. Program is developed in C# language .This program is designed using namespaces**.**

```
Upon receiving an ATIM frame (receiver MAC address DA, subtype ID)
if (DA == BROADCAST) continue to wake up and receive;
else { /* unicast */
if (DA == MA) /* the node is the intended destination */
continue to wake up and receive;
else if (ID == 1001) /* unconditional overhearing */
continue to wake up and overhear;
else if (ID == 1101) { /* randomized overhearing */
if (rand(0, 1) ≤ PR)
continue to wake up and overhear;
else switch to sleep;
}
else switch to sleep;
}/* When packet queue is not empty */
Upon being ready to transmit a frame (receiver MAC address DA,
overhearing/rebroadacst level OL requested by DSR/ARP)
if (DA == BROADCAST) {
if (OL == unconditional) send an ATIM;
else if (OL == randomized) {
if (rand(0, 1) ≤ PF) send an ATIM;
}}
else { /* unicast */
switch (OL) {
case unconditional: ID = 1001;
case randomized: ID = 1101;
case no: ID = 1110;
}send an ATIM with subtype ID;
}
```

RESULT AND DISCUSSION :

Little effort has been devoted to integrate 802.11 PSM with a multihop routing protocol such as DSR. This study addresses this important problem and suggests an efficient solution based on Random Cast. The key observation is that unconditional overhearing, which is taken for granted without PSM, is not

freely available with PSM. In Random Cast, when a packet is transmitted, nodes in the proximity should decide whether or not to overhear it considering the trade-offs between energy efficiency and routing efficiency. Routing efficiency comes into picture because overhearing is an important tool to gather route information in DSR. Similarly, we exploring the use of Random Cast for broadcast messages in order to avoid redundant rebroadcasts and thus save additional energy.

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Signature Analysis
(Human behavior from his signature)

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ABSTRACT
The software for analyzing the signature will work on image processing. Image processing will consist of Image representation and modeling, Image enhancement, Image restoration, Image analysis, Image reconstruction, Image data compression, Image recognition and segmentation. The algorithms used for image processing are Interpolation for zooming and Sobal operator for edge detection.

We are trying to analyze the signatures by some standard characteristics. It may vary in some exceptional cases. It is not necessary that it will be 100% appropriate. But as per our analysis the results are 70% to 80% positive.

INTRODUCTION

1. Signature is a snapshot of your personality it tells about person's branding of his/her own character,capabilities, strength, weakness, reflections, authority, behavior pattern at large in public/stage/with common people.
2. Public image is the image someone wants to project at office/public place. On the other hand script or handwriting is personnel image.
3. Signature is minimum set of letters which gives maximum information about a person.
4. Signature is legal authority of a person.
5. Personality traits like honesty, communication abilities,creativity, emotional stability and self image can easily be determined just by analyzing a signature.

*** Signature Analysis is based on seven components which are:**

1. Size of the Signature.
2. Slant of the Signature.
3. Use and Size of the first name and the last name.
4. Underlining in the signature.
5. Size of the first letter of the signature.
6. Loops or backward strokes in the signature.
7. Use of Dots in the signature.

***Signature analysis:**

I. Signature reading is an interesting study. It is supposed to reveal unknown characteristics of a personality.
II. Signature analysts believe that while analyzing behavior of a person, signatures are more revealing than handwriting.
III. While writing, several thoughts run amok in the mind and lead to variations in the handwriting.
IV. Signature, on the contrary, is not subject to such frequent variations. There is an occult science behind the study of signatures.
V. All the features/signs used in handwriting is applicable on the signature, in addition with placement of signature on the paper. Various signature styles you may come across in your daily life can be grouped as further.

***The various basic steps of Image processing are:**

1. Image representation and modeling.
2. Image enhancement.
3. Image restoration.
3. Image analysis.
4. Image reconstruction.
5. Image data compression.
6. Image recognition and segmentation.
7. The field of digital image processing refers to processing digital image by computer.

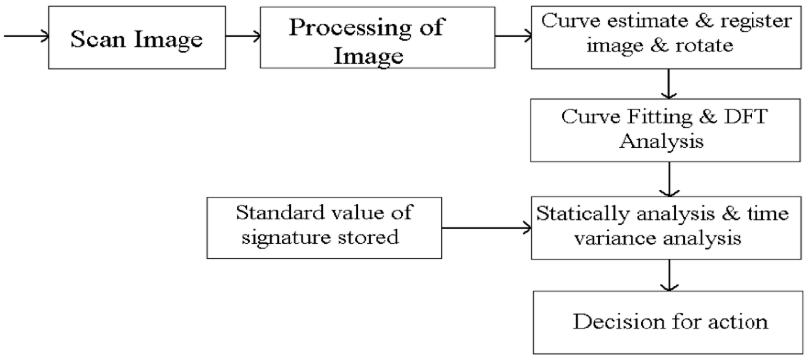

Fig: Block Diagram of Intelligent Signature Analysis.

FUNCTIONAL DESCRIPTION

Binary image: It consist of only black and white values. First process that is applied to the signature is to convert image in its binary format.

Logical box format: This is to find the shape factor. We need to calculate the different points minimum eight of the image then, calculate minimum and maximum x and y coordinates of the signature to get logic box of that image.

Profile Analysis: Curve analysis is done in this. Curve fitting algorithms are applied.

DFT Analysis: This is used to plot the spectrum analysis. Get maximum values. Co-efficient of co-relation to find match. This formula has implemented.

Shape auto correlation: this is same as finding the shape factor.

Statistical analysis: Mean and variance is calculated.

Pressure calculation: It's found based on intensity level.

Statistical time variance analysis: Store three different images of the same person. Generate limits For the particular signature and check with limits.
Analysis done...

We tried to analyze the signatures by some standard characteristics. It may vary in some exceptional cases. It is not necessary that it will be 100% appropriate. But as per our analysis the results are 70% to 80%.

1. First letter in capital and in bigger size compared to other letters in the signature & First letter written in small case with bigger size: This tells about writer has large PPI (Personnel Personality Index). Small case
means that person has high usable skills beneficial for others.

2. **Break just after first letter in the signature:** Means a person has initial\ communication hitch /gap/fear/ hibition.

3. Only person's name (surname/family name missing) / Middle name first: Tells about his/her own mission / vision , giving top most priority to his hobby.

4. First letter limited to initials, second name/surname with all the details & First name and second name interconnected: Such persons are able to create initial impression but not able to flourish themselves.

5. Dot follows signature. Putting one/two dot below the signature: Means that "the final word has been said and there is no more world stops here", doubts own actions. Such persons are inclined towards classical arts and their nature is simple and quiet. Two dots means willing to get directed (good for actors).

6. No line or dot below the signature: Such persons live their life as per their own Terms, are of good nature but are selfish also.

7. Large bottom loops: Is indication for strong need / desire for sexuality, money and material possession.

8. Ascending signature / Descending signature: Ascending means optimism, ambition, active nature. Descending means writer is pessimistic, depressed, not goal oriented.

9. Signature like printed words: Such persons are very kind towards others, have a very good heart, are a bit selfish.

10. Illegible signature / Illegible deformed crawled threaded signature: Shows person has clear vision/mission of his choice. Threaded signature show writer has high IQ but not able to fulfill his own vision and mission.

11. Curved and smooth signature & Signature with angular connections: Tells that person is gentle, charming , flexible, out-going, sociable. Angular connection
implies that writer is force-full, strong personality, competitive, aggressive and will full.

12. Encircled signature: Tells writer want to hide or shelter from society, protective behavior, not able to utilize entrepreneurship / self interest.

13. No similarity between name and signature: Such persons try to be very smart and hide facts in all possible ways and means.They never say in a simple and straight way.

14. Underscoring below signature / at middle zone of letters /Many underscoring / Underlining at upper zone / above the signature: Indicates that person has healthy ego. Such persons are full of confidence, underscoring at
middle indicates person is sacrificing

15. Initials starting strokes &long ending stroke: Writer has inherited skills, can't starts things without introduction. Long stroke means extra energy.

***How it can be implemented in computers:**
The ultimate aim in a large number of image processing applications is to extract important features from image data, from which a description, interpretation or understanding scene can be provided by machine.

Digital image is defined as a two dimensional function, where x and y are spatial coordinates and amplitude of pixel or intensity of a pixel. Intensity is called gray levels i.e. varies from 0 to 255.

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Shape auto correlation: this is same as finding the shape factor.

Statistical analysis: Mean and variance is calculated.

Pressure calculation: It's found based on intensity level.

Statistical time variance analysis: Store three different images of the same person. Generate limits For the particular signature and check with limits.

OBSERVATIONS & RESULTS

I. The study of signature analysis puts you in touch with a new and fascinating world that deals with the amazing potential of the human personality.
II. Your signature holds the proof of your strengths that will help you to believe in yourself. The ability to analyze signature can give you a new understanding of yourself or others that are dear to you.
III. You can find out why people sometimes gain the wrong impression about you – an impression that you never intended to give them.
IV. Sometimes we feel that we have reached the crossroads in our lives. At such times we need to look at ourselves objectively.

CONCLUSION

Signatures exude unseen thoughts and emotions.Specialists use certain techniques to analyze them. However by analyzing the letters alone it is difficult to judge the personality traits completely. One may need some more supplementary techniques for this purpose. Remember! Signatures do not create a personality. Personality is exuded through the signatures.

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Speech Recognition System-A Review

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ABSTRACT

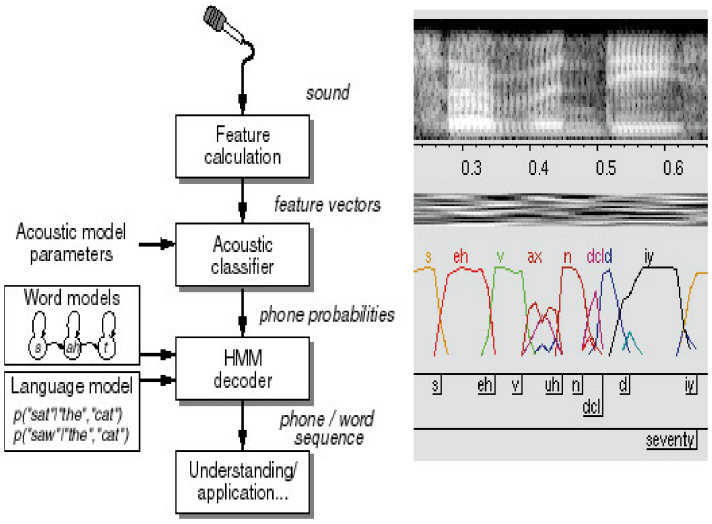
The concept of Recognition one phase of Speech Recognition Process using Hidden Markov Model. Preprocessing, Feature Extraction and Recognition three steps and Hidden Markov Model (used in recognition phase) are used to complete Automatic Speech Recognition System. Today's life human is able to interact with computer hardware and related machines in their own language. Research followers are trying to develop a perfect ASR system because we have all these advancements in ASR and research in digital signal processing but computer machines are unable to match the performance of their human utterances in terms of accuracy of matching and speed of response. This paper gives an overview of the speech recognition system and its recent progress. The primary objective of this paper is to compare and summarize some of the well known approaches used in various speech recognition system.

Keywords : *Analysis, feature extraction, Modeling, Testing, speech processing, Automatic Speech Recognition (ASR), HMM model, human machine interface.*

INTRODUCTION:

Speech recognition is also known as automatic speech recognition or computer speech recognition which means understanding voice of the computer and performing any required task or the ability to match a voice against a provided or acquired vocabulary. The task is to getting a computer to understand spoken language. By "understand" we mean to react appropriately and convert the input speech into another medium e.g. text. Speech recognition is therefore sometimes referred to as speech-to-text (STT). There has been steady progress in the field of speech recognition over the recent yeas with two trends. First is academic approach that is achieved by improving technology mainly in the stochastic modeling, search and neural networks. Second is the pragmatic, include the technology, which provides the simple low-level interaction with machine, replacing with buttons and switches. A second approach is useful now, while the former mainly make promises for the future.

Below picture shows processing of an ASR system.



A speech recognition system consists of a microphone, for the person to speak into; speech recognition software; a computer to take and interpret the speech; a good quality soundcard for input and/or output; a proper and good pronunciation. Many approaches have been used such as:

I.Acoustic-Phonetic Approach: Acoustic-phonetic approach assumes that the phonetic units are broadly characterized by a set of features such as format frequency, voiced/unvoiced and pitch. These features are extracted from the speech signal and are used to segment and level the speech.

II. Knowledge Based Approach: Knowledge based approach attempts to mechanize the recognition procedure according to the way a person applies its intelligence in visualizing, analyzing and finally making a decision on the measured acoustic features. Expert system is used widely in this approach.

III. Pattern Recognition Approach: Pattern recognition approach requires no explicit knowledge of speech. This approach has two steps – namely, training of speech patterns based on some generic spectral parameter set and recognition of patterns via pattern comparison. The popular pattern recognition techniques include template matching, Hidden Markov Model .

IV.Artificial Intelligence Approach: The artificial Intelligence approach attempts to mechanize the recognition procedure according to the way a person applies its intelligence in visualizing, analyzing, and finally making a decisions on the measured acoustic features. The Artificial Intelligence approach is a hybrid of the acoustic phonetic approach and pattern recognition approach.

V. Template Based Approaches : Template based approaches matching (Rabiner et al., 1979) unknown speech is compared against a set of pre-recorded words (templates) in order to find the best match.
Template based approach to speech recognition have provided a family of techniques that have advanced the field considerably during the last six decades.

VI. Dynamic Time Warping (DTW) : Dynamic time warping is an algorithm for measuring similarity between two sequences which may vary in time or speed. DTW is a method that allows a computer to find an optimal match between two given sequences (e.g. time series) with certain restrictions.

VII. Statistical Based Approach : In this approach, variations in speech are modeled statistically (e.g., HMM), using automatic learning procedures. This approach represents the current state of the art. Modern general-purpose speech recognition systems are based on statistical acoustic and language models.

Hidden Markov Models (HMM) :
HMM is doubly stochastic process with an underlying stochastic process that is not observable, but can only be observed through another set of stochastic processes that produce sequence of observed symbols. The basic theory behind the Hidden Markov Models (HMM) dates back to the late 1900s when Russian statistician Andrej Markov first presented Markov chains. Baum and his colleagues introduced the Hidden Markov Model as an extension to the first-order stochastic Markov process and developed an efficient method for optimizing the HMM parameter estimation in the late 1960s and early 1970s. Baker at Carnegie Mellon University and Jelinek at IBM provided the first HMM implementations to speech processing applications in the 1970s . Proper credit should also be given to Jank ferguson at the Institute for defense Analysis for explaining the theoretical aspects of three central problems associated with HMMs.

Use of HMM in Speech Recognition:

HMM can be used to model a unit of speech whether it is a phoneme, or a word, or a sentence. Linear predictive analysis followed by the vector quantization of the unit of speech, gives a sequence of symbols . HMM is one of the ways to capture the structure in this sequence of symbols. The reason why HMMs are popular is because they can be trained automatically and are simple and computationally feasible to use . The word sequence and a pronunciation dictionary and the HMM training process can automatically determine word and phone boundary information during training. This means that it is relatively

straightforward to use large training corpora. It is the major advantage of HMM which will extremely reduce the time and complexity of recognition process for training large vocabulary.

TYPOLOGY OF SPEECH RECOGNITION SYSTEMS

- **Speaker Dependent**: - systems that require a user to train the system according to his or her voice.
- **Speaker Independent**: - systems that do not require a user to train the system i.e. they are developed to operate for any speaker.
- **Isolated word recognizers**: - accept one word at a time. These recognition systems allow us to speak naturally continuous.
- Connected word systems allow speaker to speak slowly and distinctly each word with a short pause i.e. planned speech.
- Spontaneous recognition systems allow us to speak spontaneously.

Feature Extraction:-

First of all, recording of various speech samples of each word of the vocabulary is done by different speakers. After the speech samples are collected, they are converted from analog to digital form by sampling at a frequency of 16 kHz. Sampling means recording the speech signals at a regular interval. The collected data is now quantized if required to eliminate noise in speech samples. The collected speech samples are then passed through the feature extraction, feature training & feature testing stages. Feature extraction transforms the incoming sound into an internal representation such that it is possible to reconstruct the original signal from it. The most widely used feature extraction techniques are explained below.

A. Linear Predictive Coding (LPC):-

One of the most powerful signal analysis techniques is the method of linear prediction. LPC of speech has become the predominant technique for estimating the basic parameters of speech. It provides both an accurate estimate of the speech parameters and it is also an efficient computational model of speech. The basic idea behind LPC is that a speech sample can be approximated as a linear combination of past speech samples. Through minimizing the sum of squared differences (over a finite interval) between the actual speech samples and predicted values, a unique set of parameters or predictor coefficients can be determined. These coefficients form the basis for LPC of speech . The analysis provides the capability for computing the linear prediction model of speech over time. The predictor coefficients are therefore transformed to a more robust set of parameters known as cepstral coefficients.

B.Mel frequency Cepstral Coefficient(MFCC):-

MFCCs are used because it is designed using the knowledge of human auditory system and is used in every state of speech recognition system or art speech. MFCC is a standard method for feature extraction in speech recognition tasks. MFCC include certain steps applied on an input speech signal. These computational steps of MFCC include: -Framing, Windowing, DFTH, Mel filter bank algorithm ,computing the inverse of DFT.

Decoding:-

It is the most important step in the speech recognition process. Decoding is performed for finding the best match for the incoming feature vectors using the knowledge base. A decoder performs the actual decision about recognition of a speech utterance by combining and optimizing the information conveyed by the acoustic and language models.

Pronunciation Modelling:-

In pronunciation modelling , during recognition, the sequence of symbols generated by acoustic model HMM is compared with the set of words present in dictionary to produce sequence of words that is the system's final output contains information about which words are known to the system and how these words are pronounced i.e. what is their phonetic representation. Decoder is then used for recognizing words by combining and optimizing the information of acoustic & language models.

Progress in ASR system:-

Building a speech recognition system becomes very much complex because of the criterion mentioned in the previous section. Even though speech recognition technology has advanced to the point where it is used by millions of individuals for using variety of applications. The research is now focusing on ASR systems that incorporate three features: large vocabularies, continuous speech capabilities, and speaker independence. Today, there are various systems which incorporate these combinations. However, with these numerous technological barriers in developing ASR system, still it has reached the highest growth. The milestone of ASR system is given in the following table.

Year	**Progress of ASR System**
1952	Digit Recognizer
1976	1000 word connected recognizer with constrained grammar
1980	1000 word LSM recognizer (separate words w/o grammar)
1988	Phonetic typewriter
1993	Read texts (WSJ news)
1998	Broadcast news, telephone conversations
1998	Speech retrieval from broadcast news
2002	Rich transcription of meetings, Very Large Vocabulary, Limited Tasks, Controlled Environment
2004	Finnish online dictation, almost unlimited vocabulary based on morphemes
2006	Machine translation of broadcast speech
2008	Very Large Vocabulary, Limited Tasks, Arbitrary Environment
2009	Quick adaptation of synthesized voice by speech recognition (in a project where TKK participates in)
2011	Unlimited Vocabulary, Unlimited Tasks, Many Languages, Multilingual Systems for Multimodal Speech Enabled Devices
Future Direction	Real time recognition with 100% accuracy, all words that are intelligibly spoken by any person, independent of vocabulary size, noise, speaker characteristics or accent.

RESULTS AND DISCUSSION

In this paper we have worked to find the merits and demerits of different approaches so as to make their use easier in future working.Following are our observation based on our research.

Different Approaches	**Merits**	**Demerits**
1.Acoustic- Phonetic	Acoustic phonetics have a strong physical interpretation, it is easy to pinpoint the source of error in such a recognition system. It is easy to tell whether the pattern matcher has failed.	Matching a phonetic sequence with a word or a group of words is not obvious
2. Knowledge Based	Explicitly modeling variations in speech	Unfortunately such expert knowledge is difficult to obtain and use successfully, so this approach was judged to be impractical, and automatic learning procedures were sought instead.

Different Approaches	Merits	Demerits
3.Pattern Recognition	A direct comparison is made between the unknown speeches with each possible pattern learned in the training stage in order to determine the identity of the unknown according to the goodness of match of the patterns.	Systems performance is directly dependent over the training data provided.
4.Artificial Intelligence	AI research had also developed highly successful methods for dealing with uncertain or incomplete information,employing concepts from probability and economic.	This approach had only limited success, largely due to the difficulty in quantifying expert knowledge. Another difficult problem is the integration of many levels of human knowledge phonetics, phonotactics, lexical access, syntax, semantics and pragmatics.
5.Template Based	errors due to segmentation or classification of smaller acoustically more variable units, such as phonemes can be avoided	pre-recorded templates are fixed, so variations in speech can only be modeled by using many templates per word, which eventually becomes Impractical
6.Dynamic Time Warping Based	It is a method that allows a computer to find an optimal match between two given sequences (e.g. time series) with certain restrictions	It has certain restrictions, i.e. the sequences are "warped" non-linearly to match each other
7. Statistical Based	Processing of large amounts of training data is a key element in the development of an effective ASR technology nowadays	They must make *a priori* modeling assumptions, which are liable to be inaccurate, handicapping the systems performance

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Web Crawler and Data Mining

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ABSTRACT
Web crawler and data mining both are dependent systems like coin one always need other. In this paper we have done work on few programs that does image crawling and also grabbing specific content from web page. Web crawlers are used for a variety of purposes. Most prominently, they are one of the main components of web search engines, systems that assemble a corpus of web pages, index them, and allow users to issue queries against the index and find the web pages that match the queries. Data mining is a process that uses a variety of data analysis tools to discover patterns and relationships in data that may be used to make valid predictions.
Keywords – web crawler, data mining, robots, machine learning, web spider, etc.

INTRODUCTION
A *web crawler* (also known as a *robot* or a *spider*) is a system for the bulk downloading of web pages. Web crawlers are used for a variety of purposes. Most prominently, they are one of the main components of web search engines. A related use is web archiving, where large sets of web pages are periodically collected and archived for posterity. A third use is web data mining, where web pages are analyzed for statistical properties, or where data analytics is performed on them. Finally, web monitoring services allow their clients to submit standing queries, or *triggers*, and they continuously crawl the web and notify clients of pages that match those queries.

METHODOLOGY
The goal of this paper is to study & implement web crawler crawler regulations and behavior based on the Robots Exclusion Protocol. The widely adopted Robots Exclusion Protocol provides a foundation for the study. Web crawlers may be regulated by different rules in the robots.txt files. Such bias may have a significant impact on the indexable content of each crawler. Since the Robots Exclusion Protocol specifies es a set of advisory rules, the crawler may behave differently than the regulation rules specify.

This paper attempts to explore the following questions:
- How is the Robots Exclusion Protocol used?
- Does a robot bias exist?
- How do crawlers actually behave on the web?

Programs are developed in java language, these java programs are designed using “jsoup library”.

jsoup: Java HTML Parser
jsoup is a Java library for working with real-world HTML. It provides a very convenient API for extracting and manipulating data, using the best of DOM, CSS, and jquery-like methods**.** Jsoup implements the WHATWG HTML5 specification, and parses HTML to the same DOM as modern browsers.

Jsoup is designed to deal with all varieties of HTML found in the wild; from pristine and validating, to invalid tag-soup; jsoup will create a sensible parse tree. Jsoup is open source.

RESULT AND CONCLUSION
Well I have written two programs one is AmazonPriceMining.java which extracts title of the product, image of the product, and price of the product. The time taken by this program to execute and extract

information from target link is just 2sec on speed of 2 Mbps internet network. As network speed increases the information retrieval time decreases, so higher speed is always a need.

Also the second program DownloadImages.java downloads all the images available on target link. The time taken by this program is 10sec for nearly 70 images on speed of 2 Mbps internet.

Web crawler collects large masses of data and stores in data warehouses and mining algorithms collects and process this data.

It is very essential in e-commerce business to get to know customer's needs. E-commerce does rely on both of these.

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Learning Curve: MPT

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ABSTRACT
Learning Curve: MPT' (An Orientation in Chemistry) is simple, modern, purposefully enriched course for the chemistry students. Aforementioned domain captures a lot of information from the all the branches chemistry in the form of orientation to the student of level- higher secondary, junior college, senior college, post graduate, budding researchers along with research scholars. The most important feature of this framework is that it is built in blind-friendly manner. Also, this documentation can be easily referred by the non science background person due to its friendly approach. The name itself state that this program mainly deals with the *Modern Periodic Table*. The information of each and every element in lucid manner is the heart of this beautiful application. This is developed under the programming language C# which is initiative of Microsoft .NET.
Key words: Modern Periodic Table, Microsoft .Net, C#, Modern Study in Chemistry, Blind-friendly

INTRODUCTION

In the early 2014, the field of chemistry is remarkably radiant due to its brilliant shadow from the last year. Last year, most prestigious ***Noble Prize*** in Chemistry was awarded jointly to Martin Karplus, Michael Levitt and Arieh Warshel 'for the development of multiscale models for complex for chemical systems'. At the same time, ***Bharat Ratna***, the foremost *Ratna* awards in India was awarded to honourable scientist Dr. Chintamani Nagesha Ramachandra Rao (Prof. CNR Rao). And latterly the most-awaited award in Padma, ***Padma Vibhushan*** is awarded to Dr. Raghunath A. Mashelkar. These explicitly denote the importance of incorporation of technology in the field of not only the *Chemistry* but also in whole *Science*.

By making obeisance to these great ethoses, I, Rahul Patil, am encouraged to develop this technology based Orientation in Chemistry. The idea behind the development of such application is to strengthen the knowledge of chemistry by hands-on experience of modern technology.

This orientation has cardinal role of *Modern Periodic Table* in it. Modern periodic table is the tabular form of classification of all the elements discovered so far. Till date 118 elements are discovered either naturally or by artificial synthesis. Above mentioned application possess detailed information of each and every element in most lucid way.

METHODOLOGY

'Learning Curve: MPT' (An Orientation in Chemistry) is developed by thorough study and researches on different literature of chemistry. All the information is compiled from several tutorials, courses, course books, reference books, websites on chemistry, textbooks offered to consecutive standards of academics.

This application is developed under the programming language C#. Followings are few reasons for using C# for development: 1) Modern, general-purpose programming language; 2) Object oriented; 3) Component oriented; 4) Easy to access; 5) Structured language; 6) It can be compiled on a variety of computer platforms; 7) Part of .Net Framework. The .Net framework is a revolutionary platform that helps you to write the following types of applications: Windows applications, Web applications, Web services. As earlier said, the .Net framework applications are multi-platform applications. The framework has been designed in such a way that it can be used from any of the following languages: C#, C++, Visual Basic, Jscript, COBOL, etc. All these languages can access the framework as well as communicate with each other. Microsoft provides the following development tools for C# programming: Visual Studio 2010

(VS), Visual C# 2010 Express (VCE), Visual Web Developer. The last two are freely available from Microsoft official website. In this application, we have mainly used Visual C# 2010 Express.

This is catagorised into several tabs elucidating brief history of modern periodic table, different milestones during discoveries, information regarding nomenclature, symbols and notifications of every element including their reactions, properties, applications, etc. This also includes very important section of appendix which provides comparative study of the different native properties of elements like atomic weights, atomic densities, melting points, boiling points, Van der waals' radii, metallic radii, covalent radii, ionic radii, average single-double-triple bond energies, electrical resistivity and abundances in earth's environment. The whole study is shortened in the exclusive tab called Quick Access, which involves all the basic and frequently required information. And after all this huge brain training, you are now faced to some exercises in terms of MCQs. These will not only measure your comprehension but also enhance the power of comprehension. These MCQs are classified accordingly with the blocks of *MPT.*

The aforementioned literature was developed under C#, the programming language developed by Microsoft within its .NET initiative led by Anders Hejlsberg. C# is a simple, modern, general-purpose, object-oriented programming language approved by Ecma and ISO.

RESULT AND DISCUSSION

'Learning Curve: MPT' (An Orientation in Chemistry) is authored successfully for the students of Chemistry. It is a characterized software dealing with Modern Periodic Table and related studies. Such software is really useful in nearest future for the paperless study. Due to this study seems very lucid and decorative. Instead of carrying high weighed books, this can be carried into a simpler pendrive, CD or DVD like hardwares of few grams. Therefore, in short, such softwares are need of today's education system.

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2-Hydroxy Chalcone Precursor for Synthesis of Aurones : A Plant Flavonoids

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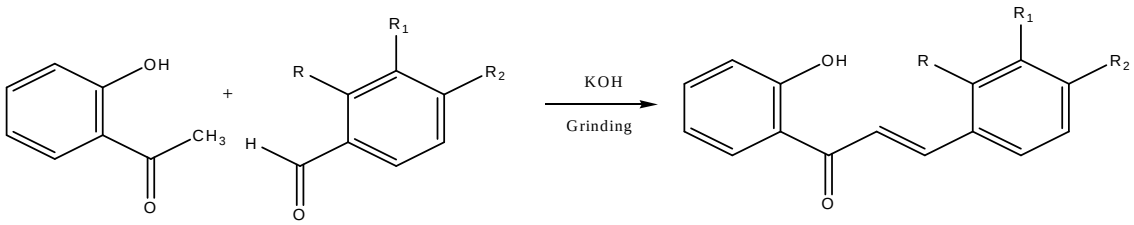
ABSTRACT
An efficient reaction shown between O-hydroxy acetophenone and substituted aldehydes gives 2'-Hydroxy chalcones. These chalcones undergo oxidative cyclization in presences of pyridine and copper bromide gives aurones . The product obtained are chareacterized by recording I.R. and M.P.
Key words-Aurones , 2'-Hydroxy chalcones,Grinding method.

INTRODUCTION

Chalcones (1,3-diaryl-2-propen-1-ones) are flavonoid and isoflavonoid precursors which are abundant in edible plants and display a wide spectrum of biological activities . Chalcones are use as a precursor for synthesis of aurones .Aurone is a heterocyclic chemical compound which is a type of flavonoid. Aurones, (Z)-2-benzylidenebenzofuran-3-(2H)-ones constitute a less studied subclass of flavonoids, which occur rarely in nature, mainly flowering plants, and a few ferns, mosses and marine brown algae. Aurones are responsible for the bright yellow color of some popular ornamental flowers such as snapdragon, cosmos and dahlia. Aurones have been reported antioxidant, antibacterial[1,2], antileishmanial[3–5], anticancer[6-8], antiangiogenic[9],anti-infective and anti-inflammatory activities [10], inhibitory activity against a variety of enzymes and proteins, and have been developed as potential amyloid imaging agents.

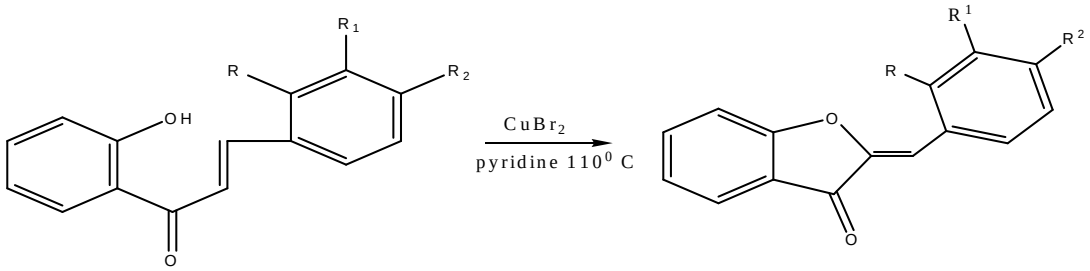
METHODOLOGY

Synthesis of chalcones by grinding method



2-hydroxy acetophenone (5mmole), substituted benzaldehyde (5mmole) and solid KOH (10 mmole)were taken in mortar and grind for several minutes. After few minutes a mixture was converted into a powdered form (completion of reaction).Then it was diluted with cold water and neutralized by dil. HCl. The yellow solid obtained was filtered dried and recrystallized from methanol to give chalcone (3a-3c).

Synthesis of Aurones from chalcones

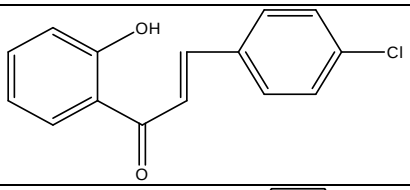
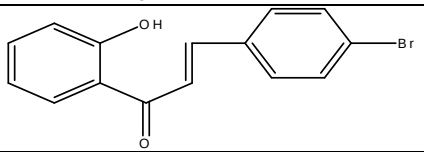
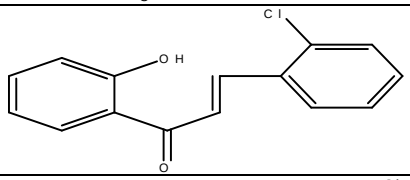
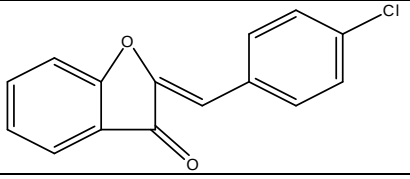
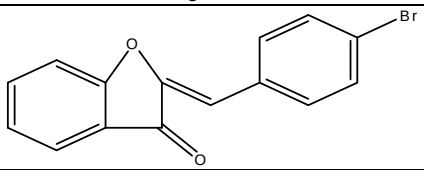
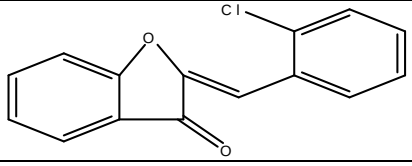


$CuBr_2$ (10-15mg) was added to pyridine (10ml) and 2-hydroxy chalcones (3a –d)(0.002mole) were dissolved in the solution and the solution was reflux for 1.5 hour .The mixture was cooled ,poured on ice cold water kept overnight at room temperature the product was filtered and crystallized from ethanol to give pure aurone (4a-4c)

RESULT AND DISCUSSION

This authenticity of chalcones and aurones was established by comparing their melting points and I.R. spectral data with reported in literature. The results are summarized below:

Table : Chemical structure, yield, M.P.and I.R. frequencies

Sr no.	Product	M.P	Time	Yield	I.R.Frequencies (cm^{-1})
3a		154 (154-155)	18 min	87%	3130, 3061, 1641, 1564, 800
3b		148 (140)	16 min	65%	3128, 3062, 1645, 1554, 815
3C		180 (178-180)	15 min	75%	3128, 3024, 1643, 1573, 862
4a		160^0 c	1.5 hr	90%	3061, 1700, 1570, 1070, 810
4b		179^0 c	1.5 hr	75%	3056, 1720, 1575, 1020, 815
4C		185^0 c	1.5 hr	81%	3070, 1710, 1550, 1100, 860

CONCLUSION

Mentioned method are superior to that of conventional method, products obtained are in good yield and also they appear to be of general applicability. The present reaction is oxidative cyclization of Chalcone.

High efficiency, commercially readily available starting material. Thus , this constituted a new synthetic route for the synthesis of Aurones

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Oscillating Reaction

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ABSTRACT

Oscillating or periodic phenomenon are ubiquitous in physics astronomy and biology . The two substances react to yield a third substance , it is expected that the reaction will continue steadily until the reactants are exhausted or until equilibrium state is reached. It is known that many biological important reactions possess autocatalic steps. It is certain that advance in reaction techniques knowledge of oscillatory path ways and instrumentation will reveal the secrets of enzymatic reactions wich control our life.

Key word :equilibrium step, autocatalytic steps, oscillatory path.

INTRODUCTION

Oscillating or periodic phenomenon are ubiquitous in physics, astronomy and biology. they rang from the familiar motion of pendulums and the orbit of planet to the complex biological clocks that govern the daily and second behavior of living organism. if two substances react to yield a third substance, it is expected that the reaction will continue steadily until the reactant are exhausted or until equilibrium state is reached. it was thought that oscillations are periodicity of reactant or products would be clear violation of second law of thermodynamics.

Oscillating reaction occur industrial processes in biochemical system. oscillatory reaction for example to maintain the rhythm of the heartbeat. It appears that three conditions must be fulfilled in order to obtain oscillation.

1.The reaction must be far from equilibrium.
2.The reaction must have autocatalysis step.
3.The system must be able to exist in two steady states.

METHOD

Preparation of Solution:

Solution A : 25 ml of distilled water into a100 ml beaker was taken. it is mixed with 3.6 ml of 30% hydrogen peroxide(molecular wt of H_2O_2 = 34.09 gm).the solution was diluted to 100ml with distilled water.

Solution B : 4.3 gm of potassium iodate (molecular wt of KIO_3 = 214.02 gm) and approximately 25 ml of distilled water in the 100 ml beaker were take of 2.3 ml of concentrate perchloric acid (molecular wt of $HClO_4$ =100.46 gm) was added to this mixture. the mixture was stirred until the potassium iodate dissolved. the solution was diluted to 100 ml with distilled water.

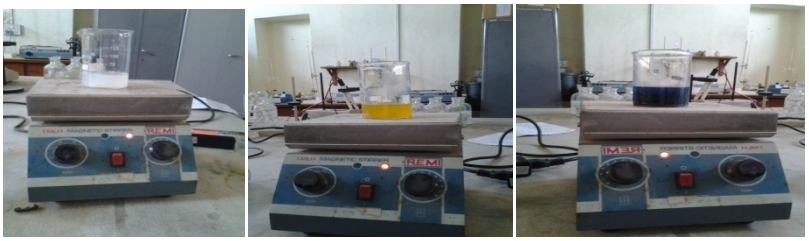
Solution C : 1.5 gm of malonic acid (Molecular wt = 104 gm) and 0.3 gm of manganese sulphate (hydrate0 is dissolved in approximately 50 ml of distilled water in third 100 ml beaker and diluted the solution to 100 ml with distilled water.

Indicator : Starch was added (1 ml)

Procedure:

The three solution prepared above were used to prepare a final mixture. 10 ml of each solution was kept on a magnetic stirrer with a needle for rotation. starch (1 ml) was added in between. the final mixing result in setting of oscillation. the colour of solution changes from colourless to golden yellow and then to blue and again colourless. the cycles are clearly seen . The photographs were taken and shown in fig a,b,c. the time interval for each colour changes was measured and the data are collected in table .

Fig:



a b c

RESULT AND DISCUSSION

We have prepared the three solution separately as described above. when they are mixed with each their and starch as an indicator, we observed the setting of oscillation as shown in the photograph the cyclic nature of reaction is seen to be of existence via the colour changes i.e. colourless-golden yellow-blue - colourless. The time intervals for the corresponding changes were measured and collected in table. The oxidative steps of Mn^{+2} to Mn^{+3} are characterized by the corresponding period of the existence of the species we found the period of the order colourless - golden yellow-blue -colourless for the three colour changes. The period time is analysis. We note that one period measurement of time have standard deviation of the order of colourless - golden yellow-blue -colourless . The determination of period are shown in figure. We note the rhythmic pattern of oscillation for the studied Brigs and Rauschere oscillating reaction.

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SYNTHESIS OF 2-HYDROXY CHALCONES BY NOVEL ROUTE

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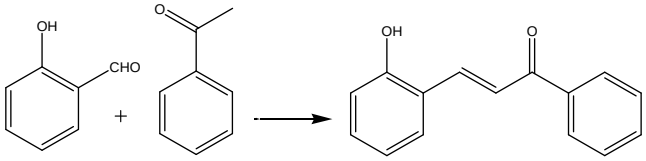
ABSTRACT
The 2-hydroxychalcones are synthesized by novel route. The condensation of easily accessible starting materials, salicylaldehyde & acetophenones furnished respective chalcones with high yields.

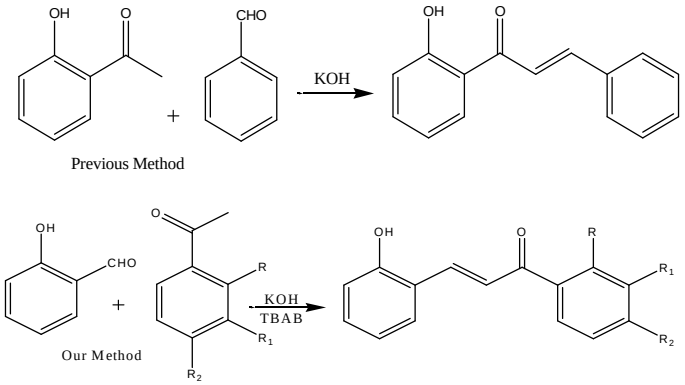


Keywords : Salicylaldehyde, acetophenone, chalcone.

INTRODUCTION
2 hydroxy chalcones are prepared via the most commonly used method, Claisen -Schamidt condensation reaction between 2-droxyacetophenones and benzaldehyde in the presence of aqueous alkaline bases. We report here the synthesis of 2 hydroxy chalcones by slight variation using readily accessible starting materials, salicylaldehyde and acetophenones in presence of phase transfer catalyst.

MATERIALS AND METHODS
All reagent used were of analytical grade. Solvents were distilled before use. Melting points were determined in Open Capillaries and are uncorrected. The purity of compound was checked by TLC. IR spectra were recorded on Shimadzu FT-IR 8400.

Synthesis of 2- hydroxy chalcones
To the stirring solution of Salicyl aldehyde (5 mmol) and substituted acetophenone (5 mmol) in adry ethanol (5 ml). KOH (10mmol) and TBAB was added and the mixture vigorously stirred till the completion of the reaction (tlc checked). Crystals began to separate after 5-10 min. The separated solid was filtered, washed with cold ethanol and recrystallized from ethanol.



1 2a-i 3a-i

3a : R=H,R_1=OCH_3, R_2=H
3b : R_1=H, R_1=H, R_2=F
3c: R= H, R_1=H,R_2= CH_3
3d: R= H, R_1=H, R_2=Cl
3e: R= H, R_1=H, R_2= H

RESULTS AND DISCUSSIONS:

Sr. No.	Compd	2-hydroxy chalcone	Yield (%)	mp (^{0}C)
1.	**3a**	R=H,R_1=OCH_3, R_2=H	**85**	**170^0 C**
2.	**3b**	R_1=H, R_1=H, R_2=F	**78**	**210^0 C**
3.	**3c**	R= H, R_1=H,R_2= CH_3	**75**	**178^0 C**
4.	**3d**	R= H, R_1=H, R_2=Cl	**66**	**162^0 C**

The I.R. sectrum of these compound in general exibited band around 1640 indicating that the carbonyl group and olefinic bonds are in conjugation. In IR these compounds showed O-H stretching frequency at about 3100cm^{-1} which confirmed the presence of free hydroxyl group and further supported by coloured reaction with $FeCl_3$ solution.

CONCLUSION

The method extended here for the synthesis of 2-hydroxy chalcones is simple, effective in terms of shorter reaction time, good yields and formation of single product. The method used in the present work proved to be convenient, economical and eco-friendly as no other by product was formed and no toxic material was used during synthesis..

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Acid Catalysed Esterification Reaction: A Green Approach

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ABSTRACT

Esterification of carboxylic acid was carried out using green acid catalyst and fatty acid as a renewable feedstock. The effects of all the parameters such as reaction temperature, molar ratio and different acid catalyst on the reaction were studied and the conditions optimized to attain an adequate synthesis. The reaction product was characterized.

Key words: Esterification, Fatty acid, Acid catalyst

INTRODUCTION

In recent years, with the increase of environmental protection the synthesis of ester from fatty acid as the raw material has increasingly received attention[1]. Oleic acid is an important fatty acid and accounts for more than 50% of natural fatty acids. Moreover, it is also the main component of vegetable oil. Oleic acid ester is an important reaction intermediate. It can be further transformed into various kinds of surfactants, lubricant oil and oil additives, and products for other applications[2-5]. Esterification of stearic acid with p-cresol over different catalysts[6], esterification reaction have been carried out using montmorillonite clay[7,8], Kaolinite clay[9]. In order to satisfy the demands of environmental protection, the chemical industry must move towards sustainable development. Consequently the traditional liquid acid catalyst in the esterification reaction must be substituted by more environmentally friendly catalyst. At the same time, improving the quality of production, increasing the biodegradable monoester and controlling the synthesis process could also prevent environmental pollution. A mild and clean protocol for esterification of oleic acid using Fuller's earth and sulphamic acid as a green catalyst is reported.

EXPERIMENTAL:

Chemicals: Oleic acid, Sulphamic acid were procured from Sd. Fine chemicals, India.

The synthesis process was carried out in six station reaction assembly (Carousel 6 plus model, Radleys Tech., US) equipped with magnetic stirring system, refluxing condenser and electrical heating system.

In a typical experiment oleic acid and glycerol with different molar ratio (1:1, 1:2, 1:3) and different acid catalyst (0.5%) were placed in a dry reaction flask. The temperature was slowly raised to 100–130^{0}C for 3 hrs. The progress of the reaction was monitored by TLC and also by acid value. When the acid number of the reaction system no longer decreases, the reaction was stopped at once. Then a series of operation were carried out: cooling, filtration, washing with alkali to remove acid, and washing with warm water to neutralization, extract from water. The organic layer was dried over anhydrous sodium sulphate to finally isolate a transparent oily product. In general reaction for the esterification of an organic acid with an alcohol is represented as,

$$\mathbf{RCOOH + R'OH} \xrightleftharpoons{H^+} \mathbf{RCOOR' + H_2O}$$

RESULT TABLE

Table 1: Oleic acid ester catalyzed by different acid catalysts

Sr. No.	Batch Code	Molar ratio of Oleic acid: glycerol	Catalyst	Acid Value	% Yield	Product Colour
1	E1	1:1	Conc. H_2SO_4	12	65%	Yellow
2	E2		Clay	15	59%	Light Yellow
3	E3		Sulphamic acid	17	42%	Colourless
3	E4	1:2	Conc. H_2SO_4	20	71%	yellow
4	E5		Clay	16	62%	Light Yellow
5	E6		Sulphamic acid	15	48%	Colourless
6	E7	1:3	Conc. H_2SO_4	10	77%	yellow
7	E8		Clay	14	69%	Light Yellow
8	E9		Sulphamic acid	15	55%	Colourless

The reaction was monitored by determining acid values. Acid value was calculated by using following formula.

$$\text{Acid Value} = \frac{56.1 \text{ X } N_{KOH} \text{ X volume of KOH solution}}{\text{Weight of sample in g}}$$

Where *N* was the exact normality of alc. KOH (in MeOH).

RESULTS AND DISCUSSION:

As mentioned in the experimental details, different catalysts have different effects on the synthesis of Oleic acid ester. Other reaction condition was the molar ratio of oleic acid: glycerol. The reaction was monitored by TLC.

The reaction time was determined by analyzing sample with acid value. The acid value was decreased from 195 to 10. As acid value was decreased more is the conversion of acid to ester. Drop in acid value from result table indicates completion of reaction.

As shown in Table 1, conc. sulphuric acid leads to the best oleic acid conversion rate though it gives more % yield than Clay, but the product colour was so bright as compared to Clay catalysed reaction. Sulphamic acid catalysed reaction shows less yield but it gives colourless product.It proved that sulfamic acid is excellent catalyst for esterification reaction. The best molar ratio ofoleic acid: glycerol was 1:3 as it gives moreyield with drop in acid value and colourless product.

FTIR Spectra:

An ester group peak at 1740-1750 cm^{-1}which shows that an ester has been introduced into the product. Peaks of the C–H bond of the methyl group and methylene group appeared at 2,924 cm^{-1}, 2,857 cm^{-1}.

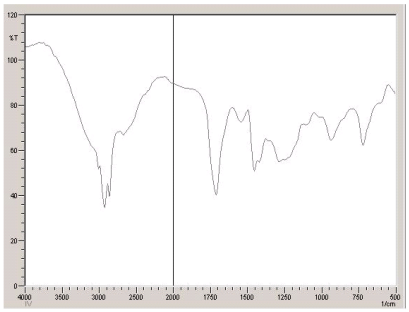

Fig. FTIR spectra of batch E4

CONCLUSION

The present one pot three component reaction is mild simple, efficient and makes use of inexpensive, non hazardous locally available catalyst. Since practically no waste product is formed. This is green acid catalysed and renewable feedstock protocol for preparation of esters.

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Zinc dust: easily available, cheap, reusable and highly efficient heterogeneous catalyst for Acetylation, Benzoylation and Chloroacetylation of alcohols.

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ABSTRACT
Zinc dust has been found to be an efficient reusable heterogeneous catalyst for Acetylation, Benzoylation and Chloroacetylation of alcohols at ambient temperature
Key words: Acetylation, Benzoylation, Chloroacetylation, Alcohols, Zinc dust, Heterogeneous catalyst

INTRODUCTION:

An esterification is an important step to protect hydroxyl group during functional group transformation[1,2,3]. The most common method for preparing esters is to heat a carboxylic acid (R-COOH) with an alcohol (R'-OH) while removing the water that is formed. The reaction is slow and reversible. An acid catalyst is usually needed to make the reaction occur at a useful rate. It has been reported that many acid catalysts used in the esterification reaction affect the reaction rate[4]. However, protection and de-protection of hydroxyl functional group has prime importance in pharmaceutical industries, polymers, cosmetics, per- fumes, plasticizers to achieve excellent yield to potential targeted synthetic compounds. Owing the importance of protection of hydroxyl functional group during the multi- steps organic synthesis, the various methods for the protection of hydroxyl group using varieties of reagent and catalysts such as homogeneous basses such as amines, pyridine, Et3N[5] or acids such as p- toluene sulphonic acid[6] metal chlorides[7,8,9] metal triflates such as Sc(OTf)3/Bi(OTf)3/Li(OTf)3[10,11,12] polymeric acids[13,14] metal perchlorates ($LiClO_4$ /$BiOClO_4$)[15,16] have also been utilized as Lewis acid catalysts for acylation of alcohols. However, the use of homogeneous catalysts poses several serious problems, such as difficulty in the separation and recovery of the catalyst, disposal of the spent catalyst, corrosion problems etc. Hence there is a need for development of easily separable and reusable solid catalyst having high activity. Solid catalysts like zeolites, clays and resins also found active for ester formation from alcohols[17,18,19]. It is observed that having some advantages , the above methods suffer from one/or other limitations and drawbacks such as drastic reaction conditions, long reaction time, high temperature, use of moisture sensitive, toxic, expensive reagents and catalysts. Therefore, considering all the above facts, still there is a need and demand to develop a solvent free, greener and an economical protocol and catalysts for protection of hydroxyl of alcohols by esterification. Therefore, herein, we wish to report a mild, rapid and efficient protocol for the O-acylation of alcohols with different acylating reagents like acetyl chloride, benzoyl chloride and Chloroacetyl chloride using Zinc dust as a easily available, safe and efficient catalyst at ambient temperature.

METHODOLOGY

Experimental

Materials and Methods:

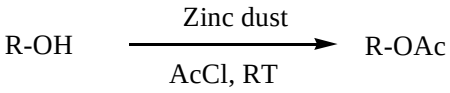
a) Chemicals and Reagents:
All Reagents used were of commercial grade and used as such without further purification

b) Melting Points and Boiling points:
Melting points were determined in Open Capillaries and are uncorrected.

c) IR Spectrum:
IR spectra were recorded on Shimadzu FT-IR 8400 (Affinity model SI 118675A) using KBr.

d) Thin Layer Chromatography:
Thin layer chromatography plates were obtained from silica gel slurry prepared in methanol. The solvent system used for TLC was 10% ethyl acetate in n-hexane.

General reaction Procedure:



Scheme 1: Zinc dust catalyzed O-acylation of alcohols.

Alcohol (20 mmol) and Acylating agent -acetyl chloride/benzoyl chloride/chloroacetyl chloride (25 mmol) was taken in 10 mL of ether in a 25 ml round bottom flask. To this reaction mixture catalyst Zinc dust catalyst was added then the mixture was stirred at ambient temperature for specified time period. The completion of the reactions was monitored by TLC. After the completion of the reaction, the mixture was diluted with diethyl ether (10 ml) and the catalyst was recovered by filtration. The filtrate was washed with $NaHCO_3$ twice and then with small quantity of water, dried over anhydrous Na_2SO_4. Evaporation of ether gives the pure product. Confirmation of product was done by comparing physical constant and the spectral analysis with standard product.

Antimicrobial study:
Antibacterial study of the all the acylated products was determined by diffusion technique on agar. The culture of bacteria (e.coli) was maintained on nutrient agar and was incubated. After the incubation for 24h at 30°c the diameter (mm) of inhibition zone was measured.

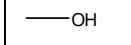
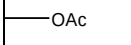
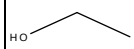
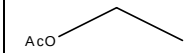
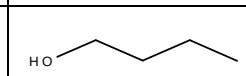
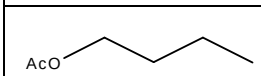
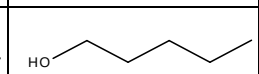
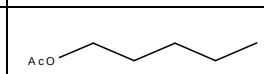
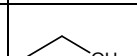
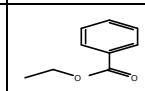
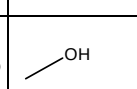
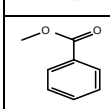
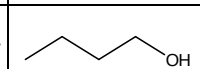
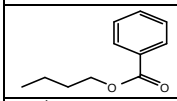
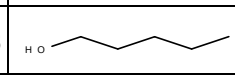
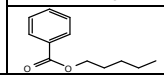
RESULTS AND DISCUSSIONS
Part 1: Acetylation of alcohols by acetyl chloride and Benzoylation of alcohols by benzoyl chloride.
Initially Ethanol was chosen as model substrate and its acetylation was examined under various reaction conditions like various catalysts and it was found that activity of Zinc is higher and hence its amount was optimized (**Table-1**). The results of influencing catalyst promoted us to evaluate the scope of this methodology for different types of alcohols using acetyl chloride and benzoyl chloride as acylating agent and Zinc dust as catalyst and we found that number of alcohols were acetylated and benzoylated in good yield without any difficulties in very short reaction time(**Table 2**)

Table 1: Acetylation of alcohol by acetyl chloride in presence of different catalysts.

Sr. No.	Catalyst	Amount (wt% wrt wt. of ethanol)	Time (min)	% yield
1	(Indion-130 resin)	20	10	75
2	(Indion-140 resin)	20	10	64
3	(Indion-790 resin)	20	10	74
6	Silica	20	10	62
7	Zinc dust	5	10	68
8	Zinc dust	10	10	80
9	Zinc dust	20	10	82
10	No Catalyst	--	10	Trace

*Reaction conditions: The ethanol (20 mmol), acetyl chloride (25 mmol), room temperature;

Table 2: Zinc dust catalyzed acetylation and Benzoylation of different alcohols with acetyl chloride and benzoyl chloride.

Sr. No	Starting Material		Product	m.p./b.p. ^{0}C (Literature)	Time (min)	Yield (%)	Anti-bacterial activity (E.coli)
	Substrate	Acylation agent					
1		Acetyl Chloride		58, liq. (57)^	10	72	+
2				78, liq. (77)^	10	73	-
3				124, liq. (126)^	10	81	+
4				152, liq. (149)^	10	89	+
5		Benzoyl Chloride		211-213 liq. (211)^	30	73	+
6				196-198 liq (198)^	30	77	+
7				Above 200 (250-255)^	30	80	+
8				Above 200 (260)^	30	78	++

***Reaction conditions:** The substrate (20 mmol), acetyl chloride/benzoyl chloride (25 mmol), 10 weight% catalyst, room temperature; TLC, ^ Merck Index; (+) = 1-10 mm = less active; (++) = 11-20 mm = moderately active; (+++) = more than 20 mm = highly active

Part 2 - Zinc dust catalysed Chloroacetylation of alcohols by chloroacetyl chloride

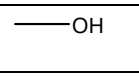
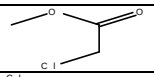
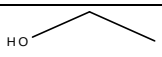
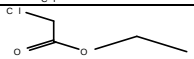
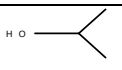
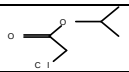
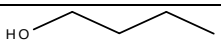
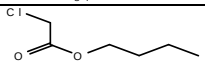
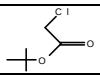
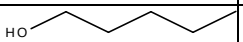
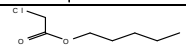
Initially Ethanol was chosen as model substrate and its chloroacetylation was examined under various reaction conditions like various catalysts and amounts (**Table 3)**. Under optimum reaction conditions, ethanol was chloroacetylated at room temperature almost quantitatively using Zn dust as a catalyst. To evaluate the scope of this methodology for different types of alcohols using chloroacetyl chloride as acylating agent and Zinc dust as catalyst and we screened number of alcohols (Table 4)

Table 3: Influence of various catalyst for chloroacetylation of alcohol by chloroacetyl chloride

Sr. No.	Catalyst	Amount (wt.% wrt wt. of Ethanol)	Time (min)	% yield
1	(Indion-130 resin)	20	60	80
2	(Indion-140 resin)	20	60	75
3	(Indion-790 resin)	20	60	78
5	Silica	20	60	62
6	Zinc dust	5	60	55
7	Zinc dust	10	60	75
8	Zinc dust	20	60	85
9	No catalyst	--	60	No Reaction

*__Reaction conditions:__ The ethanol (20 mmol), chloroacetyl chloride (25 mmol), 20 weight% catalyst, room temperature

Table4: Zinc dust catalyzed chloroacetylation of alcohols with chloroacetyl chloride

Sr.No	Alcohol	Product	m.p./b.p. ^{0}C (Literature)	Time (min)	Yield (%)	Anti-bacterial activity(E.coli
1			130-131 (130)	60	78	++
2			140-141 (142-145)	60	85	++
3			147-148 (149- 150)	60	85	-
4			178-179 (180)	60	90	-
5			48-49 (48-49)	60	72	++
6			195-197 (197)	60	92	-

Reaction conditions: alcohol (20 mmol), chloroacetyl chloride (25 mmol), 20 weight% catalyst, room temperature; (+) = 1-10 mm = less active; (++) = 11-20 mm = moderately active; (+++) = more than 20 mm = highly active.

Recyclability Study:

We examined the recovery and reusability of the zinc dust for acetylation of ethanol using acetyl chloride at the same optimized reaction condition and found that catalyst can be separated by simple filtration and can be reused without any significant loss in its product yield (**Table 5**)

Table 5 Recyclability study of Zinc dust for Acylation of alcohols

Cycle	Time(min)	Yield (%)
1	10	80
2	10	79
3	10	74

*__Reaction conditions:__ The substrate (20 mmol), acetyl chloride (25 mmol), 10 weight% catalyst, room temperature

CONCLUSION

In conclusion, Zinc dust is an active catalyst for the acetylation, benzoylation and chloroacetylation of alcohols. The process has asset of simplicity, easier work up, recyclability of catalyst, waste minimization.

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Development of Electronic Nose

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ABSTRACT

Principle of e-nose

- E- nose consists of array of gas sensors, signal conditioning & preprocessing circuits.
- gas sensor array generates fingerprint of odour.
- Pattern recognition performs odour identification & discrimination.
- The E-nose needs training to identify particular odour.

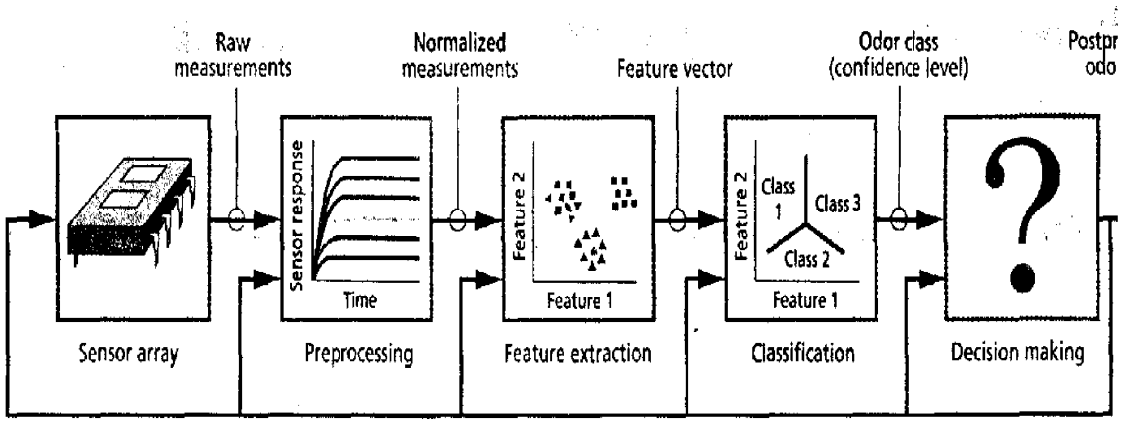
Mechanism:-

- Each sensor produces independent response to different chemical elements in a sample.
- Array of 4 to 32 gas sensors.
- Sum of all sensor responses forms the pattern for unknown sample.
- To identify an unknown sample pattern is compared with patterns in library.
- The steady state sensor responses are utilized for the qualitative analysis.
- The sensor transient response are employed for the Quantitative analysis

Applications:-

- *Industrial applications* - To measure quality of food, drink, perfumes, cosmetics, chemicals product, gas leakages etc.
- *Health & hygiene* - Voc to early detection of cancer, heart trouble, urinary system etc.
- *Environment* - Air, Water ,toxic gas, bacteria
- *Military application*- Detection of explosive

Working System



First of all we warm the sensor. Because the warm up period of the sensor is 24hour.

When we start the experiment we use the power supply to do this experiment.

We have to use the battery of 12V. The voltage required for the sensors is 5V and the voltage required for the fan which is we attach of equally distribution is 12V

Before the inject the gas the nitrogen gas is give to electronic nose to leave the all types of gases which are present inside the electronic nose.

Sensors are very sensitive for all type of gases. So for low concentration also we get the reading.

Now we inject the gas in the electronic nose whose reading we have to taken with the help of siring through gas plug.

As soon as we inject the gas the sensors gives the response for gas.

The reading of sensors we have to take on the DMM or volt meter. here we use the DMM

Datasheets of Used Sensor

MQ-6 Semiconductor Sensor for LPG

Sensitive material of MQ-6 gas sensor is SnO2, which with lower conductivity in clean air. When the target combustible gas exist, The sensor's conductivity is more higher along with the gas concentration rising. Please use simple electrocircuit, Convert change of conductivity to correspond output signal of MQ-6 gas sensor has high sensitity to Propane, Butane and LPG, also response to Natural gas.

Sensor could be used to detect different combustible gas, especially Methane, it is with low cost and suitable for different application.

Features

- Good sensitivity to Combustible gas in wide range
- High sensitivity to Propane, Butane and LPG
- Long life and low cost
- Simple drive circuit

Application

- Domestic gas leakage detector
- Industrial Combustible gas detector
- Portable gas detector

MQ-3 Semiconductor Sensor for Alcohol

Features

- High sensitivity to alcohol and small sensitivity to Benzine .
- Fast response and High sensitivity
- Stable and long life
- Simple drive circuit

Application

They are suitable for alcohol checker, Breathalys

MQ-4 Semiconductor Sensor for Natural Gas

Features

- High sensitivity to CH4, Natural gas.
- Small sensitivity to alcohol, smoke.
- Fast response . * Stable and long life * Simple drive circuit

Application

They are used in gas leakage detecting equipments in family and industry, are suitable for detecting of CH4,Natural gas.LNG, avoid the noise of alcohol and cooking fumes and cigarette smoke.

MQ-5 Semiconductor Sensor for Propane

Features

- High sensitivity to LPG, iso-butane, propane
- Small sensitivity to alcohol, smoke.
- Fast response . * Stable and long life * Simple drive circuit

Application

They are used in gas leakage detecting equipments in family and industry, are suitable for detecting of LPG, iso-butane, propane, LNG, avoid the noise of alcohol and cooking fumes .

MQ-7 Semiconductor Sensor for Carbon Monoxide

Features

- High sensitivity to carbon monoxide
- Stable and long life

Application

They are used in gas detecting equipment for carbon monoxide(CO) in family and *industry*

RESULT

1. We can detect the unknown gas with the help of prototypes electronic nose.
2. We take the number of readings to get the accurate value.We also can plot the graph, with the help of this we can study the whole process.

DISCUSSION

There are numerous potential applications of electronic noses from the product and process controlo the environmental monitoring of pollutants and diagnosis of medical complaints. However, this requireshe developments of application-specific electronic nose technology that is electronic noses that have beendesigned for a particular application. This usually involves the selection of the appropriate active material,tsensor type and pattern recognition scheme. The work has led to several commercial instruments, oneemploying commercial tin oxide sensors (Fox 2000, Alpha MOS, France) and another employing conductingolymer sensors (NOSE, Neotronics Ltd, UK). Future developments in the use of hybrid microsensor arraysand the development of adaptive artificial neural networking techniques will lead to superior electronic noses.

The major areas of research being carried out in this field are:

- Improved sensitivity for use with water quality and sensitive microorganism detection applications.
- Identification of microorganisms to the strain level in a number of matrices, including food.
- Improvement in sensitivity of the E-Nose for lower levels of organisms or smaller samples.
- Identification of infections such as tuberculosis in noninvasive specimens (sputum, breath).

CONCLUSION

With a vast amount of literature now available to demonstrate the theoretical and practical feasibility of using electronic noses in many diverse applications, the trick now will be to go the extra distance to begin to fine-tune these technologies for many practical and specific applications.

This will require cooperative efforts and informative exchanges between researchers and practitioners. Once these difficulties and logistics are resolved, electronic-nose devices should be capable of solving many problems and serving many of the future needs of the industries that have yet to be discovered.

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Development of Electronic Nose

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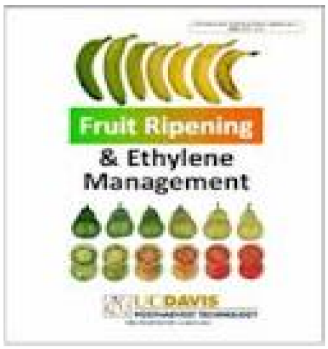

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- ***Environment -*** Air, Water ,toxic gas, bacteria
- ***Military application -*** Detection of explosive

INTRODUCTION

- Gas molecules interact with solid-state sensors by absorption, adsorption or chemical reactions with thin or thick films of the sensor material.
- Physical and/or chemical changes takes place in these processes and these changes are measured as an electrical signal.
- These materials work on the principle that a change in some property of the material resulting from interaction with a gas/odour leads to a change in resistance in the sensor.
- With a multisensor array, you can look at the simultaneous individual-sensor-element responses to an

odor as a bar chart. Because each sensor element has a unique odor sensitivity, the combined response of the elements is a unique profile, or fingerprint, of an odor. However, you need not rely on 1-D graphs of detected odors. E-nose vendors use data-processing software to manipulate sensor responses to display data as 2- or 3-D graphs.

- In this work, the use of an Electronic Nose for non-destructively monitoring the fruit ripening process is presented. Based on a tin oxide chemical sensor array and neural network-based pattern recognition techniques, the olfactory system designed is able to classify fruit samples into three different states of ripeness (green, ripe and overripe) with very good accuracy. Measures done with peaches and pears show a success rate above 92%, while a slightly worse accuracy is reached with apples. An additional feature of the system is its ability to accurately predict the number of days the fruit has been in storage since harvest. Measures done with peaches show a maximum error of 1 day.

DISCUSSION

The trend of the e-nose sensor signals as directly used in field versus time. The figure also shows the evolution of the response in terms of conductance (S) of the 6 TGS sensors during a measurement (duration time: 3 h). Based on the operator feedback that has been recorded simultaneously with the use of electronic nose, different time intervals have been identified (asdetermined on the Figure 2), in which the electronic nose has been exposed to different gas mixtures:
odourless air - waste - compost.

Figure 1: Trend of sensor signals of the e-nose in the field 141The most interesting results can be obtained through the correlation of the instrument information along with the observations of the operator nose. Some of these results are summarized as it follows:

The main peaks of the odour class "waste" have been recorded when the trucks emptied their transported volume into the waste pit; the higher peaks of the odour class "compost" have been recorded at the time of the mechanical operations of the green waste windrows turning. The PCA score plot of 301 observations recorded every 30 s for three continuous hour for the first of .May is presented in Figure 2 in the plane of the two first components (explaining 90.88 % of the total variance). First, PCA has been carried out on the whole data set, the score plot allows to highlight the time evolution of the different odour events.

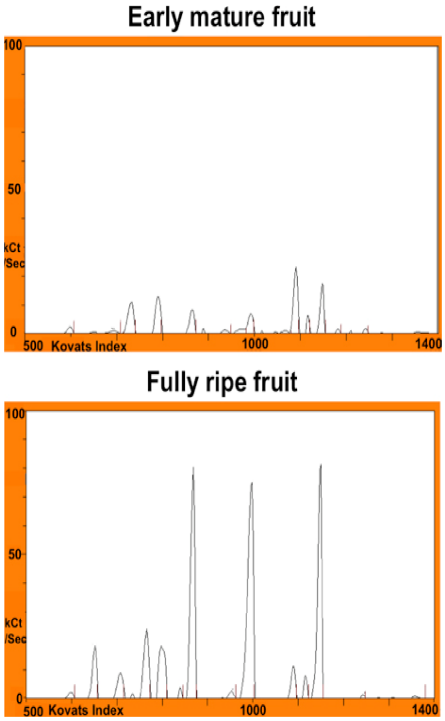
Figure 2: Score plot of a PCA showing the time evolution of different odour events .In Figure 3 it is showed that the e-nose reports variations in terms of odour concentration, as the point at 14:01 was monitored at the time waste trucks were discharging solid waste in the pit; on the opposite, at 14:13 the e-nose operator was moving away from the odour source. Moving from 14:01 to 14:13, Factor 1 value changed. We can observe some lack of definition between some observations of the odourless air group and the compost ones. Explanation of this phenomenon might be given as it follows: the points identified as “compost” on the upper part of the score plot are those for which the operator noted a “light odour”.

Similarly, “waste” detections at low concentrations highlight a lack of definition in that the sampling did not occur at the source, but instead at a certain distance from the emission point. This has, in turn, led to a bad correlation of these points with the whole “waste” group, that, on the overall, is well defined on the score plot. As to consider all the previously described elements, four groups have been introduced: the first group “waste” represents all the data where a strong odour has been recorded straight on the odour source; the second group “waste 1”, consists in all the points where a similar odour has been monitored, even though its intensity is lower; the third group “compost” represents all the inspected points where the e-nose operator correlates the odour with a compost matrix; the fourth group, “odourless”, is made up of all the points over the plant where the operator cannot detect any odour at all.

These new rules of classification have been applied on a new data set. Only the data with a perfect identification of the class by the operator and after a separation in “waste” and “waste 1” are considered. So the data are non-contiguous in time: the observations concern several short intervals of time covering 5 odour campaign measurement for a duration time of 2 hour for every analysis. At the end, 366 observations are retained.

These observations were recorded each 1 min for the different sources: 154 for the background air, 87 for the group “waste”, 46 for the group “waste 1” and 79 for the group “compost”.

The PCA score plot of these is presented in Figure 4 in the plane of the two first components (explaining 91.1 % of the total variance).



RESULT

The paper has presented the design of an Electronic Nose system using 08 Metal Oxide Semiconductor gas sensors from Figaro Sensor (China). All the parts of the E-nose system were designed and fabricated in the laboratory. The developed E-nose has been tested to confirm its repeatability, reproducibility and discriminative ability which are important characteristics of an analytical instrument.

The presented results constitute an important step towards reliable classification for odour continuous measurement in the environmental sector. The results show the great efficiency of the proposed approach of field investigation to reduce the time needed to build the complete data set and to maximize the electronic nose capability of operating a qualitative classification of odour sources.Further enhancements of the e-nose development consist in its application in areas where people complain about odour annoyance. This will lead to a better comprehension of its potentiality in terms of reliability and accuracy.

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Evaluation of Groundwater Quality near Open Solid Waste Dumping sites in Jalgaon City, Maharashtra

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ABSTRACT

Large quantity of solid waste generated from the residences, commercials and hospitals is dumped in open land areas. Such dumping causes environmental pollution by deteriorating the ground water quality by leachate which makes the water unfit for drinking and other purpose. The study was conducted to evaluate the effect of solid waste dumps on ground water quality near open dumping areas. Ground water samples were collected from different locations from two open dumping sites of Jalgaon city i.e. Tambapura site and Aahuja Nagar site. The ground water samples were analyzed for physico-chemical parameters like Color, Taste, pH, EC, Turbidity, Acidity, Alkalinity, Hardness, Total dissolved solids, Chlorides, Fluorides. MPN test were determined to evaluate biological contamination of ground water in this study area. All observations were compared with Bureau of Indian Standard for Drinking Water (BIS: 10500:1991). It has been found that most of the parameters of ground water quality exceed the permissible limits due to the contamination from solid waste materials that are dumped in the area.

Keywords: Ground water, solid waste, leachate, physico-chemical, biological contamination

INTRODUCTION

Groundwater pollution is mainly due to the process of industrialization and urbanization that has progressively developed over time without any regard for environmental consequences. In recent times, the impact of leachate on groundwater and other water resources has attracted a lot of attention because of its overwhelming environmental significance. Leachate migration from wastes sites or landfills and the release of pollutants from sediments (under certain conditions) pose a high risk to groundwater resource if not adequately managed. Open dumps are the oldest and most common way of disposing of solid wastes, although in recent years, thousands have been closed, many are still being used. Waste management has become increasingly complex due to the increase in human population, industrial and technological revolutions and the processes that control the fate of wastes in the soil is complex and many of them are poorly understood. Issues such as nutrients release rate and other chemicals, leaching of nutrients, metals through macro pores as suspended solids and sludge organic matter on the sorption degradation are often not understood by many. Leaching of hydrophobic organics and long term bioavailability and fate of metals fixed by soil organic matter needed to be studied to have a better approach in handling groundwater pollution. Toxic chemicals that have high concentration of nitrate and derived from waste in the soil can filter through a dump and contaminate both ground and surface water. Insects, rodents, snakes and scavenger birds, dust, noise, bad odor are some of the aesthetic problems associated with sanitary landfill.

MATERIALS & METHODS

Two open solid waste dumping sites i.e. Tambapura area and Aahuja Nagar area in Jalgaon City were selected for this study. At present open dumping at Tambapura is ongoing while at Aahuja Nagar area, it is closed since last two years.

Water sampling

Water samples from groundwater sources that are extensively used for drinking purposes by the local residents were collected randomly by grab sampling technique. Total 5 samples were collected from both the open dumping sites to evaluate its effect on groundwater aquifer.

The plastic container having 2 liter capacity was used for collection and storage of water sample. The containers were thoroughly washed and rinsed before every collection. All samples were properly labeled with details of the source, date of sampling, time of sampling and address. Sample containers for bacteriological examinations were sterilized before use. For each sampling site separate container was used.

The collected ground water samples were analyzed for 4 physical and 16 chemical parameters respectively. Most Probable Number (MPN) test was done to assess the biological contamination of water. All analysis was performed as per standard methods (APHA, 1998).

RESULT & DISCUSSION

The analytical results of the various physico-chemical analysis of the groundwater samples of Tambapura area (T1 to T5) and Aahuja Nagar area (AN1 to AN5) are tabulated in table 1 and shown in fig.1 and fig. 2 respectively. All obtained results are compared with Bureau of Indian Standard / Specification for Drinking Water (BIS: 10500:1991)

Tambapura Area		**Aahuja Nagar Area**	
Parameters within limits	**Parameters exceed limits**	**Parameters within limits**	**Parameters exceed limits**
pH	Tubbidity	pH	Turbidity
Electrical Conductivity	Total Hardness	Electrical Conductivity	Total Hardness
Alkalinity	Calcium Hardness	Calcium Hardness	Mg^{2+}
TSS	Magnesium Hardness	Ca^{2+}	
Sulphate	Ca^{2+}	TDS	Acidity
Sodium	Mg^{2+}	TSS	
Potassium	TDS	Nitrates	Fluoride
Phosphate	Fluoride	Sulphates	
	MPN	Pottasium	MPN
		Phosphate	

Table 1: Table showing obtained limits of various physico-chemical parameters of both study area

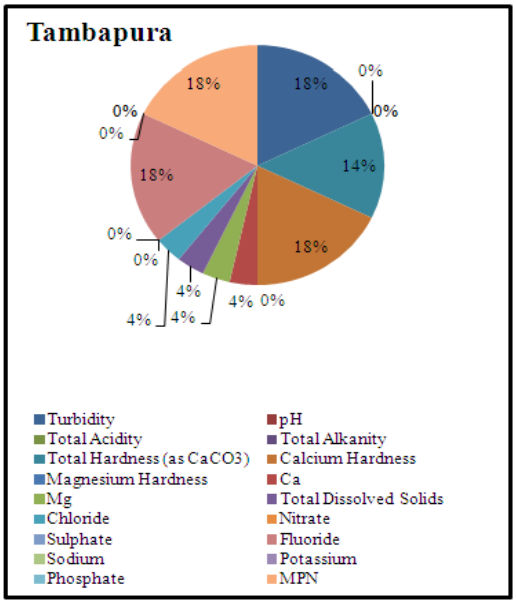

Fig. 1: Statistics of exceeding parameters in Tambapura

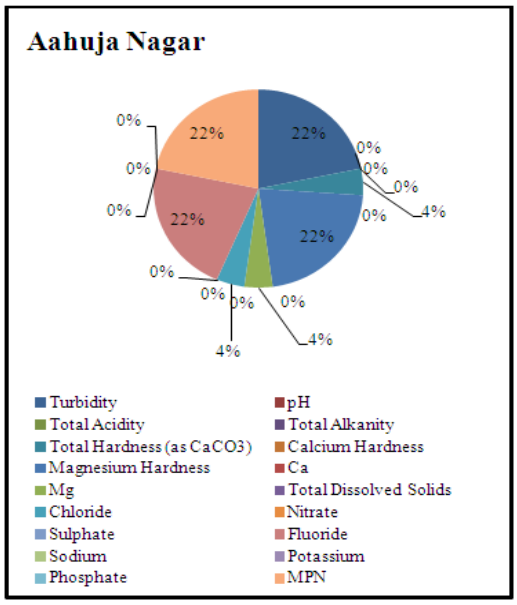

Fig. 2: Statistics of exceeding parameters in Aahuja Nagar

From sample analysis it was found that the chemical parameter like Turbidity, Acidity, Total Hardness, Ca Hardness, Fluorides were present above the prescribed limit in all five samples of Tambapura. The other parameters like TDS, Ca^{2+}, Mg^{2+} and Chlorides were present only in 1 or 2 samples from this area. At Aahuja Nagar area Turbidity, Fluorides, MPN were beyond the prescribed limit in all five samples. Potassium were detected in all five samples of Tambapura area within prescribed limit while at Aahuja Nagar areas potassium were not detected in any sample. MPN test were positive for all 10 samples from both locations.

CONCLUSION

From physico-chemical analysis of the groundwater samples of Tambapura area and Aahuja Nagar area it is concluded that the ground water is contaminated by the dumping of municipal solid waste near these areas. Out of total 16 parameters, 12 parameters were found exceeded the prescribed limits when they were compared with BIS standards. The positive results of MPN test of all samples shows the biological contamination of ground water in these areas.

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Systematic review of water related infectious diseases and its relation with drinking water quality in Jalgaon city, Maharashtra

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ABSTRACT

Water is the essential resource for human survival and improvement. According to the World Health Organization UNICEF/WHO (2012) only 18% of the Indian household has access to safe drinking water. The unhygienic drinking water and sanitation practices are the main cause of water borne diseases. The contaminated of water resources affects human health and natural environment. The present study focused on water related infectious diseases and its relation with drinking water quality as of Jalgaon City. Various analyses including physical, chemical and microbiological evaluation were carried out on the water samples collected from the Jalgaon city. Most of physico-chemical parameters were observed beyond the priscribed limit. Out of 5 locations, in 2 locations were observed biological contamination of drinking water.

Key words: water quality, microbial contamination, infectious diseases.

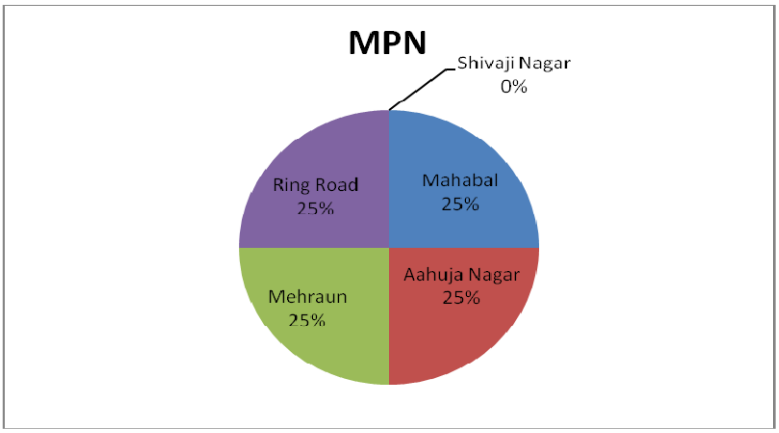
INTRODUCTION

Water is the key element in our life for survival. Water quality related issues are the major concern in many developing countries including India. According to the UNICEF/WHO (2012) report near the one billion people in the world lacks access to safe and adequate water. The World Health Organization (WHO) reported that around 94% of the worldwide diarrheal trouble and 10% of the aggregate infection load are because of unsafe drinking water, lacking sanitation, and deprived hygienic practices. This unhygienic practice leads to contamination of water resources. Lack of safe drinking water and sanitation ultimately affects the well being of the community. Hence it is essential to study the microbial contamination of water resources. This research includes the review of water related diseases and its relation with drinking water quality in Jalgaon city, Maharashtra state.

MATERIALS AND METHODS

1. **Method of Sample collection:** The sample locations for water quality analyses were determined by the adults and children hospital's review carried out to find out the types of diseases occurs season wise, age factor and gender were also considered in study. Through this review the disease prone areas in the Jalgaon city were identified.. The water samples were collected from randomly selected household of this identified areas.
2. **Physicochemical Analysis:** The parameters analyzed include physico-chemical parameters such as pH, Electrical Conductivity (EC), Total Dissolved Solids(TDS) and Total Hardness(TH), also the major ions in water sample such as Calcium (Ca), Magnesium (Mg), Sodium (Na), Potassium (K),Carbonate (Co^3), Bicarbonate (HCO_3), Chloride (Cl), and Sulphate (SO4). All analysis were done by standard methods (APHA 2005)
3. **Microbial Analysis:** The microbial parameter of health significance was tested for coliforms by the Most Probable Number Test (MPN).

RESULT AND DISCUSSION



All observed values were compared with BIS drinking water standard (10500:1991). Most of the physico-chemical parameters were found within prescribed limits except total hardness. Total Hardness found beyond prescribed limit at Shivaji Nagar (2 locations), Ring Road (2 locations) and Aahuja Nagar (1 location). The MPN test were possitive at Mehrun, Ring Road, Mahabal, Aahuja Nagar showing biological contamination of drinking water sources.

CONCLUSION:

From the above results it was conclude that due to presence of biological contamination there is risk of health related issues in this area. So it is suggested that advance water purification techniques should be adopted.

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Deficiencies of micronutrients in soils of Watershed in SAT region - An Analytical Study of Padmalaya Model Watershed, Jalgaon, Maharashtra.

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ABSTRACT

Rain-fed agriculture productivity is crucial for food security and economy of the state. To characterize the fertility of soils under dry-land agriculture in the semi-arid regions, 45 soil samples were collected from watershed area in Jalgaon district of Maharashtra to diagnose the deficiencies of macronutrients like Potassium, Sodium and Sulphur and micronutrients like Boron and Zinc. A summary of the chemical analysis of soil samples covering the watershed area showed that the farmer's fields sampled had a wide range in pH and EC and they were low-to-moderate in organic carbon, generally adequate in exchangeable potassium and sodium. However, the most revealing results on soil chemical analysis were the widespread deficiencies of levels of extractable phosphorous (P), sulphur (S), boron (B) and zinc (Zn) in the samples.

Keywords: rain-fed, agriculture, fertility, macronutrients, micronutrients, deficiencies.

INTRODUCTION

Semi Arid Tropics (SAT) regions spread over 11.6 million square kilometers in the developing world, are densely populated and poverty stricken, largely as a result of dependence of the economy and livelihoods on subsistence agriculture (Srinivasarao et. al., 2008). Soils in the Indian SAT are marginal compared to irrigated soils. Poor soils are brought under cultivation due to population pressure. At relatively low yields of crops, the deficiencies of major nutrients, especially nitrogen (N) and phosphorus (P) are considered important for the SAT soils (El-Swaify et. al., 1985). Little research effort has been devoted to diagnose the extent of deficiencies of the secondary nutrients such as sulphur and micronutrients in various crop production systems. It is, however, recognized and emphasized that the productivity of SAT soils is low due to water shortage. Apart from water shortage, low fertility is also an issue because it constraints crop productivity in the SAT regions of India; but in practice the deficiencies of major nutrients (N and P) are considered important (Sahrawat et. al., 2007).

In the current study, 45 soil samples from farmer's fields in the participatory watershed are analyzed for various essential micronutrients to analyze the widespread deficiencies of the micronutrients.

MATERIALS AND METHODS

Site description and Soil sampling

A 982-ha agricultural watershed, encompassing two villages, namely Pathri-Samner, located in Jalgaon district of Maharashtra state in western India chosen by ICRISAT as the model watershed area keeping the Government of India guidelines in view was selected as a test site for carrying out the study. 45 soil samples from agricultural fields in the watershed area were collected by adopting stratified random sampling along the toposequence. The soil samples were collected from each farmer's field from the soil surface (0-15cm depth) layer. Before analysis, the soil samples were air dried and the clods were crushed and grinded by mortar and pestle to fine powder and sieved through a 2 mm sieve.

Soil Analysis

For soil analysis, pH was measured with a glass electrode using a soil-to-water ratio of 1:5; electrical conductivity (EC) was determined with an EC meter using a soil-to-water ratio of 1:5. Organic Carbon was determined using the Walkley - Black Method. Exchangeable potassium (K) and exchangeable sodium (Na) was determined using the ammonium acetate method. Available Sulphur was measured

using 0.15% calcium chloride ($CaCl_2$) as an extractant; available P was measured using the sodium bicarbonate ($NaHCO_3$) test. Available Zn was extracted by DTPA reagent, and available B was extracted by hot water.

Preparation of spatial Distribution maps

Arc GIS software (Ver. 9.3) was used for digitization, generation of spatial and attribute database and for preparation of various spatial distribution maps by inverse distance weighted (IDW) method.

RESULTS AND DISCUSSIONS

The results of soil analysis for various fertility parameters pH, EC, Organic C and extractable P, Na, K, P, S, B and Zn with emphasis on the concentrations of extractable or available S,B and Zn in the soil of SAT regions of Indian state of Maharashtra are discussed village-wise in the watershed area.

Table 1. Soil fertility status of farmer's fields in Samner Village of Padmalaya Model Watershed

Sample Count – 17									
Parameter	**pH**	**EC**	**Org C**	**Ols- P**	**Exch-K**	**Exch-Na**	**Avail-S**	**Avail-B**	**Avail - Zn**
Range	7.6-8.5	0.20-1.42	0.59-1.40	1.4-10.5	100-380	150-890	2.0-46.3	0.18-0.86	0.10-1.16
Mean	8.1	0.59	1.09	4.2	221	574	15.7	0.44	0.44
% deficiency			0	71	0	0	24	76	88

Out of the samples taken from 17 farmer's fields in Samner village, 71% was deficient in available P, 24% in S, 76% in extractable B and 88% in extractable Zn (Table-1). The soil samples had adequate amounts of Organic carbon, exchangeable sodium and potassium while a wide range in pH and electrical conductivity (indicative of soluble salt content) was observed.

Table 2. Soil fertility status of farmer's fields in Pathri Village of Padmalaya Model Watershed

Sample Count – 28									
Parameter	**pH**	**EC**	**Org C**	**Ols-P**	**Exch-K**	**Exch-Na**	**Avail-S**	**Avail-B**	**Avail - Zn**
Range	7.3-8.5	0.11-1.25	0.49-1.47	3.3-13.3	104-370	330-950	2.3-84.6	0.22-1.08	0.12-0.94
Mean	8.1	0.48	1.14	6.6	247	521	25.4	0.64	0.47
% deficiency			4	36	0	0	14	43	89

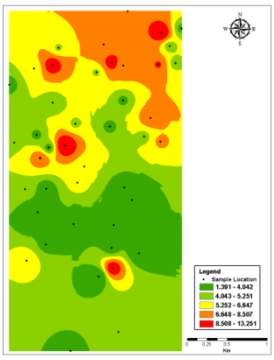
The results of analysis of soil samples collected from 28 farmer's fields in Pathri village in Padmalaya watershed are shown in Table 2. On an average, 4% of the farmer's field was found to be deficient with organic carbon, 36% in available P, 14% in extractable S, 43% and 89% in extractable boron and zinc respectively.

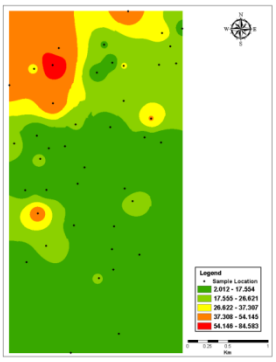
The deficiency of secondary nutrients and micronutrients varied among both villages in the watershed. Overall, out of the 45 farmer's field in the total watershed area, the deficiency of available P (89%) and extractable Zn (87%) was most widespread, followed by extractable B (56%) and S (18%) (Table 3). Spatial distribution of the deficient fertility parameters of soil over the watershed area are shown by IDW maps using Arc GIS 9.1 (Fig. 1-4).

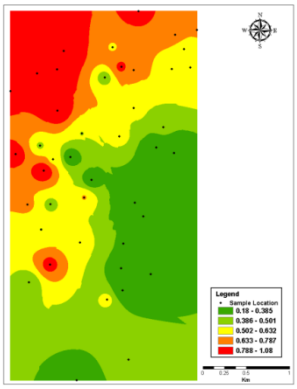
Table 3. Soil fertility status of farmer's fields in total Padmalaya Watershed Area

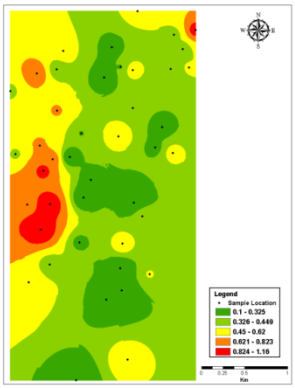
Sample Count – 45									
Parameter	**pH**	**EC**	**Org C**	**Ols-P**	**Exch-K**	**Exch-Na**	**Avail-S**	**Avail - B**	**Avail – Zn**
Range	7.3-8.5	0.11-1.42	0.59-1.40	0.5-10.5	100-380	150-950	2.0-84.6	0.18-1.08	0.10-1.16
Mean	8.1	0.52	1.11	2.2	238	536	21.9	0.56	0.45
% deficiency			31	89	0	0	18	56	87

* Critical limits in the soil used: 10 mg/kg calcium chloride extractable S; 0.58 mg/kg hot water extractable B; 0.75 mg/kg DTPA extractable Zn









CONCLUSIONS

The results clearly demonstrate the widespread deficiencies of available P, extractable S, B and Zn in farmer's field in the Samner and Pathri villages in the watershed of district of Jalgaon. To sum up, the resultes presented here show that although water shortages affect crop production in rain-fed areas in the SAT regions of India, widespread deficiencies of micronutrients also hold back productivity of rain-fed systems, resulting in low water use efficiency. Thus, it can be also observed that soil testing was effective to diagnose and predict the occurrence of deficiencies of the micronutrients in farmer's field.

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Water Literacy in Tribal and Non-Tribal Woman in Jalgaon District

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INTRODUCTION

Education is one of the important media for the developing personality of the human being. The socio-economic status of the society is governed by the educational level of the society. Hence education is considered as a basic means of development of the society. India having 65.38% literacy rate which is less than various countries of the world. Indian government is implementing various programme to increase the literacy levels in India.

Location :

Jalgaon district is located in Northern part of Maharashtra. It is one of the socially and economically developed district of Maharashtra State. Jalgaon district lies between 20^{o} and 21^{o} latitude and $74^{o}55'$ and 76^{o} 78' east longitude. It is a part of upper Tapi basin.

Objectives :

i) To study and mark water literacy level in tribal and non-tribal women
ii) To study and know the regional variations in the level of water literacy in the study region.
iii) To study the role of educational levels on variations in water literacy level among women.

METHODOLOGY

This research work is based on primary data collected in the field work. Questionnaire survey and interviews are the main tools used for data collection to know the water literacy among the tribal and non-tribal women three aspects related to water has considered. Data is tabulated and analysis is done with the help of statistical method

Water resource Awareness and literacy :

Water resource awareness and water literacy is calculate with the help of questionnaire survey from the women samples.

Table 1 Tribal women water resource literacy in Jalgaon District.

SN	I			II			III		
	WR	WPA	WRP	WR	WPA	WRP	WR	WPA	WRP
1	7	9	7	10	13	11	11	12	11
2	6	8	8	9	12	12	10	13	12
3	3	3	6	8	10	10	8	10	11
4	4	5	8	7	8	11	9	11	10
5	2	4	4	6	8	9	8	10	11
6	5	6	7	8	8	9	9	11	10
7	6	7	6	6	7	8	7	10	12
8	5	6	7	5	8	7	7	11	11
9	7	8	7	7	9	8	8	11	12

SN	I			II			III		
	WR	**WPA**	**WRP**	**WR**	**WPA**	**WRP**	**WR**	**WPA**	**WRP**
10	6	7	6	6	9	7	8	11	11
11	5	6	7	6	8	9	7	11	12
12	4	6	7	5	8	7	6	10	11
13	7	7	8	8	12	9	9	8	9
14	6	7	7	9	12	10	8	10	10
15	6	8	5	9	11	8	9	11	10
Avg.	**5.2**	**6.4**	**6.6**	**7.2**	**9.5**	**9.0**	**8.2**	**10.6**	**10.8**

I – Illiterate, II – School level, III-College level,
WR = Water resource score, WRP = Water resource planning score
WPA = Water pollution awareness score

Tribal women and water resource Awareness literacy :

In the table I tribal women water resource literacy in Jalgaon district is seen. The educational levels and water resource awareness is marked in this table. It has been seen in the tribal women that lower level of water awareness is found above water resource. In the three levels and fourty five samples average score is 6.8.

Non-tribal Rural women and water resource Awareness literacy :

In this survey fourty five samples at various educational levels as shown in Table 5.2. The water resource awareness and literacy score is calculated with the help of questionnaire and interviews.

Water pollution awareness

The educational levels as considered in Table I questions related to water pollution, import of water pollution on health remedies to prevent water pollution etc. are included in questionnaire.

Water Pollution Awareness in Tribal Women :

The intensive survey about the water pollution awareness is mark in table I. In this table we can see that lowest water pollution awareness in tribal women i.e. 6.2 as compared to rural women in illiterate women.

Water pollution awareness in non-tribal rural women :

In this research work water pollution awareness among the non-tribal women is measured with the help of questionnaire survey. The water pollution awareness among the illiterate women is 9.3 while it increases as the literacy increases.

Table 2 : Non- Tribal women water resource literacy in Jalgaon District.

SN	I			II			III		
	WR	**WPA**	**WRP**	**WR**	**WPA**	**WRP**	**WR**	**WPA**	**WRP**
1	10	11	9	13	14	12	17	18	16
2	8	10	8	12	15	11	16	17	15
3	7	9	6	12	13	12	17	18	16
4	8	10	7	12	14	13	18	18	17
5	7	9	7	12	13	11	16	18	16
6	6	10	7	13	15	12	17	17	15
7	5	7	6	11	12	11	16	18	16

SN	I			II			III		
	WR	**WPA**	**WRP**	**WR**	**WPA**	**WRP**	**WR**	**WPA**	**WRP**
8	7	8	6	13	14	12	16	17	14
9	8	9	7	10	12	13	18	18	13
10	8	9	7	11	13	13	17	17	15
11	6	10	5	13	14	13	17	19	13
12	7	9	6	12	13	11	18	18	12
13	8	9	7	15	17	12	16	17	15
14	7	10	8	12	15	11	17	16	16
15	7	9	9	13	16	12	18	19	17
Avg.	**7.2**	**9.3**	**7.00**	**12.2**	**14.0**	**11.93**	**16.8**	**17.7**	**15.06**

In the school education level water pollution awareness is 14. it is more than illiterate women. As our expectation water pollution awareness is highest in higher education college level i.e. 17.7. There are close relationship between water resource awareness, pollution awareness, water resource planning awareness among women and education levels in the study region. As educational level increases then water literacy also increases.

FINDINGS

- There are spatial variation of water literacy among the tribal and non-tribal women in Jalgaon District.
- Water as resource awareness is higher among the non-tribal women than tribals.
- Water pollution awareness is also higher in non-tribal women in study region.
- Water resource planning awareness is lower in tribal and illiterate women in Jalgaon. district.
- Literacy rate play key role on water literacy among tribal and non-tribal women.
- Higher the literacy then higher the water literacy in water resource awareness, water pollution awareness, water resource planning awareness in the women in Jalgaon District.

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Application of RS & GIS in Water Resource Management

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ABSTRACT

Agriculture is the main occupation of the Jalgaon district. Tapi is major river of the region, but due to mismanagement and extra used of water, farmers facing the problem of water scarcity in district. Jalgaon District divided into two parts i.e. Upper and lower region of Tapi and lower region facing more water scarcity problem than upper region. Water scarcity can be managed by construction of Dams or Irrigation Projects on the rivers to harvest the water. Therefore Government have been constructed many irrigation projects under the department Tapi Irrigation Development Corporation in Jalgaon district. But still farmers are facing the problem of water for their agriculture. The study related to irrigated area covered by dams & Irrigation projects in the Jalgaon District. The study has done using RS & GIS technique by preparing various maps for each category of Irrigation project according to the locations and drainage system using GIS technique including use of GIS software like ERDAS IMAGINE 9.2, ArcGIS 9.3. Overlaying the satellite image of Jalgaon district of LISS III sensor (Nov. 2011), Map provided by Tapi Irrigation Development Corporation (Feb 2012) and SOI Toposheet of Jalgaon district. After preparation of GIS based irrigation projects maps and overlap with LULC (Nov. 2011) result is that, 1017.04 sq. Km area are still not irrigated of command area of irrigation projects.
Keywords : Irrigation Projects, RS, GIS

INTRODUCTION

Water is another form of life. Water is the primary need of every human being and animal on the earth surface and it plays an important role in all human activities including the most prominent Agricultural activity. India is still a developing country and agriculture is the most predominant occupation of most of the Indian peoples. And the availability of water is the most important think for agricultural development, but due to imbalance of rainfall, large dry season, climatic variations & global warming, the suitable amount of water is not available for agriculture especially in the dry season i.e. in the ruby period of harvesting. Hence proper agriculture development requires the management of water for not only agriculture but for multipurpose use. This can be only done by construction of water reservoirs such as dams or Irrigation projects. Irrigation projects play an important role in providing the water for agriculture mainly when rainwater is not available. But the Projects give benefit of irrigation facility only when proper management has done and going on. Hence if there is a need of construction of irrigation projects there should be a need for its management also for its proper benefit, present situation & working capability. And Today Remote Sensing (RS) & Geographic Information System (GIS) technologies are the most significant for management of water resources. The technology helps to manage, manipulate and understand the ability of water resources.

METHODOLOGY

Analysis of Data: The analysis of Map and documentaries of irrigation projects in Jalgaon district provided by Government of Feb 2012, LISS III (Nov. 2011) Satellite image of Jalgaon district, SOI Toposheet(scale-1:50000 cm) of Jalgaon district has done.

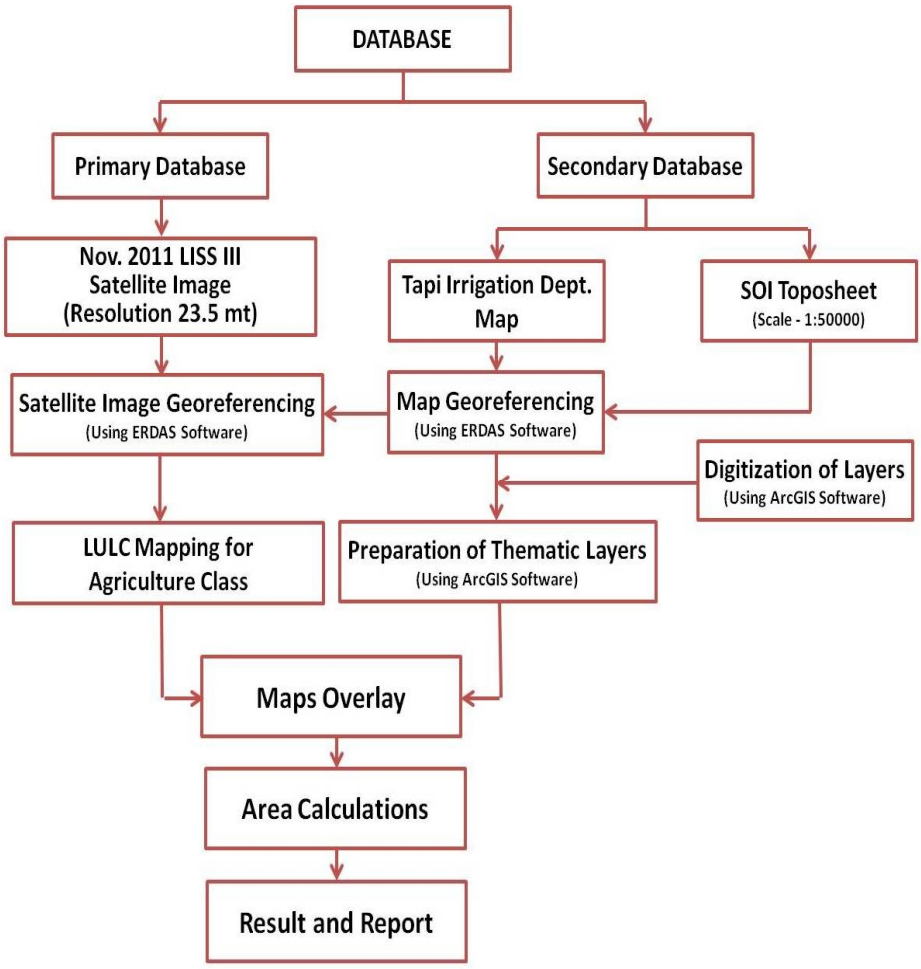

Fig. 1 : Flow Chart of Methodology

Georefrencing: The georeferencing of Map and Satellite image has done using ERDAS IMAGINE 9.2 Software.

Digitization of layers: The digitization of 26 different types of layers including drainage pattern and different types of irrigation projects with canals and irrigated area under the projects has done. The cauterization according to the type of irrigation has done. The LULU mapping for Agriculture Class has done with the digitization on satellite image.

Maps Overlay: The overlaying of maps over LULC has done for the calculation of actual area under irrigation

Area Calculations & Results: The calculation of irrigated area of the government map and through the LULC has done for different type of Major, Minor, Medium, Complete, Ongoing, Future irrigation projects

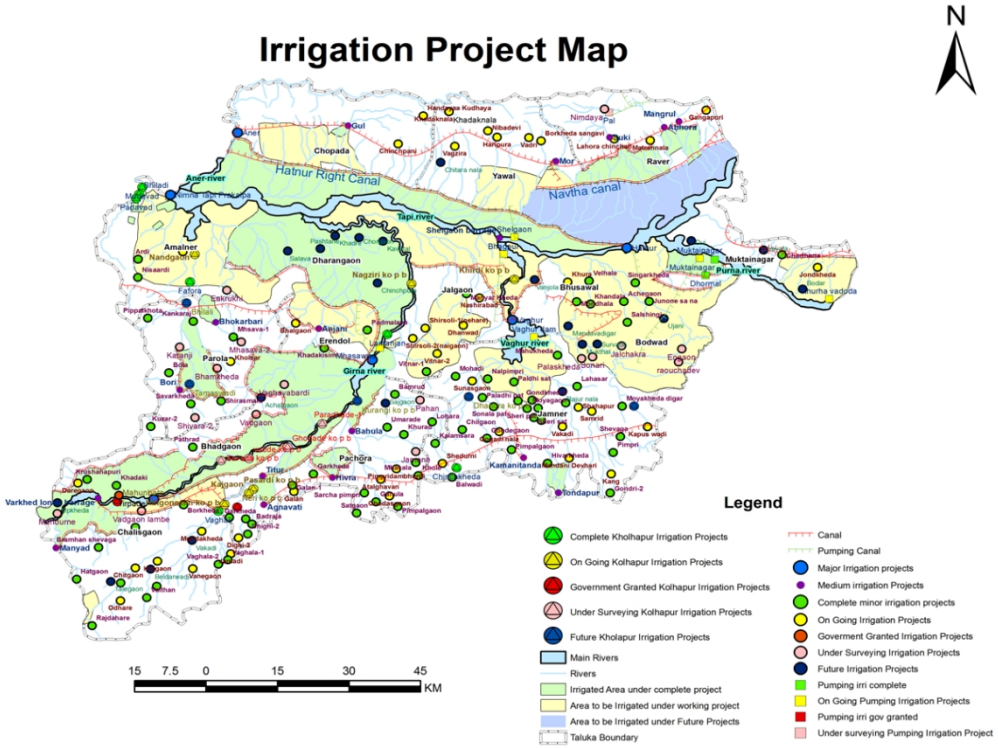

Fig. 2 : GIS based map of Irrigation projects

RESULT AND DISCUSSIONS

In the era of Water Resource Management RS & GIS acts as a powerful tool for detail study in relation with location and for solving the problems. In the study 23 different types of maps have been prepared on the basis of irrigation map. The results are as follows:

- Irrigated Area under complete projects - **2400.71** Sq. Km
- Actual irrigated area under complete projects as per research result – **1383.67** Sq. Km
- Difference in the area under irrigation by Govt. and actual area under irrigation – **1017.04** Sq. Km
- Area to be irrigated under working projects – **2542** Sq Km
- Area under Reserve Forest in the area of working projects – **114.78 S**q. Km
- So the area, government will have to irrigate from working projects – **2427.22** Sq Km
- The area to be irrigated through the future irrigation projects – **439.7** Sq Km

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Spatial Distribution Maps of Soil Parameters in Yawal and Jamner Tahsil using GIS Techniques

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ABSTRACT

Soil is a thin layer of earth crust formed by the process of weathering, which serves as a natural medium for the growth of the plants. It is a important natural resource on which are the supporting life systems and socio-economic development depends. The soil degradation is a major issue in our country as well as in world. The soil degradation is mainly due to over stress of population, extensive use of fertilizers and so more. Spatial Distribution Maps of Soil Parameters in Yawal and Jamner Tehsil prepared by using RS and GIS and it needs detailed geoscientific investigations for its effectiveness. Present study targeting the over exploitd and Tapti's thick alluvium region in Jalaon District, it will very helpful to relative study of overexploitation of water and distribution of soil parameters.

The present investigation was carried out for available macronutrient in Yawal and Jamner tehsil to characterize, classify and mapped the soil for pH, Electrical Conductivity and for Macronutrients such as P, K, OC in Yawal and Jamner tehsil on Jalgaon District, Maharashtra.

Keywords: Spatial Distribution Maps, Soil Parameters.

INTRODUCTION

Soil is a component of the lithosphere and biosphere system. t is a important natural resource on which are the supporting life systems and socio-economic development depends. The soil degradation is a major issue in our country as well as in world. The soil degradation is mainly due to over stress of population, extensive use of fertilizers and so more.

The National Bureau of Soil Survey and Land Use Planning (NBSS & LUP) is engaged in preparing soil resource maps of different states by using the latest technology and know-how to highlight areas of potentials and problems (Sehgal, 1996) A 370 - sheet soil resource map (SRM) of India (state wise) has been prepared and databases about each mapping unit generated for use by different organizations.

GIS is getting very famous tool in fields of natural resource management, environmental analysis, transportation management, planning and development of area, etc. There are many applications of this fast developing system which is very useful for efficient and speedy work.

The Present investigation was carried out for available macronutrient in Yawal and Jamner tehsil of Jalgaon District, Maharashtra with the objective like to characterize, classify and map the soil for pH, Electrical Conductivity and for Macronutrients such as P, K, OC in Yawal and Jamner tehsil on Jalgaon District, Maharashtra.

METHODOLOGY

Soil Sample Analysis database obtained from Soil Survey Data Register of District Soil Survey and Soil Analysis Department, Jalgaon. For Yawal tehsil the data is from March 1994 to 1999 & for Jamner tehsil it is from November 2006 onward. The report having Soil Sample Analysis from different Villages of Yawal and Jammer tehsil, this data includes pH, EC, Organic Carbon, Phosphorus, Potassium content. We also obtained the Soil Sample Analysis Report of Department of Agriculture, Maharashtra State. According to their report following conclusion are made various soil parameter.

Secondly we collected the SOI toposheet of scale 1:50,000 of Yawal & Jamner Tehsil. Toposheet numbers for Yawal are 46O11, 46O15, 46O12, 46O16 & for Jamner 46P9, 46P13, 46P10, 46P14, 55D2. The SOI toposheet of 1:50,000 scale were geometrically rectified at geographic co-ordinate system using digital image processing software, i.e. ERDAS imagine software 9.1. The assigned projection system was

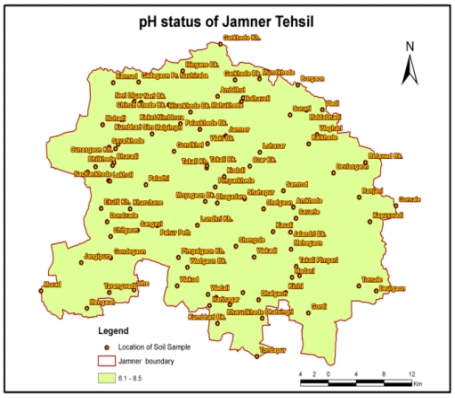
Polyconic, IndoBangla datum & spheroid Everest. Then georefrencing of satellite image with the help of SOI toposheet of 1:50,000 scale of Jalgaon Dist. was done in ERDAS imagine software 9.1.From these toposheets we prepared Thematic Maps for Yawal and Jamner Tehsil by using Arc GIS 9.1. This includes digitization of Yawal and Jamner Tehsil boundary and Point map for location of villages. From these Thematic Maps we selected the location of Soil Samples of Yawal & Jamner & made the final Thematic Maps of sample villages. The attributes Data were assigned to location in the Thematic Map. Then we prepared the IDW maps using ArcGIS Software.

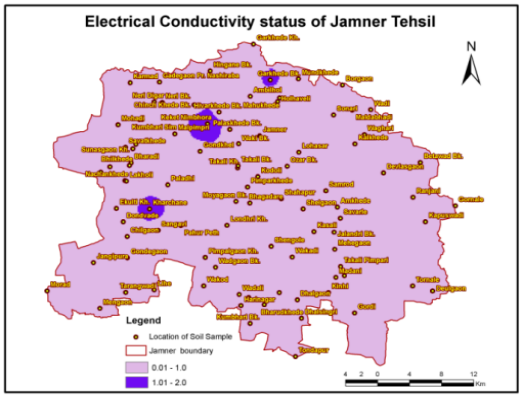
RESULT AND CONCLUSION

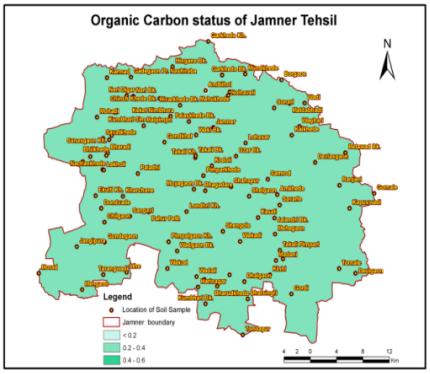
By using the IDW method, we prepared the Soil parameter status maps for Yawal & Jamner Tehsil.
The results are as follows:

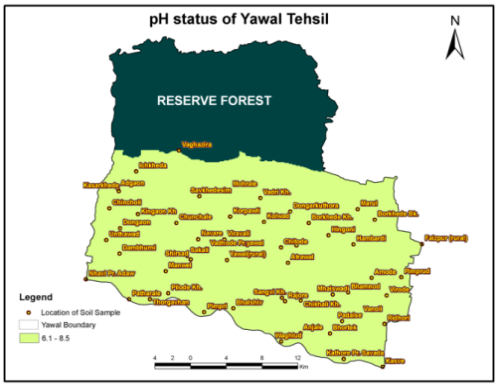
- The pH status for Yawal tehsil is in between 6.1 to 8.5 which are suitable for crops. The EC status for Yawal tehsil is suitable for crops which is <1.00, except for Ridhori and nearby area where it is >1.00. The OC status for Yawal tehsil is that, OC percentage goes on increasing successively towards Yawal rural area and so become excess in Yawal rural & it is very less at Manwel. In Yawal taluka the Phosphorus content is successively increasing towards Yawal Rural area and there it is from 65 – 80 Kg/hec. And for the Southern, South Western, Western and Central area of Yawal having Phosphorus content from 31 - 50 Kg/hec, and for the remaining area having its content is from 16 – 30 Kg/hec. Potassium Status for Yawal is > 360 Kg/hec which means that it present in excess quantity.
- The pH status for Jamner tehsil is in between 6.1 to 8.5 which are suitable for crops. In Jamner tehsil, EC status is <1.00 and it is suitable for crops except Kharchane, Palaskhede Bk.& Garkhede Bk. villages and nearby area where it is in between 1.01 – 2.0.For Jamner, OC status is less. It is in between 0.2 - 0.4 and at Ambilhole it is < 0.2 which is very less. The Phosphorus content is from 31 – 50 Kg/hec in Northern, South Eastern and in Southern area and nearby area of Mengaon, Wakadi, Jalandri Bk., Mehegaon, bhagadare, Takli Bk.,Malpimpri, Gondkhel villages of Jammer. The Phosphorus content < 16 Kg/hec is in Western, Central part of Jamner and also for Devlasgaon, Betawad Bk., Ranjani villages in the East of Jammer. Remaining area having Phosphorus content in between 16 – 30 Kg/hec.Potassium Status for Jammer tehsil is > 360 Kg/hec which means that it present in excess quantity.
-

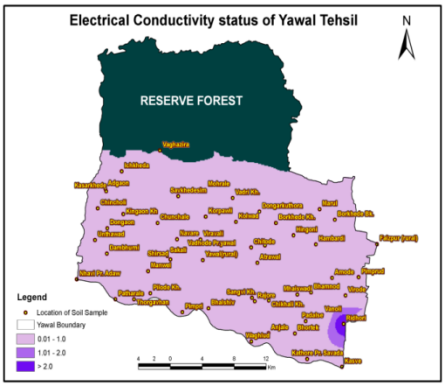
SPATIAL DISTRIBUTION MAPS OF YAWAL AND JAMNER TEHSIL

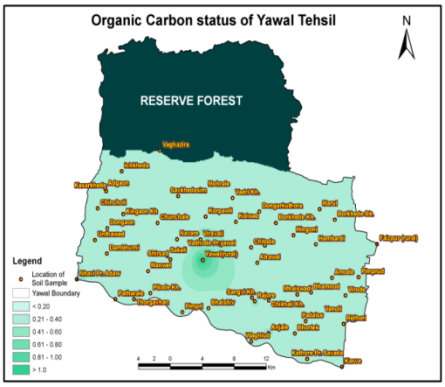


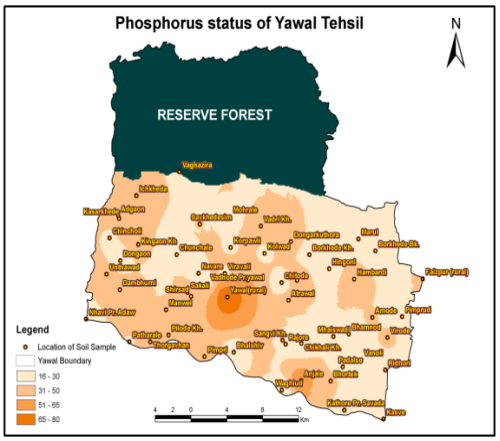


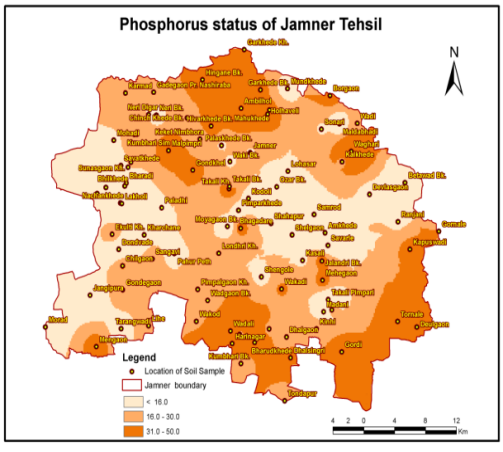

Organic Carbon status of Jamner Tehsil
N
Legend
Location of Soil Sample
Jamner boundary
< 0.2
0.2 - 0.4
0.4 - 0.6

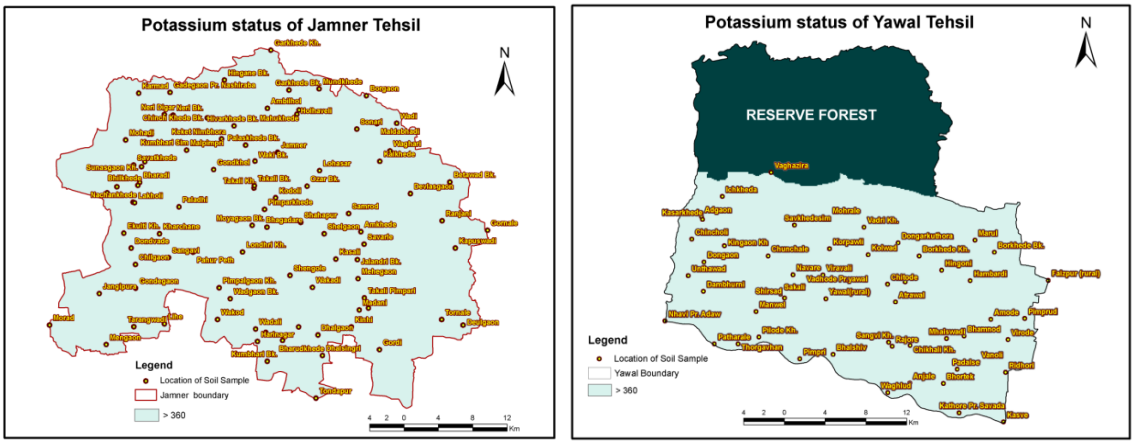

pH status of Yawal Tehsil
N
RESERVE FOREST
Legend
Location of Soil Sample
Yawal Boundary
6.1 - 8.5


Electrical Conductivity status of Yawal Tehsil
N
RESERVE FOREST
Legend
Location of Soil Sample
Yawal Boundary
0.01 - 1.0
1.01 - 2.0
> 2.0


Organic Carbon status of Yawal Tehsil
N
RESERVE FOREST
Legend
Location of Soil Sample
Yawal Boundary
< 0.20
0.21 - 0.40
0.41 - 0.60
0.61 - 0.80
0.81 - 1.00
> 1.0


Phosphorus status of Yawal Tehsil
N
RESERVE FOREST
Legend
Location of Soil Sample
Yawal Boundary
16 - 30
31 - 50
51 - 65
65 - 80


Phosphorus status of Jamner Tehsil
N
Legend
Location of Soil Sample
Jamner boundary
< 16.0
16.0 - 30.0
31.0 - 50.0



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Flow in tubes of linearly varying crosssection with permeable wall

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ABSTRACT

In this paper, we study low Reynolds number steady flow in a tube of varying cross section for an incompressible Newtonian fluid with rigid and permeable wall.The wall permeability is assumed to obey Starling's law. A numerical solution for two point initial value problem for pressure is obtained by using perturbation method. The expressions for wall shear stress, pressure drop and volumetric flow rate are evaluated numerically.

INTRODUCTION

Flow in tubes of varying cross-section has attracted many researchers due to its importance in physiological and engineering flow problems. Several authors have investigated flow through ducts with permeable walls as suction/injection problems where normal velocity of the fluid at the wall is prescribed. Radhakrishnamacharya et al. (1981) studied the creeping flow of a Newtonian fluid in converging and diverging tubes with absorbing walls as a model for renal flow. Later, Peeyush Chandra and Radhakrishnamacharya (1983) accounted fluid exchange across converging/diverging tube walls by Darcy's law. Peyush Chandra and Krishna Prasad (1992) extended the work of Manton(1971) to study low Reynolds number flow in tubes of varying cross-section with permeable walls.

Formulation of the Problem

Consider steady flow of a Newtonian incompressible fluid in an axisymmetric tube of varying cross-section with permeable wall[5]. Using cylindrical polar coordinates (X, R, θ) where R = O is the axis of symmetry for the tube, the equations of motion and continuity are given as :

$$UU_x + VU_R = -P_X/\rho + \nu[U_{XX} + (RU_R)_R/R] \quad (1)$$

$$UU_X + VV_R = -P_R/\rho + \nu[V_{XX} + (RV_R)_R/R - V/R^2] \quad (2)$$

$$U_X + (RV)_R/R = O \quad (3)$$

Where (U, V) are the fluid velocity components in (X, R) directions respectively, P is the pressure, ν is the kinematic coefficient of viscosity and ρ is the constant fluid density.Also the suffix denotes partial derivates with respect to that particular variable .

We consider tube of slowly varying cross-section, and hence, the radius of the tube R = a (X) is given as :

$$a(x) = a_0 S(\varepsilon X / a_0) \ , \ \varepsilon = a_0/L << 1 \ , \ S(O) = 1 \quad (4)$$

Where ε is the wall variation parameter, a_0 is the tube radius at the initial cross-section, L is the characteristic length and $S(\varepsilon X / a_0)$ is an arbitrary function of X.

The fluid exchange across the permeable wall is given by Starling's law and the net external pressure acting on the surface of the wall is assumed to be constant. This gives the normal fluid velocity at the tube wall as :

$$V - a_X U = K(P - P_{ext}) \quad \text{at} \quad R = a(X). \quad (5)$$

The tangential velocity of the fluid at the wall is zero, hence,

$$U + a_X V = 0 \qquad \text{at} \qquad R = a(X) \tag{6}$$

The axisymmetry of the flow implies

$$U_R = 0 \quad , \text{V=0} \qquad \text{at} \qquad R = 0. \tag{7}$$

Further,

$$P_{mean} = \frac{1}{\pi a^2(X)} \int_0^{a(X)} 2\pi R\, P\, dR \quad and \quad the\ flux\ Q = \int_0^{a(X)} 2\pi R\, U\, dR \tag{8}$$

At the initial cross-section we have: $\left.\begin{matrix} P_{mean} = P_{in} \\ Q = Q_0 \end{matrix}\right\}$ at $X = 0.$ (9)

1. Method of Solution:

Using the non-dimensional quantities,

$$x = \varepsilon X / a_0 \ , \ r = R / a_0 \ , \ u = 2\pi\, a_0^2 U / Q_0 \ ,$$

$$v = 2\pi\, a_0^2 V / \varepsilon Q_0 \ , \ (p, p_{ext}) = 2\pi\, a_0^3 \varepsilon (P, P_{ext}) / \nu\rho Q_0 \ ,$$

$$k = \nu\rho K / \varepsilon^2 a_0 \ , \ q = Q / Q_0 \ ,$$

the eqns. (1) – (3) are written in non-dimensional form and we seek approximate solution of the obtained equations in terms of perturbation parameter ε , i.e.,

$$(u, v, p, q) = (u^{(0)}, v^{(0)}, p^{(0)}, q^{(0)}) + \varepsilon (u^{(1)}, v^{(1)}, p^{(1)}, q^{(1)}) + O(\varepsilon^2)$$

By solving zeroth order and first order quations, we get expressions for $u^{(0)}, v^{(0)}, u^{(1)} \ and \ v^{(1)}$ and solving them we get following expressions for flow rate (q) and wall shear stress T_w.

$$q = -\frac{S^4}{16}[\, p_x^{(0)} + \varepsilon\{ p_x^{(1)} + \frac{R_e}{16} S^3 p_x^{(0)} (12k(p^{(0)} - P_{ext}) - S_x p_x^{(0)})\}] + O(\varepsilon^2). \tag{10}$$

$$T_w = \frac{S}{2} p_x^{(0)} + \varepsilon[\, p_x^{(1)} + \frac{R_e}{24} S\, p_x^{(0)} \{16k(p^{(0)} - p_{ext}) - S^2 S_x p_x^{(0)}\}] + O(\varepsilon^2). \tag{11}$$

Using the boundary conditions, we get the following differential equations for $p^{(0)} \ and \ p^{(1)}$:

$$p_{xx}^{(0)} + 4\frac{S_x}{S} p_x^{(0)} - 16\frac{k}{S^3}(p^{(0)} - p_{ext}) = 0 \tag{12}$$

$$p_{xx}^{(1)} + 4\frac{S_x}{S} p_x^{(1)} - \frac{16k}{S^3} p^{(1)} = -\frac{R_e}{64} S^2 [3S^2 (p_x^{(0)^2} + p_x^{(0)} p_{xxx}^{(0)}) + 40 S S_x p_x^{(0)} p_{xx}^{(0)} + 8 p_x^{(0)^2} (S S_{xx} + 7 S_x^2)]. \tag{13}$$

The correspongding boundary conditions are:

$$p^{(0)} = p_{in} \ , \ p_x^{(0)} = -16 \tag{14}$$

$$p^{(1)} = O \, , p_x^{(1)} = 4R_e[3k(p^{(0)} - p_{ext}) + 4S_x] \tag{15}$$

By using the following expression pressure drop can be canculated:

$$\sqcup p = p_{mean}^{(0)} - p_{mean}^{(x)} = p_{in} - p^{(0)}(x) - \varepsilon p^{(1)}(x) + O(\varepsilon^2) \tag{16}$$

can be calculated.

NUMERICAL SOLUTION

We solve the differential equations for pressure using numerical methods and in figures 1 to 2 we plot shear stress vs axial distance for both linear convergent tube as well as linear divergent tube for various values of Re and k. We take S(x)= 1 + 0.35x for divergent tube and S(x)= 1-0.35 x for convergent tube and $\varepsilon = 0.05$.

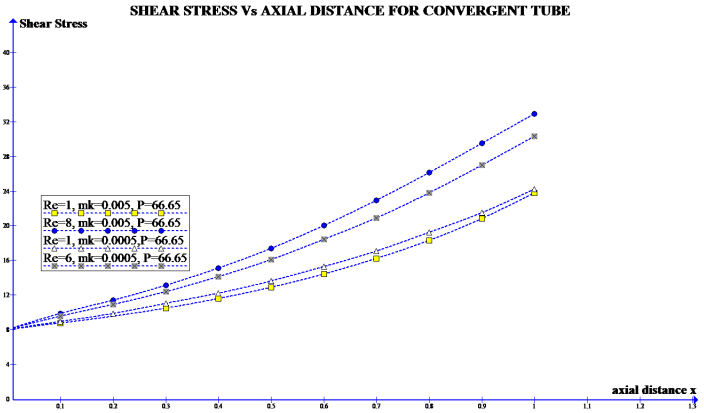

Fig.1 Shear stress Vs Axial distance for linearly convergent tube

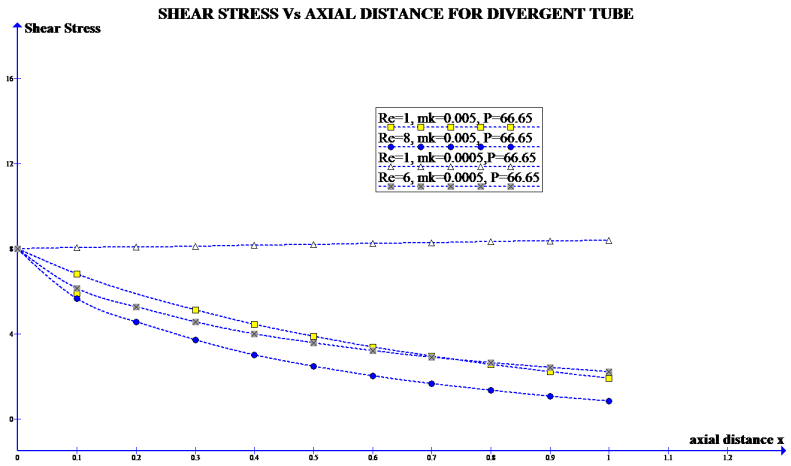

Fig2. Shear stress Vs Axial distance for linearly divergent tube

CONCLUSION

In this paper ,we have considered effect of wall permeability (k) and Reynolds number (Re) on wall shear stress , pressure and flow flux for both linearly varying convergent and divergent tubes. The increase in Re or k results in increase of shear stress for the convergent tube where as the increase in Re and k gives rise to decrease in the wall shear stress for a divergent tube.

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Isolation And Characterization of Microorganism From Hot Spring Water

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ABSTRACT

Study was carried out to isolate a micro organism from a hot water spring taken from a Unapdev. Isolated microorganism is thermophile showing optimum growth at 55 ^{o}C. The microorganism shows maximum growth on Horikoshi medium and. Further study by morphological and biochemical study reveals that the microorganism is gram positive , non motile, showed catalase test positive whereas other test were negative and no growth were observe on starch agar media. Microorganism shows lipase production when supplemented with 1% olive oil as a substrate and activity was assayed quantitatively with p-nitrophenyl acetate (pNPA). The optimum lipase activity is determined at specific temperature and pH for maximum lipase production.

Key words: Hot water, Thermophiles, Lipase enzyme.

INTRODUCTION

Thermophiles meaning heat-loving organisms, with an optimum temperature for growth at 50°C, a maximum of up to 70°C, and a minimum of about 40°C. One theory suggested that the thermopiles were among the first living things on this planet, developing and evolving during the primordial birthing days of earth when surface temperatures were quite hot and thus, had been called the ("Universal Ancestor" Doolittle, W. F. *et al* 1999). Estimated at 3.6 billion years old, they are said to be as abundant as to "comprise as much as half of all living things on the planet (Woes,C. R. *et al* 1998). Some extreme thermophiles (hyperthermophiles) require a very high temperature (80°C to 105° C) for growth. Their membranes and proteins are unusually stable at these extremely high temperatures. Thus many important biotechnological processes utilize thermophilic enzymes because of their ability to withstand intense heat.

A thermophilic is an organism – a type of extremophile that complies at high temperatures between 45^{0}Cand 80ºC(Madigan MT, *et al* 2006) thermophiles are found in various geothermally heated region of the Earth such as hot spring like those in Yellowstone national park and deep sea hydrothermal vents, as well as decaying matter such as peat bogs & compost.Thermophiles are classified into obligate and facultative thermophiles. obligate thermophiles' (also called extreme thermophiles) require such high temperatures for growth, whereas facultative thermophile (also called moderate thermophile) can grow at high temp. but also at lower temp.(below 50 C). Hyperthermophiles are particularly extreme thermophiles for which the optimal temperature are above 80 ºC.

Many hypothermophile archea require elemental sulfur for growth some are anaerobes that used the sulfur instead of oxygen as an electron acceptor during cellular respiration. Some are lithotrophs that oxidized sulfur to sulfuric acid.This organism are inhabitants of hot, sulfur rich environments usually associated with volcanism, such as hot spring.

Example of thermophiles species are *Thermus aquaticus* & *Thermococcus litoralis* .

The term alkaliphile is used for microorganism that grows optimally at pH value above 9 and slowly at the near neutral pH value of 6.5. Alkaliphiles include prokaryotes and archea . Many different taxa are represented among the alkaliphiles and some of this have been proposed as new taxa. Alkaliphiles can be isolated from normal environment such as garden soil, although viable counts of alkaliphiles are higher in sample from alkaline environment the cell surface may play a key role in keeping the intracellular pH value in range between 7 and 8.5 value, allowing alkaliphiles to thrive in alkaline environment.

Alkaliphiles consist of two main physiological groups of microorganism alkaliphiles & haloalkaliphiles. Alkaliphiles require an alkaline pH of 9 whereas haloalkaliphiles require both and alkaline pH (≥ pH 9) and high salinity. Alkaliphiles have been isolated mainly from neutral environment. Some time even from acidic soil sample and feces. Haloalkaliphiles have been mainly found in alkaline saline environments.

Thermoalkaliphiles are the organism able to grow at two extreme condition alkaline and elevated temperature (Weigel and kevbrin *et al* 2004) . This organism are of interest for both fundamental and applied science.

MATERIALS AND METHOD

Sample Collection

Firstly, sample collection was done from the hot water spring of Unapdev. Water sample was collected in bottles and stored at room temperature.

Isolation of organism

The water sample was serially diluted and a loopful of water sample was streaked on various media such as Horikoshi medium. Halophilic medium ,9K medium. The composition of horikoshi medium is as follows:

Horikoshi medium-

Glucose	0.5g
Peptone	0.25g
Yeast extract	0.23g
KH_2PO_4	0.05g
$MgS0_4.7H_20$	0.0lg
Na_2C0_3	0.5g
Agar	1.5g
pH	10.2
Distilled water	100ml

IDENTIFICATION AND CHARACTERIZATION

Morphological Characteristics

Morphological identification of an organism involves preliminary microscopic examination of microorganism .Motility and Grams staining were performed was observed under the light microscope.

Biochemical Characteristics

Isolated strains were biochemically characterized viz, Catalase Test, Indole Production Test, Methyl Red Test, Vogas Proskaure Test, Citrate Utilisation test, sugar fermentation tests, Starch hydrolysis test as mentioned by Arora,2003.

Lipase Production

1ml of olive oil(1%), peptone(0.25g), yeast extract(0.25g), KH_2P0_4(0.05g) ,$MgS0_4.7H_20$(0.01g),Na_2Co_3(0.5g) pH 10.2 in 250 ml of Erlenmeyer flask were autoclaved at 15 psi for 15 minutes and incubate at 50°C for 5 days.

Enzyme Assay

Crude enzyme extract was prepared from the production broth which was centrifuged at 10,000 rpm for 15 min at 4˚C. Lipase activity was measured spectrophotometrically using p- nitrophenyl acetate (pNPA) as a substrate at 45°C in 0.5 M phosphate buffer of pH 7.0.The substrate for this reaction was composed of solution A and B. Solution A contained 40 mg of p-nitro phenyl actetate dissolved in 12 ml of isopropanol, solution B contained 0.1 g of gum arabic and 0.4 ml of triton X-100 dissolved in 90 ml of distilled water. The substrate solution was prepared by adding 1 ml of solution A and 19 ml of solution B. The assay mixture contained 1 ml of the substrate, 0.5 ml of buffer, 0.1 ml of enzyme and final volume was made up to 3 ml with distilled water .The enzyme activity was stopped after 10 minutes by

adding 0.2 ml isopropanol and liberation of p- nitrophenol at 45 °C was detected in spectrophotometer at 400 nm. One enzyme unit was defined as 1 µ mol of p-nitrophenol enzymatically released from the substrate per minute (Prakash Tiwari *et al* 2011)

Effect of temperature on lipase activity

The optimum temperature of the enzyme was determined with p-nitro phenyl acetate by incubating the assay mixture in the temperature range from 35°C to 70°C using 0.5 ml of phosphate buffer (0.5M) of pH 7.0 and add 0.1 ml of enzyme were incubated at different temperatures for 10 minutes and assayed for lipase activity as described in enzyme assay method.

Effect of pH on lipase activity

The optimum pH of the enzyme was determined with p-nitro phenyl acetate by incubating the assay mixture using 0.5M phosphate buffer at different pH ranges from 5 to 9 0.5 ml of phosphate buffer (0.5M) and 0.1 ml of enzyme were incubated at different pH for 10 minutes and assay for lipase activity as described in enzyme assay method.

RESULT AND DISCUSSION

Isolation of the Microorganism:

Various media were used to isolate the thermoalkaliphilic organism i.e horikoshi medium, Halophilic medium,9k medium and it was observed that colonies were isolated on Horikoshi medium. Thus, selective media for the organism was found to be Horikoshi medium.

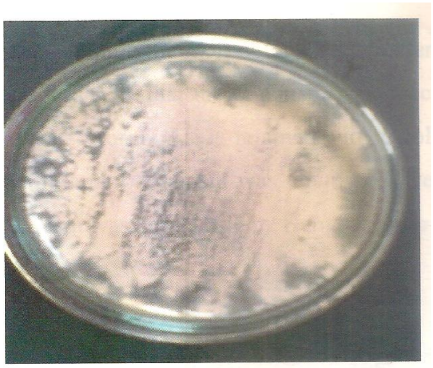

Fig 1. Plate of Horikoshi medium shows isolated colonies of the organism.

Identification and Characterization of the organism

Sr. No	Test	Observation
1.	Shape	Cocci
2.	Arrangement	Cluster
3.	Gram Character	Gram positive
4.	Motility	Non-Motile

By performing Gram staining the morphological characteristics of organism were studied and it was seen that the organism was cocci shaped and they were present in cluster form. As it retained violet colour during Gram staining it showed the microorganism was Gram positive in nature. It was shown that the organism was non motile by Hanging drop method.

Morphological Characteristics

Sr.No	Test	Observation
1.	Temperature	55^0C
2.	Growth	Abundant
3.	Colony color	Whitish
4.	Density	Opaque
5.	Shape	Circular
6.	Margin	Entire

By observing the isolated colonies on the plate of Horikoshi medium the colony characters of the organism was determined. It showed its optimum growth at 55^oC indicating that it is moderate thermophilic and showed abundant growth on the plate. The colonies were whitish in color and were opaque in nature. The shape of the organism was circular and margin was found to be entire.

Biochemical Characteristics:

IMViC Test:

Sr.no.	Test	Results
1.	Indole Production	Negative
2.	MR VP Test	Negative
3.	Citrate Utilization	Negative
4.	Catalase test	Positive

Carbohydrate Fermentation

No.	Sugar	Observation
1.	Glucose	Positive
2.	Lactose	Positive
3.	Sucrose	Negative

Effect of temperature On lipase activity

The optimum temperature for lipase production by this organism was determined and tested at the range of 35˚C to 70˚C. It was observed that 55˚C was the optimum incubation temperature (Imandi and Garapati 2010 *et al*).This shows that the lipase produced by this organism is thermo tolerant. Therefore, this enzyme can be exploited for detergent and food processing industries. The crude enzyme shown maximum activity and stability at 55˚C, indicating thermo tolerant nature of the enzyme (Deive and Jatta *et al* 2003).

Temp.	30^0c	40^0c	50^0c	60^0c	70^0c	80^0c
Lipase activity (U/ml)	30	34	36	51	44	34

Figure. Effect of Temperature on lipase Activity

Effect of pH on enzyme activity

The pH plays crucial role for the detection of enzymatic activity. The study of the effect of pH on enzymatic activity provide valuable clue regarding the type and identity of amino acids present in the

enzyme. Enzymes are affected by changes in pH and show maximum activity at a specified pH. Extremely high or low pH values generally result in complete loss of activity for most of enzyme. In this study, highest activity at pH 7.0 was recorded (Korbekandi and Kim 2008 *et al*), and as the pH increased beyond 7.0, the activity was dropped.

pH	**5.0**	**6.0**	**7.0**	**8.0**	**9.0**
Lipase activity (U/ml)	69	76	99	86	71

Fig.Effect of pH on enzyme activity

CONCLUSION

From persent studies,it is revealed that microorganism isolated from hot water springs of Unapdev, Horikoshi Medium was the suitable medium for its maximum growth. The results of IMViC tests showed that the organism was catalase positive. This test along with Gram staining confirmed that the microorganism was Gram positive in nature.From Morphological, Biochemical and sugar fermentation tests it was concluded that the isolated unknown microorganism may be identified as Bacillus species by using Bergey's Manual.

The microorganism produces the (0.53 U/ml) lipase enzyme after the fifth day of incubation in batch culture.The The optimum temperature and pH for lipase production by this organism was 55^{o} C and 7.0 respectively.

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Isolation of phosphate solubilizing bacteria from regional soil and its effect on plant growth promoting activity

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ABSTRACT

Phosphorus is an vital element required by a plant comparatively in larger quantity are called macronutrient. It is important plant nutrient next to nitrogen and potassium to increase growth and productivity. Phosphorus acts on plant growth promoter because the development of root, stalk, stem, flower and seed formation it also involve in crop maturity, N_2 fixation, resistance of plant diseases. The major store house of phosphorus is rock deposited and iron phosphate which is unavailable to plant is solubilised by phosphate solubilising bacteria into solution.It play major role by enhancing its availability to plant through release from organic and inorganic soli phosphate pools by solubilisation and mineralization with the enzyme phosphatase. In this study identification, characterization of different strain of phosphate solubilising bacteria from regional soil were carried out and perform growth promoting activity by pot experiment.

Key words :-Mineralisation ,Solubilisation, Phosphatase.

INTRODUCTION

India is an agriculture country so most of the economic stability depends on agriculture yields. For these aspects large quantity of chemical fertilizers used to increases the crop productivity and production. Asia is the larger chemical fertiliser consuming about 40% of total global production these causes the soil erosion as well as decreases soil fertility and soil microflora which play a major role in plant metabolites by various cycles, ultimately affect the crop productivity. The uses of bio fertiliser to maintain the soil microflora such as N_2 fixing , phosphorus solubilises can increase the soil fertility. Phosphorus is the major macronutrient for growth and development of plant next to nitrogen and potassium. Phosphorus deficiency may occurs weak stem,slow development,older leaves may appears bluish green, purple veins, stunted growth, fruit become small and immature which affect crop yield. Phosphorus is solubilised and make it available to plant by action of different type of bacteria are *Archobacter, Arthobacter, Pseudomonas, Bacillus, Flavobacteria etc*. Phosphate solubiliser commonly involved in the acid production however liberation of H_2S by some bacteria associated with phosphorus to plant.These bacteria have ability to degrade and solubilise the inorganic phosphate into soluble form by mechanism of secretion of organic acids such as acetic acid, citric acid, gluconic acid,lactic acid which is lowering the pH and causes the dissociation of bound form of phosphate through their carboxyl and hydroxyl group chelate the cation.(Sharma*,et.al ,2011) They play major role in nutrient by enhancing its availability to plant through release from organic and inorganic soli phosphate pools by solubilisation and mineralization with the enzyme phosphatase.

METHODOLOGY

Isolation and idetification of Phosphate solubilizing bacteria

Soil sample were collected from different places like regional soil near Jalgaon city. 1gm of soil inoculated into pikovskaya's broth medium. It was then incubate at room temperature on shaker at 120rpm.After incubation a serial dilution up to 10^{-8} for each sample was made. A loopful of suspension was steak on pikovskaya's agar plate and incubated at room temperature for 48hr.After incubation zone of clearance around the colonies was observed. The colony characteristics were ,Gram`s staining and motility.

Bioassay for growth promoting activity

To study the plant growth promoting activity of bioinoculum, healthy seed of wheat and cotton were selected and pot experiment was carried out.Seed were added into inoculums of respective organism. After seed treatment seed were sown into pots with respective controls. Pot were irrigated daily with sterile distilled water. After 10-15 days, the vegetative growth of plant measured it root and shoot length and compared with respective controls also measured pH.

RESULT AND DISCUSSIONS

The result showed that out of 3 samples only two isolate exhibiting holozone on pikovskaya's agar medium as a result of phosphate solubilisation. This isolated colonies has morphological feature as white, entire, opaque, gram negative rods, non motile.

Table No 1.Identification test of phosphate solubilisation bacteria from regional soil.

Characteristics	***Isolate 1***	***Isolate 2***
Indol test	Negative	Negative
Methyl red test	Negative	Negative
Voges proskuer test	**Positive**	Negative
Citrate test	Positive	Positive
Ureas test	Negative	**Positive**
Catalase test	Positive	Positive
Glucose test	**Positive**	Negative
Sucrose test	Positive	Negative
Lactose test	Negative	Negative
Manitol test	-	**Positive**
H2s test	Negative	Negative

The isolated species were identified using based on the colony characters, staining reaction, motility, biochemical tests and carbohydrate fermentation test the isolate 1 and 2 result were identified as *Bacillus spp* and *Pseudomonas spp* respectively.
(*Bergey's Manual of Systematic Bacteriology,1st ed. 1986.*)

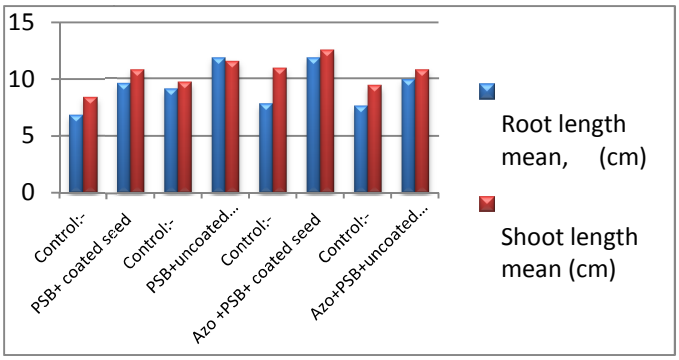
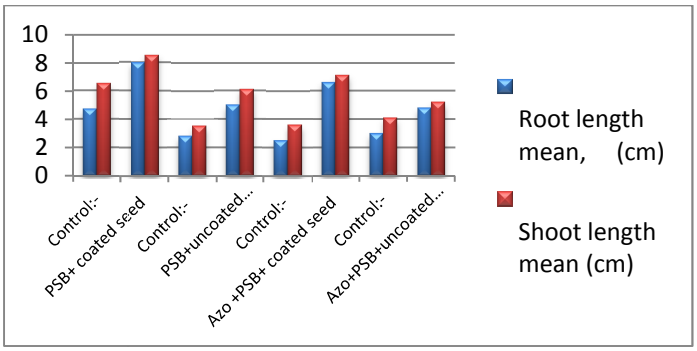


Fig 1 & 2

Effect of growth promoting activity of phosphate solubilising bacteria on wheat and cotton seeds.



On the basis of observation tables, the result shows that isolated strains have good potential as bio fertiliser for better growth of corps. Combination of isolate with *Azatobacter* was shown better result as compared to single inoculums and it also minimises pH.

CONCLUSION

In vitro results showed that both inoculants have greater phosphate solubilising efficiency, it produces organic acid followed by decreases the pH the culture medium there by solubilising the insoluble phosphate. In present study, investigated with regard to growth promoting activity results that seedling (wheat and cotton) treated with single inoculums had bigger shoot length, increases the root length also more green leaves were observed. It may be results from availability of phosphorous as compared to additional control treatment. It was also noted that the combine treatment of *Azatobacter* and Phosphate solubilizer bacteria showed increase in vegetative growth rate as compared to single inoculation and minimize the pH.

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Design of Laboratory Scale Biogas Production Unit

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ABSTRACT

In India, large quantity of lignocellulosic matter as agricultural waste is produced every year. It is mostly used as compost, animal feeding or burned. There is urgent need to find uses of these waste for eco-friendly and sustainable utilization, it will also reduce pollution. As result of increasing demand for fossil fuels and environmental threat, a number of renewable sources of energy have been studied worldwide. In this project, a new laboratory scale biogas production unit was designed which is easy and cheap to construct. In this biogas unit, any type of biodegradable waste such as agricultural waste, waste food, spoiled vegetables, garden waste can be used.

Key words :-Biogas, lignocelluloses.

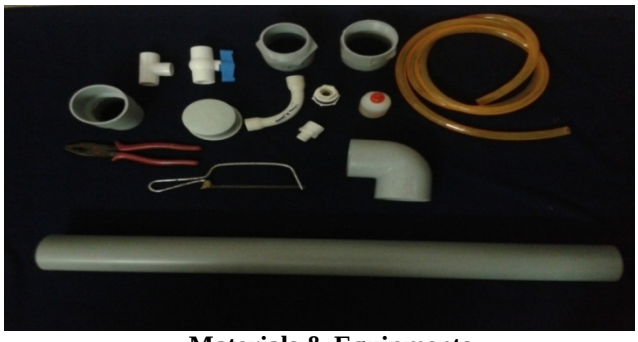
INTRODUCTION

In recent years, biogas process have attracted considerable attention and emerged as a promising approach to decentralized rural development. Biogas is digesting organic wastes anaerobically to generate a renewable energy source. It is produced naturally in humid environments with no air or oxygen and can be obtained artificially by fermenting animal or plant waste in a Biodigester or "Biogas Plant". Small scale biogas plants have been around for 150 years for farms and food companies. They produce liquid waste, anaerobic digestion which offers an ideal solution for generating renewable fuel for combined heat and power boilers to power their own facilities. In addition, biogas plants generate effluent that can be used to fertile spoiled based crops and therefore improve agricultural yield. Biogas systems are important with respect to various objectives: a renewable source of energy for cooking fuel, conversion of manure into an improved fertilizer, waste recycling, rural development, public health and hygiene, pollution control, environmental management, appropriate technology, and technical cooperation. In this study, a small scale biogas plant was design for household production of biogas which can be used as fuel for cooking, boiling water, to generate electricity etc. It is easy to handle and do not require any expertise for its maintenance.

MATERIALS AND METHOD

Materials

A plastic tank of 100 liters capacity, PVC pipe (diameter- 2.5 inch), MTA-3(2.5 inch), FTA-3(2.5 inch), Elbow(2.5 inch), T-Pipe(1.25 inch), Check nuts, tank nipple, Cap(2.5 inch), Reducer(2.5 inch ×1 inch), Garden pipe, plastic transparent jars-2, valves(1.25 inch), PVC cement, necessary equipments etc.



Materials & Equipments

Method

A] For Biodigester

A plastic tank of 100 litre capacity was taken in which holes were made one at bottom and another at upper middle. Pipes were fixed in those holes. Bottom pipe was closed by end cap. Upper pipe was attached to overflow slurry collection unit. There was another large pipe inserted through lid of tank which acts as inlet through which substrate gets added in biodigester. There was a gas outlet to the lid which is connected to the gas reservoir system.

B] For Gas Reservoir

Gas reservoir system is the transparent plastic jar or a rubber tube. Plastic jar filled with water was placed in plastic tray filled with water. As the gas produced, it gets collected in that jar by downward displacement of water in jar.

C] For Slurry Collection

Overflowed slurry was collected in a tank placed besides the digester.

CONCLUSION

Biogas plant was design to utilize organic waste from agricultural origin. It will help to generate renewable energy and valuable fertilizers for agricultural use. The controlled parameter are design to increases the production of biogas. The laboratory scale biogas production unit is design with as per need of production of biogas at laboratory scale. Further up gradation of unit can be done on the basis of batch trial for biogas production. It will overcome the problems in designing.

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Larvicidal efficacy of *Sphaeranthus indicus* against *Anopheles* species.

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ABSTRACT
Methanolic extract (MeOHx) and semipurified alkaloidal fraction (SAF) of flower of *Sphaeranthus indicus* Linn were tested for larvicidal activity against *Anopheles* species, the vector of malaria. MeOHx and SAF exhibited significant larvicidal activity against III and IV instar larvae. SAF showed 100% mortality at 5 mg/ml after 3rd h. LD_{50} values of MeOHx against III[rd] and IV[th] instar larvae of *Anopheles* species were 5.75 mg/ml (χ^2= 2.87) and 3.87 mg/ml (χ^2= 0.85) respectively. LD_{50} values of SAF against III[rd] and IV[th] instar larvae were 0.76 mg/ml (χ^2= 0.80) and 0.75 mg/ml (χ^2= 0.22) respectively. As compared to IV[th] instar larvae of *Anopheles*, III[rd] instar larvae were highly sensitive.
Keywords: Larvicidal, *Sphaeranthus indicus* Linn, flavonoid, alkaloid.

INTRODUCTION

Malaria is a major public health problem in more than hudred countries, inhabited by a total of some 2.4 billion people, or close to half of the world's population (Persidis, 2000). Female *Anopheles* mosquitoes are involved in the transmission of malaria. The larval stage is the most vulnerable stage to attack mosquitoes as they are concentrated in smaller areas. Thus, one of the approaches for control of malaria transmission is by interrupting mosquito life cycle at larval stage. In the absence of an effective preventive measures or vaccine, the best approach should be the interruption of disease transmission by either killing, preventing mosquitoes from biting people or by killing the larva at the breeding sites of vectors. The discovery and use of conventional pesticides like DDT and malathion against adult mosquitoes in the last five decades demonstrated a successive move. However, this success was short lived due to the development of resistant to many mosquito strains, ecological imbalance and harm to mammals. This has necessitated the continued effort for search and development of environmentally safe, biodegradable and low cost larvicides and adultcides for killing larva and adult mosquitoes respectively from natural sources (ICMR Bulletin, 2003).

S. indicus is a member of Asteraceae family and its phytochemical investigations shows presence of various sesquiterpene lactones (Rahman et al., 1989), alkaloids (Basu and Lamsal,1946), eudesmanolides (Shekhani et al., 1990) and flavonoid C-glycoside (Mishra et al., 2007) etc. Some reports are available to indicate pharmacological profile of this plant (Pawar and Therani, 2012) but none related to mosquito larvicidal property of methanolic extract of flowers. In the present study, the flower of *S. indicus* was evaluated against III[rd] and IV[th] instar larvae of *Anopheles* species.

MATERIAL AND METHOD

Collection of plant

The plant is collected from North Maharashtra Region in the period of May 2011. The plant *Sphaeranthus indicus* is identified by Dr. Tanveer Khan, Department of Botany and deposited a voucher specimen in the Department of Zoology.

Preparation of extract

The plant material was collected and shade dried. Dried powdered plant material was exhaustively extracted in Soxhlet apparatus with methanol. MeOHx extract was proceeds for fractionation by adsorption column chromatography. After the phytochemical analysis the alkaloidal fraction (SAF) was collected (Harborne, 1998).

Bioassay: Third and forth instar larvae of *Anopheles* species collected and cleaned several times with distilled water. Larvicidal activity was evaluated using Maheswaran et al., (2008) method with slight modifications. Ten larvae of third and forth instars were released in a 199 ml D.W. and pinch of glucose (as larval food) and 1ml of desired concentration of test sample. Bioefficacy was determined in six replicates for each concentration ran at a time. Each test sample was dissolved in water with emulsifier (Tween-80) to get the experimental concentrations of MeOHx 5, 10, 15, 20 and 25 mg/ml and 1,2,3,4 and 5 mg/ml of SAF. Tween-80 was used as negative control. The whole set was discarded, if the mean mortality in the control was greater than 20%. Mortality and survival rate were recorded at hourly interval.

STATISTICAL ANALYSIS

The recorded data were statistically analyzed by Stat Plus 2006 Professional 3.9.8 – Survival – Probit analysis software.

RESULTS

Preliminary phytochemical screening of the extract and fraction of flower of *S. indicus* revealed the presence of various bioactive components of which alkaloid was most prominent (Table 1)In the present investigation, bioassays conducted with both MeOHx and SAF, indicated that the SAF has maximum larvicidal activity followed by MeOHx (Table2). SAF showed 100% mortality at 5 mg/ml after 3rd h. LD_{50} values of MeOHx against IIIrd and IVth instar larvae of *Anopheles species* were 5.75 mg/ml (χ^2= 2.87) and 3.87 mg/ml (χ^2= 0.85) respectively. LD_{50} values of SiF against IIIrd and IVth instar larvae were 0.76 mg/ml (χ^2= 0.80) and 0.75 mg/ml (χ^2= 0.22) respectively. As compared to IVth instar larvae of *Anopheles*, IIIrd instar larvae were highly sensitive.

Table 1 Phytochemical analysis MeOHx and SAF of *Sphaeranthus indicus*

Phytochemical studies	MeOHx	SAF
Alkaloids	+ +	+ +
Glycosides	+	+
Flavonoids	+	+
Tannins	+	--
Phenolic compounds	+	+
Anthocynins	--	--
Saponins	+	--
Terpenoids	--	--
Amines	--	--

+ Presence, - Absence

Table 2 Larvicidal activity of the MeOHx and SAF of the *S. indicus* against IIIrd and IVth instar larva.

Instar	Test material	LD_{50} mg/ml	LCL	UCL	Slope	Chi-square	Df	p value
IIIrd	MeOHx	5.75	0.0062	9.7686	3.18	2.87	3	0.41
IVth		3.87	0.0065	6.8691	3.51	0.85	3	0.83
IIIrd	SAF	0.76	0.5069	0.9825	5.33	0.80	3	0.84
IVth		0.75	0.4634	0.998	5.30	0.22	3	0.97

Values were based on five concentrations and six replications. Significant at $p<0.05$ level, Df = Degree of Freedom

DISCUSSION

Various plants of Asteraceae family are reported to have mosquito larvicidal activity due to presence of several thiophenes and flavanoids (Srivastava et al., 2008). Sharma and Saxena (1996) reported the toxic effect of petroleum ether fraction of same plant against II^{nd} and IV^{th} instar larvae of *Culex quinquefasciatus* at 100 to 500 ppm concentration. Whole plant of *S. indicus* showed moderate larvicidal activity against IV^{th} instar larvae of *Culex quinquefasciatus* (Rahuman et al., 2008). However, they have not concentrated either on specific part, exract or isolated principle. Four alkaloids, 10-O-demethyl-17-O-methylisoarnottianamide; 6-acetonyl-N-methyl- dihydrodecarine; Nitidine and Chelerythrine were isolated from the plant *Zanthoxylum lemairei* (Rutaceae) and evaluated for mosquito larvicidal activity against the malaria vector *Anopheles gambiae* (Talontsi et al., 2011). They demonstrated that the per cent mortality of 100% was observed at a concentration of 500 mg/L. In the present study, MeOHx and SAF obtained from flower of *S. indicus* have larvicidal against *Anopheles* mosquitoe larvae. SAF has more killing effect than MeOHx as it is free from another less potent phyto ingredient. This finding may be elaborating experimentation for newer more selective, biodegradable and natural larvicidal compounds.

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In Vivo Free radical scavenging activity of the methanolic extract and its fraction of flower of the *Sphaeranthus indicus* Linn

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ABSTRACT

Sphaeranthus indicus protects liver injury in CCL4 treated animals,probable reason for such activity is that it has antioxidant property. Peroxidase and catalase levels significantly increased in the higher concentration of SiAF (***P<0.001). There was a significant increase in SOD levels in MeOHx 2 and SiAF 2 groups (*P<0.05). The level of GSH in MeOHx 2, SiAF 1 and SiAF 2 groups were significantly increased (***P<0.001**)** when compared with control group of animals. The present studies revealed that *S. indicus* have significant *in-vivo* antioxidant activity and can be used to protect tissue from oxidative stress**.**

Keywords: *S. indicus*, CCl_4, glutathione, SOD, catalase, peroxidase

INTRODUCTION

Antioxidant potential of a substance is an important area in the medical field as well as in the food industry. The main characteristic of an antioxidant is its ability to trap free radicals. These radicals are produced by body's normal use of oxygen and are also generated through environmental pollutants, cigarette smoke, automobile exhaust fumes, radiation, air pollution, pesticides etc (Ashok, 2001 and Aqil et al., 2006). The oxidation induced by ROS can result in cell membrane disintegration, membrane protein damage and DNA mutation, which can further initiate or propagate the development of many diseases, such as liver injury, cardiovascular disease and cancer (Liao and Yin, 2000). Although, the body possesses defense mechanisms, such as, enzymes and antioxidant nutrients, which arrest the damaging property of ROS and cause irreversible oxidative damage. However, this natural antioxidant mechanism can be inefficient, and hence dietary intake of antioxidant compounds is important (Naphade et al., 2009).Therefore, research for the determination of the natural antioxidants source is important. The synthetic antioxidants like Butylated hydroxyl anisole (BHA), butylated hydroxyl toluene (BHT), tertiary butylated hydroquinon and gallic acid esters have been used. Recently, such antioxidants are criticized due to their prompt negative health effects. It is generally assumed that frequent consumption of plant-derived phytochemicals from vegetables, fruit, tea and herbs may contribute to shift the balance towards an adequate antioxidant status. Up to date antioxidant activity of crude extracts of *S. indicus* are reported, no report on fraction of the same plant is occurred in the literature. Therefore, further study is extended to evaluate antioxidant activity of the MeOHx and SiAF of flowers of *S. indicus* by Peroxidase, SOD, Catalase, and GSH method.

MATERIAL AND METHOD

Collection of plant

The plant is collected from North Maharashtra Region in the period of May 2011. The plant *Sphaeranthus indicus* is identified by Dr. Tanveer Khan, Department of Botany and deposited a voucher specimen in the Department of Zoology.

Preparation of extract

The plant material was collected and shade dried. Dried powdered plant material was exhaustively extracted in Soxhlet apparatus with methanol. MeOHx extract was proceeds for fractionation by adsorption column chromatography. After the phytochemical analysis the fraction (SiAF) was collected.

***In vivo* antioxidant activity**

The rats were divided into seven groups of six rats each as follows; The CCl_4 was diluted with liquid paraffin (1:1), before administration. (Madhavan et al., 2010).

Group-1	Control: Tween-80 (2% w/v p.o)
Group-2	Positive control (CCl_4Induced): treated with CCl_4, 0.5 ml/kg, p.o.
Group-3	Standard: Liv.52 (1 ml/kg/day, p.o.,)
Group-4	MeOHx 1: 200 mg/kg/day, p.o.
Group-5	MeOHx 2: 400 mg/kg/day, p.o.
Group-6	SiAF 1: 50mg/kg/day, p.o.
Group-7	SiAF 2: 100 mg/kg/day, p.o.

The treatment schedule was once daily for 7 days. All groups except the normal control, were treated with CCl_4 0.5 ml/kg, p.o. once daily for 7 days.

SAMPLE COLLECTION

On 8^{th} day, 18 h after the last dose of CCl_4, all animals were sacrificed with an excess of anesthetic, to allow isolation of the liver. The isolated liver was perfused in ice cold saline, blotted dry and weighed. The liver was further divided into 2 parts and liver homogenates were prepared. One part was used for the preparation of a 10 % *w/v* homogenate in potassium chloride (0.15 M). It was centrifuged at 5724 g for 10 mins (as described by Pierce Biotechnology, Inc., 2005). The supernatant obtained was used for estimation of peroxidase, catalase, and total proteins. The second part was used for the preparation of 10 % *w/v* homogenate in 0.25 % *w/v* sucrose in phosphate buffer (5 M, pH 7.4). This was also centrifuged at 5724 g for 10 mins. The supernatant was used for estimation of superoxide dismutase and glutathione [Masoodi et.al.2009,Sumanth M.and Ahmed R.2008.].

Assay of peroxidase activity

The assay was carried out by the method of Addy and Goodman, 1972. The reaction mixture consisted of 3ml of buffered pyrogallol [0.05 M pyrogallol in 0.1 M phosphate buffer (pH 7.0)] and 0.5 ml of 1% H_2O_2. To this added 0.1 ml enzyme extract and O.D. change was measured at 430 nm for every 30 seconds for 2 minutes. The peroxidase activity was calculated using an extinction coefficient of oxidized pyrogallol (4.5 litres/mol).

Assay of superoxide dismutase (SOD) activity

The assay of superoxide dismutase was done according to the procedure of Das *et al*., 2000. In this method, 1.4 ml aliquots of the reaction mixture comprising 1.11 ml of 50 mM phosphate buffer of pH 7.4, 0.075 ml of 20 M L-Methionine, 0.04ml of 1% (v/v) Triton X-100, 0.075 ml of 10 mM Hydroxylamine hydrochloride and 0.1ml of 50 mM EDTA) was added to 100 µl of the sample extract and incubated at 30ºC for 5 minutes. 80 µl of 50 µM riboflavin was then added and the tubes were exposed for 10 min to 200 W-philips fluorescent lamps. After the exposure time, 1ml of Greiss reagent (mixture of equal volume of 1% sulphanilamide in 5% phosphoric acid) was added and the absorbance of the color formed was measured at 543 nm. One unit of enzyme activity was measured as the amount of SOD capable of inhibiting 50% of nitrite formation under assay conditions.

Assay of catalase activity

Catalase activity was assayed by the method of Sinha, 1972. The enzyme extract (0.5 ml) was added to the reaction mixture containing 1ml of 0.01 M phosphate buffer (pH 7.0), 0.5 ml of 0.2 M H_2O_2, 0.4 ml H_2O and incubated for different time period. The reaction was terminated by the addition of 2 ml of acid reagent (dichromate/acetic acid mixture) which was prepared by mixing 5% potassium dichromate with glacial acetic acid (1:3 by volume). To the control, the enzyme was added after the addition of acid reagent. All the tubes were heated for 10 minutes and the absorbance was read at 610 nm. Catalase activity was expressed in terms of moles of H_2O_2 consumed/min/mg protein.

Estimation of reduced glutathione (GSH)

The amount of reduced glutathione in the samples was estimated by the method of Boyne and Ellman, 1972. 1ml of the sample extracts were treated with 4.0 ml of metaphosphoric acid precipitating solution (1.67 g of glacial metaphosphoric acid, 0.2 g EDTA and 30 g NaCl dissolved in 100ml water). After centrifugation, 2.0 ml of the protein-free supernatant was mixed with 0.2 ml of 0.4 M Na_2HPO_4 and 1.0 ml of DTNB reagent (40 mg DTNB in 100 ml of aqueous 1% tri sodium citrate). Absorbance was read at 412 nm within 2 minutes. GSH concentration was expressed as nmol/mg protein.

STATISTICAL ANALYSIS

All data were expressed as mean ± SE and the ANOVA followed by Bonferroni's Multiple Comparison Test by using GraphPad software.

RESULTS AND DISCUSSION

Preliminary phytochemical screening of the extract and fraction of flower of *S. indicus* revealed the presence of various bioactive components (Table 1). In the present study, the MeOHx and SiAF of *S. indicus* flowers were evaluated for *in vivo* antioxidant activity using CCl_4-intoxicated rats (Table 2). Peroxidase and catalase levels significantly increased in the higher concentration of SiAF (***P<0.001). There was a significant increase in SOD levels in MeOHx 2 and SiAF 2 groups (*P<0.05). The level of GSH in MeOHx 2, SiAF 1 and SiAF 2 groups were significantly increased (***P<0.001**)** when compared with control group of animals.

The earlier but very recent study revealed that methanolic extract of *S. indicus* exhibited a significant effect showing increasing levels of superoxide dismutase (SOD), Catalase (CAT), and glutathione peroxidase (GPX) by reducing malondialdehyde (MDA) levels (Tiwari and Khosa, 2009). Nemade et al., (2011) evaluated 14 wound healing plants for their antioxidant potency; one of them is fresh juice of flower of *S. indicus*. This showed moderate antioxidant property. In the present study, SiAF showed a potent radical scavenging activity and it may be due to alkaloid(s) or flavonoids. Hence there is need of further study to determine the mechanism of action of the alkaloids or flavonoids as antioxidant.

Table 1 Phytochemical analysis MeOHx and SiAF of *Sphaeranthus indicus*

Phytochemical studies	MeOHx	SiAF
Alkaloids	+	+
Glycosides	+	+
Flavonoids	+	+
Tannins	+	--
Phenolic compounds	+	+
Anthocynins	--	--
Saponins	+	--
Terpenoids	--	--
Amines	--	--

+ Presence, - Absence

Table 2 Free radical scavenging activity of the MeOHx and SiAF of the *S. indicus*

Groups	Peroxidase (U/mg protein)	SOD (U/mg protein)	Catalase (U/mg protein)	GSH (U/mg protein)
Control	0.15 ± 0.04	26.75 ± 2.05	0.12 ± 0.009	41.09 ± 1.92
Positive control	0.12 ± 0.01	24.74 ± 6.56	0.10 ± 0.02	29.42 ± 1.02
Std	0. 20 ± 0.006	30.90 ± 7.72	0.93 ± 0.01	55.90 ± 3.26
MeOHx 1	0.1 ± 0.01	29.10 ±11.08	0.11 ± 0.002	45.57 ± 5.42
MeOHx 2	0.18 ± 0.03	59.22 ± 5.64*	0.22 ± 0.002	69.57 ± 4.27***
SiAF 1	0.12 ± 0.01	53.78 ± 4.18	0.21 ± 0.07	82.28 ± 2.5***
SiAF 2	0.30 ± 0.05***	60.17 ± 4.12*	0.32 ± 0.003***	88.62 ± 3.96***

Std. Liv.52 = 1ml/kg, MeOHx 1- 200 mg, MeOHx 2- 500 mg, SiAF 1- 50 mg, SiAF 2- 100 mg / kg body weight. Each value expressed as mean ± SE, n=6, ***P<0.001 and *P<0.05 Vs. control

Acknowledgement
The author is grateful to DBT, New Delhi for their financial support. The authors are also thankful to Principal A.G. Rao for providing necessary facilities to carry out experiment and to Dr. R.T. Mahajan for providing laboratory facility to complete the experimental work.

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Effect of Lead Nitrate on Biochemical Contents of Teleost Fish *Barbonymus schwanenfeldii*

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ABSTRACT

In this study, the 48 hr LC_{50} and LC_{10} value of lead nitrate [$Pb(NO_3)_2$] was determined in teleost fish ***Barbonymus schwanenfeldii***. Gills liver, and muscle tissues from fish were collected on 48 hr in experiment. The study used a static bioassay test system and found log LC_{50} and LC_{10} values of 0.1412 and 0.0526 mg/l, respectively for 48 hr. Further its effects on glycogen, protein and lipid contents in the gills, liver and muscle were analyzed. A significant decrease of glycogen, protein and lipid content was registered in liver, gills and muscle of metal treated fishes when compared to their controls. The lead nitrate also had significantly decreased effect on lactate dehydrogenase and succinate dehydrogenase activity in comparison to the control.

Keywords: Lead toxicity, Teleost Tinfoil, biochemical and physiological changes.

INTRODUCTION

Lead is dispersed throughout the environment primarily as the result of anthropogenic activities. The impact of metals, as well as other pollutants, on aquatic biota can be evaluated by toxicity tests, which are used to detect and evaluate the potential toxicological effects of metals on aquatic organisms like fish. Lead nitrate getting into natural water may cause significant tissue damage in fish (Sheriff *et al.,* 2012; Chandravathy and Reddy, 1996) Though the effect of lead toxicity is well elucidated in man (McGeer, *et al.,* 2003), there is paucity of information on its effects on fish, which are eaten by man.Lead nitrate are neither fully metabolized nor quickly detoxicated and therefore create serious problems of residue accumulation. Recent review articles (Tawari-Fufeyin, et al., 2008; Parashar and Banerjee, 2002and Has-Schon *et al*., 2008; Grande and Andersen, 2004) on ambient toxicants in fish have clearly demonstrated that increased concentrations of several heavy metals seriously damage the gills of teleostean fish. In this study noticed the effect of lead nitrate on teleost fish *Barbonymus schwanenfeldii*. Physico-chemical parameters were also recorded. The study used a static bioassay test for lead nitrate [$Pb(NO_3)_2$] in teleost fish *Barbonymus schwanenfeldii* and found log LC_{50} and LC_{10} for 48 hr and from selected tissues like gills, liver and muscles biochemical as protein, glycogen, lipid and Lactate Dehydrogenase and Succinate Dehydrogenase activity was determined. The present study reports metabolic dysfunction in response to lead nitrate toxicity in the fish.

METHOD AND MATERIALS

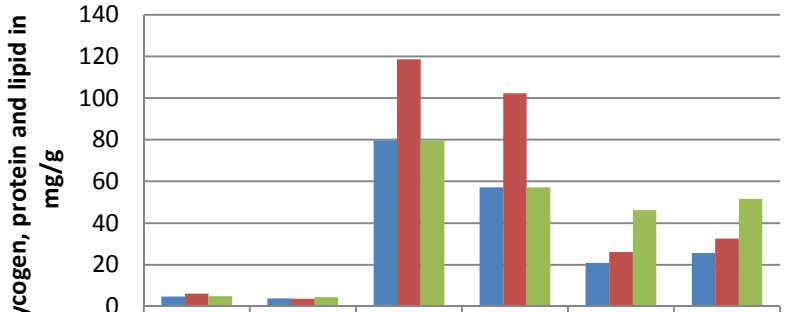
Barbonymus schwanenfeldii teleost fish of uniform size (5 ± 1.2 grams weight, 8 cm length) was collected from Fish shop and acclimatized for a week in laboratory condition. The toxicity test was done as per the standard bioassay method of APHA (1998). The test animal fish *Barbonymus schwanenfeldii* were selected which is commonly named as Tinfoil barb, an average body weight 5 ± 1.2 grams weight, 8 cm length. The study used a static bioassay test for lead nitrate [$Pb(NO_3)_2$] and found log LC_{50} and LC_{10} values of 0.1412 and 0.0526 ppm, respectively for 48 hr, calculated by method of probit analysis (Finney, 1971). After 48 hr exposure, 50% of the experimental fishes were decapitized, tissues such as gills, liver and muscles were separated, blotted free of blood and processed for biochemical as protein by Lowry method (1951), Glycogen by Anthrone method of Van der Vier (1954), Lipid by Folch *et al.* (1957) and expressed as mg/ gm. The lactate dehydrogenase (LDH) and succinate dehydrogenase (SDH) activity was determinated by the method of Nachlas *et al*., (1960) and expressed as µ moles of formazan /mg protein /hr at 37^0C.

RESULTS AND DISCUSSION

The results of the physico-chemical parameters as hardness 143.4 mg/l as $CaCO_3$ pH 7.6 to 8.2 and dissolved oxygen concentration 6.5 to 7.5 mg/l were recorded. LC_{50} values for static bioassay test system and found log LC_{50} and LC_{10} values of 0.1412 and 0.0526 ppm, respectively for 48 hr. The biochemical and enzymatic activity are summarized in graph 1, 2 and 3.

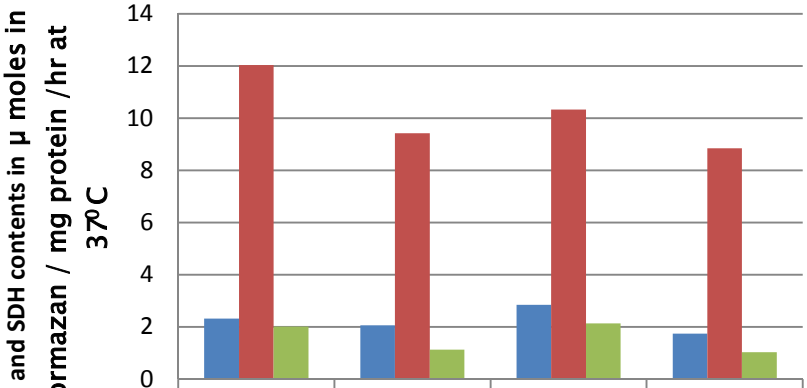
Changes in biochemical parameters in gills, liver and muscle were recorded. Significant depletion of glycogen, protein and lipid in these tissues occurs after exposure to metal in selected tissues. Similar results are noted by Palani kumar et al., (2012). Kasthuri and Chandran (1997) made a similar suggestion after working with Mystus *gulio* exposed to lead for 21 days. Tewari et al. (1987) in *Barbus conchonius* (Ham) as an impact of chronic lead poisoning.

Graph. 1



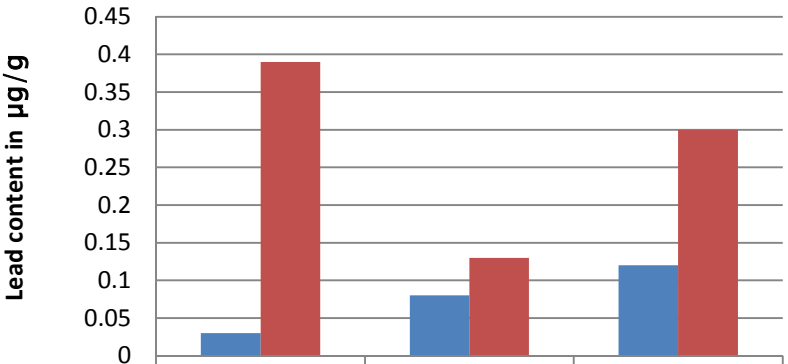
	Control	Glycogen mg/g	Control	Protein mg/g	Control	Lipid mg/g
Gills	4.773	3.751	79.8	57.07	20.91	25.64
Liver	6.133	3.693	118.6	102.4	26.1	32.57
Muscle	4.903	4.413	79.8	57.07	46.24	51.59

Graph. 2



	Control	LDH	Control	SDH
Gills	2.31	2.06	2.84	1.74
Liver	12.03	9.42	10.33	8.84
Muscle	2.01	1.12	2.13	1.03

Graph 3.



	Gills	Liver	Muscle
Control	0.03	0.08	0.12
Lead µg/g	0.39	0.13	0.3

The SDH, in gills, liver and muscle tissues of the fish decreased with a concurrent increase in LDH activity in all the tissues of the exposure to lead nitrate. Reduced activities of dehydrogenase systems in all the three tissues explicitly show impairment of oxidative metabolism. The suppression of succinate dehydrogenase activity in kidney and brain of *C. striatus* indicates impairment of oxidative metabolic cycle and reliance on the anaerobic glycolytic pathway to meet the energy demands (James *et al*., 1996).

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Toxicity of Zinc Sulphate to the Teleost Fish Tifoil Barb

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ABSTRACT

Laboratory tests were conducted on fishes of teleost Tinfoil Barb common to commercial aquarium were estimated their sensitivity to acute toxicity of zinc. In this study, the 24hr and 48 hr $LC_{50\ and}$ LC_{10} value of zinc sulphate ($ZnSO_4.7H_2O$) was determined in teleost fish Tinfoil barb. The results were evaluated by the Statistical Probit Analysis by Finney Method for 24 hr and 48 hr hours LC_{50} and LC_{10}value for fish was found to be 0.1412, 0.0526, 0.0855 and 0.0106 respectively.

INTRODUCTION

Heavy metals have been recognized as strong biological poisons because of their persistent nature and cumulative action. (Joshi *et al.*,2003; Hoo et al., 2004). Zinc, however, plays a vital role in almost all aspects of living systems either directly or indirectly (Liyaquat et. al. 2003; Jat and Kothari, 2006; Gupta and Srivastava, 2006), but when present at higher levels than normal, it can act as a pollutant (Agrawal and Srivastava, 2003; Gupta and Srivastava 2006). Although the toxicity of zinc to several fish species has been documented, the toxicity of this metal is not well known for all aquatic organisms (Hogstrand and Wood, 1996). This study was therefore, designed to investigate the toxicity of zinc on the available commercial aquarium teleost Tinfoil barb fish species by determination of LC_{50} and LC_{10} values for 24hr and 48 hr at different concentrations of the toxicants.

MATERIALS AND METHODS

Tinfoil barb teleost fish of uniform size (5 ± 1.2 grams weight, 8 cm length) was collected from Fish shop and acclimatized for a week in laboratory condition. The toxicity test was done as per the standard bioassay method of APHA (1998). The test animal fish Tinfoil barb were selected an average body weight 5 ± 1.2 grams weight, 8 cm length. The study used a static bioassay test for Zinc Sulphate (ZnSO4.7H2O) and found log LC_{50} and LC_{10} values for 24 hr and 48 hr, calculated by method of probit analysis (Finney, 1971).

Physico-chemical parameter:

The physico-chemical parameters of the water used in the experiment as hardness, pH and dissolved oxygen by techniques as outlined in APHA (1998).

The percentage for corrected mortality was calculated using the Abbott's formula (1952).

$$\text{Corrected mortality (\%)} = \frac{\text{Percentage living in control - percentage living in treatment}}{\text{Percentage living in control}} \times 100$$

RESULTS AND DISCUSSION

The results of the physico-chemical parameters measured are given in table1. LC_{50} values for static bioassay test system and found log LC_{50} and LC_{10} values of 0.1412, 0.0526, 0.0855 and 0.0106, respectively for 24 hr and 48 hr. and summarized in table 2 and 3.

Table 1. Physicochemical Parameters of water

Sr No.	**Physicochemical Parameters**	**Values**
(i)	pH	7.5 ± 0.6
(ii)	Temperature	23° C± 1° C
(iii)	Dissolved oxygen	6.5 ± 0.5mg/L
(iv)	Total hardness	143.4 ± 5 mg/L as $CaCO_3$

Table 2. Mortality of Teleost Tinfoil barb fish in different concentration of zinc sulphate at 24hr and 48 hr exposure period.

Toxicity for hours	**Concentration of zinc suplhate (mg/l)**	**Log conc.**	**No. of fish alive out of ten**	**Percent kill**	**Safe conc LC_{10} (mg/l)**	**LC_{50} (mg/l)**	**Regression equation**
24 hrs	0.05	1.698	90	10	0.0526	0.1412	Y= 0.335 X +0.475
	0.10	2.000	70	30			
	0.15	2.176	50	50			
	0.20	2.301	30	70			
48 hrs	0.020	1.301	8	20	0.0106	0.0855	Y= 0.708 X –1.608
	0.040	1.602	7	30			
	0.060	1.778	6	40			
	0.080	1.903	5	50			

RESULTS AND DISCUSSION

There were methods for data evaluation employed for acute the toxicity response. Our results were tested by Finney's Probit Analysis gave 24 hr and 48 hr LC_{50} and LC_{10} value for the fish Tinfoil barb exposed to different Zinc Sulphate concentrations as 0.1412, 0.0526, 0.0855 and 0.0106, respectively.

There were methods for data evaluation employed for acute the toxicity response. The observed differential toxicity of heavy metal investigation were attributed to several factors such as the type of heavy metal tested, solubility of the compound predominant ions in test solution, physico –chemical characteristics of the test solution and the mechanism(s) of action of the metals. All of these subjects determine the accessibility, including the penetrability of the metals into the test fish and hence, their toxicity. The authors reported differential toxicities following exposures of different species of fish to varying concentrations of heavy metals.

These all results were well in agreement with Bhoraskar and Kothari, (1997), Drummond ,(1986), Drummond and Russom ,(1990) and Joshi, (2011). In the present study the abnormal changes in the fish exposed to lethal concentration of zinc sulphate are time dependent, therefore acute toxicity tests are most widely used methods for determining the toxic range of heavy metals. Exposition duration noticeably influenced the value of LC_{50} & LC_{10} The greatest differences were observed between 24hr and 48hr values were quite close.

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Comparative milk clotting activity of proteases of some members of Euphorbiaceae family and their application in cheese making

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ABSTRACT
The present study was undertaken to observe the distribution of milk clotting and proteolytic activities of the crude enzymes in the various parts (leaves, stem and latex) of plants belonging to Euphorbiaceae family.The results showed that milk clotting activity of crude enzyme of latex of four plants are in order of *Euphorbia tirculli* followed by *Euphorbia nerifolia* , *Euphorbia nivulia* and *Pedilanthus tithymaloides* . Milk coagulation is the basic step in cheese making, therefore these crude enzymes were used in the manufacturing of cheese. It was observed that, nutritional quality of cheese prepared from *E. nivulia* is comparable to papain however, not fully matched with Amul cheese.
Keywords : Milk clotting activity, Euphorbiaceae, Papain and cheese.

INTRODUTION

Cheese is one of the numerous products from the processing of milk. In many milk-producing countries a large fraction of the milk produced is used for cheese making. Cheese is used as a form of preserving essential nutrients in milk and is an excellent source of nutrients such as protein, fat, minerals and vitamins. Cheese manufacture is essentially a dehydration process in which the fat and casein of milk are concentrated 6-10-fold. Since long the animal rennin (or rennet) is employed in making cheese. The enzyme rennet is obtained on a commercial scale from the fourth or true stomach of the unweaned calves which are specifically slaughtered for this purpose single calf produces only 5 to 10 gm of rennet. The enzyme helps in coagulating the casein of milk. Much research interest has been directed towards discovering a milk-clotting enzyme which would satisfactorily replace calf rennet produced by genetically engineered bacteria have proven suitable substitutes for animal rennet but increasing attention has been directed towards natural rennet extract from plants (Ahmed et al., 2009) plant proteases employed for cheese production in various areas of the world include papain, bromelin, ficin oryzasin, cucumisin, Sodom apple and jacaratia corumbensis (Duarte et al.2009). In the present study attempt has been made for comparative evaluation of milk clotting enzyme of lattices of four members of Euphorbiaceae family for its application in cheese production. Evaluation of nutritional quality of manufactured cheese with standard Amul cheese.

MATERIAL AND METHODS

Plant collection- The different plant part (leaf, stem and fruit) of some medicinal plants of Euphorbiaceae family and the lattices of latex bearing medicinal plants of Euphorbiaceae family were collected early in the morning by superficial incisions of stem, fruit or trunk of healthy plant and allowing the milky latex to drain in clean glass vials separately, brought to the laboratory and store at 4^0C.

Preparation of crude enzyme- All operations were carried out at $0 – 5\ ^0$C. The plant part e.g. leaf, stem, fruit and latex was homogenized in homogenizer under chilled condition and filtered successively through four folds of muslin cloth and Whatmann filter paper No. 1. Filtrate called “Crude enzyme”, was used for further investigation of Proteolytic activity (Silva 2005).

Protein Estimation-Protein concentration in the enzyme extract was determined using Folin Ciocalteu reagent as per the procedure of Lowry *et al*. (1951).

Milk clotting activity-The milk clotting activity of proteases was performed as described by (Badgujar and Mahajan, 2010). The enzyme source (0.2 ml) was added to 2 ml of substrate solution (12% skim milk powder in 0.01M CaCl2). The time necessary for the formation of curd fragment was measured. Milk clotting activity is expressed in term of Soxhlet unit.

Cheese preparation and analysis-Cheese preparations of Cow's milk using crude enzyme of latices of four plants of Euphorbiaceae family were carried out according to (Silva, 2005). Nutritional analyses of prepared cheese were carried out according to the Official Methods of Analysis (AOAC, 1990) for food with respect to Yield, total solid, moisture content, total carbohydrate, total Protein and total fat.

RESULTS AND DISCUSSION

Different plant parts such as leaf stem and latex of twenty plants of the Euphorbiacae family ware evaluated for milk clotting activity. Latex posses the highest milk clotting activity as compare to the leaf and stem. Among the all selected plants crude enzyme of latex of four plants show prominent milk clotting activity, whereas other sixteen plants possess poor activity, therefore they are excluded from the present study. The relationship of protein and enzyme activity is illustred in Table 1. The efficacy of enzyme towards cheese production is given in Table 2. Our findings agreed with results of Badgujar and Mahajan (2012).

Table 1 Comparative milk clotting activity of latex of some members of Euphorbiaceae family

Sr. No	Botanical Name	Common name	Nature	Habitat	Part used	Protein in mg	SA MCA
1	*Euphorbia nivulia*	Leafy Milk Hedge	M	T	St, Lx	5.3±0.2	54.7±3.9
2	*Euphorbia nerifolia*	Thor	M	H	Lf, St	5.2±0.3	60.5±3.2
3	*Euphorbia tirculli*	pencil plant	O	S	St, Lx	1.9±0.1	78.03±9.0
4	*Pedilanthus tithymaloides*	Devil's Backbone	O	S	Lf, St, Lx	5.7±0.08	41.3±2.2

O - Ornamental, M - Medicinal plant, H - Herb, S - Shrub, T - Tree, Lf - Leaf, St - Stem, Lx- latex, MCA – Milk clotting activity, SA- Specific activity in Units mg^{-1} of Protein

Table 2 Nutritional analysis of cheese sample prepared using Cow's raw milk using crude enzyme

Sr. No.	Cheese sample	Yield (%)	Moisture (%)	Total solids (%)	Carbohydrate content (%)	Protein content (%)	Fat content (%)
1	*E. tiruculli*	20.7	54.3	45.7	0.5	14.6	22.6
2	*E. nivulia*	21.4	51.9	48.1	1.2	15.2	22.1
3	*E. nerifolia*	21.3	52.1	47.9	1.0	12.1	21.2
4	*P. tithymaloides*	20.4	48.3	51.7	1.0	13.0	21.5
5	Papain	23.4	42.3	57.7	2.1	15.7	19.5
6	Amul cheese		41.1	58.9	2.0	22.	29.9

CONCLUSION

Twenty plants of *Euphorbiaceae* are screened for their possible milk clotting activity. Milk clotting activtiy is distributed poorly in both stem and leaf tissue, where as latex posses highest milk clotting activity among investigated plants. Crude enzyme of latex of *Euphorbia tirculli* posses highest milk clotting activity followed by *Euphorbia nivulia, Euphorbia nerifolia* and *Pedilanthus tithymaloides.* Further these enzymes were used for cheese preparation. It was observed that, nutritional quality of

cheese prepared from *E.nivulia* is comparable to papain however, not fully matched with Amul cheese as given in table 2.

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Evaluation of Diuretic Activity of Polyherbal Formulation of Medicinal Plant in Rats

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ABSTRACT

PURPOSE
This study was investigated the diuretic potential of polyherbal mixture formulation prepared from the bark of *Bauhinia racemosa,* leaves of *Tiphrozea purpurpa, seed* of *Tectona grandis* and *Dolichos biflorus*,fruit of *Tribulus terrestris* and flower of *Sphaeranthus indicus. Method*-By taking the different concentration of polyherbal formulation like (250,500 & 1000 mg),frusemide are administered to rat(n=6 animals/group) and their urine output collected after 24 hours. The urinary output, pH, electrolytes (Na^+,K^+& Cl^-), were estimated the polyherbal formulation. The occupied improvement in diuretic activity .*Result* -Polyherbal formulation produced significant increase of urine volume. Increase in electrolytes(Na^+,K^+& Cl^-), excretion caused alkilinization of urine, diuretic activity, saluretic index, natriuretic index .This all showed close dependent relationship when compared to control animal by the concentration of polyherbal formulation., *Conclusion*- Over all this study strongly suggests that the polyherbal formulation increased the diuretic activity of rats.
Keywords - Diuretic, polyherbal formulation, frusemide, rats.

INTRODUCTION

Man has been using herbs and plant product for it's medicinal uses since antiquity. However it is imperative that the traditional system should be scientifically supported for their efficacy and safety(Jain et al, 2012).It is also estimated that the traditional and modern medicine uses about 50,000 to 70,000 species of plants. In technologically advanced countries like the United State, 60% of the population commonly uses medicinal plant to combat certain diseases and in Japan there is more demand for herbal preparation as official drug. Beside, the World Health Organization has estimated that over 75% of the world's population still relies on plant-derived medicines, usually obtained from traditional healers, for basic health-care needs

By definition, diuretics are drug that bring about an increase in urinary volume as well as in the electrolyte output .Naturally occurring diuretic include caffeine, alcohol and wine, which inhibit Na+ reabsorption and inhibit secretion of ADH but have the adverse effect including impotence, fatigue, weakness etc. Sahooet al.,. About 179 plants have been reported in Cuba to be used by the population as diuretics. Among the several plant, *Bauhinia racemosa, Tiphorozea purpura , Tectona grandis, Tribulus terrestris , Dolichos biflorus , Speranthus indicus* have shown excellent diuretic activity.(Talele et al.,2012)

MATERIAL AND METHOD

Collection of plant material

The study was done during June 2013 – July 2013. The bark of *Bauhinia racemosa* was collected from campus of Moolji Jaitha College, Jalgaon during may 2013. It is locally called as (*'Aapata)'*. The leaves of *Tephrosia purpurpa* locally called as *(Shurpunkha).*In similar way seed of *Tectona grandis (Sag)* , fruit of *Tribulus terrestris L. (Gokhshur)* , Seed of *Dolichos biflorus L. (Kulith)* and flower of

Sphaeranthus indicus (Gorakhmundi) were collected. And identified by Dr.G.S.Chaudhary department of Botany.

Drug and chemicals

Frusemide (lasix), CMC (Carboxyl Methyl Cellulose) were purchased from Chemist of Jalgaon. All other chemicals used in study were of analytical grade.

Design of work

Control- given 10 ml/kg body weight of mineral water. - 2)Placebo - 1% CMC/kg body weight. - 3)Frusemide-40 mg/kg body weight. – 4) Herbal mixture 1- 250 mg/kg body weight. – 5)Herbal mixture 2- 500 mg/kg body weight. – 6)Herbal mixture 3 – 1000 mg/kg body weight. In all cases volume of the dose was administered 10 ml/kg body weight. Immediately after administration of the rat was placed in metabolic cage separately after each 24 hours and urine samples were collected in graduated cylinder and it's volume was recorded after 24 hours Bhadoriyaet al.,(2011).

RESULT

Table 1: - Effect of oral administration of polyherbal formulation and frusemide on urine output and electrolyte excretion.

Group	Dose	Urinary output (ml)	Na+ (mEq/L)	K+ (mEq/L)	Cl- (mEq/L)	Na+/K+
Control	-	4.7	43	23	115	1.8
Placebo	1% CMC	4.4	42	27	118	1.5
Frusemide	40 mg/kg	6.4	81	46	113	1.7
HM1	250 mg/kg	4.8	44	24	121	1.8
HM2	500 mg/kg	5.8	53	26	123	2.03
HM3	1000 mg/kg	6.1	64	31	125	2.06

Table 2: Effect of oral administration of polyherbal formulation and frusemide on saluretic, natriuretic and diuretic index

Group	Dose	Urinary output (ml)	Ph	Saluretic index	Natriuretic index	Diuretic action	Diuretic activity
Control	-	4.7	9	158	1.8	-	-
Placebo	1% CMC	4.4	9	160	1.5	0.93	0.68
Frusemide	40 mg/kg	6.4	9	214	1.7	1.36	-
HMI	250 mg/kg	4.8	9	165	1.8	1.02	0.75
HMII	500 mg/kg	5.8	9	176	2.03	1.23	0.9
HMIII	1000 mg/kg	6.1	9	189	2.06	1.29	0.94

Abbrevation-HM-I Herbal Mixture-250mg/kg, HMII- HerbaI Mixture 500mg/kg, HMIII-1000mg/kg,CMC Carboxy methyl cellulose

DISCUSSION

The prepared polyherbal formulation contains the mixture of saponins, flavonoids, steroids, terpenoids etc. The presence of saponin might be responsible for saluretic activity by modulating renal sodium

excretion. Presence of phenolic compounds, organic acids and polar compounds such as flavonoids and steroidal saponins are responsible for diuretic activity. The level of excreted Na^+, K^+ and Cl^- in urine was equally low. The frusemide treated group, the diuretic action increased significantly from normal rats. In the herbal mixture administered group showed lesser urine volume when compared with frusemide. The polyherbal formulation show diuretic effects after the administration of 250 mg/kg body weight dose. With respect to polyherbal formulation, the maximum increase in urinary excretion was produced at 1000 mg/kg .The high dose mixture produced effect nearly equal to frusemide. The increase in the ratio of concentration of sodium, potassium and chloride ions indicates that the polyherbal formulation increase Na^+ ion excretion to a greater extent than K^+ which is very essential quality of good diuretic with lesser hyperkalaemic side effect . This study confirms that the polyherbal formulation at different range of doses given orally in a single dose have a diuretic potential.

CONCLUSION

The present study revealed that polyherbal mixture showed significant increase in urinary output and urinary elecrolyte concentration. We concluded that the results of polyherbal formulations were compared with control and frusemide (standard drug). The urine volume increased by the dose of 1000mg was approximately equal to urine volume increased by frusemide. From the study observations administration of herbal mixture produce the diuretic activity

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Investigations into the immunomodulatory activity of methanolic extract of root of *Ziziphus jujuba* Mill in Rat.

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ABSTRACT
The objective of the present study was to investigate the immunomodulatory activity of *Ziziphus jujuba* on cellular and humoral immunity. Oral administration of the methanolic extract of *Z. jujuba* root, at the doses of 100 and 200 mg/kg in rat dose dependently potentiated the delayed type hypersensitivity reaction induced both by sheep red blood cells (SRBC). It significantly enhanced the production of circulating antibody titre in rat in response to SRBC. Chronic administration of MeOHx significantly ameliorated the total white blood cell count and also restored the myelosuppressive effects induced by cyclophosphamide. The present investigation reveals that MeOHx possesses immunomodulatory activity.
Keywords: *Ziziphus jujuba*, immunomodulation, phagocytosis.

INTRODUCTION
The immune system is known to be involved in the etiology as well as pathophysiological mechanisms of many diseases (Ghule etal., 2006 and Gokhale et al., 2003). It is able to generate an enormous variety of cells and molecules capable of specifically recognizing and eliminating variety of foreign invaders (Roitt et al., 2001). Modulation of the immune response to alleviate various diseases has been of interest for many years (Sharma, 1983).Medicinal plants are a rich source of substances which are claimed to induce paraimmunity, which is the non-specific immunomodulation of essentially granulocytes, macrophages, natural killer cells and complement functions (Sainis et al., 1997). Because of the concerns about the side effects of conventional drugs, the use of natural products as an alternative to conventional treatment in healing and treatment of various diseases has been on the rise in the last few decades (Fong, 20002). Medicinal plants serve as therapeutic alternatives, safer choices or in some cases, as the only effective treatment. Recent screening with plants has revealed many compounds like flavonoids, alkaloids, glycosides, etc and vitamins having pronounced antioxidant, antineoplastic, antiulcer, anti- inflammatory and immunostimulating potential (Dashputre and Naikwade, 2010). One of them, *Ziziphus jujua* (*Rhamnaceae)* is occurred in North Maharashtra Region. It is used traditionally as tonic and aphrodisiac and sometimes as Hypnotic-sedative and Anxiolytic, anticancer (Melanoma cells), Antifungal, Antibacterial, Antiulcer, Anti-inflammatory, Cognitive, Antispastic, Antifertility/contraception, Hypotensive and Antinephritic, Cardiotonic, Antioxidant, Immunostimulant, and Wound healing properties (Chopda,2009). However, no information is available on the immunomodulatory effects of *Z. jujuba*. In reguard to this, the present study is planned to examine the immunomodulatory effects of *Z. jujuba* in rat.

MATERIALS AND METHODS
Collection of plant
The plant is collected from North Maharashtra Region in the period of May 2011. The plant *Ziziphus jujua* is identified by Dr. Tanveer Khan, Department of Botany and deposited a voucher specimen in the Department of Zoology.

Preparation of extract
The plant material ,root was collected and shade dried. Dried plant material coarsely powdered. Powder was exhaustively extracted in Soxhlet apparatus with methanol**.** Resultant extract was preserved in a desiccator. The methanolic extract (MeOHx) of the plant obtained was screened for phytochemistry (Harborne, 1998).

Animals: Male wistar rats (150-200g) were used. Animals were housed under standard conditions of temperature (23±1°C), 12 h light/dark cycle and fed with standard pellet diet and water *ad libitum*. The experimental protocols (protocol no.= CPCSEA/1690/1) have been permitted and approved by the Institutional Animal Ethics Committee (IAEC) and treated as per the guideline of Committee for the Purpose of Control and Supervision on Experiments on Animals (CPCSEA). Fresh Sheep red blood cells (SRBC's) in Alsever's solution were obtained from local shepherd.

Drugs and chemicals

All the drugs and chemicals were of analytical grade Drugs were procured from Levamisole (Khandelwal Pharmaceutical Ltd. Mumbai), Cyclophosphamide (Biochem pharmaceutical, Mumbai).

Antigen (SRBCs): SRBC collected in freshly prepared Alsever's Solution (1:1). Blood was kept in the refrigerator and processed, for the preparation of SRBCs batch, by centrifugating at 2000 rpm for 10 minutes. Washed three times in large volumes of Pyrogen free 0.9% Normal Saline and then suspending into buffered saline for further use. (adjusted to a concentration of 0.5 x 10^9 cells/ml for immunization and challenge.)

Haemagglutination antibody (HA) Titer (Joharapurkar et al., 2004)

The rat were divided into five groups consisting of six animals each. Rat in group I received vehicle only for 21 days. Group II received standard drug levimasole (LMS) (50 mg/kg/p.o.) as an established immunostimulant agent for 21 days Group III received cyclophosphamide (negative control) 100 mg/kg, p.o. on 9th and 16th day as a single dose. Rat in treatment group IV and V were given 100 and 200 mg/kg/day/p.o MeOHx daily for 21 days respectively. On 7th and 14th day of the study, rat from all the groups were immunized and challenged respectively, with SRBCs in normal saline (0.1ml of 20% SRBCs) intraperitoneally. Blood was withdrawn on 14th and 21st day from retro-orbital plexus under mild ether anaesthesia from all antigenically sensitised and challenged rat respectively. Blood was centrifuged to obtain serum, normal saline was used as a diluent and SRBCs count was adjusted to (0.1% of SRBCs). Each well of a microtitre plate was filled initially with 20 µl of saline and 20 µl of serum was mixed in the first well of micro titer plate. Subsequently the 20 µl diluted serum was removed from first well and added to the next well to get two fold dilutions of the antibodies present in the serum. Further twofold dilutions of this diluted serum were similarly carried out till the last well of the second row (24th well), so that the antibody concentration of any of the dilutions is half of the previous dilution. 20 µl SRBCs (0.1% of SRBCs) were added to each of these dilutions and the plates were incubated at 37°C for one hour and then observed for haemagglutination. The highest dilution giving haemagglutination was taken as the antibody titre. The antibody titers were expressed in the graded manner, the minimum dilution (1/2) being ranked as 1, and mean ranks of different groups were compared for statistical significance. Antibody titer obtained on 14^{th} day after immunization (on 7th day) and on 21st day after challenge (on 14th day) with SRBCs was considered as primary and secondary humoral immune response respectively.

Delayed Type Hypersensitivity (DTH) Response (Agarwal et al., 1999 and Fulzele et al., 2003)

The drug treatment was exactly the same as described above for HA titer. On 14th day of the study, all the groups I to V were immunized with SRBCs (0.1ml of 20% SRBC i.p.) in normal saline. On day 21st all animals from all the groups were challenged with 0.03 ml of 20% SRBCs in subplantar region of right hind paw. Foot pad oedema in rat was used for detection of cellular immune response. On 21st day, injection of 0.1ml of 20% SRBCs in the subplantar region of right hind paw in the volume of 0.03 ml and normal saline in left hind paw in same volume. Foot pad reaction was assessed after 24 hr. on 22nd day, in terms of increase in the thickness of footpad as a result of hypersensitivity reaction due to oedema, the thickness of the right hind footpad was measured using Plethysmometer. The footpad reaction was expressed as the difference in the thickness (m.l.) between the right foot pad injected with SRBCs and the left footpad injected with normal saline.

Neutrophil adhesion test (Ghule et al., 2006)

Rats were divided into four groups of six animals each. The control group I received vehicle, while Group II received levimasole (LMS) (50 mg/kg/p.o.) for 14 days. Animals of treatment group III and IV were given MeOHx (100 and 200 mg/kg/day/p.o. respectively.) daily for 14 days. On the 14th day of the treatment, blood samples from all the groups were collected by puncturing retroorbital plexus under mild ether anaesthesia. Blood was collected in vials pre-treated by disodium EDTA and analysed for total leukocyte count (TLC) and differential leukocyte count (DLC) by fixing blood smears and staining with Leishman's stain. After initial counts, blood samples were incubated with nylon fiber (80 mg/ml of blood sample) for 15 min at 37^{o}C. The incubated blood samples were again analyzed for TLC and DLC. The product of TLC and % neutrophil gives neutrophil index (NI) of blood sample. Per cent neutrophil adhesion was calculated as follows,

$$\textbf{Neutrophil adhesion (\%)} = \frac{\text{NIu} - \text{NIt}}{\text{NIu}} \text{X } 100$$

Where, NIu: Neutrophil Index before incubation with nylon fiber and NIt: Neutrophil Index after incubation with nylon fiber.

Statistical analysis

All the results were expressed as mean ± Standard Error (SEM). Data were analyzed using one-way Analysis of Variance (ANOVA) followed by Bonferroni's multiple comparisons test. P-values <0.01 were considered as statistically significant.

RESULTS AND DISCUSSION

Acute oral toxicity was carried out by according to OE-- guideline. It is found that MeOHx was safe at limit dose 4000 mg/kg with no mortality in studied subjects respectively. Preliminary phytochemical screening show the presence of flavonoids, glycosides, alkaloids, tannins and phenolic compounds.

Assessment of Humoral immune response

Table 1 Effect of *Z. jujuba* treatment on primary and secondary antibody titre.

Group	Primary Antibody titre	Secondary Antibody titre
Control	4.00 ± 0.63	4.00 ± 0.63
Standard	6.80 ± 0.80	6.80 ± 0.80
Negative Control	4.00 ± 0.63	4.80 ± 0.80
MeOHx 1	10.00 ± 0.63***	10.80 ± 0.80***
MeOHx 2	10.00 ± 0.63***	10.80 ± 0.80***

Values are expressed as (Mean ± S.E.M.), n= 6, *** p< 0.001,
treated groups were compared with control group .

Haemagglutinating Antibody [HA] Titer (Table 1)

Effect of MeOHx on Primary antibody response on day 14th at 200 mg/kg/p.o. treated group with normal immune status showed significant increase (P<0.001) in HA titer when compared with the control group. Secondary antibody titer on twenty-first day in MeOHx treated group with normal immune status group showed a significant rise (P<0.01) in the antibody titer when compared with the control group. Both MeOHx (100 and 200 mg/kg/p.o.) extract results are comparable with LMS (50 mg/kg/p.o.) standard.

Delayed Type Hypersensitivity (Table 2)

Effect of MeOHx on cell mediated immune response on 21st day MeOHx (100 and 200 mg/kg/p.o.) treated group showed significant (p<0.01) decrease in the mean difference of paw thickness when compared to control group.

Neutrophil Adhesion Test (Table 3)

Effect of MeOHx on neutrophil activation by the neutrophil adhesion test shows that the % neutrophil adhesion was significantly ($p<0.05$) increased by MeOHx (200 mg/kg/p.o.) when compared with the control group.This suggests its possible immunostimulant effect under experimental condition.

Assessment of Cell Mediated Immune Response.

Table 2 Effect of *Z. juuba* treatment on cell mediated immune response by delayed type hypersensitivity induced footpad oedema.

Group	Mean Difference of paw oedema (mm)
Control	2.667 ± 0.16
Standard	1.307 ± 0.17
Negative Control	2.473 ± 0.31
MeOHx 1	2.273 ± 0.02
MeOHx 2	1.637 ± 0.08**

Values are expressed as (Mean ± S.E.M.), n= 6, ** p< 0.01, treated groups were compared with control group .

Assessment of Non-specific immune response

Table 3 Effect of *Z. jujuba* treatment on neutrophil activation by neutrophil adhesion test.

Group	% Neutrophil adhesion
Control	**10.77 ± 1.636**
Standard	**27.18 ± 4.711**
MeOHx 1	**30.54 ± 8.963**
MeOHx 2	**43.55 ± 12.67***

Values are expressed as (Mean ± S.E.M.), n= 6,
* p< 0.05, treated groups were compared with control group.

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Acute Toxicity of Zinc Sulphate to the Teleost Fish *Barbonymus schwanenfeldii*.

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ABSTRACT

Laboratory tests were conducted on fishes of teleost *Barbonymus schwanenfeldii* common to commercial aquarium were estimated their sensitivity to acute toxicity of zinc. In this study, the 24hr and 48 hr $LC_{50\ and}$ LC_{10} value of zinc sulphate ($ZnSO_4.7H_2O$) was determined in teleost fish *Barbonymus schwanenfeldii*. The results were evaluated by the Statistical Probit Analysis by Finney Method for 24 hr and 48 hr hours LC_{50} and LC_{10}value for fish was found to be 0.1125, 0.0154, 0.1324 and 0.01276 ppm respectively.

INTRODUCTION

Heavy metals have been recognized as strong biological poisons because of their persistent nature and cumulative action. (Joshi *et al.,* 2002; Ho, 2004). Zinc, however, plays a vital role in almost all aspects of living systems either directly or indirectly (Gupta and Srivastava, 2006), but when present at higher levels than normal, it can act as a pollutant (Gupta and Srivastava 2006; Rand, 2008). Although the toxicity of zinc to several fish species has been documented, the toxicity of this metal is not well known for all aquatic organisms (Shetty 2007; De Schamphelaere and Janssen, 2004). This study was therefore, designed to investigate the toxicity of zinc on the available commercial aquarium teleost *Barbonymus schwanenfeldii* species by determination of LC_{50} and LC_{10} values for 24hr and 48 hr at different concentrations of the toxicants.

MATERIALS AND METHODS

Barbonymus schwanenfeldii teleost fish commonly named Tinfoil barb selected as uniform size (5 ± 1.2 grams weight, 8 cm length) was collected from Fish shop and acclimatized for a week in laboratory condition. The toxicity test was done as per the standard bioassay method of APHA (1998). The test animal fish Tinfoil barb were selected an average body weight 5 ± 1.2 grams weight, 8 cm length. The study used a static bioassay test for Zinc Sulphate (ZnSO4.7H2O) and found log LC_{50} and LC_{10} values for 24 hr and 48 hr, calculated by method of probit analysis (Finney, 1971).

Physico-chemical parameter:

The physico-chemical parameters of the water used in the experiment as hardness, pH and dissolved oxygen by techniques as outlined in APHA (1998).

The percentage for corrected mortality was calculated using the Abbott's formula (1952).

$$\text{Corrected mortality (\%)} = \frac{\text{Percentage living in control - percentage living in treatment}}{\text{Percentage living in control}} \times 100$$

RESULTS AND DISCUSSION

The results of the physico-chemical parameters measured are given in table1. LC_{50} values for static bioassay test system and found log LC_{50} and LC_{10} values of 0.1125, 0.0154, 0.1324 and 0.01276 ppm respectively for 24 hr and 48 hr. and summarized in table 2 and 3.

Table 1. Physicochemical Parameters of water

Sr No.	**Physicochemical Parameters**	**Values**
1.	pH	7.5 ± 0.6
2.	Temperature	23° C± 1° C
3.	Dissolved oxygen	6.5 ± 0.5mg/L
4.	Total hardness	143.4 ± 5 mg/L as $CaCO_3$

Table 2. Mortality of Teleost Tinfoil barb fish in different concentration of zinc sulphate at 24hr and 48 hr exposure period.

Toxicity for hours	**Concentration of zinc suplhate (mg/l)**	**Log conc.**	**No. of fish alive out of ten**	**Percent kill**	**Safe conc LC_{10} (mg/l)**	**LC_{50} (mg/l)**	**Regression equation**
24 hrs	0.05	1.698	90	10	0.0526	0.1412	Y= 0.335 X +0.475
	0.10	2.000	70	30			
	0.15	2.176	50	50			
	0.20	2.301	30	70			
48 hrs	0.020	1.301	8	20	0.0106	0.0855	Y= 0.708 X –1.608
	0.040	1.602	7	30			
	0.060	1.778	6	40			
	0.080	1.903	5	50			

RESULTS AND DISCUSSION

There were methods for data evaluation employed for acute the toxicity response. Our results are tested by Finney's Probit Analysis and gave 24 hr and 48 hr LC_{50} and LC_{10} value for the fish Tinfoil barb exposed to different zinc sulphate concentrations as 0.1125, 0.0154, 0.1324 and 0.01276 ppm respectively.

A number of earlier researcher employed either acute or sub acute toxicity response in an aquatic animals. The observed differential toxicity of heavy metal investigation were attributed to several factors such as the type of heavy metal tested, solubility of the compound predominant ions in test solution, physico – chemical characteristics of the test solution and the mechanism(s) of action of the metals. All of these subjects determine the accessibility, including the penetrability of the metals into the test fish and hence, their toxicity. We reported differential toxicities following exposures of different species of fish to varying concentrations of heavy metals. These results were well in agreement with several worker (El-Sayed, 2006; Gupta.and Srivastava, 2006; Kawade and Khillare, 2012; Joshi, 2011). In the present study the abnormal changes in the fish exposed to lethal concentration of zinc sulphate are time dependent, therefore acute toxicity tests are most widely used methods for determining the toxic range of heavy metals. Exposition duration noticeably influenced the value of LC_{50} and LC_{10}. The greatest differences were observed between 24hr and 48hr values were quite close.

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Cytotoxicity of metahnolic extract of root of *Ziziphus jujuba* by MTT assay

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ABSTRACT
In this study, different concentrations of methanolic extract of roots of the plant *Ziziphus jujuba* were subjected to cytotoxic activity against HeLA cells using MTT assay. MTT assay was used to evaluate the reduction of viability of cell culture in the presence and absence of the extract. Cell viability was inhibited to different extents by different concentration of extract.
Keywords: *Ziziphus jujuba;* HeLA cells; MTT assay

INTRODUCTION

Many experiments carried out *in vitro* are for sole purpose of determining the potential cytotoxicity of the compound being studied, either because the compounds are being used aspharmaceutical or cosmetics and must be shown to be non-toxic or because they are designed as anticancer agent and cytotoxicity may be crucial to their action. New drugs, cosmetics, foods, food additives and so on go through extensive cytotoxicity testing before they are released for use by public. There is much pressure for both human and economic to perform at least part of cytotoxicity testing *in-vitro*. It is well established that secondary metabolites obtained from plant material like Alkaloids, Cynogenic glycosides, Flavonoids, Tannins and Phenolic compounds possesses various biological activity. Plant has shown potential as medicinal properties. Thus the aim of present study is to discover plant derived compound that could possess anticancer activity and alternative to rather expensive and side effects of them, from the root of *Ziziphus jujuba* Mill.

MATERIALS AND METHODS

Ziziphus jujuba Mill. (Rhamnaceae); Vernacular name: Eng: Common jujube; Chinese date; Chemical constituents: Carbohydrates, fat protein, amino acids, anthocyanins from fruit, seeds and leaves. Leucocyanidin from bark. Leucopelargonidin, betulinic and ceabothic acids from wood. Rutin from leaves. Mauritines A,B,C,D,E and F, frangufoline and amphbines B,D and F. Ziziphine A,B,C,D,E,------Q from stem and root bark (Mahajan and Chopda, 2009). Uses: The roots are bitter, useful in wounds and ulcers. The leaves are bitter and are useful in wounds, syphilitic ulcers. Fruits are useful in leprosy, skin diseases, pruritus, wounds and ulcers, hemorrhages and general debility. The seeds are acrid and are useful in wounds (Chopda and Mahajan, 2009). Root of *Ziziphus jujuba* is being used by tribal Adivasies in eastern parts of Jalgaon District (Maharashtra State) influencing injuries, small cuts and or animals bite, attack and wounds. Various activities like anti-inflammatory (Adzu and Haruna, 2007); sedative and hypnotic (Gong et al., 2000); anticancer, antiretroviral (Biswas and Mukharjee, 2003); anti-complementary (Sang et al., 2004) and antioxidant (Seong et al., 2008) has been reported.

Collection of plant

The plant is collected from North Maharashtra Region in the period of February 2012. The plant *Ziziphus jujuba* is identified by Dr. Tanveer Khan, Department of Botany and deposited a voucher specimen in the Department of Zoology.

Preparation of extract: The plant material was collected from North Maharashtra Region Jalgaon District, Maharashtra State, India. The plant root was shade dried. After complete drying the material was crushed and grinded to form coarse powder. One kg of dried powdered plant material was exhaustively extracted in Soxhlet apparatus with methanol. The solvent extract so obtained was then filtered to remove any suspended impurities. Extract was concentrated under reduced pressure and controlled temperature

(55^0C to 60^0C). The extract of plant was preserved in dry, cool condition in desiccator. The methanolic extract (MeOHx) was further proceed for their cytotoxicity in HeLa cell line by MTT assay.

Phytochemical study: MeOHx and (ZjFF) were analyzed for its phytochemical investigation by qualitative methods (Harborne, 1998).

Cell line used: HeLA cell line was used to determine the cytotoxicity of medicinal plants, the cell line was grown in HAM's media containing FBS (Foetal Bowins Serum) Hela cell line , is a cell type in an immortal cell line used in scientific research. It is the oldest and most commonly used human cell line. The line was derived from cervical cancer cells taken on February 8, 1951, from Henrietta Lacks a patient who eventually died of her cancer on October 4, 1951. GROUPS - 1 Control -Buffer only; 2 Standard - Vincrestin; 3 Placebo - 1% DMSO; 4 *Ziziphus jujuba* - 500µg to 31.25 µg/ml in DMSO.

Estimation of cell viability: Viability screening is carried out by Trypan blue dye exclusion method. The cells were seeded in 96-well plates. Four wells for each concentration were seeded and triplicate plates were used the cell line. Then, the cells were incubated at 37°C. After 24 h the medium was replaced by fresh medium containing different concentrations of the plants extract. After incubation 0.1 ml trypan blue was added and number of dead cells determined by using haemocytometer. The per cent viability was calculated by using formula: % viability = (live cell count/total cell count)*100

MTT assay: The monolayer cell culture was trypsinized and the cell count was adjusted to 3-lakhcells/ ml using medium containing 10% Foetal Bovin Serum. The cells HeLA cell line was recovered in culture flask. Counting of cells was done by using haemocytometer. To the each well of 96 well microtitre plate, 100µl of diluted cell suspension was added .The plate was incubated for 24-48 hrs in CO_2 incubator. After 24 hours, when the monolayer formed the supernatant was flicked off and 100 µl of different test compounds were added to the cells in microtitre plates and kept for incubation at 37ºC in 5 % CO_2 incubator for 72 hour and cells were periodically checked for granularity, shrinkage, swelling. After 72 hour, the sample solution in wells was flicked off and 10 µl of MTT dye was added to each well. The plates were gently shaken and incubated for 4 hours at 37oC in 5% CO_2 incubator. The supernatant was removed, 10 µl of DPBS was added, and the plates were gently shaken to solubilize the formed formazan. Absorbance was determined at 450nm wavelength by using ELISA reader. The percentage growth inhibition was calculated using the formula below: % cell inhibition = 100 - {O.D. of Sample) / (O.D. of Control} x 100.

RESULTS AND DISCUSSION

Using the ethnomedical data approach, *Ziziphus jujuba* was collected and evaluated for their cytotoxic activities. The search for new anti-cancer drugs is one of the most prominent research areas of natural products. To investigate the cytotoxic potential of *Ziziphus jujuba* extract was prepared and screen it for their possible cytotoxic activity against HeLA cell lines. Evaluation of effects on cell viability using MTT test activity can be evaluated by measuring the activity of a mitochondrial enzyme succinate dehydrogenase using MTT test. MTT is designed to be used for the quantification of both cell proliferation and cell viability in cell population using 96-well plate format. This test is widely used in the *in vitro* evaluation of the biosafety of plant extracts. Therefore, cancer and normal cells were exposed to increasing concentrations (31.25 - 500 µg/ml of culture medium) of the methanolic extract for 24 h. The MTT assays data are presented respectively in Figures 1 and the corresponding IC50 are summarized in Table 1.

The absorbance of the MTT formazan was determined at 450 nm in an ELISA reader. Cell viability was defined as the ratio (expressed as a percentage) of absorbance of treated cells to untreated cells. Values given represent the mean ± standard deviations of three independent experiments carried out in triplicate two times. The extract produced a reduction in cell proliferation of lymphocytes cells at 24-hrs incubation (Figure 1B) with *Ziziphus jujuba* resulting in the best growth inhibition at lower concentrations. At the highest concentration tested (500 µg/ml) with a 24-hrs incubation period, *Ziziphus jujuba* resulted in 99.36% inhibition of cell proliferation.

Table 1 Effect of Methanolic extract of root of *Z. jujuba* as cytotoxicity.

Plant extract	Concentration (µg/ml)	Absorbance	% inhibition	IC 50 (µg/ml)
Methnolic extract	31.25	0.481	-0.6345	168.75
	62.5	0.460	3.586	
	125	0.393	17.64	
	250	0.160	66.46	
	500	0.003	99.36	

The results show dose dependent response. The extract showed different anti- proliferative profiles regarding extract concentrations. There were different inhibitions produced by different concentrations of at 24-hours incubation. On the other hand, there was no difference in the level of inhibition produced by concentrations lower than 31.25 µg/ml. The inhibition percentage with regard to cytotoxicity was found to be 99.36 % at 500 µg with IC50 value of 168.75 µg/ml.

Fig. 1 Effect of Methanolic extract of root of *Z. jujuba* as cytotoxicity.

CONCLUSION

The present work reveals that the methanolic extract of root of *Ziziphus jujuba* may be an interesting source of new anticancer agent, however, further studies to be aopted to fractionate the extract to identify the active principle and to determine the mechanism of action of the constituents possessing potential cytotoxicity.

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SECTION B

COMMERCE

A STUDY OF TRAINING AND DEVELOPMENT PROGRAMME IN THE ORGANIZATION: CASE STUDY OF JAIN IRRIGATION SYSTEMS PVT. LTD.

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INTRODUCTION

Human resource development is the process of improving, moulding and changing the skills, knowledge, creative ability, aptitude, attitude, values, commitment, etc. based on present and future job and organizational requirement. These functions include-

1. **Performance appraisal**: It is the systematic evaluation of individuals with respect to their performance on the job and their potential for development.
2. **Training:** It is the process of imparting to the employees technical and operating skills and knowledge.
3. **Management development**: It is the process of designing and conducting suitable executive development programmes so as to develop the managerial and human relations skills of employees.
4. **Career planning and development:** It is the planning of one's career and implementation of career plans by means of education, training, job search and acquisition of work experience. It includes internal and external mobility.
5. **Internal mobility:** It includes vertical and horizontal movement of an employee within an organization.
6. **Transfer:** It is the process of placing employees in the same level jobs where they can be utilized more effectively in consistence with their potentialities and needs of the employees and the organization.
7. **Promotion:** It deals with upward reassignment given to an employee in the organization to occupy higher position which commands better status and pay keeping in view the human resources of the employees and the job requirements.
8. **Demotion:** It deals with downward reassignment to an employee in the organization.
9. **Change and organization development:** Change implies the creation of imbalances in the existing pattern or situation.

OBJECTIVES OF THE STUDY

1. To deeply study the whole procedure of training and development procedure in the organization.
2. To study the various methods of training and development in the organization.
3. To study the benefit of present training and development.
4. To find out what different and unique procedures/methods are applied for the organization so That it is one of the top leading organization in India.

HYPOTHESES

The hypotheses of the project are as follows:

1) Employees are trained by their superiors.
2) Certain training techniques are used in the organization.
3) Training improves the job knowledge and skills of the employees at all levels of the organization
4) Difference in behaviors of employees before & after training can be observed.

RESEARCH METHODOLOGY

Jain irrigations ltd. was selected as sample area.

1. **Sampling unit:** Sample unit consist of employee from various categories and dept.
2. **Sample size:** Sample size of 50 employees is selected for this study.
3. **Data collection:** Primary data was collected through personal interview with the officers and workers and along with questionnaire were filled by employee.

LIMITATIONS OF THE STUDY

1. The research is limited to Jalgaon city only.
2. The scope of the research is limited to Jain Irrigation ltd.
3. This study is based only on the information provided by the organization.
4. In view of the limited time available for the study, training and development process is studied. The answers given by the respondents have to be believed and have to be taken for granted as truly reflecting their perception.

TRAINING AND DEVELOPMENT:

TRAINING AND DEVELOPMENT NEEDS = STANDARD PERFORMANCE – ACTUAL PERFORMANCE

These can make a distinction among training, education and development. Such distinctions enable us to acquire a better perspective about the meaning of term training.

Researchers had collected responses with the help of the questionnaires. And form these responses the following interpretations are made.

FACILITIES FOR TRAINING:

The organization has excellent facilities for imparting within its factory premises. These facilities includes: Black board, White board, T.V. and VCR/DVD-VCD, Computer, laptop, LCD projector.

DURATION:

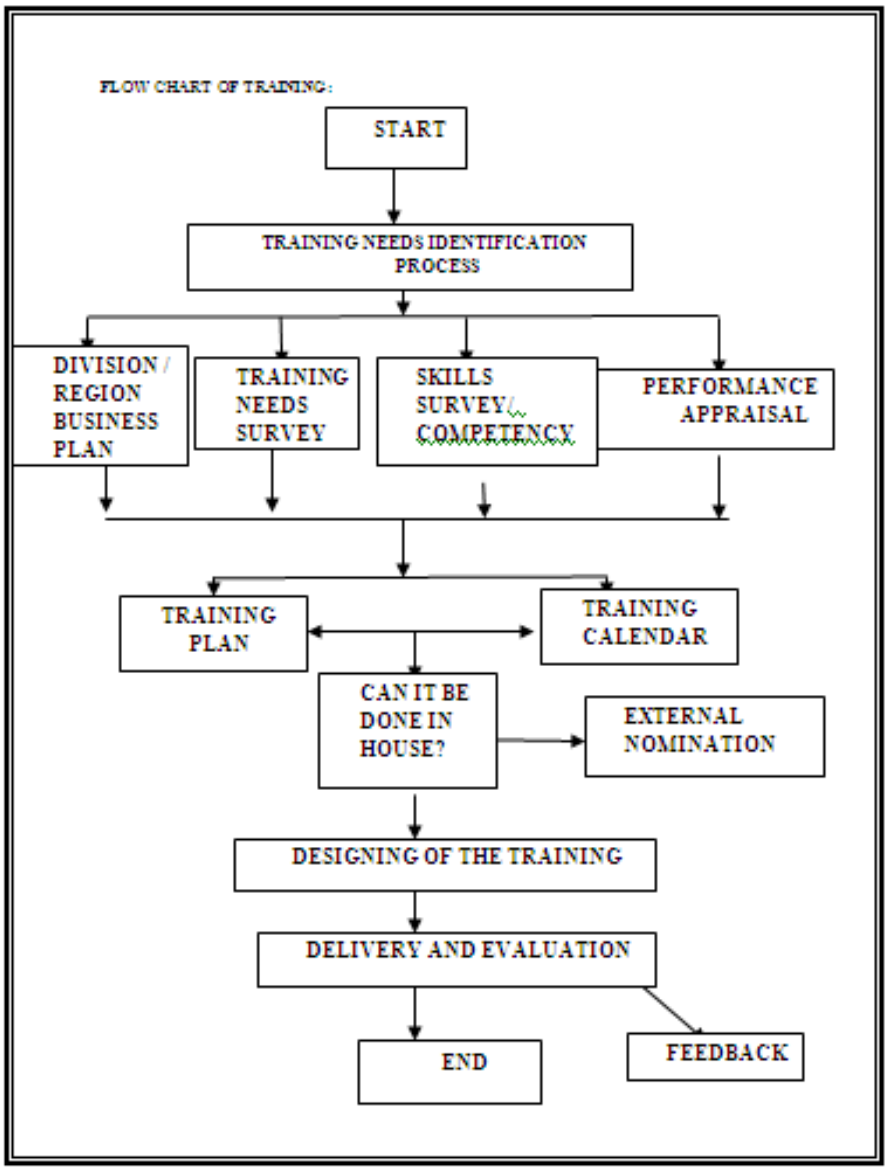
The duration is depended upon the programme. As per programme it varies from 1 day 2 to 3 days. The training department also has a training workshop fully equipped with the equipments required for imparting technical training.

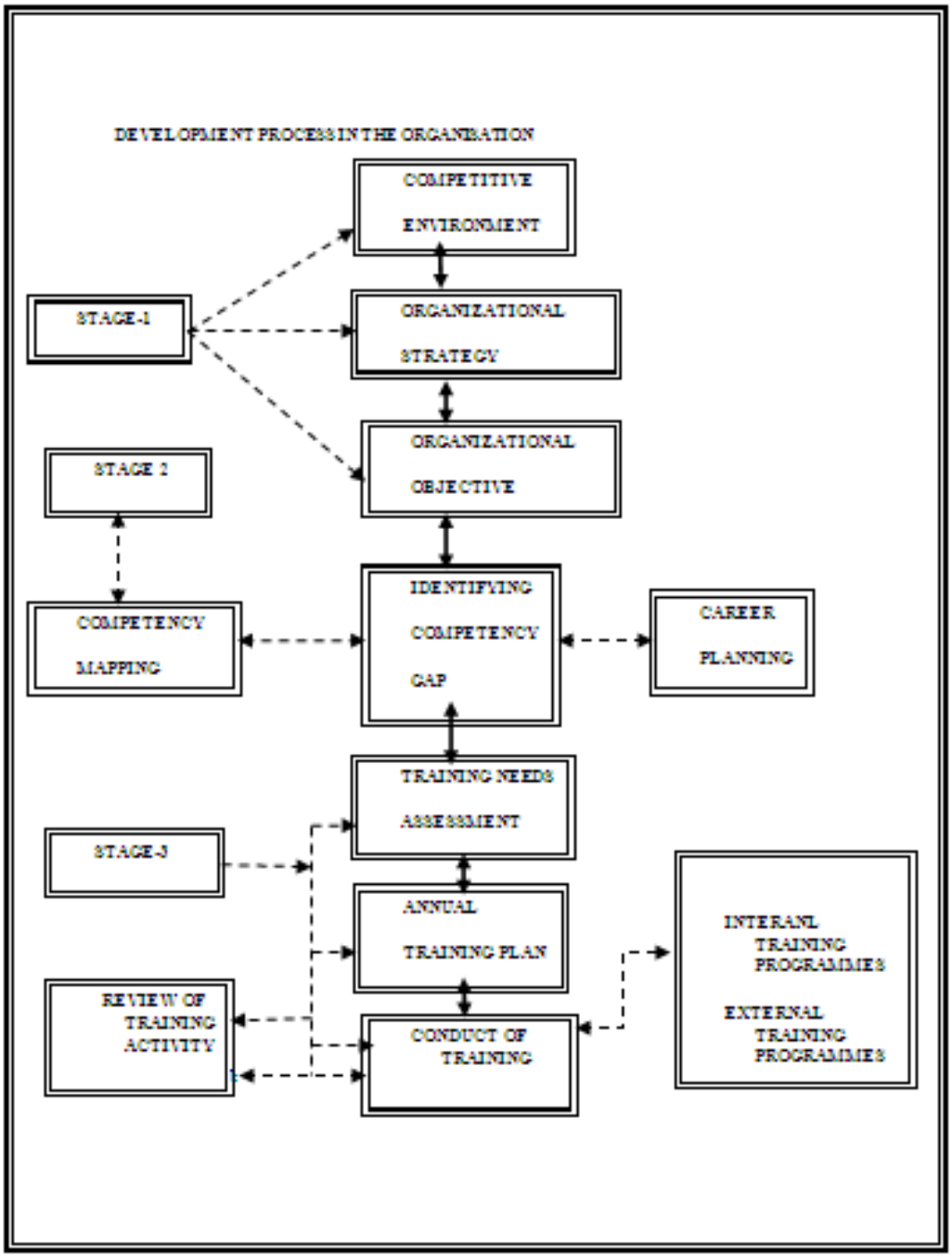
PLANNING OF TRAINING:

- Calendar of training programmed is prepared to meet the inter-departmental training needs.
- Whenever required inter-departmental training is required through on the job day to day or through procedure and instruction.

Training programmers are organized in consultation with the vice president in charge.

FLOW CHART OF TRAINING :




DEVELOPMENT PROCESS IN THE ORGANISATION
COMPETITIVE ENVIRONMENT
STAGE-1
ORGANIZATIONAL STRATEGY
ORGANIZATIONAL OBJECTIVE
STAGE 2
IDENTIFYING COMPETENCY GAP
COMPETENCY MAPPING
CAREER PLANNING
TRAINING NEEDS ASSESSMENT
STAGE-3
ANNUAL TRAINING PLAN
INTERANL TRAINING PROGRAMMES
EXTERNAL TRAINING PROGRAMMES
REVIEW OF TRAINING ACTIVITY
CONDUCT OF TRAINING

SECTION C

ARTS & HUMANITIES

महाराष्ट्र राज्यातील संग्राम योजना -
पाचोरा तालुका : एक व्यष्टी अध्ययन

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अर्थशास्त्र विभाग,मू. जे. महाविद्यालय, जळगाव

प्रस्तावना

भारत निर्माण कार्यक्रमातील नॅशनल गव्हर्नन्स कार्यक्रमांतर्गत सर्व पंचायतराज संस्थांचे संगणकीकरण करून त्यांच्या कारभारात एकसूत्रता व पारदर्शकता आणण्यासाठी EPRI / ई-पंचायत हा मिशन मोड प्रकल्प हाती घेण्यात आलेला आहे. महाराष्ट्रातील सर्व पंचायतराज संस्थांचे (जिल्हा परिषद, पंचायत समिती, ग्रामपंचायत) संगणकीकरण करून त्यांचा कारभार ऑनलाईन करण्याचा महत्वाकांक्षी **संगणकीय ग्रामीण महाराष्ट्र (संग्राम)** हा प्रकल्प राबविण्यात येत आहे.

संग्राम योजनेची माहिती

संग्राम म्हणजे **संगणकीय ग्रामीण महाराष्ट्र** होय. संग्राम कक्षाची स्थापना १५ ऑगस्ट २०११ या साली करण्यात आली. संग्राम कक्ष हे जिल्हास्तरीय, तालुकास्तरीय व ग्रामपंचायत स्तरावर स्थापन करण्यात आलेल्या आहे. पंचायत समितीला संग्राम कक्ष हे एकच असते तसेच जिल्हा परीषद व ग्रामपंचायतीला सुद्धा संग्राम कक्ष हे एकच असते. पंचायत समिती मधील संग्राम कक्षातील काम करणाऱ्यांची संख्या ४ आहे ती पुढीलप्रमाणे - (१) तालुका समन्वयक (२) हार्डवेअर इंजिनिअर (३)संग्राम कक्ष ऑपरेटर - १ (४) संग्राम कक्ष ऑपरेटर - २

पाचोरा तालुका स्तरावर शंभर ग्रामपंचायती आहेत व प्रत्येक ग्रामपंचायतीत एक संग्राम कक्ष स्थापन करण्यात आलेले आहे. तेथे प्रत्येक एक एक संगणक परिचालक नेमण्यात आलेला आहे.

पाचोरा तालुक्यातील संग्राम योजनेचे अध्ययन व त्याची उपयुक्तता यांचा अभ्यास प्रस्तुत संशोधनात केला आहे.

संशोधनाची उद्दिष्टे

१) संग्राम योजनेची कार्यवाही तपशीलवर माहिती समजून घेणे.
२) या योजनेमुळे ग्रामीण भागातील लोकांना त्याचा कितपत लाभ होतो त्याची पाहणी करणे.
३) या योजनेमुळे सरकारी कामातील सुसूत्रता किंवा सुलभता किंवा परिणामकारकता तपासणे.
४) या योजनेच्या अंमलबजावणीत येणाऱ्या अडचणींचा अभ्यास करून त्यावर उपाययोजना सुचविणे.

गृहीतकृत्ये

१) संग्राम योजनेअंतर्गत लोकांना लागणाऱ्या विविध प्रकारच्या सेवा शासनाकडून एकाच केंद्रामध्ये / कक्षामध्ये उपलब्ध झाल्या.
२) या योजनेमुळे लोकांना लागणारे वेगवेगळ्या प्रकारचे महत्त्वाचे दाखले (रहिवासी दाखला, मृत्यु दाखला, दारिद्र्य रेषेखाली असलेला दाखला, सातबारा उतारा इ.) त्वरीत मिळू लागल्याने त्यांचा वेळ, श्रम व पैशांची मोठ्या प्रमाणात बचत झाली.
३) या योजनेमुळे सरकारी कामांमध्ये सुलभता येवून त्यांची कार्यक्षमता / परिणामकारकता वाढली.

संशोधन पध्दती

प्रस्तुत अध्ययन करण्यासाठी पुढील दोन पद्धतींचा वापर करण्यात आलेला आहे.

१) स्थूल पातळीवरील विश्लेषण

२) सूक्ष्म विश्लेषण पद्धती

स्थूल पातळीवरील विश्लेषण

पाचोरा तालुक्यातील संग्राम योजनेबद्दलची अंमलबजावणी व त्याची उपयुक्तता यांचा अभ्यास प्रस्तुत संशोधनामध्ये करण्यात येणार आहे. त्यासाठी दुय्यम स्वरूपाच्या आकडेवारीचा आधार घेण्यात आला आहे. दुय्यम आकडेवारी ही शासनाचे विविध अहवाल, परिपत्रक, संगणक इ. तून घेतलेली आहे.

सूक्ष्म विश्लेषण पद्धती

ही पद्धती नमुना निवडलेल्या लाभधारकांच्या व ऑपरेटरांच्या (संगणक परिचालक) प्राथमिक माहितीवर आधारलेली आहे. प्राथमिक आकडेवारी गोळा करण्यासाठी मुलाखत अनुसूचीचा वापर करून निवडलेल्या नमुन्याची मुलाखत घेऊन प्राथमिक माहिती संकलित केली आहे. त्यासाठी नमुना निवड पद्धतीचा वापर केला आहे.

नमुना निवड

अध्ययनाचे क्षेत्र असलेला पाचोरा हा जळगाव जिल्ह्यातील प्रमुख तालुका आहे. त्यासाठी त्रिस्तरीय स्वैर नमुना निवड पद्धतीचा (Three State Stratified Random Sample) वापर केला आहे. त्यात तालुका हा पहिला एकक, गाव हा दुसरा एकक तर निवडलेले लाभधारक हा अंतिम एकक आहे. जेव्हा अभ्यास विषय असणाऱ्या समष्टीचे विविध गटात वर्गीकरण झालेले असते तेव्हा स्तरीत स्वैर नमुना चाचणी वापर करावा लागतो. या पद्धतीत समष्टीच्या विविध गटातील आवश्यक तेवढे एकक स्वैर पद्धतीने निवडल्यानंतर त्या सर्व एककांचा मिळून स्तरीत स्वैर नमुना होतो.

पाचोरा तालुक्यातील लोकांना संग्राम योजनेचा किती व कसा लाभ झाला याचे अध्ययन करण्यासाठी या तालुक्यातील १०० लाभधारकांची नमुना निवड पद्धतीने निवड केली. निवडलेल्या लाभधारकांपैकी ५१ शेतकरी, २५ शेतमजूर, नोकरी करणारे १३, व्यापार करणारे ११ होते. या ५१ शेतकऱ्यांचे धारणक्षेत्रानुसार वर्गीकरण केले असता असे दिसून आले की सिमांत शेतकरी १९, लहान शेतकरी १५, मध्यम शेतकरी ७, मोठे शेतकरी १० होते. तसेच पाचोरा तालुक्यातील एकूण ८८ ऑपरेटर्सची निवड केली आहे. या सर्व लाभधारकांची प्रत्यक्ष मुलाखत ऑक्टोबर व नोव्हेंबर २०१३ या कालावधीत मुलाखत अनुसूचीच्या आधारे घेण्यात आली. मुलाखत अनुसूचीवर प्रक्रिया करून संगणकीकरण करून विश्लेषणासाठी तक्ते तयार केले आणि त्या आधारावर काढलेले प्रमुख निष्कर्ष पुढीलप्रमाणे मांडले आहेत-

प्रमुख निष्कर्ष

- पाचोरा तालुक्यातील एकूण १०० गावांपैकी सर्वेक्षणासाठी निवडलेल्या २२ गावातील एकूण लोकांनी २०१२-१३ या वर्षात नेलेल्या विविध प्रकारच्या नेलेल्या दाखल्यांची (प्रमाणपत्रे) संख्या ३७४६७ एवढी होती. यावरून संग्राम योजनेचा लाभ घेणाऱ्या लाभधारकांची संख्या प्रचंड असल्याचे आढळून येते.
- उर्वरित ७८ गावातील लोकांनी नेलेल्या दाखल्यांची एकूण संख्या ११९५५६ इतकी आढळून आली यावरून असे आढळून येते की, पाचोरा तालुक्यातील लोकांना फार मोठ्या प्रमाणात या योजनेचा लाभ झाला.
- इंदिरा आवास म्हणजेच घरकुल योजनेअंतर्गत पाचोरा तालुक्यातील दारिद्र रेषेखालील ४१७४ लोकांनी २००६-०७ ते २०१२-१३ या कालावधीमध्ये या योजनेचा लाभ घेतल्याचे दिसून येते.

- संग्राम कक्षातून दिलेल्या एकूण दाखल्यांपैकी प्रामुख्याने ४ दाखल्यांची (जन्माचा दाखला, मृत्युचा साखला, दारिद्र रेषेखालील असलेला दाखला, रहिवासी दाखला) लोकांना जास्त आवश्यकता असल्याचे दिसून येते.
- संग्राम योजनेअंतर्गत १४ सॉफ्टवेअरच्या साहाय्याने ग्रामीण भागातील लोकांना पुरविल्या जाणाऱ्या सेवांचे प्रकार व मिळणाऱ्या सर्व प्रकारच्या दाखल्यांचा विचार करता लोकांना व्यवहारात उपयोगी पडणाऱ्या व महत्त्वपूर्ण अशा सर्वच प्रकारच्या दाखल्यांची उपलब्धता या एकाच केंद्रामार्फत होते हे लक्षात येते.
- पाचोरा तालुक्यातील एकूण १०० गावांपैकी सर्वेक्षणासाठी निवडलेल्या २२ गावांव्यतिरिक्त संग्राम योजनेअंतर्गत १४ सॉफ्टवेअरच्या साह्याने ग्रामीण भागातील लोकांना पुरविल्या जाणा-या सेवांचे प्रकार व मिळणा-या सर्व प्रकारच्या दाखल्यांचा विचार करता लोकांना व्यवहारात उपयोगी पडणा-या व महत्त्वपूर्ण अशा सर्वच प्रकारच्या दाखल्यांची उपलब्धता या केंद्रामार्फत होते असे दिसून येते.
- पाहणी केलेल्या लाभधारकांना संग्राम योजनेची माहिती मिळणा-या स्त्रोतांमध्ये दवंडी देणारे (३८%) या घटकाचे प्रमाण तुलनेने सर्वाधिक असून त्यानंतर अनुक्रमे ग्रामसभा (२४%), गावातील लोक (२०%) आणि ऑपरेटर (१८%) हे घटक दिसून येतात.
- सर्वेक्षण केलेल्या ऑपरेटर्सपैकी लोकांना संग्राम योजनेची माहिती नसण्याचे कारण हे निरक्षरता असल्याचे सांगणा-या ऑपरेटर्सची संख्या ४७ (५३.४०%) सर्वात जास्त असून त्यानंतर अनुक्रमे उदासीनता २३ (२६.१४%) व इतर कारणे १८(२०.४६%) असा क्रम दिसून येतो. यावरून अजूनही ग्रामीण भागात विविध नवीन सरकारी योजनांची माहिती व त्याचा लाभ तळागाळापर्यंत पोहचण्यातील प्रमुख अडथळा म्हणजे निरक्षरता असल्याचे स्पष्ट होते.
- संग्राम कक्षातून दाखले घ्यायला येणा-यांमध्ये स्त्रियांच्या तुलनेत पुरुषांचे प्रमाण लक्षणीय आहे.

वरील सर्व निष्कर्षावरून संग्राम योजनेअंतर्गत लोकांना लागणा-या विविध प्रकारच्या सेवा शासनाकडून एकाच केंद्रामध्ये उपलब्ध झाल्या, या योजनेमुळे लोकांना लागणारी वेगवेगळ्या प्रकारचे महत्त्वाचे दाखले त्वरीत मिळू लागल्याने त्यांचा वेळ, श्रम व पैशांची मोठ्या प्रमाणात बचत झाली आणि या योजनेमुळे सरकारी कामामध्ये सुलभता येऊन त्यांची कार्यक्षमता वाढली ही तिन्ही गृहीतके सिद्ध झाली असे दिसून येते.

अडचणी

- ज्यावेळी गावामध्ये लोडशेडींग होते त्यावेळी लाईट नसल्यामुळे गावातील नागरिकांना दाखले मिळण्यासाठी विलंब होतो.
- विशिष्ट दाखले घेण्यासाठीच (उदा. रहिवासी दखला, जन्म-मृत्यु दाखला, दारिद्र रेषेखालील असलेला दाखला आणि सात बारा उतारा) लोक ग्रामपंचायतीमध्ये जातात. बाकीच्या दाखल्यांची व इतर सेवासुविधांची माहिती निरक्षरता व उदासीनतेमुळे लोकांपर्यंत पोहचत नाही.
- संग्राम योजनेचा प्रसार अद्यापही ग्रामीण भागात प्रभावीपणे पूर्णपणे झालेला नाही.

विविध प्रकारचे दाखले घेण्यासाठी ग्रामीण भागातून येणाऱ्यांपैकी पुरुषांच्या तुलनेत स्त्रीयांचे प्रमाण फारच कमी असल्याचे दिसून आहे. स्त्रीयांमध्ये निरक्षरतेचे असलेले जास्त प्रमाण, कुटूंबात व समाजात स्त्रीला मिळणारी दुय्यम दर्जाची वागणूक, पुरूष प्रधान संस्कृती इ. कारणे त्यासाठी कारणीभूत असल्याचे लक्षात येते.

उपाययोजना

१. जेव्हा ऑपरेटर रजेवर असतात तेव्हा त्यांच्या जागेवर दुसऱ्या पर्यायी ऑपरेटरची नेमणूक केली पाहिजे.
२. संग्राम केंद्राला अखंडीत वीजपुरवठा करण्याची तजवीज केली जावी. प्रसंगी ग्रामपंचायतीला इन्व्हर्टरची सुविधा उपलब्ध करून द्यावी.
३. ग्रामीण भागातील जनतेला संग्राम योजनेअंतर्गत ज्या विविध प्रकारच्या सेवा पुरविल्या जातात व दाखले उपलब्ध होतात त्यांची माहिती लोकांपर्यंत पूर्णपणे पोहचत नाही. त्यासाठी शासकीय पातळीवर प्रयत्न होणे गरजेचे आहे.
४. दाखले घेण्यासाठी येणाऱ्या स्त्रियांच्या प्रमाणात वाढ होण्यासाठी त्यांच्यामध्ये साक्षरता, सरकारी पातळीवर प्रभावी प्रसार व महिला सबलीकरणासाठी सरकारकडून प्रभावीपणे कार्य होणे आवश्यक आहे.

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जळगाव जिल्ह्यातील केळी उत्पादक शेतकऱ्यांच्या समस्या

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प्रस्तावना

भारत हा कृषीप्रधान देश आहे. देशातील ८०% लोक खेड्यात राहतात व शेती हाच त्यांचा मुख्य व्यवसाय आहे. शेतीमधील जैवतंत्रज्ञानाला शेतीक्षेत्रात भरीव कामगिरी करणारा आणि एकप्रकारे प्रगतीमधील मैलाचा दगड मानावे लागेल. त्यामुळे केळीमधील उती संवर्धनाला प्रोत्साहन मिळते. शेतीतील उच्च तंत्र व त्यामधील अत्याधुनिक विकास मोठ्या प्रमाणात वाढू लागला आहे. जळगाव जिल्हा हा केळी पिकासाठी अग्रेसर आहे. सर्वाधिक केळी पिकाचे उत्पादक म्हणून जळगाव जिल्ह्यातील रावेर तालुका प्रसिद्ध आहे. बलवाडी गावातील बहुसंख्य शेतकरी केळीची लागवड करतात. संशोधक ग्रामीण भागात राहात असल्यामुळे केळी उत्पादक शेतकऱ्यांच्या समस्या जवळून पाहिल्या आहेत आणि त्यांच्या समस्या सर्वांसमोर आणण्यासाठी संशोधिकेने हा विषय निवडला आहे. या विषयाच्या माध्यमातून केळी उत्पादक शेतकऱ्यांना कोणत्या समस्यांना तोंड द्यावे लागते व ते समस्यांना कसे सामोरे जातात हे या संशोधनातून अभ्यासले आहे.

अभ्यासाची उद्दिष्टे

१. केळी उत्पादक शेतकऱ्यांच्या समस्यांचे अध्ययन करणे.
२. केळी उत्पादक शेतकऱ्यांच्या उत्पन्न खर्चाचे विश्लेषण करणे.

अभ्यासाचे गृहीतके

१. केळी उत्पादक शेतकऱ्यांना अनेक समस्यांना तोंड द्यावे लागते.
२. केळी उत्पादक शेतकऱ्यांना आर्थिक संकटांना तोंड द्यावे लागते.

संशोधन पद्धती

प्रस्तुत अध्ययन प्राथमिक व दुय्यम तथ्यावर आधारलेले आहे. दुय्यम तथ्ये विविध अहवाल, ग्रामपंचायत व तलाठी कार्यालयातून मिळविली आहे. प्राथमिक तथ्ये बलवाडी गावातील केळी उत्पादक शेतकऱ्यांचे सर्वेक्षण करून एकत्रित केले आहेत. बलवाडी गावातील ३१५ शेतकरी कुटुंबांपैकी २२ शेतकरी नमुना म्हणून स्वैर नमुना पद्धतीने निवडले आहेत. एकत्रित केलेली माहिती संकलित करून त्यावर प्रक्रिया करून निष्कर्ष काढले आहेत.

माहिती संकलन पद्धती

माहिती खालील पद्धतीने गोळा केली आहे.

(१) व्यक्तिगत मुलाखती

संशोधनासाठी आवश्यक माहिती संकलनासाठी जी साधने वापरली जातात. त्यापैकी मुलाखत हा प्रकार महत्त्वाचा मानला जातो

"**जळगाव जिल्ह्यातील केळी उत्पादक शेतकऱ्यांच्या समस्या**" या विषयाचा अभ्यास करण्यासाठी बलवाडी गावातील ग्रामसेवक, तलाठी तसेच २२ शेतकऱ्यांच्या मुलाखती घेतल्या, त्यांना प्रश्न विचारले व माहितीचे संकलन संशोधिकेने केले.

(२) प्रश्नावली पद्धत

२२ शेतकऱ्यांच्या मुलाखती घेण्यासाठी प्रश्नावलीचा वापर करण्यात आला व त्याद्वारे त्यांच्या समस्या जाणून घेतल्या. प्रश्नावली पद्धतमध्ये त्यांची उत्तरे गोळा करून संशोधनाचे निष्कर्ष काढण्यात आले आहेत.

पाहणी केलेल्या २२ शेतकऱ्यांचा वार्षिक, सरासरी उत्पादन खर्च

बलवाडी गावातील पाहणी केलेल्या २२ शेतकऱ्यांना प्रति हेक्टरी उत्पादन खर्च किती येतो व उत्पन्न किती मिळते याचा अभ्यास करण्याचा प्रयत्न केला. प्रथम सर्व शेतकऱ्यांना केळी लागवडीसाठी प्रत्येक बाबीवर येणाऱ्या खर्चाची बेरीज घेवून एकूण लागवड क्षेत्राने भागाकार करून प्रती हेक्टरी प्रत्येक बाबीवरील खर्च काढण्यात आला. त्यानंतर सर्व बाबींच्या खर्चाची बेरीज करून प्रती हेक्टरी एकूण लागवड खर्च काढण्यात आला.

पाहणी केलेल्या शेतक-यांचा वार्षिक दर हेक्टरी उत्पादन खर्च संशोधिकेने त्यांची प्रत्यक्ष मुलाखत घेऊन काढला आहे. सरासरी वार्षिक मजूरीवरील खर्च रू. ४०३३.१०, बियाणांवरील वार्षिक खर्च रू. ३३७१ एवढा केला जातो, मशागतीवर वार्षिक खर्च रू. २७४५.७६ करतो. सेंद्रीय खतावर रू. ४४८५.७८, रासायनिक खतांवर रू. ४२७१.१८ खर्च होतो. केळी काढणीचा वार्षिक खर्च रू. १३१५.६३ एवढा आहे. केळीचा माल काढल्यानंतर शेतक-यांचा बाजारपेठाचा खर्च रू. ९७२.७४ एवढा आहे. निंदणीचा खर्च रू. ३१११.११ होतो व फवारणीवर वार्षिक खर्च रू. २७१९.३४ एवढा केला जातो. ठिबक सिंचनावर रू. २६३६.५३ एवढा वार्षिक खर्च केला जातो. वीजबीलाचा सरासरी वार्षिक खर्च रू. ७००० एवढा येतो. मोटार दुरुस्तीसाठी वार्षिक १८०० रू. खर्च केला जातो. अशाप्रकारे एकूण वार्षिक खर्च प्रति हेक्टरी ३८४११.९२ रू. एवढा आहे. एक हेक्टरमध्ये सरासरी १६०० खोड असतात. त्यात प्रत्येक घडाचे सरासरी वजन २० किलोपर्यंत असते आणि केळीला सरासरी भाव १०००/- रू. प्रती क्विंटल मिळतो. अशाप्रकारे एकूण उत्पन्न ३२०००/- रू. पर्यंत मिळते तर निव्वळ उत्पन्न २८०५८८/- रू. मिळते.

निष्कर्ष

प्रस्तुत अध्ययनाचे प्रमुख निष्कर्ष खालीलप्रमाणे आहेत -

- बलवाडी गावाचे क्षेत्रफळ ४६५.०५ चौ.कि.मी. आहे.
- बलवाडी गावातील लागवडीखालील क्षेत्रफळ २८३.११ हेक्टर आहे.
- सिंचनाखालील क्षेत्रफळ १९६.५७ हेक्टर (६९.४३%) आहे.
- बलवाडी गावाची लोकसंख्या २३९० आहे.
- बलवाडी गावातील ९९ % लोकसंख्या शेतीवर अवलंबून आहेत.
- बलवाडी गावातील दर हजार पुरुषांमागे स्त्रियांचे प्रमाण ९०६ एवढे आहे.
- बलवाडी गावात साक्षर लोकसंख्या १८०० (७५.३१%) आहे.

पाहणी केलेल्या कुटूंबांची सामाजिक आर्थिक स्थिती

- पाहणी केलेल्या कुटूंबाचा सरासरी आकार ६.४ आहे.
- बलवाडी गावातील पाहणी केलेल्या २२ शेतक-यांचे धारण क्षेत्रफळ ३६७.५० हेक्टर आहे.
- पाहणी केलेल्या शेतक-यांचे सरासरी धारण क्षेत्र १६.७० हेक्टर आहे.
- पाहणी केलेले शेतकरी केळी हे प्रमुख पीक घेतात.
- पाहणी केलेल्या शेतक-यांचे दुसरे प्रमुख पीक ऊस हे आहे.

- पाहणी केलेल्या शेतक-यांचा केळीच्या लागवडीचा प्रती हेक्टरी खर्च ३८४११.९२ रू. आहे.
- पाहणी केलेल्या शेतक-यांना केळीपासून मिळणारे प्रती हेक्टरी उत्पन्न ३२०००० रू. आहे.
- पाहणी केलेल्या शेतक-यांना केळीपासून प्रती हेक्टरी निव्वळ २८०५८८ रू. मिळतात.

केळी उत्पादकांच्या समस्या

केळी उत्पादक शेतक-यांना पुढील प्रमुख समस्यांना तोंड द्यावे लागते - वीजेचे भारनियमन, ठिबक सिंचनाची साधने वेळेवर न मिळणे, ठिबक सिंचनाचे नोजर बंद पडणे, रासायनिक खतांचा तुटवडा, सेंद्रीय खतांचा तुटवडा, आकस्मिक चक्रीवादळ, पिकांच्या विम्याचा सोयीचा अभाव, वेळेवर मजूर न मिळणे, बियाण्यांचा तुटवडा, किटकनाशकांचा तुटवडा, केळी काढणीची समस्या, केळी मालाला योग्य किंमत न मिळणे, व्यापा-यांकडून वेळेवर पैसे न मिळणे, वित्तपुरवठा वेळेवर उपलब्ध न होणे

उपाययोजना

केळी उत्पादक शेतक-यांच्या परिस्थितीमध्ये सुधारणा होण्यासाठी पुढील उपाययोजना सुचविण्यात आलेल्या आहेत - (१) वीजेचे भारनियमन बंद करावे. (२) रासायनिक खतांचा पुरवठा सुरळीत करावा. (३) चक्रीवादळामुळे झालेल्या नुकसानीची भरपाई वेळेवर मिळावी. (४) पीक विमा योजनेचा लाभ मिळावा व त्याबाबत शेतक-यांमध्ये जागरूकता निर्माण करावी. (५) रोजगार हमी योजनेत शेतीकामाचा अंतर्भाव करावा. (६) चांगल्या व उच्च प्रतीच्या बियाणांची उपलब्धता वेळेवर व्हावी. (७) मशागतीची साधने वेळेवर उपलब्ध करून द्यावीत. (८) ठिबक सिंचनाचे अनुदान वेळेवर मिळावे. (९)केळी काढणीच्या तंत्रात सुधारणा केली जावी. (१०) वाहतूकीच्या सुविधा पुरेशा प्रमाणात उपलब्ध करून द्याव्यात. (११) व्यापा-यांकडून वेळेवर पैसे मिळावेत किंवा तात्पुरत्या काळासाठी वित्तसंस्थांकडून वित्तपुरवठा केला जावा.

संदर्भ ग्रंथ

१. जगन्नाथ शिंदे, जळगाव जिल्ह्यातील शेती उत्पादन
२. जळगाव जिल्हा सामाजिक व आर्थिक सर्वेक्षण
३. बलवाडी शेतकरी संघ अहवाल
४. बलवाडी ग्रामपंचायतीचे कार्यालयीन कागदपत्रे
५. बलवाडी तलाठी कार्यालयातील माहिती
६. डॉ. नीता वाणी, कृषी अर्थव्यवस्था
७. दै. सकाळ ॲग्रोवन विशेषांक

मुक्ताईनगर पंचायत समितीतील महिला सदस्यांच्या राजकीय कार्याचे चिकित्सक अध्ययन

राजपुत उषा बाबुलाल, न्हावकर रूख्मा वासुदेव, प्रा. भारंबे एन. व्ही*

राज्यशास्त्र विभाग, मूळजी जेठा कॉलेज, जळगांव

सारांश

प्रस्तुत संशोधनात संशोधकाने मुक्ताईनगर पंचायत समितीतील महिला सदस्यांच्या राजकीय कार्याचे चिकित्सक अध्ययन ही समस्या निश्चित केली होती. पंचायत समितीतील महिला सदस्यांनी राबविलेल्या योजनांचे अध्ययन करणे, ग्रामीण भागातील महिलांच्या राजकीय परिस्थितीचे अध्ययन करणे, महिलांना घटनेने पंचायतराज मध्ये ५० टक्के आरक्षण दिले, त्याचे अध्ययन करणे. ही उद्दिष्ट्ये ठरविली होती.

प्रस्तुत संशोधनात संशोधकने संशोधनासाठी मुक्ताईनगर पंचायत समितीची निवड केली होती. संशोधकाने निरीक्षण व मुलाखत पद्धतीचा वापर केला होत. संशोधकाने निवडलेल्या नमुना म्हणजेच पंचायत समिती महिला सदस्यांच्या मुलाखती घेऊन तसेच पंचायत समिती मुक्ताईनगर मध्ये प्रत्यक्ष जाऊन माहिती संकलीत केली होती.

प्रस्तावना :

प्राचीन काळापासून महिलांचा राजकीय सहभाग असलेला दिसतो. भारताचा इतिहास बघीतल्यास लक्षात येते की, अशा अनेक स्त्रिया होत्या की ज्यांनी राज्यकारभार केला आहे. त्यात चंद्रगुप्ताची मुलगी प्रभावती, चालूक्य वंशातील राजकुमारी विजयभट्टारीका, महाराणी दिद्दा, मोगल काळातील अल्तमशची मुलगी रझिया सुलतान, चांदबीबी सुलतान, नूरजहाँ, मराठ्यांच्या काळात राणी जिजाबाई, राणी ताराबाई यासरख्या स्त्रियांनी राजनितीत सहभाग घेतला.

भारतात नव्हे तर पूर्ण जगभरातून राजकारणात सर्वत्र महिलांच्या सहभागाची जागतिक सरासरी ११ टक्के तर विमेन टू थाऊजंड या संयुक्त राष्ट्रसंघाच्या माहिती पत्रकानुसार १९७ देशांपैकी ४८ देशात एकही महिला मंत्री नाही. जगातील केवळ १५ देशात महिलांना २० ते ३० टक्के पर्यंत प्रतिनिधीत्व आहे.

स्वातंत्र्यापूर्वीच्या काळातह महिलांचा राजकारणातील सहभाग हा ब्रिटीश सरकारला विरोध करणे या बाबींशी निगडीत होता. या काळात स्त्रियांना मतदानाचे अधिकार, निवडणूक लढण्याचे अधिकार प्राप्त झाले.

नवा पंचायतराज कायदा १९९३ पासून लागू झाला. त्याद्वारे स्थानिक स्वराज्य संस्थानातील आणि पदामध्ये स्त्रीयांना ३३ टक्के आरक्षण दिले व त्यात दुरूस्ती होवून घटना दुरूस्ती ११० (२००८ नुसार) स्त्रीयांना पंचायत राजमध्ये ५० टक्के आरक्षण दिले. त्यामुळे ग्रामपंचायत सरपंच, पंचायत समिती सभापती, जिल्हा परिषद अध्यक्षा या पदावरही स्त्रीया निवडून येऊ लागल्या. महिलांचा राजकीय सहभाग वाढविण्यासाठी त्यांना विविध प्रकारच्या प्रशिक्षणाची, माहितीची गरज आहे. हे सर्व महिला सदस्य ग्रामपंचायतीच्या अभ्यासातून लक्षात आले.

एकंदारत प्राचीन काळापासून तर आजतागायत भारतीय राजकारणातील स्त्रियांची प्रगती होत आहे. अलिकडील काळातील महिलांच्या राजकीय सहभागाची कमान ही दिवसंदिवस उंचावत आहे. ही कमान अशीच उंचावत गेली तर पुढील काळ महिलांच्या उन्नतीबाबत सुवर्णयुग आणणारा ठरेल.

गरज :

भारताला स्वातंत्र्य मिळून सहा दशके पूर्ण झाली. भारताने आर्थिक, सामाजिक, राजकिय, शैक्षणिक, सांस्कृतिक क्षेत्रात खूपच प्रगती केली. महिलांचा राजकिय सहभाग वाढविण्यासाठी ७३ वी घटना दुरूस्ती केली. त्याअन्वये पंचायत राज व्यवस्थेत महिलांना राखीव जागा (३३ टक्के) मिळण्यास २० वर्षे पूर्ण झाली. त्याचे चिकित्सक अध्ययन करणे आवश्यक ठरते. खरच महिलांचा राजकिय सहभाग वाढला आहे का? त्याचा व्यवस्थित अभ्यास होणे, आढावा घेणे, त्याचे परिणाम काय झालेले आहेत ते पहाणे आवश्यक ठरते. म्हणून सदर विषयावर संशोधन करण्याचे ठरविले आहे. एकुणच महिलांचा पंचायत राज व्यवस्थेत ५० टक्के जागा मिळालेल्या असतांना महिलांच्या संबंधी अभ्यास पूर्ण व वस्तुस्थिती दर्शक संशोधन व अध्ययन व्यापक प्रमाणात झालेले आढळून येत नाही. त्यामुळे सदर विषयावर संशोधन करणे गरजेचे वाटते. म्हणून सदर विषय संशोधनासाठी निवडलेला आहे.

महत्व :

आजच्या परिस्थितीत पंचायत राज व्यवस्थेचा अभ्यास केला असता महिलांचा सहभाग हा नाममात्र दिसतो. ती सदस्य असली तरी कुणाच्याणा कुणाच्या हातातली कळसुत्री बाहुलीप्रमाणे कार्य करत असते. तिच्या भोवती बाप, भाऊ, नवरा, मुलगा यांच्यापैकी कुणाचेतरी वलय असल्याचे दिसते.

आज राजकिय क्षेत्रात पुरुष प्रधान संस्कृतिचे वर्चस्व कायम राहिल्यामुळे राजकारण करणे हा पुरुषांचाच प्रांत आहे अशीच भुमिका राजकारणात दिसून येते. महिलांच्या राजकिय क्षेत्रातील सहभाग, कार्य या विषयावर फारसे विचार मंथन झालेले नाही. सद्यपरिस्थितीत महिला वर्गाकडे विकास कार्यक्रमातील एक प्रभावी एक घटक म्हणून फारसे पाहिले जात नाही.

महिलांचा राजकीय सहभाग सक्रीय करण्यांचे सर्वात महत्वाचे कारण म्हणजे गावापातळीवरील लोकशाही संस्था आणि प्रक्रिया मजबूत करणे हे आहे. त्यामुळे त्यांचे प्रश्न, समस्या व दृष्टीकोण मांडले जाणार आहेत व त्यांची दखल घेतली जाणार आहे. त्यासाठी महिलांनी पंचायत समितीमध्ये कलेच्या कायद्याचा अभ्यास करणे महत्वाचे आहे.

देशाच्या खऱ्या अर्थाने विकास करायचा असेल तर भारतीय लोकशाहीचे एक चाक असलेल्या महिलांना दुय्यम स्थान देऊन चालणार नाही. महिलांचे ग्रामीण पातळीपासून ते केंद्रीय पातळीपर्यंत राजकारणात असलेले योगदान किंवा त्यांनी केलेल्या कार्याचा विचार करणे आवश्यक आहे. जेणेकरुन महिलांना प्रोत्साहन मिळेल व त्या अधिक यशस्वीपणे आपले कार्य करतील त्या दृष्टीने प्रस्तुत संशोधन महत्वाचे आहे.

उद्दीष्टे :

१) पंचायत समितीतील महिला सदस्याच्या कार्याचे अध्ययन करणे.

२) पंचायत समितीतील महिला सदस्यांनी राबविलेल्या योजनांचे अध्ययन करणे.

३) ग्रामीण भागातील महिलांच्य राजकिय परिस्थितीचे अध्ययन करणे.

४) महिलाना घटनेने पंचायतराज मध्ये ५०S आरक्षण दिले त्यांचे अध्ययन करणे.

गृहीतके :

१) पंचायतराज मधील महिलांचा सहभाग फारसा नाही.

२) महिला नाममात्र पदावर असतात.

३) महिलांची राजकीय जाणीव जागृती नाही.

मर्यादा :

प्रस्तुत संशोधन हे मुक्ताईनगर पंचायत समितीपुरते मर्यादित आहे.

संशोधन कार्यक्षेत्र :

प्रस्तुत संशोधनात जळगांव जिल्ह्यातील मुक्ताईनगर पंचायत समितीची निवड केली होती.

संशोधन पद्धती :

प्रस्तुत संशोधन करण्यासाठी संशोधकाने निरीक्षण या संशोधन पद्धतीचा वापर केला.

संशोधनाची साधने :

प्रस्तुत संशोधनात संशोधकाने मुलाखत या संशोधन तंत्राचा वापर केला.

गृहितक पडताळणी :

१) संशोधकाने पहिले गृहितक प्रमाण मानले होते की, पंचायतराज मधील महिलांचा सहभाग नाही. संशोधकाने संशोधन विषयाच्या अनुशंघाने संकलन केलेल्या तथ्यांच्या आधारे गृहितक बऱ्याच प्रमाणात सिद्ध झालेले आहे. ४० टक्के महिला पंचायत समितीच्या प्रक्रियेत सक्रिय आहेत कारण त्यांचे शिक्षण व घरातील राजकिय वातावरणाची परंपरा व पतिपासून मिळणारे उत्तेजन होय.

२) महिला नाममात्र पदावर असतात. हे गृहितक ६० टक्के प्रमाणात सिद्ध झालेले आहे, कारण शिक्षणाचे कमी प्रमाण व त्या महिलांच्या वतीने त्यांचे पती राजकिय कार्य करण्यात सक्रिय आहेत. त्यांच्या गटात कार्य झालेले आढळते. परंतु ते त्या महिलांच्या नावाने पतिदेव कार्य करतात. याचा अर्थ ६० टक्के महिला ह्या नाममात्र राजकिय कार्य करित असल्याचे स्पष्ट होते.

३) महिलांची जाणीव जागृती नाही.

या गृहितकांच्या अनुशंगाने केलेल्या तथ्यांच्या आधारे ४० टक्के महिला यांची राजकिय जाणीव जागृती झालेली दिसून येते तर ६० टक्के महिला सदस्यांची जाणी जागृती फारशी झालेली आढळून येत नाही.

निष्कर्ष :

१) अध्ययन क्षेत्रातील महिलांसाठी राखीव जागा असल्याने महिल निवडणुकीत भाग घेऊन निवडून येतात. त्यातील ४० टक्के महिला या स्वतः पंचायत समितीच्या प्रक्रियेत सहभागी होतात व उरलेल्या ६० टक्के महिला यांच्या वतीने त्याचे पतिदेव कार्य करतात.

२) सदर महिलांमधील शिक्षणाचे प्रमाण कमी असल्याचे आढळून येते.

३) ४० टक्के महिला राजकिय प्रक्रियेत सहभागी होतात. याचे कारण त्यांच्या घरातील असलेले राजकिय वातावरण असल्याचे स्पष्ट होते.

मुलाखतीवरून काढलेले निष्कर्ष :

१) अध्ययनक्षेत्रातील पंचायत समितीतून निवडून आलेल्या महिला सदस्या घरकाम व शेतीकाम करणाऱ्या आहेत.

२) सर्व महिला सदस्या ३३ ते ४३ या वयोगटातील आहे.

३) सर्व महिला सदस्यांचे शिक्षणाचे प्रमाण इयत्ता ४ थी ते १२ वी पास असल्याचे दिसून येते.

४) एकुण सदस्यांपैकी चार महिला सदस्या भारतीय जनता पक्षातर्फे निवडून आलेल्या असून एक महिला सदस्य राष्ट्रवादी पक्षातर्फे निवडून आलेली आहे.

५) निवडून आलेल्या महिला सदस्या व त्यांचे घारातील राजकीय वातावरण अनुकूल असल्याचे दिसून येते.

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निरीक्षण गृह, शालेय वसतिगृह व कुटुंबात राहाणाऱ्या मुलांचा स्व–नियंत्रणाचा तुलनात्मक अभ्यास

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प्रस्तावना :
आधुनिक काळात मानवी जीवनाच्या विकासाच्या दृष्टीने व्यक्तीमत्वाचा अभ्यास करतांना व्यक्तीचा स्वनियंत्रणाचा अभ्यास करणे अत्यंत महत्त्वाचे आहे.जर व्यक्तीचे स्वतःवर नियंत्रण असेल तर त्या व्यक्तीचे व्यक्तीमत्वही चांगल्याप्रकारे असते. म्हणून व्यक्तीचे स्वतःवर नियंत्रण असणे फार महत्त्वाचे असते. व्यक्तीचे जर स्वतःवर नियंत्रण नसेल तर व्यक्ती आक्रमक होते. अभ्यासात लक्ष लागत नाही.थोडया थोडया गोष्टीमुळे व्यक्ती अस्वस्थ होते.

प्रस्तुत संशोधनात निरीक्षण गृहात राहणारी मुले, शालेय वसतिगृहात राहणारी मुले व घरी राहणारी मुले यांचा 'स्व' नियंत्रणाचा अभ्यास करावयाचा आहे.

स्व :–
व्यक्तीमत्वाचा विकास वेगवेगळया टप्प्यात होतो. 'स्व' हा आपल्या व्यक्तीमत्वाचा केंद्रबिंदू असतो. असे अल्पोर्ट व रॉजर्स यांनी सांगितले आहे. अल्पोर्टने स्व विकासाचे सात टप्पे सांगितले.रॉजर्सच्या मते 'स्व' च्या विकासात व्यक्तीला लहानपणापासून येणारे अनुभव महत्त्वाचे असतात. त्यानुसार त्याचा 'स्व' विकसीत होतो. व्यक्तीचा स्वतःविषयीचा संघटीत, सातत्यपुर्ण विश्वास व संवेदन संच म्हणजे 'स्व' होय.

"Self an organized consistent set of perception and belidfs about one self"

अर्थात आपण स्वतःला जसे समजतो तसे इतरही समजतात असे नाही. व्यक्ती स्वताला सुंदर, बुद्धमान, प्रामाणिक समजत असेल पण इतरांच्या दृष्टीकोनातुन ती तशी नसेल अशावेळी आपण इतरांचा आपल्या विषयीचा दृष्टीकोनही समजवून घेत असतो. व त्यानुसार 'स्व' प्रतिमा तयार करतो. जसजशी व्यक्ती मोठी होते तसतसे तिचे अनुभव विश्व वाढतही असते. व बदलतही असते. त्यानुसार व्यक्तीच्या 'स्व' मध्येही बदल होतांना दिसतो. लहानपणापासून व्यक्तीचे 'स्व' चे संघटन झालेले असते. तिच्या व्यक्तीमत्त्वाचा गाभा तसाच राहतो. उदा. खुप वर्षांनी आपला मित्रआपल्याला भेटल्यानंतर त्याच्या मध्ये खुपखुप बदल झालेला असतो. परदेशात जावूनही त्याने विविध असे अनुभव घेतलेले असतात. पण आपल्या लक्षात येते की, त्याची बोलण्याची लकब, विनोदाची शैली मात्र तीच राहते. म्हणुन अनुभव विश्व कितीही बदलले तरी 'स्व' विषयक पाया मात्र तसाच असतो.

बालकाच्या 'स्व' विकासात त्याच्या सभोवताली असणाऱ्या व्यक्ती महत्त्वाच्या असतात. त्या ज्या पद्धतीने त्याच्याशी वागतात. त्यानुसार त्याचा 'स्व' तयार होतो. या व्यक्ती सतत त्याच्या विषयी नकारात्मक वाईट बोलत असतील तर त्याचा 'स्व' आदरभाव कमी होतो. व त्याचा परिणाम 'स्व' विकासावर होतांना दिसतो.

संशोधनाचे विवरण :
'निरिक्षण गृहात राहाणारे व शालेय वसतिगृहात राहणारे व घरी राहणाऱ्या मुलांचा 'स्व' नियंत्रणाचा तुलनात्मक अभ्यास करणे'

संशोधनाची उद्दिष्टे :–
1. निरिक्षण गृहात राहणारे विद्यार्थी व शालेय वसतिगृहात राहणारे विद्यार्थी यांचा स्व–नियंत्रणाचा अभ्यास करणे.
2. निरिक्षण गृहात राहणारे विद्यार्थी व घरी राहणारे विद्यार्थी यांचा स्व–नियंत्रणाचा अभ्यास करणे.
3. शालेय वसतिगृहात राहणारे विद्यार्थी व घरी राहणारे विद्यार्थी यांचा स्व–नियत्रणाचा अभ्यास करणे.

संशोधन अभ्यासाचे महत्त्व :

एखादी समस्या घेतल्यावर संशोधन करतांना ती समस्या का घेतली ? कोणत्या परिवर्तकांच्या समावेश करावा लागेल. याचा विचार आधी करावा लागेल. प्रस्तुत संशोधनासाठी निरीक्षण गृहात राहणारे मुले, शालेय वसतिगृहात राहणारे मुले व घरी राहणारे मुले यांचा स्वनियंत्रणाचा अभ्यास करावयाचा आहे. या तीनही गटातील विद्यार्थ्यांचा स्वनियंत्रणात काही तफावत आढळुन येईल का ? हा उद्देश् डोळयासमोर ठेवून प्रस्तुत संशोधन करण्याचे ठरविले आहे.

तर्क :

निरीक्षण गृहात राहाणाऱ्या, शालेय वसतिगृहात राहाणाऱ्या व कुटुंबात राहाणाऱ्या विद्यार्थ्यांचा शैक्षणिक वातावरणात वेगवेगळया प्रकारे फरक आढळुन येतात. घरी राहाणाऱ्या विद्यार्थ्यांना घरून सर्व सोयी सुविधा पुरविल्या जातात. त्याच प्रमाणे शालेय वसतिगृहात राहाणाऱ्या विद्यार्थ्यांना थोडयाफार प्रमाणात सोयी सुविधा पुरविल्या जातात. पण निरिक्षण गृहात राहाणाऱ्या विद्यार्थ्यांला त्या सर्व सुविधा पुरविल्या जात नाही. तसेच कुटुंबात राहणाऱ्या विद्यार्थ्यांना त्यांच्याा आईवडीलांचे प्रेम व सहवास लाभतो त्याचप्रमाणे शालेय वसतिगृहात राहणाऱ्या मुलांना देखील त्यांच्या आई वडीलांचे प्रेम व सहवास लाभते. पण जे विद्यार्थी निरीक्षण गृहात राहतात त्यांना त्यांच्या आईवडीलांचे प्रेम व सहवास लाभत नाही त्यामुळे त्या विद्यार्थ्यांना एकटेपणाची जाणीव होते. उदासिनता वाढते, चिंता वाटते व त्यांच्या स्व–नियंत्रणाचा अभाव दिसून येतो. म्हणुन त्यांची प्रगती कमी दिसून येते. म्हणुन या विद्यार्थ्यांचा 'स्व' नियंत्रणाचा अभ्यास या शोध निबंधात संशोधकाला अभ्यावयाचा आहे. म्हणुन संशोधकाने पुढील विषयाची संशोधनासाठी निवड केलेली आहे.

प्रस्तुत शोध निबंधाचा विषय निरिक्षण गृह, शालेय वसतीगृह व कुटुंबात राहणाऱ्या मुलांच्या 'स्व' नियंत्रणाचा तुलनात्मक अभ्यास.

गृहितके :

1. निरीक्षण गृहात राहणारे विद्यार्थी व शालेय वस्तीगृहात राहणारे विद्यार्थी यांचा स्व–नियंत्रणाचा अभ्यास.
2. निरीक्षण गृहात राहणारे विद्यार्थी व कुटुंबात राहणारे विद्यार्थी यांचा स्व–नियंत्रणाचा अभ्यास.
3. शालेय वसतिगृहात राहणारे विद्यार्थी व कुटुंबात राहणारे विद्यार्थी यांचा स्व–नियत्रणाचा अभ्यास.

संशोधन पद्धती

संशोधन आराखडा :

प्रस्तुत संशोधनात संशोधनाची आखणी पुढील प्रमाणे केलेली आहे. संशोधकाने संशोधनासाठी सहेतुक पद्धतीने नमुना निवड केलेला आहे. त्यासाठी एकुण ९० चा प्रदत्त गोळा केला आहे. यात निरिक्षण गृहात राहणारे ३० विद्यार्थी शालेय वसतिगृहात राहणारे ३० विद्यार्थी व घरी राहाणारे ३० विद्यार्थी यांचा समावेश करण्यात आला आहे.

यात विद्यार्थ्यांना SELF Control Scale हि चाचणी देण्यात आली.

संशोधन पद्धतीचा नमुना :

1. हा नमुना सहेतुक पद्धतीने घेतलेला आहे.
2. प्रस्तुत शोध निबंधात प्रदत्ता निरिक्षण गृह, शालेय वसतीगृह व शाळेतुन घेतले आहेत.
3. शोध निबंधात निरिक्षण गृहातील विदयार्थी शालेय वस्तीगृहातील विद्यार्थी व घरी राहणारे विदयार्थी यांचा समावेश केला आहे.
4. संशोधन नियमित व्हावे यासाठी निरिक्षण गृहातील विद्यार्थी, शालेय वसतिगृहातील विद्यार्थी व घरी राहणारे विद्यार्थी यांना समान संख्येत घेण्यात आले आहे.या संशोधनात Factorial Design 2 x 2 हा आराखडा घेतला आहे.

नमुना आलेख

निरिक्षण गृहातील विद्यार्थी	३०
शालेय वसतिगृहातील विद्याथी	३०
घरी राहणारे विद्याथी	३०

संशोधनातील परिवर्तके :

१) स्वतंत्र परिवर्तक :

१. निरिक्षण गृहात राहाणारे विद्यार्थी
२. शालेय वसतिगृहात राहाणारे विद्यार्थी
३. घरी राहाणारे विद्यार्थी

२) परतंत्र परिवर्तक :

१. स्व–नियंत्रण चाचणी

संशोधन साहित्य :

या शोध निबंधात विद्यार्थ्यांच्या 'स्व' नियंत्रणाचा शोध घेण्यासाठी अरूण कुंभार सिंग व अल्पना सेुन गुप्ता यांनी प्रमाणित केलेली प्रश्नावली वापरण्यात आली. यात एकुण ३० विधाने आहेत. त्यामध्ये विचारलेल्या प्रश्नांना हो किंवा नाही अशी प्रतिक्रिया देता येते.

या चाचणीची विश्वसनीयता ०.८४ आहे व यथार्थता ०.८७ आहे ही चाचणी ०.०१ या पातळीला सार्थक आहे.

प्रदत्त विश्लेषण :

प्रदत्ता विश्लेषण करण्यासाठी माहिती पुस्तिकेचा वापर करण्यात आला. ४, ६, ९, ११, १२, १३, १४, १५, १६, १७, १८, १९, २०, २१, २३, २४, २६, २९, ३० या विधानांना 'हो' असेल तर शुन्य गुण देण्यात आले. व 'नाही' असेल तर एक गुण देण्यात आले व बाकीच्या विधानांना 'हो' असेल तर एक गुण देण्यात आले व 'नाही' असेल तर शुन्य गुण देण्यात आले. या विधानांची एकुण बेरीज करण्यात आली. व ती 'Percentile Rank' मध्ये बदलण्यात आली. हे काम संशोधकाने स्वतः केले व सहाय्यक मित्रांकडून पुन्हा तपासुन घेतले. घरज पडेल तेथे मार्गदर्शकांची मदत घेतली.

संख्याशास्त्रीय विश्लेषण व गणन :

1. प्रस्तुत संशोधनासाठी परस्पर विचलन बघण्यासाठी 'F Test'साठी केली.
2. त्यातील लघुत्तम भेदासाठी 't' Testकेली.
3. सर्व आलेल्या गुणांकनासाठी ०.०५ हा स्तर ठरविण्यात आला.

संख्याशास्त्रीय आधारावर सर्व परिकल्पनांचे परिक्षण करून निष्कर्ष काढले.

संख्याशास्त्रीय फलिते व निष्कर्ष

संख्याशास्त्रीय :

प्रस्तुत संशोधन करतांना संशोधकाने संख्याशास्त्रीय विश्लेषणासाठी 'F Test easy calcutator या software चा वापर करून काढला आहे. 'F Test' मध्ये ज्या परिक्षकांना सार्थक भेद दिसून आला. अशाच संवर्गांची 't' Test संशोधकाने केला आहे. व त्या गटांचे मध्यमान वर्ग, प्रमाण विचलन व 't' मुल्य अशा प्रकारे संख्याशास्त्रीय तक्ता तयार केला गेला आहे.

Group	df	F	Level of signifcant
निरिक्षण गृहात व शालेय वसतिगृहात राहाणारे विद्याथी	58	0.15	N.S.
निरीक्षण गृहात व कुटुंबात राहाणारे विद्यार्थी	58	0.71	N.S.
शालेय वसतिगृहात व कुटुंबात राहाणारे विद्याथी	58	0.55	N.S.

दिलेल्या तालिके वरून असे लक्षात येते की, निरीक्षण गृहातील, शालेय वसतिगृहातील व कुटुंबात राहाणारे विद्यार्थ्या ंचे 'F' Test' चे मुल्ये ०.०५ स्तरापेक्षा कमी आढळुन आले. अर्थात यांच्यातील विवरण समान कोणतेही आंतरक्रिया प्रभाव आढळुन आला नाही. याकरिता पुढील 't' Testचे विश्लेषण केले नाही.

निष्कर्ष :

1. निरीक्षण गृहात राहाणारे विद्यार्थी व शालेय वसतिगृहात राहाणारे विद्यार्थी यांच्या 'स्व' नियंत्रणात सार्थक भेद आढळुन आला नाही.
2. निरीक्षण गृहात राहाणारे विद्यार्थी व कुटुंबात राहणारे विद्यार्थी यांच्या 'स्व' नियंत्रणात सार्थक भेद आढळुन आला नाही.
3. शालेय वसतिगृहात राहाणारे विद्यार्थी व कुटुंबात राहणारे विद्यार्थी यांच्या 'स्व' नियंत्रणात सार्थक भेद आढळुन आला नाही.

चर्चा व सारांश

चर्चा :

प्रस्तुत शोध निबंध विषय हा निरीक्षण गृहात राहाणारे विद्यार्थी, शालेय वसतिगृहात राहाणारे विद्यार्थी व कुटुंबात राहणारे विद्यार्थी यांच्या 'स्व' नियंत्रणाचा अभ्यास करणे असा आहे. यामध्ये स्वतंत्र परिवर्तक निरीक्षणगृहात राहणारे विद्यार्थी आणि कुटुंबात राहणारे विद्यार्थी असे असून परतंत्र परिवर्तक 'स्व' नियंत्रण चाचणी हे आहे. यात संशोधकाने संशोधनासाठी अरूण कुमार सिंग व अल्पना सेन गुप्ता यांची 'स्व' नियंत्रण चाचणी वापरली आहे. वसतीगृह, निरिक्षणगृह आणि कुटुंबात राहणाऱ्या विद्यार्थ्यांच्या सभोवतालचे सामाजिक वातावरण हे वेगवेगळे असते. त्यामुळे त्यांच्यात 'स्व' नियंत्रण कसे असते हे शोधण्यासाठी या विद्यार्थ्यांची निवड केली आहे. या संशोधनात ९० विद्यार्थ्यांचा नमुना घेतला असून प्रत्येकी ३० विद्यार्थी घेतले आहेत. निरिक्षणगृह व शालेय वसतिगृहातील विद्यार्थ्यात 'स्व' नियंत्रण बाबत सार्थक भेद आढळुन आला नाही. यावरून संशोधक असे म्हणतो की, परिस्थिती जरी वेगवेगळी असली तरी प्रत्येक विद्यार्थी हा 'स्व' नियंत्रण मिळविण्याचा प्रयत्न करतो. स्वतःच्या भावना, विचार आणि कृतीवर नियंत्रणाचा त्याचा प्रयत्न असतो. शालेय वसतिगृहातील व कुटुंबात राहाणारे विद्यार्थ्यांमध्ये 'स्व' नियंत्रणाबाबत सार्थक भेद (प्रमाण विचलन समान आढळले) आढळुन आला नाही. हे विद्यार्थी वसतिगृहात राहत असले तरी आधी घरचे वातावरण त्यांना लाभलेले असते व त्याअनुरूप त्यांना 'स्व' नियंत्रण आत्मसात झालेले असते. निरिक्षणगृह व कुटुंबात राहणारे विद्यार्थ्यात सार्थक भेद (स्व नियंत्रण) आढळुन आला नाही. वातावरण वेगळे असले तरी केवळ आईवडील किंवा पालक जवळ नसले तरी 'स्व' नियंत्रणावर फारसा फरक पडत नाही. त्यामुळे त्यांच्यात 'स्व' नियंत्रण हे सारख्या प्रमाणात आढळले.

अक्षक्रीडा - बदलते स्वरूप

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- **प्रस्तावना**

'प्राचीन लोकोत्सव' विशेषत: भारतीय प्राचीन मनोरंजन हे विविध क्रीडा, उत्सव यांनी परिपूर्ण आहेत. मनोरंजनाची साधने ही मानवाला विशेषत: मानवी मनाला समस्यांपासून दूर करण्याचे कार्य करतात जर ही साधने उपलब्ध नसती तर मानवाचे जीवन जगणे कठीण झाले असते. प्राचीन काळी धावण्याची शर्यत, कुस्ती, कंदुक क्रीडा इत्यादी शारिरीक तसेच काव्यसभा, नाटक, गोष्टी, समवाय इत्यादी बौद्धिक खेळ प्रचलीत झाले होते, तसेच अक्ष-क्रीडा, चित्रकारी, जादूचे खेळ आणि इतरही साधने प्रचलीत झाली.

यापैकी शोधनिबंधाचा प्रमुख विषय अक्ष -क्रीडा असून यांच्या वैदिक, लौकीक तसेच आधुनिक काळातील स्वरुप, सामाजिक स्थितीचा याठिकाणी परामर्श केला जाईल.

- **वैदिक काळ**

१) १५०० - ५०० ई.स.पू.

वैदिक साहित्याच्या माध्यमातून मनोरंजनाची त्याकाळी साधने स्तोत्र- गायन, गीत, नृत्य, शिकार, वाद्य तसेच अक्ष-क्रीडा, सुरापान (मद्यपान) इत्यादीचीही माहिती मिळते.[१] जुगार वैदिक काळात 'अक्षक्रिडा' नावाने प्रचलित होता. 'सभा' द्युतगृहाचे वैदिक नांव.[२] द्युतगृहाचा मालक हा 'सभिक' म्हटला जाई. खेळताना फाशांचा वापर करत. ऋग्वेदात ५३ (त्रिपञ्यास:) फाशांचा उल्लेख आहे . बेहडा वृक्षाच्या खोडापासून बनलेल्या या फाशांचा रंग लाल-पिवळा असे. फाशांना पाच प्रकारची नावे होती.

१)(अक्षराज २) कृत ३) त्रेता ४) व्दापार ५) कलि या पाचही फाशांना 'पंचिका द्युत' म्हटले जाई . खेळताना गोटी आणि शलाका या दोघांचा वापर होई.

हा खेळ खेळताना फाशाचे नाव 'ग्रह' किंवा 'ग्राभ' होते. खेळल्या जाणा-या डावाला 'विज' म्हणत. पूरस्काराचे नाव'लक्ष'होते.[३]

ऋग्वेदातील **'अक्षसूक्त'** (१०.३४) हे अक्ष -क्रीडा यावर आधारीत सूक्त आहे .

अक्ष-क्रीडा हे वैदिक काळाचे अत्यंत प्रचलित असे मनोरंजनाचे साधन होते. विभीदकाच्या वृक्षाच्या फळांचा उपयोग यांत फाशांसाठी करत.

"त्रिपञ्यास:क्रीडति व्रात:एषां ----- ||"[४]

या सूक्ताच्या आठव्या ऋचेतून त्रिपञ्यास : शब्दाने हे सूचित होते की खेळामध्ये या फाशांची संख्या ५३ असे. ऋग्वेदातील हा जुगारी आपल्या कटू अनुभवांचे निवेदनही करतो. जुगारी द्युतगृहात कोणाही धनिकाला लुबाडावे याच आशेने प्रवेश करत. द्युतात हरले तर इतस्तत भटकणे नाहीतर पैशांची मदत न मिळाल्याने जुगारी चोरी करण्यास प्रवृत्त होतो.[५]

अशाप्रकारे सर्वत अवगुणी असलेली अक्ष - क्रीडा वैदिक काळातील मनोरंजनाचे लोकप्रिय साधन होते. यज्ञादि प्रसंगात अनुष्ठानिक रुपात अक्ष-क्रीडा ही पद्धत होती राजसूय यज्ञाच्या वेळी दिग्विजयाच्या प्रतीक रुपात अक्ष- क्रीडा प्रचलित होती. त्यावेळी सोन्याचे फासे वापरत असत. [६]

संस्कृत साहित्यातील वर्णित अक्ष-क्रीडा : -

मनोरंजनाच्या सर्वच साधनांना अतीप्राचीन नाव 'क्रीडा' असे होते. जुगार हा 'द्युत-क्रीडा' म्हणून संबोधत. द्युतक्रीडेचे वैविध्यपूर्ण महत्व या ठिकाणी परिवर्तित स्वरुपात दिसून येते. महाभारतात काही ठिकाणी अक्ष-क्रीडा ही निदंनीय सांगितली आहे .

"मृगया द्युतं स्त्रियः पानमिति चतुर्वर्ग :|"[७]

स्वत: कौटिल्य स्पष्ट करतो की द्युत हे अधिक घातक व्यसन आहे. त्यासाठी त्याने जुगारावर राष्ट्राचे नियंत्रण लावले. सरकारी द्युतशाळेतच द्युत खेळले जावे. अन्यत्र ठिकाणी खेळल्यास दंड आकारला जावा. वैदिक काळाप्रमाणे या काळातही द्युताची व्यापकता आणि लोकप्रियता दिसून येते. कालांतराने त्यात नवीन बदल झाले. राजकोषातील धन कमी झाल्यास धनी नागरिकांना घरी बोलवून आणि कुटपाशकांचा वापर करुन धन जिंकत असत. आधुनिक चौपटी खेळाशी मिळता -जुळता हा खेळ .

आधुनिक काळ

आधुनिक काळातील मानवाच्या मनोरंजनाच्या साधनांमध्ये आमूलाग्र बदल झाला. भारतीयच नाही तर पाश्चात्य खेळ मोठ्या उत्साहाने खेळले जाऊ लागले. नेमबाजी, भालाफेक,टेनिस, फुटबॉल, बॉक्सींग अशा अनेकानेक खेळांतून मोठ्या प्रमाणात प्राविण्यसूदधा मिळवले जाऊ लागले. परंतु त्यापेक्षा अधिक मिळवण्याची लालसा ही मानवाला सट्टा, शमी, लॉटरी, रेस अशा कुमार्गाकडे घेऊन गेली यावरुन वेदकालीन समाज हा वैचारीकदृष्ट्या प्रगल्भ आणि दूरदृष्टी लाभलेला दिसून येतो. धूत-क्रीडा ही वैदिक तसेच आधुनिक काळातील निंदनीय अशी संकल्पना दिसून येते.[८]

निष्कर्ष

१) जुगार हे मनोरंजनाचे उत्तम साधन होते. जुगाराचे परिवर्तन सट्टयाच्या स्वरुपात बदलेले दिसते.
२) मी श्रमात जास्त पैसा कमावण्याची लालसा मानवाची कार्यक्षमता क्षीण करते.
३) भौतीक सुखाची इच्छा, असामाजिक वर्तन ही जुगार खेळण्याच्या मार्गासाठी प्रवृत्त करते.
४) जुगार हा खेळ वाईट खेळांमध्ये गणल्या गेल्यामुळे त्याला समाजात प्रतिष्ठा प्राप्त झाली नाही.
६) हा अतिशय निंदनीय असा खेळाचा प्रकार असल्याने आणि आर्थिक तसेच सर्वप्रकारच्या हानीला कारणीभूत म्हणून शासन नियंत्रण असावे.

संदर्भ

१) प्राचीन भारतीय मनोरंजन -पृष्ठ क्र. ४२
२) ऋग्वेद - (१०/३४/८)
३) प्राचीन भारतीय मनोरंजन -पृष्ठ क्र. ४३
४) ऋग्वेद - (१०/३४/८)
५) ऋग्वेद - (१०/३४/६ते १०/३४/१०)
६) प्राचीन भारतीय मनोरंजन -पृष्ठ क्र. ४५
७) कौटिल्य अर्थशास्त्र प्रदीप -पृष्ठ क्र. १४०-१४१
8) History of Indian Literature - pg.no.103

[illegible] / [illegible]

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[illegible]

[illegible]

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[illegible]
वगाकरण पुढालप्रमाण,
[illegible]
*[illegible] ([illegible]) [illegible] ([illegible] +[illegible]+[illegible]) [illegible].
[illegible]. ([illegible]-क्र-[illegible])
[illegible]शब्दाचा गावाणलघुकाशाताल बालाभाषताल अथ आइ ,[illegible]. ([illegible]-क्र-[illegible])
[illegible] ,[illegible].([illegible]-क्र-[illegible])
[illegible], [illegible], [illegible], [illegible], [illegible]

[illegible]

[illegible] -या शब्दाचा मूळ सस्कृत शब्दाशा असलला सबध लक्षात घण्यासाठा वगवगळ्या काशाचा अभ्यास कलला आह.या प्रकल्पात याच शब्दाचा सबध दाखवण्याचा प्रयत्न कला [illegible]हा प्रकल्प पूण करत असताना काहा शब्द जसच्या तस मूळरूपात सस्कृतमधून आलल[illegible] [illegible] .सस्कृतमधाल अनकशब्द ह अपभ्राशत हाऊन आलल आहत.

काहा शब्द आपण बालाभाषामध्य जस मराठा ,,ब्राज इत्यादा अपभ्राश

[illegible]

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[illegible]

सस्कृत साहित्यातील महाकवी कालिदासाच तीन महाकाव्य प्रसिद्ध आहत.त्या तीन महाकाव्यापकाच “[illegible]”[illegible] .[illegible] “[illegible]”[illegible]
दाक्षिणावतनाथ आणि पूण सरस्वती याच्या [illegible] .[illegible]
प्रतिभा दिसून यत.सहा शास्त्राच्या पाडित्याबराबर ज भागालक ज्ञान हात ,ज त्या काळी आतिकठीण [illegible] .[illegible]
[illegible] सागितलल्या मार्गावरून त्यातील भागालिक वणन आपल्याला कळत.

[illegible] .कालिदासाच्या भाषासमृद्धाचा झलक सपूण काव्यात जागाजागा दिसून यत.या प्रकल्पात आम्हा मघदूताचा [illegible]
[illegible]. सशाधकामध्य कालिदासान मघदूत [illegible]
[illegible].जस का रामागरा म्हणज रामटक का रामगड , आम्रकुट म्हणज अमरवाडा का [illegible] .म्हणून यातील यथाथता व सत्यता शाधण्याचा [illegible] हा लहानसा प्रयत्न .

[illegible] :

[illegible] ,[illegible] ,[illegible] .[illegible]
[illegible] .[illegible]
[illegible] ,[illegible]
[illegible].[illegible].[illegible]
[illegible].[illegible] [illegible].राजहसाचा मानस सरावराचा आढ प्रसिद्ध आह.[illegible]
[illegible] .[illegible].[illegible] [illegible]त पुढीलप्रमाण :

“पयाधरः पुण्यजनाङ्गनाना निविष्टहमाम्बुजरणु यस्याः ।
ब्राह्म सरः कारणमाप्तवाचा बुद्धारिवाव्यक्तमुदाहरान्त ॥”

मघदूतात मघाच्या मार्गात ३ [illegible] ,[illegible] ,[illegible] .[illegible]
पवतावर असलल्या नसागक सादयाच वणन कालिदासान अगदी उत्तम प्रकार कल आह.[illegible]
[illegible] , [illegible]
यामध्य रामागराच दखाल वणन कलल आ[illegible]

□□□□□□ □□□.□□□ □□□□□□□□□□□□ □□□□□□□□□□ □□ □□ □□ □□□□□□□□□□ □□ □□ □□□ □□□□ .□□□□ □□□□□□ सवागाण समृद्धा मघासमार यक्ष वणात आह.अलकच ातच्या वाशष्ट्यासह आाण शक्य त्या ठकाणा □□□□□ □□□□ □□□□ □□न कल्यावर यक्ष आपल्या घराच्या खाणाखुणा मघाला त नमक सापडाव म्हणून □□□□ □□उज्जायनानगरा हा यक्षाला स्वगाचा एक तुकडाच वाटता.□□□□□□□□□□ □□□ □□□□ □□□□□ यक्ष अगदा दहभान ावसरून जाता.□□□□□ □□□□ □□ □□□□ □ .त्या यक्षाला रमणासारख्याच वाटतात.□□□ ावावध पवताचा उल्लख दखाल आढळता.

मघदूतात ानसगाच : .□□□□,□□□ ,दशपूर आाण उज्जायना नगराच्या वणनातून कालदासाच्या काळातील नागरा जावन प्रकट झाल आह.मघाला सदश दताना अलकपयतच्या प्रवासाच्या मागाच आतशय सुदर वणन यक्षान कल 3□ □ानसगप्रम हा कालदासाच्या व्याक्तत्वाचा एक आवभाज्य □□□ □□□□□□□□□□□□□□ □□□□□□ □□□□ □□ □□□□ □ □□□□□ □□ □□□ .

□□□□ :

या प्रकल्पावरून आपल्याला कालदासान अत्यत सूक्ष्मतन कलल भागाालक पारास्थताच यथाथ वणन □□□□□□ .□-□□□ □□□□□□□□□□□ ालदासान वाणलला भागाालक पारास्थता नहमाच वादाचा ावषय □□□□.□□□□ -□□□□□□ □□□□ □□□□ ,आम्रकुट म्हणज अमरवाडा ाक 3
असलल्या ादशाचा उल्लख.म्हणून यातील यथाथता व सत्यता शाधण्याचा आम्हा या प्रकल्पातून छाटासा □ □□□□ □□ .

□□ ात्तात कालदासान रामागरापासून अलका नगरापयतच्या मागाच फार सुरख वणन कल आह.□□ □□□□□ □□□ □□□ □□ □ □□□ □□ □□□□ □□□ □□ □□□ □□□ ,□ □□ □□□□□□ □□ □□□□□□□□ □□□□□□ वाणलल्या सव स्थानाचा कसून शाध घतला गला आह.

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मू.जे.महाविद्यालयात शिक्षण घेणा-या ग्रामीण भागातील विद्यार्थ्यांच्या महाविद्यालयीन प्रवेशासंबंधी समस्या अभ्यासणे

चेतन उत्तम महाजन, डॉ.जयश्री महाजन*
समाजशास्त्र विभाग, मू.जे.महाविद्यालय, जळगांव

प्रस्तावना :

समाज परिवर्तनाचे एक साधन म्हणून स्वातंत्र्योत्तर कालखंडात शिक्षणावर भर दिला गेला. त्याचा परिणाम म्हणून शाळा कॉलेज विद्यापीठे यांच्या संख्येत तिव्र गतीने वाढ झाली. पंचवार्षिक योजनांच्या माध्यमातून शिक्षणाच्या विकासासाठी अनेक योजना कार्यान्वित केल्या गेल्या. याची बिजे आपल्याला स्वातंत्र्यपुर्व कालखंडात दिसून येते. शिक्षणाचे महत्व ओळखून शाहू महाराजांनी आपल्या संस्थानात शिक्षण सक्तीचे करुन क्रांतीकारक पाऊले उचलली. राजा राम मोहन रॉय, दयानंद सरस्वती, मदनमोहन मालविय, गोपाल गणेश आगरकर, चिपळूणकर, लोकमान्य टिळक इत्यादी समाजसुधारकांनी राष्ट्रीय शिक्षणाची पायाभरणी केली. ज्योतीबा फुले यांनी शिक्षणाचे महत्व ओळखून १८४४ मध्ये पहिली मुलींची शाळा पुण्यात काढली आणि शैक्षणिक क्षेत्रात मोठी क्रांती घडवून आणली. परंतु आजही एकविसाव्या शतकात भारतातील निरक्षरता संपुष्टात आलेली नाही. २०११ च्या जनगणनेनुसार भारताचा साक्षरता दर ७४% महाराष्ट्राचा ८२% तर जळगांव जिल्ह्याचा ७८% आहे. एकंदरीत आजही शिक्षण क्षेत्रातील आव्हाणे अजूनही संपलेली नाहीत, हे लक्षात येते.

भारत हा खेडी प्रधान देश म्हणून ओळखला जातो. जवळपास ७५ ते ८० टक्के लोक खेड्यातून वास्तव्य करतात. या दृष्टिकोनातून स्वातंत्र्योत्तर कालखंडात भारतातील ग्रामीण शिक्षण समाजाचे नवीन पर्व उघडले. ग्रामीण समाजाच्या शिक्षणासंबंधीत गंभीरपणे विचार करण्यास सुरुवात झाली. त्यासाठी विविध आयोग व योजना आखण्यात आल्या. ग्रामीण समाजाला सुशिक्षित करणे ही काळाची गरज मानली गेली आणि त्यानुसार शिक्षण पध्दतीत बदल केले गेले. बहुसंख्य लोकांना शिक्षण मिळावे म्हणुन राज्य सरकारने सार्वत्रिक मोफत व सक्तीच्या प्राथमिक शिक्षणाचे कायदे मंजूर केले. माध्यमिक व उच्च शिक्षणासाठी अनेक शिष्यवृत्त्या जाहीर केल्या गेल्या. मुलींसाठी आरक्षण ठेवण्यात आले. वस्तीगृहे, शिष्यवृत्त्या, आर्थिक सहाय्य व सामुहिक प्रयत्नामधून ही शैक्षणिक प्रगती भारतात काही अंशी साधली गेली परंतु अजूनही भारतात निरक्षरतेचे प्रमाण जास्त आहे. माध्यमिक शिक्षणात व उच्च शिक्षणात ग्रामीण भागातून होणा-या गळतीचे प्रमाणही महत्तम आहे.

अजूनही उच्च शिक्षण घेणा-या ग्रामीण मुलामुलींचे प्रमाण अत्यंत कमी आहे. भारतात जवळपास १० ते ११% विद्यार्थी उच्च शिक्षण घेत असल्याचे दिसून येते. ग्रामीण भागात ही स्थिती आणखीनच दयनिय दिसते. अजूनही ग्रामीण भागातील विद्यार्थ्यांना शिक्षण घेत असतांना अनेक समस्यांना तोंड द्यावे लागते. या दृष्टिकोनातून मु.जे.महाविद्यालयात शिक्षण घेणा-या ग्रामीण विद्यार्थ्यांच्या प्रवेशासंबंधीत समस्या जाणून घेण्यासाठी लघु स्वरुपात हा अभ्यास करण्यात आलेला आहे.

अभ्यास विषय :

मु.जे.महाविद्यालयात शिक्षण घेणा-या ग्रामीण भागातून येणा-या विद्यार्थ्यांच्या महाविद्यालयीन प्रवेशासंबंधीत समस्या अभ्यासणे.

अध्ययन उद्दिष्ट्ये :

१. मु.जे.महाविद्यालयात कला, वाणिजय व विज्ञान शाखेत शिक्षण घेणा-या ग्रामीण विद्यार्थ्यांची संख्या लक्षात घेणे.
२. महाविद्यालयात प्रवेश घेतांना त्यांना येणा-या समस्या लक्षात घेणे.
३. विद्यार्थ्यांच्या शैक्षणिक समस्या अभ्यासणे.
४. विद्यार्थ्यांच्या अपेक्ष रेखांकीत करणे.

संशोधन योजना :

प्रस्तुत अध्ययन पध्दती प्राथमिक व दुय्यम आकडेवारीवर आधारित आहे.

या अध्ययनासाठी नमुना निवड पध्दतीने मु.जे.महाविद्यालयात शिक्षण घेणा-या कला, वाणिज्य व विज्ञान शाखेतील ५० विद्यार्थ्यांची निवड केली व त्याच्याकडून मुलाखत अनुसूची भरुन घेतली. या अनुसूचीच्या माध्यमातून मिळालेल्या माहितीच्या आधारे खालील निष्कर्ष मांडले गेले.

निष्कर्ष :-

१. मु. जे. महाविद्यालयातील कला विभागात ग्रामीण भागातून शिक्षण घेणा-या विद्यार्थ्यांचे प्रमाण महत्तम असून ते ३०% आहे. तर विज्ञान या विद्याशाखेत १६.२५% विद्यार्थी ग्रामीण भागातील आहे. ग्रामीण भागातून वाणिज्य शाखेत प्रवेश घेणा-या विद्यार्थ्यांचे प्रमाण १३.२१% आहे.
२. एकंदरीत कला या विद्याशाखेत सर्वाधिक ग्रामीण विद्यार्थी शिक्षण घेत असलेले दिसतात. मिळालेल्या माहितीनुसार महाविद्यालयात प्रवेश घेतांना विद्यार्थ्यांना बहुतांशी कार्यालयीन समस्यांना तोंड द्यावे लागते. त्याविषयी त्यांना योग्य माहिती न मिळाल्यामुळे त्यांना अडचणी येतात.
३. असे असले तरी प्रवेशासंबंधित माहिती मिळाल्याचे त्यांनी मान्य केले आहे. सदर प्रवेश अर्ज भरतांना बहुतांशी विद्यार्थ्यांना मार्गदर्शनाचा अभाव जाणवला, त्याच बरोबर प्रवेश अर्जाच्या माहितीचे क्लीष्ठ स्वरुप यामुळेही अडचणी आल्याचे त्यांनी सांगितले.
४. प्रवेश अर्ज तपासतांना मात्र त्यांना फारशा समस्या आल्या नाही. ब-याच वेळा प्रवेश अर्ज तपासतांना वेळेवर संबंधीत व्यक्तिची उपलब्धता नसणे, ही अडचण त्यांनी व्यक्त केली. सद्य स्थितीत ऑनलाईन प्रवेश अर्ज भरावा लागतो, त्या संदर्भात संगणकाच्या अज्ञानामुळे त्यांना समस्या येत असल्याचे स्पष्ट झाले.
५. चलन भरण्यासंबंधीत मात्र महत्तम विद्यार्थ्यांना फारशा अडचणी आल्या नाही. महाविद्यालयात प्रवेश घेतांना शैक्षणिक कागदपत्रे प्रमाणित करणे आवश्यक असते.
६. त्या संदर्भात अडचणींचा अभ्यास केला असता प्रमाणित करणा-या संबंधित कर्मचा-याची ओळख नसल्यामुळे त्या संबंधीत अडचणी येत असल्याचे त्यांनी नमुद केले, त्यासोबतच शैक्षणिक कागदपत्रे प्रमाणित करणा-या संबंधीत व्यक्ति वेळेवर उपलब्ध होत नसल्याचे सांगितले.
७. प्रवेश अर्ज दाखल करतांना त्या संबंधात त्यांना योग्य माहिती नसल्याचे जाणवले. मुलजी जेठा महाविद्यालयात प्रवेश घेण्यासाठी कोणती बाब कारणीभूत ठरली हा प्रश्न विचारला असता, महाविद्यालयात

पुरवण्यात आलेल्या सुविधा, महाविद्यालयाचे मानांकन व माजी विद्यार्थ्यांचे मार्गदर्शन या बाबींना विद्यार्थ्यांनी प्राधान्य दिले. त्याच बरोबर संबंधीत शाखेत योग्य मार्गदर्शन मिळत असलयाचेही त्यांनी नमूद केले.

८. महाविद्यालयात शिक्षण घेत असतांना त्यांना प्राध्यापकाकडून योग्य मार्गदर्शन मिळत असल्याचे त्यांनी सांगितले.

९. शैक्षणिक सुविधा ही प्राप्त होत असल्याचे दिसून आले. शहरी-ग्रामीण असा कोणताही भेदभाव जाणवला नाही. महत्तम विद्यार्थ्यांनी महाविद्यालयात वेळेवर तासिका होऊन योग्य मार्गदर्शन मिळत असल्याचे स्पष्ट केले.

१०. काही विद्यार्थ्यांनी मात्र चलन भरण्यासंबंधीत अडचणी येत असल्याचे सांगितले. विषयासंबंधीत कामकाजात त्यांना अडचणी येत नसल्याचे दिसून आले. महाविद्यालयात असणारे क्रिडा संकूल, ग्रंथालय, संगणक कक्ष, एनसीसी, एनएसएस, बस पास योजना, पुस्तक पेढी योजना या सुविधाची माहिती विद्यार्थ्यांना असून कला शाखेतील २० टक्के विद्यार्थ्यांनी बससेवा योजना व पुस्तक पेढी योजनेचा लाभ घेतला आहे, तसेच ग्रंथालय व संगणक कक्षाचाही बहुतांश विद्यार्थी उपयोग घेत असल्याचे दिसून आले.

११. ग्रामीण भागातून येणा-या विद्यार्थ्यांपैकी महत्तम विद्यार्थी बस आणि रेल्वेचा वापर करतात आणि त्या संदर्भात बस वेळेवर न येणे किंवा बस मध्ये बसण्यासाठी जागा न मिळणे यासारख्या अडचणींना त्यांना तोंड द्यावे लागते.

या संदर्भात काही विद्यार्थ्यांनी बसेसची संख्या कमी असल्याचे नमूद केले. ग्रामीण भागातील या विद्यार्थ्यांना आपले पुढील करिअर शहरी भागात करण्याची ओढ जाणवली. अत्यंत कमी विद्यार्थ्यांनी ग्रामीण भागातच करीअर करण्याची इच्छा व्यक्त केली. बहुतांशी विद्यार्थ्यांनी महाविद्यालय व प्राध्यापक कर्मचा-याचे चांगल्या प्रकारचे मार्गदर्शन करावे व सहकार्य करावे ही अपेक्षा व्यक्त केली.

जलव्यवस्थापन : एक सामाजिक अध्ययन
(क्षेत्रकार्य : खर्ची बु.।। गांव)

मराठे गोपाल बळीराम, वाघे गोपाल वसंत, डॉ.जयश्री महाजन*

अध्ययनाचे उद्दिष्ट्ये :-

१. खर्ची बु.।। गावातील पाण्याची उपलब्धता लक्षात घेणे.
२. जलव्यवस्थापनासंदर्भात या गावातील लोकांच्या जाणिवा अभ्यासणे.
३. गावातील सांडपाण्यासंदर्भात स्थिती लक्षात घेणे.
४. आरोग्याचा एक भाग म्हणुन गावातील शौचालयाचे प्रमाण लक्षात घेणे.

संशोधन योजना :-

मु. जे. महाविद्यालयातील समाजशास्त्र विभागात विद्यार्थ्याने वरील उद्दिष्ट्ये डोळ्यासमोर ठेवुन खर्ची बु.।। हे गांव निवडले. या अध्ययनात तथ्य संकलनासाठी वैज्ञानिक पध्दतीचा वापर केला. त्यासाठी नमुना निवड पध्दतीने ५० लोकांची निवड केली. त्यांच्याकडील प्रत्यक्ष मुलाखत तंत्राचा अवलंब करुन अनुसूची भरुन घेतलेल्या माहितीच्या आधारे खालील निष्कर्ष मांडले गेले.

अध्ययन क्षेत्र :-

जळगांव जिल्ह्यातील एरंडोल तालुक्यात खर्ची बु.।। हे गांव अध्ययनासाठी निवडण्यात आले.

संशोधन समस्या :-

जलव्यवस्थापन व गावातील सांडपाण्याचे व्यवस्थापनासंदर्भात समस्या जाणून घेणे.

कालमर्यादा :-

शैक्षणिक वर्ष २०१३-१४ या वर्षाच्या सुरुवातीला अनुसूची भरुन घेण्यात आल्या. फेब्रुवारी २१४ मध्ये संकलित केलेल्या अनुसूचींचे विश्लेषण करण्यात आले.

अभ्यासाची व्याप्ती :-

जळगांव जिल्ह्यातील एरंडोल तालुक्यात खर्ची बु.।। हे गांव.

संशोधन तंत्रे :-

संशोधनात तथ्य संकलनासाठी वैज्ञानिक पध्दतीचा वापर केला. सर्वेक्षण सर्वव्यापक व उपयुक्त व्हावे म्हणुन निवडक स्त्री पुरुषांना सर्वेक्षणात समाविष्ट करण्यात आले.

सर्वेक्षणात अनुसूची तंत्राचा अवलंब करण्यात आला. यामध्ये अनुसूची तयार करतांना रचनात्मक अनुसूचिचा आधार घेण्यात आला. अनुसूची भरुन घेतांना प्रत्यक्ष मुलाखत या तंत्राचा अवलंब करण्यात आला.

अनुसूची तयार करतांना अध्ययन- विषयाचा सांगोपांग विचार करु त्या संबंधिता प्रश्न यात समाविष्ट करण्यात आले. जलव्यवस्थापन या घटकावर लक्ष केंद्रीत केले आहे. तयार करण्यात आलेली अनुसूची संशोधन क्षेत्रातील ५० व्यक्तींकडून भरुन घेण्याचे ठरविले. या व्यक्तींची निवड प्रत्यक्ष मुलाखत तंत्राचा वापर करण्यात आला. यासाठी समाजशास्त्र विभागातील पदवीच्या २ विद्यार्थ्यांमार्फत हे कार्य करण्याचे ठरविले. यासाठी या विद्यार्थ्यांनी आवश्यक ते प्रशिक्षण देण्यात आले.

अहवाल लेखन :-

अध्ययन विषयासंबंधित संपूर्ण माहिती सुव्यवस्थित रितीने मांडण्यासाठी अहवाल लेखन केले गेले. यात खालील मुद्यांचा सामावेश करण्यात आला.

१. प्रस्तावना
२. संशोधन योजना
३. तथ्यांचे संकलन
४. निष्कर्ष
५. परिशिष्ट

संशोधनाची मर्यादा :-

प्रस्तुत अध्ययन हे जळगांव जिल्ह्यातील एरंडोल तालुक्यातील खर्ची या गावापुरते मर्यादित आहे. या अध्ययनात जल व्यवस्थापन संदर्भात प्रश्नांच्या संदर्भात प्रकाश टाकला गेला आहे. अध्ययन घटक मानवी असल्यामुळे अमूर्त व भावनात्मक घटकांचे अध्ययन करण्यास मर्यादा पडतात. अध्ययन कर्ता स्वत: अध्ययन विषयाचा भाग असल्यामुळे संशोधन संदर्भात काही मर्यादा येतात. तरीसुध्दा अध्ययन विषयासंदर्भात महत्वूपर्ण माहिती संकलित करण्याचा प्रयत्न या अभ्यासातून केलेला आहे.

निष्कर्ष :-

१. प्रस्तुत अध्ययनात समाविष्ट बहुसंख्य उत्तरदाते पुरुष असुन स्त्री उत्तरदात्यांचे प्रमाण २०% आहे.
२. या उत्तरदात्यांपैकी २५ ते ४० वयोगटातील निवेदकांची संख्या महत्तम म्हणजे पन्नास टक्के आहे. त्या खालोखाल ४१ ते ६० वयोगटातील निवेदक आहेत.
३. धर्मानुसार वर्गवारी केली असता सर्वच्या सर्व उत्तरदाते हिंदु धर्मिय आढळले.
४. या अभ्यासात समाविष्ट असलेल्या उत्तरदात्यांचे शिक्षण लक्षात घेतले त्यात माध्यमिक शिक्षण घेतलेल्या उत्तरदात्यांचे प्रमाण जास्त आहे. या नमुन्यात २२टक्के लोक निरक्षर आहेत.
५. उत्तरदाते निवेदकांमध्ये तीन अपत्य संख्या असलेले कुटूंबांचे प्रमाण सर्वात जास्त आहे. त्या खालोखाल दोन अपत्य संख्या असलेले कुटूंब आहे.
६. उत्तर दात्यांच्या या कुटूंबात ५ ते ८ सभासद संख्या असलेले कुटूंबे ५० टक्के आहे.
७. व्यवसाय वर्गवारी केली असता बहुसंख्य निवेदक शेती व्यवसायात सहभागी असल्याचे आढळते. त्यांचे प्रमाण ७४ टक्के आहे.
८. खर्ची बु.।। या गावात कुटूंबांना पिण्याचे पाणी बहुतांश विहीरीच्या माध्यमातुन उपलब्ध होते.
९. गावाला पाणीपुरवठा विहीरीतुन नळाद्वारे केला जातो. या संदर्भात निम्मे उत्तरदात्यांनी नळांना पाणी नियमित येत असल्याचे मान्य केले.

१०. नळाद्वारे पाणी पुरवठा जवळपास ३ ते ४ दिवसांनी केला जातो, असे लक्षात आले.
११. संपुर्ण कुटूंबासाठी पाणी पुरेशे असते का, हा प्रश्न विचारला असता ७८ टक्के उत्तरदात्यांनी पाणी पुरेसे असल्याचे मान्य केले.
१२. पाणी पुरवठ्या संदर्भात काही अडचणी असल्यास विहीरीच्या माध्यमातुन पाणी उपलब्ध करुन घेतले जाते, असे लक्षात आले.
१३. जलव्यवस्थापन करणे आज काळाची गरज आहे, या संदर्भात उत्तरदात्यांचे मत जाणून घेतले असता बहुतांशी उत्तरदात्यांनी पावसाच्या पाण्याचे व्यवस्थापन करत नसल्याचे सांगितले.
१४. केवळ १४ टक्के उततरदाते पावसाच्या पाण्याचे व्यवस्थापन करतात, त्यासाठी ते शेतामध्ये शेततळे करुन पाणी शेतीत जिरवतात.
१५. घरातील सांडपाण्यासंदर्भात माहिती घेतली असता, बहुतांशी उत्तरदात्यांनी सांडपाण्याचे व्यवस्थापन करीत नसल्याचे सांगितले.
१६. ज्या उत्तरदात्यांनी सांडपाण्याचे व्यवस्थापन केले आहे, त्यांनी शौचखड्याचा उपयोग केल्याचे दिसते.
१७. उत्तरदात्यांपैकी ८० टक्के उत्तरदात्यांचे स्वत:चे मालकीचे शेत आहे.
१८. ही शेती करण्यासाठी बहुसंख्य शेतकरी विहीरीचा वापर करतात. तर काही शेतकरी पावसाच्या पाण्यावर अवलंबुन असल्याचे दिसते.
१९. शेती करतांना बहुसंख्य शेतकरी पारंपारिक सरी पध्दतीचा उपयोग करीत असल्याचे लक्षात आले. तर काही शेतकरी ठिबक सिंचन पध्दतीचा वापर करतात.
२०. जल व्यवस्थापन जागृतीचे अध्ययन केले असता सर्वच निवेदकांनी पावसाच्या पाण्याचे व्यवस्थापन केल्यास पाण्याच्या पातळीत वाढ होईल, हे मान्य केले.
२१. परंतु जलव्यवस्थापनेसंदर्भात योजनेबाबतची जागृती आणि प्रत्यक्ष कृती फारशी आढळून आली नाही.
२२. काही शेतक-यांची K. T. वेअर बंधारे बांधून जलव्यवस्थापन केल्याचे दिसले. परंतु त्याचे प्रमाण अत्यंत कमी आहे.
२३. शेती करतांना पाण्याची कमतरता भासते काय, यासंदर्भात ९४ टक्के उत्तरदात्यांनी शेतीसाठी पाणी कमी पडत असल्याचे मान्य केले.
२४. जवळपास मार्च ते जुन या कालावधीत पाण्याची टंचाई निर्माण होत असल्याचे जाणवले.
२५. बहुसंख्ये उत्तरदाते कांदा, गहु, कापुस, मका, हरभरा या सारखी पिके घेत असल्याचे दिसुन आले.
२६. या गावाच्या परिसरात नाला असल्याचे लक्षात आले.
२७. परंतु या नाल्याच्या पाण्याचा वापर शेतीकामासाठी केला जात नसल्याचे महत्तम उत्तरदात्यांनी सांगितले.
२८. गावातील या नाल्यावर जलव्यवस्थापनासंदर्भात कोणत्याही उपाययोजना नसल्याचे लक्षात आले.
२९. हगणदारीमुक्त जनजागृती यासंदर्भात अध्ययन केले असता, निम्मे उत्तरदात्यांकडे शौचालय उपलब्ध आहे, परंतु या निम्मे उत्तरदात्यांपैकी ५० टक्के लोक फक्त शौचालयाचा वापर करतात.
३०. जागेच्या टंचाईमुळे निम्मे उत्तरदात्यांकडे शौचालय नसल्याचे लक्षात आले.

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