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Diatoms from Abhora dam of Raver tahsil district, Jalgaon, Maharashtra

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ABSTRACT

The present paper deals with the taxonomic details of 23 taxa of diatoms belonging to 12 species, 03 forms and 08 varieties of 10 genera of diatoms from Abhora dam in Raver tahsil of Jalgaon district, Maharashtra. All the taxa were recorded for the first time from the study area. Key words: Diatoms, Abhora dam, Raver, Jalgaon

Introduction

Diatoms are microscopic and well defined members of algal class Bacillariophyceae characterized by the presence of silicified wall and structure composed of two valves overlapping the other. Diatoms are easily distinguished from almost other algal groups by the presence of silicified wall. The knowledge of Bacillariophyceae in Maharashtra is known through the work of Gandhi (1952,1954,1956,1957a-b,1958,1959,1960,1962a-b), Barhate and Tarar (1981,1983,1985), Sarode and Kamat (1984), Jawale and Kumawat (2000,2001), Bhoge and Ragothamn ((2003,2005), Narkhede and Ragothamn (2003,2006a-b,2007a-b), Kumawat and Jawale (2005), Aher and Mahajan (2006), Kumawat (2006,2007), Kumawat et.al (2008 a-b), Dhande and Jawale (2009), Andhale et.al (2012), Mahajan(2012), Borse and Kumawat (2014), Pathan and Borse (2015), Patil (2016), Mahajan (2019).

Material and methods:

The algal collections were made during April 2007 to March 2008 from Abhora dam near village Abhora of Raver Tahsil. Abhora dam is located near foot of Satpura hills (760 01' North latitude and 210 18' East longitude) in the Raver Tahsil of Jalgaon district, Maharashtra. The collected samples were preserved in 4% formalin for microscopic studies and line drawings were drawn with the help of camera lucida technique. Identification was made with the help monograph of Sarode and Kamat (1984), Cleve-Euler (1953, 1955) and other relevant literature.

Systematic Enumeration

Fragilaria brevistriata Grun.

Cleve- Euler, 1953, p. 31, Fig. 343 f.

Valve 3.5 µm broad, 38.0 µm long; frustules rectangular, attached together to form short chains; linear elliptic to elliptic, abruptly tapering towards the ends; pseudoraphe distinct, linear lanceolate; central area not formed; striae 15-16 in 10 µm, marginal.

Habitat: Coll. No. 411AI

Fragilaria intermedia Grun.

P.T. Sarode and N. D. Kamat, 1984, p. 27, Pl. 1, Fig. 21.

Pl. 1, Fig. 2

Pl. 1, Fig. 1

Valves 6.9-7.6 μ m broad, 69.8-84.4 μ m long; frustules united together to form long bands, linear, rectangular in girdle view; linear with parallel margins; ends gradually tapering and rounded very slightly capitate; axial area narrow, linear; striae 11-12 in 10 μ m, coarse and distinct, absent on one side in the middle.

Habitat: Coll. Nos. 410AII, 452 AII

Fragilaria intermedia Grun. f. chandrapurensis Sarode et Kamat Pl. 1, Fig. 3

P. T. Sarode and N. D. Kamat, 1984, p. 27, Pl. 1, Fig. 22.

Valve 6.5 μ m broad, 47.2 μ m long; frustules linear, rectangular, united together to form long bands in girdle view; linear with parallel margins, ends abruptly tapering and rounded; pseudoraphe narrow, linear; striae 11-12 in 10 μ m, coarse and distinct, absent in the middle on one side.

Habitat: Coll. Nos. 409AII, 461A II

Synedra ulna (Nitz.) Ehr.

P. T. Sarode and N. D. Kamat, 1984, p. 31, Pl. 2, Fig. 37.

Valve 6.9 μ m broad, 106.3 μ m long, broad, linear to linear, lanceolate and tapering at the ends; ends rounded; pseudoraphae narrow, linear; central area absent or present; striae 9-11 in 10 μ m, coarse.

Habitat: Coll. Nos. 498AII, 427AI 405AII, 407AII, 409AII, 410AII, 402AI, 408AI, 413AI, 414AII, 469AI

Cocconeis placentula Ehr.

P. T. Sarode and N. D. Kamat, 1984, p. 49, Pl.4, Fig. 95 a.

Valve 13.8 μ m broad, 26.4 μ m long, elliptical; raphe valve with a thin and straight raphe; axial area very narrow, central area small, roundish, striae finely punctate, 24-26 in 10 μ m; marginal rim distinct.

Habitat: Coll. No. 419AII.

Gyrosigma bhusalvalensis Sarode et Kamat Pl.1, Fig. 6

P. T. Sarode and N. D. Kamat, 1984, p. 67, Pl. 7, Fig. 153.

Valve 24.5 μ m broad, 127.6 μ m long, broad, slightly sigmoid, linear to linear, attenuated towards the poles with obliquely rounded ends; raphe central and sigmoid; axile area very narrow; central area small, elliptical; transverse striae 14-15 in 10 μ m, coarse; longitudinal striae 17-18 in 10 μ m, distinct.

Habitat: Coll. No. 498 AII.

Gyrosigma distortum (W. Smith) Cleve var. parkeri Harrison Pl. 1, Fig. 7

P. T. Sarode and N. D. Kamat, 1984, p. 67, Pl. 7, Fig. 148.

Valve 16.3 μ m broad, 87.0 μ m long, broad, lanceolate, slightly sigmoid with obtuse protracted ends, curved in opposite directions; raphe central and sigmoid; axile area very narrow; central area small, elliptic; transverse and longitudinal striae equal in number about 28 in 10 μ m, longitudinal striae faint.

Habitat: Coll. No. 498AII Mar.

Gyrosigma kuetzingii (Grun.) Cleve

Pl. 1, Fig. 4

Pl.1, Fig. 5

Pl. 2, Fig. 1

P. T. Sarode and N. D. Kamat, 1984, p. 68, Pl. 7, Fig. 149.

Valve 13.6 µm broad, 89.0 µm long, broad, slightly sigmoid, lanceolate, with rounded ends; raphe in centre, slightly sigmoid; axile area narrow, linear; central area small; transverse striae 24 in 10 µm, coarse; longitudinal striae 26 in 10 µm, fine.

Habitat: Coll. No. 457AI.

Pleurosigma angulatum (Quekett) W. Smith f. chemburiana Gonzalves et Gandhi Pl. 2, Fig. 2 P. T. Sarode and N. D. Kamat, 1984, p. 69, Pl.8, Fig. 156.

Valve 14.5 µm broad, 87.2 µm long; slightly sigmoid, rhombic lanceolate distinctly angular in the middle; ends acutely rounded; raphe sigmoid and thin; axial area narrow; central area small and rhombic; transverse and oblique striae equidistant from one another, about 25 in 10 µm.

Habitat: Coll. No. 456AI.

Navicula cuspidata Kuetz. var. ambigua (Ehr.) Cleve. Pl. 2, Fig.3

V. Venkateswarlu, 1983, p. 22, Pl.2, Fig. 29.

Valve 21.1 µm broad, 69.8 µm long, narrowly rhombic lanceolate with constricted produced capitate ends; craticular plates sometimes present; raphe thin and straight with hook like central pores; axial area very narrow, linear; central area small; transverse striae 19-21 in 10 µm and longitudinal striae 21-22 in 10 µm, fine

Habitat: Coll. Nos. 455AI., 474AII.

Navicula gregaria Donk.

P.T. Sarode and N. D. Kamat, 1984, p. 112, Pl.13, Fig. 273.

Valve 5.7 µm broad, 24.5 µm long, lanceolate with rostrate or feebly capitate ends; raphe thin and straight; axial area very narrow; central area very small; striae 19-20 in 10 µm, fine. Habitat: Coll. No. 474AII.

Pinnularia acrosphaeria (Breb.) W. Smith **f.** *undulata* Cleve Pl. 2, Fig. 5

B.N. Prasad and M.N Srivastava, 1992, p. 229, Pl. 10, Fig. 10.

Valve 10.7 µm broad, 45.3 µm long, solitary linear with prominent inflation in the middle and towards ends; apices broadly rounded; raphe thick, median some what straight, central nodules distinct and bent on one side of the valve, terminal fissures hook shaped; axial area broad, about half of the breadth of the valve; central area more dialated on one side, striae 12-13 in 10 μ m, coarse lineate radiate in the middle becoming convergent towards apices.

Habitat: Coll. No. 493AI

Cymbella amphicephala Naeg.

P. T. Sarode and N. D. Kamat, 1984, p. 166, Pl. 19, Fig. 441.

Valve 7.6 µm broad, 33.7 µm long, asymmetrical, semilanceolate; dorsal side strongly convex; ventral side slightly convex in the middle; ends constricted, produced and capitate; raphe thin and straight with terminal fissures dorsally bent; axial area very narrow; central area small; striae 13-15 in 10 μ m on the dorsal side and 15-16 in 10 μ m on the ventral side, very slightly radial. Habitat: Coll. Nos. 471 AII., 459AI, 411AI, 412AI, 450AI, 425AII.

Cymbella cymbiformis (Ag.) Kuetz. var. caldostagnensis (Meist.) A.C 1. Pl. 3, Fig. 2 P. T. Sarode and N. D. Kamat, 1984, p. 168, Pl.20, Fig. 448.

Pl. 3, Fig. 1

Pl. 2, Fig. 4

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Valve 12.2 µm broad, 76.8 µm long, sickle shaped with convex dorsal margin and concave ventral margin with a median inflation; ends broadly rounded and truncate; raphe excentric with central pores ventrally curved; axial area narrow; central area slightly widened with three coarse punctae on the ventral side and two on the dorsal side; striae 11-13 in 10 µm, distinctly lineate and radial.

Habitat: Coll. Nos. 406AII April, 409AII May, 401AI, 445 AII Jan., 441AII Dec.

Cymbella ventricosa Kuetz.

P. T. Sarode and N. D. Kamat, 1984, p. 178, Pl. 21, Fig. 473.

Valve 11.5 µm broad, 42.6 µm long, strong convex on the dorsal side and straight or, slightly convex on the ventral side with acutely ends; raphe thin and straight; axial area narrow; central area small; striae 14-17 in 10 µm, radial, coarse lineate and slightly convergent towards the ends. Habitat: Coll.Nos. 409AII May, 404AI April, 401AI April, 422AI Sep.

Cymbella ventricosa Kuetz. var. arcuata Skv.

P. T. Sarode and N. D. Kamat, 1984, p. 178, Pl. 21, Fig. 474.

Valve 9.9 µm broad, 34.1 µm long; semielliptic with strongly convex dorsal margin and straight ventral margin; raphe arcuate; axial area narrow and central area not defined; striae 10 in 10 µm on the dorsal side and 11 in 10 µm on the ventral side, coarse.

Habitat: Coll. Nos. 406AII April, 411AI May, 467AI Mar.

Gomphonema lanceolatum Ehr. var. insignis (Greg.) Cleve

P. T. Sarode and N. D. Kamat, 1984, p. 191, Pl. 22, Fig. 516.

Valve 9.9 µm broad, 33.4 µm long; broadly lanceolate clavate with acute ends; raphe slightly thick with unilaterally bent central pores and distinct terminal fissures; axial area moderate, linear; central area unilateral with an isolated stigma on the opposite side; striae 12-13 in 10 μ m, radial fine and distinctly punctate.

Habitat: Coll. Nos. 475AIApril, 405AII April, 408 AI April, 409AII May.

Gomphonema gracile Ehr. var. major Grun.

Cleve -Euler, 1955, p. 185-186, Figs. 1281 d, e.

Valve 10.7 µm broad, 67.9 µm long; narrowly lanceolate, turgid in the middle and gradually tapering towards the rounded apex and base; raphe thin and straight; axial area narrow; central area with an isolated stigma on the opposite side; striae 11–12 in 10 µm, slightly radial and finely punctate.

Habitat: Coll. Nos. 497AI Mar., 460AI Feb, 463AII Feb, 414AII June.

Gomphonema gracile Ehr. var. intricatiforme Mayer Pl. 3, Fig.7

P. T. Sarode and N. D. Kamat 1984, P. 186, Pl. 22, Fig. 500.

Valve 10.3 µm broad, 54.9 µm long; lanceolate clavate, inflated in the middle; ends obtuse rounded; raphe somewhat thick and straight with distinct central nodules and curved terminal fissures; axial area narrow; linear; central area slightly, expanded with an isolated stigma on the opposite side; striae 12 in 10 μ m in the middle and upto 15 in 10 μ m towards the ends, slightly radial and coarse.

Habitat: Coll. Nos. 404AI April, 474AII Mar., 410AII May Gomphonema constrictum Ehr. var. indica Gandhi Pl.3, Fig.3 Pl. 3, Fig.4.

Pl. 3, Fig. 5

Pl. 3 Fig. 6

Pl. 3 Fig. 3.

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P. T. Sarode and N. D. Kamat 1984, p. 184, Pl. 21, Fig. 494.

Valve 11.1 µm broad, 42.6 µm long; clavate with slightly constricted, broadly produced and rounded apex; raphe thick and straight; axile area narrow, linear; central area some what rhomboid, unilateral with stigma on the opposite side; striae 10 in 10 µm in the middle and upto 11 in 10 µm towards the ends, radial and coarsely punctate.

Habitat: Coll. Nos. 497AI Mar., 451AII Jan., 455AI Jan.

Nitzschia angustata (W. Smith) Grun.

F. Hustedt, 1930, p. 402, Fig. 767.

Valve 8.0 µm broad, 43.7 µm long; linear with almost parallel margins and abruptly narrowed, acutely rounded ends; keel excentric; keel punctae 12 in 10 µm not distinguishable from the striae, striae 12 in 10 µm distinct.

Habitat: Coll. No. 478AII May.

Nitzschia ignorata Krasske

P. T. Sarode and N. D. Kamat, 1984, p. 218, Pl. 26, Fig. 597.

Valve 4.5 µm broad, 55.4 µm long; linear, sigmoid with obliquely rounded wedge shaped ends; keel excentric, sigmoid with a slight median constriction, keel punctae 8 in 10 µm small, rounded; striae about 35 in 10 µm, very fine and almost indistinct.

Pl. 3, Fig. 6

Habitat: Coll. No. 456AI Jan.

Nitzschia vasnaii Gandhi

P. T. Sarode and N. D. Kamat, 1984, p. 227, Pl. 27, Fig. 629.

Valve 2.6 µm broad, 25.7 µm long; linear with parallel margins and long, cuneate, strongly capitate ends; keel very narrow, excentric, keel punctae 15 in 10 µm, very small; striae more than 35 in 10 µm, very fine and indistinct.

Habitat: Coll. No. 480 AII Jan.

Conclusion

Total 23 taxa of diatoms belonging to 08 genera like Fragilaria, Synedra, Cocconeis, Gyrosigma, Pleurosigma, Navicula, Pinnularia Cymbella, Gomphonema, Nitzschia of diatoms from Abhora dam in Raver tahsil of Jalgaon district, Maharashtra.

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Pl. 3, Fig. 5

Pl. 3, Fig. 4

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Fragilaria brevistriata, 2.Fragilaria intermedia, 3.Fragilaria intermedia f. chandrapurensis
 Synedra ulna, 5.Cocconeis placentula, 6.Gyrosigma bhusalvalensis, 7.Gyrosigma distortum
 var. parkeri, 8.Gyrosigma kuetzingii, 9. Pleurosigma angulatum f. chemburian



Scale A : Figs. 1-8

Navicula cuspidata var. ambigua, 2.Navicula gregaria, 3.Pinnularia acrosphaeria f. undulata
 Cymbella amphicephala, 5.Cymbella cymbiformis var. caldostagnensis, 6.Cymbella ventricosa
 Cymbella ventricosa var. arcuata, 8.Gomphonema lanceolatum var. insignis



PLATE-3

1.Gomphonema gracile var. major, 2.Gomphonema gracile var. intricatiforme, 3.Gomphonema constrictum var. indica,
4.Nitzschia angustata 5.Nitzschia ignorata, 6.Nitzschia vasnaii

Studies of Stability constant of drug with transion metal ions at 303K.

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Abstract:-

The interaction of transion metal ion with Olmesartan drug have been investigated by pH metric titration at 0.1 M ionic strength at room temperature in 30 % Ethanol-Water mixture. The data obtained use to estimate the values of proton-ligand stability constant (P^k) and Metal -ligand stability constant (logK). It is observed that transition metal ion form 1:1, 1: 2 complexes with all the systems.

Introduction: -

The studies of metal-ligand complexes in solution of a number of metal ions with carboxylic acids, oximes, phenols etc. would be interesting which throw light on the mode of storage and transport f metal ion in the biological kingdom.

In the earlier papers extensive data base on metal complexes with substituted heterocyclic drugs was presented.

Narwade et.al. ¹ studies the Formation and Stability constant of thorium (IV) complex with some substituted pyrazolines. Mathieu W.A. Steenland et.al.² studies stability constant of Cu(II) and Ni(II) complexes of trans –dioxopentaaza macrocycles in aqueous solution by different technique. Hong-Wen Gaoet.al.³ has studied the stability constant of Cu (II) and Co (II) complexes with CNBAC in water sample spectrophotometrically. Tuba Sismanoglu ⁴ have studied the stability constant of binary complexes of Nicotinamide with Mn (II) by pH metrically. He also determines change in free energy, change in enthalpy and change in entropy from stability constant at different temperature. Tekade et.al. ⁵ have been studied complex formation of Cu (II) and Co (II) metal ion complexes amino acids with charged side chain by pH–metrically. Hayati Sari et.al.⁷ studied the stability constant of glyoxime derivative and their Nickel, Copper, Cobalt and Zinc complexes potentiometric and theoretically.

After review of literature survey the detail study of complex under identical set of experimental condition is still lacking. It was thought of interest to study the chelating properties of Olmesartan under suitable condition with metal ions by pH metrically.

Material and Method:-

pH measurement were carried out with equip-tronic EQ-610 pH meter (aceuracy ± 0.01 units) using combine glass electrode at room temperature. Metal ions solution were prepared in triply distill water and concentration estimated by standard method.⁸ The solution of drug prepared in solvent .The pH metric reading in 50% ethanol – water mixture were converted to [H⁺] value by applying the correction proposed by Van Uitert Haas.

The overall ionic strength of solution was constant and calculated by the equation

$\mu = 1/2 \ \Sigma \ X_\iota \ Z_\iota^2$

The concentration of other ion in addition to Na^+ and ClO_4^- were also taken into consideration.

Result and discussion:-

Substituted heterocyclic drugs may be ionized as acid having replaceable H^+ ion from - OH group. Therefore it is represented as HL i.e.

HL $+L^{-}$

The titration data used to construct the curves between volume of NaOH and P^{H.} They are called acid-ligand titration curves.

It is observed from titration curves for all systems ligand start deviating from the free acid curves at P^{H} 2.5 and deviating continuously up to P^{H} =11. The deviation shows that dissociation of proton in substituted drugs.

The average number of proton associated with the ligand

 (n_A) was determined from free acid and acid – ligand titration curves employing the equation of Irving and Rossotti ⁹. The P^k values were determined from formation curves $(n_A v^s P^H)$ by noting the P^H at which $n_A = 0.5$. The accurate values of pk were calculated by point wise calculations which are presented in table -1. The pK values are found.

Table-1: Proton ligand stability constant of ligandat 0.1M ionic strength

System	Constant pK					
	Half integral	Point wise calculation				
Ligand-1	6.75	$6.690. \pm 0.06$				

METAL -LIGAND STABILITY CONSTANT (Log k):-

Metal-ligand stability constant of transition metal ion chelate with drug were determined by employing Bjerrum calvin P^{H} metric titration method as adopted by Irving and Rossotti. The formation of chelate between transition metal ion with drug was indicated by the significant separation starting from pH =2.5 for transition metal ion with ligand -1.

 Table-2: Determination of metal –ligand stability constant (logK) of transition metal ion with drug at 0.1M ionic strength.

System	Logk ₁	Logk ₂	Logk ₂ - Logk ₁	$Logk_2/Logk_1$
Cu(II)-Ligand	3.65	5.45	1.80	1.4932
Fe(II)-Ligand	3.80	5.56	1.76	1.4632
Ni(II)-Ligand	3.75	5.65	1.90	1.5067
Mg(II)-Ligand	3.35	4.65	1.30	1.3881
Co(II)-Ligand	4.15	5.80	1.65	1.3976

The result shows the ratio of $Logk_2/Logk_1$ is positive in all cases. This implies that there is little or no steric hindrance to the addition of secondary ligand molecule. The smaller difference may be due to trans structure.

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A GEOGRAPHICAL STUDY OF AGE STRUCTURE OF MUSLIMS IN RURAL AREAS OF JALGAON DISTRICT

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Abstract:

Man is the base of all resources and according to their needs man played animportant role as modifier, regulator and controller of the resources. So man himself is considered as the most important and valuable resources of the earth. Man is the centraltheme of all different interrelated fields. If we know more about the population composition of the area then the implementation of the developmental tasks will be morefruitful and effective. Thus human resources can be analyzed in the form of locationcharacteristics and sequential growth of various components. The age structure of a population refers to the number of people in different age groups. Age structures are one of the most basic characteristics of a population and have great importance in population studies. The age structure of population is considered as one of the basic demographic characteristics of population. The population of any region categories into various age group help in comparisons in their distribution. The age structure of different populations is usually compared with reference to three broad age groups: (i) Young or Dependents (0 to 14 years), (ii) Adult or Working (15 to 59 years), and (iii) Old or Dependents (60 years and above). The social and economic implications of these three age groups and the geographical variations in their distribution are worthy of serious consideration (Clarke, 1972).

Key Words: Age structure, Young or Dependents, Adult or Working, Old or Dependents,

Introduction:

The study of population characteristic is one of the most important topics in the geographical analysis of any region. The size of working force depends upon a variety of demographic, social and economic factors. Age structures are one of the most basic characteristics of a population and have great importance in population studies. The age structure of population is considered as one of the basic demographic characteristics of population. The population of any region categories into various age group help in comparisons in their distribution.

The age structure of different populations is usually compared with reference to three broad age groups: (i) Young or Dependents (0 to 14 years), (ii) Adult or Working (15 to 59 years), and (iii) Old or Dependents (60 years and above). The social and economic implications of these three age groups and the geographical variations in their distribution are worthy of serious consideration (Clarke, 1972).

Study Area:

Jalgaon District is located in the Western part of Indian peninsula and Northern side of Maharashtra State. District of Khandesh was divided into two districts in 1906, called West Khandesh and East Khandesh with headquarters at Dhulia and Jalgaon district respectively. After the formation of the Maharashtra State in 1960 the two districts are named after their headquarters as Dhulia and Jalgaon. Jalgaon district is known to the world, for its Gold market. Banana production, Cotton cultivation and emerging industrial and educational hub for the region. Cotton and Banana are the staple crops of the district. Jalgaon District lying between 20° And 21° North Latitude And 74° 55' And 76° 28' East Longitude.



Area of the Jalgaon district is 11765 Sq. km. and administratively it has 15 Tahsils. As per Census 2001 it had 36,79,936 total population. Out of which Muslim population is 4,55,288. This forms the 12.37% to the total population of the Jalgaon District. The total population of Maharashtra is 9,68,78,627, which has 1,02,70,485 population of Muslims in Maharashtra. The ratio of Muslim Population to total population of Maharashtra is 10.6%. The total population of India is 1,02,86,10,328 out of it total Muslim population of is 13,81,88,240, which is the 13.4% to the population of India.

Aim & Objective:

The aim and objective of this research paper is

- 1) To study the age structure of rural Muslim population in Jalgaon district.
- 2) To study the Caste wise age structure of rural Muslim population in Jalgaon district.

Research Methodology:

A per Census 2001, out of total 1491 inhabited Villages of Jalgaon District, 118 villages (12.64% Villages) having predominant Muslim population were selected for the primary data collection. The primary data was collected by door to door interview



technique with the help of standard questionnaire. The primary data was collected by using random sampling method. 20% Muslim households were randomly surveyed in the rural areas of selected village of Jalgaon district. After collection of primary data, it was processed, tabulated and compiled then same has been cartographic represented by techniques.



Hypothesis:

The following hypotheses are employed of this research paper.

- 1) Adult population is more in number than Juvenile and Senile rural Muslim population of Jalgaon district.
- 2) Caste wise age structure of Adult population is more in number than Juvenile and Senile rural Muslim population of Jalgaon district.

Results and Discussion:

A) Age Structure of Rural Muslim Population of Jalgaon District:

There is difference between age structure of rural Muslim population and in urban Muslim population. In Jalgaon District, rural Muslim population had average 39.85% Juvenile, 54.96% Adults and 5.19% Senile population (Table 1).

Tabail	Total	0-14	% of	15-59	% of	60+	% of
1 alisti	Population	Juvenile	Juvenile	Adult	Adults	Senile	Adults
Chopda	408	139	34.07	256	62.75	13	3.19
Yawal	537	250	46.55	267	49.72	20	3.72
Raver	737	320	43.42	381	51.7	36	4.88
Muktainagar	522	236	45.21	265	50.77	21	4.02
Bodvad	533	240	45.03	269	50.47	24	4.5
Bhusawal	403	161	39.95	219	54.34	23	5.71
Jalgaon	1033	340	32.91	606	58.66	87	8.42
Erandol	436	186	42.66	241	55.28	9	2.06
Dharangaon	286	115	40.21	158	55.24	13	4.55
Amalner	231	104	45.02	119	51.52	8	3.46
Parola	334	139	41.62	181	54.19	14	4.19
Bhadgaon	614	258	42.02	328	53.42	28	4.56
Chalisgaon	786	338	43	413	52.54	35	4.45
Pachora	792	291	36.74	457	57.7	44	5.56
Jamner	1564	556	35.55	905	57.86	103	6.59
Total	9216	3673	39.85	5065	54.96	478	5.19

Table 1	Age Structure	of Rural Muslims	in Ialgaon	District- 2013
I abic I	Age Subcluie	of Rula Mushins	in Jaigaon	District - 2013

Source: Field Survey 2013

The highest percentage of rural Muslim Juvenile population, in comparison to average of the District, 46.55% in Yawal tahsil, and the lowest in Jalgaon tahsil (32.91%). The highest percentage of rural Adult Muslim population, in comparison to average of the District, 62.75% in Chopda tahsil, and the lowest in Yawal tahsil (49.72%). The highest percentage of rural Muslim Senile population, in comparison to average of the District, 8.42% in Jalgaon tahsil, and the lowest in Erandol tahsil (2.06%).

B) Caste wise Age Structure of Rural Muslim Population of Jalgaon District:

Age structure is different the Muslim amongst community. Every caste among the Muslim community is at the different stages of socioeconomic development. Muslim population was surveyed in sample villages of Jalgaon District; it had 39.85% Juvenile population, 54.96% Adult and 5.19% Senile (Table 2).



The highest percentage of Juvenile Rural Muslim population, in comparison to average of the District, 46.01% in Mujavar caste, and the lowest in Momin caste (35%). The highest percentage of Adult RuralMuslim population, in comparison to average of the District, 58% in Momin Caste, and the lowest in Mujavar caste (49.81%). The highest percentage of Senile Muslim population, in comparison to average of the District, 8.89% in Beldar caste, and the lowest in Qureshi caste (4.13%).

Casta	Total	0-14	% of	15-59	% of	60+	% of
Caste	Population	Juvenile	Juvenile	Adult	Adult	Senile	Senile
Open Category	2381	929	39.02	1321	55.48	131	5.50
Maniyaar	1373	545	39.69	767	55.86	61	4.44
Khatik	802	324	40.40	435	54.24	43	5.36
Qureshi	727	298	40.99	399	54.88	30	4.13
Bagwan	693	266	38.38	397	57.29	30	4.33
Tadvi	664	267	40.21	366	55.12	31	4.67
Chhaperband	657	285	43.38	333	50.68	39	5.94
Pinjari	710	288	40.56	383	53.94	39	5.49
Beldar	315	111	35.24	176	55.87	28	8.89
Patwe	290	112	38.62	165	56.90	13	4.48
Mujavar	263	121	46.01	131	49.81	11	4.18
Momin	200	70	35.00	116	58.00	14	7.00
Sikalgar	141	57	40.43	76	53.90	8	5.67
Total	9216	3673	39.85	5065	54.96	478	5.19

 Table 2
 Caste wise Age Structure of Rural Muslims in Jalgaon District -2013

Source: Field Survey 2013

Conclusion:

Age composition structure gives description of age wise population. The Age composition structure of any population is support for social relations within a community. In Rural areas of Jalgaon districtadult Muslim population is more in number than Juvenile and Senile rural population. Caste wise age structure of Adult population is also more in number than theJuvenile and Senile rural Muslim population of Jalgaon district. Age composition structure is also helpful for the many types of government planning, especially for services and labor supply.

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Evaluation of Water and Soil Quality of Village Pond for Rural Development

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ABSTRACT

The study was conducted to evaluate the physico-chemical parameters of water and soil of a freshwater village pond of Magdalla, Surat District of Gujarat in India in relation to their potential for rural development. Early morning water samples were collected and analyzed for temperature, pH, total dissolved solids (TDS), total hardness (TH), calcium hardness, magnesium hardness, total alkalinity, dissolved oxygen (DO), biological oxygen demand (BOD), chloride, phosphate, silicate, nitrate, nitrite and ammonical nitrogen. Similarly soil sample were collected and analyzed for moister content, pH, organic matter, nitrate and available phosphorous. The values of physico-chemical parameters of water during the study period were observed for temperature $(25.833 \pm 3.512^{\circ}C)$, pH (8.167±0.414), total dissolved solid (380.417±124.799 mg/L), total hardness (139.667±18.932 mg/L), calcium hardness (89.823±10.535 mg/L), magnesium hardness (12.163±3.527 mg/L), total alkalinity (172.667±42.128 mg/L), dissolved oxygen (3.371±1.530 mg/L), biochemical oxygen demand (2.500±1.035 mg/L), chloride (99.400±26.393 mg/L), phosphate (0.231±0.129 mg/L), silicate (0.180±0.071 mg/L), nitrate (2.921±2.728 mg/L), nitrite (0.017±0.027 mg/L), and ammonical nitrogen (0.021±0.006 mg/L). Average values for soil sample were as moister content (34.106±3.928 (8.667±0.227), matter $(0.877 \pm 0.537),$ %), pН organic nitrate (2.826±1.763mg/100g) and available phosphorous (7.772±3.284 mg/100g). Results obtained from the study suggested that village pond may be used for rural development by developing fish culture.

Keywords- Physico-chemical parameters, fish culture, village pond.

INTRODUCTION

Water is one of the most valuable component on the earth. Village ponds provide excellent source of water for various domestic purposes and it may also use for rural development by developing fish culture. Water and soil plays an important role in productivity of village pond. In rural areas of India, the village ponds are not only legacy but are also associated with rural culture. Tremendous potential exists in India to augment fish production by developing and using village ponds for which water quality play important role. Pond water quality is dependent on different land use in agriculture and village life and catchment environments. These water bodies differ greatly in origin and in morphological conditions such as surface area, depth and volume, and natural and anthrophogenically altered ponds experience different precipitation, insolation, water temperature and catchment nutrient inflow so quality of water and soil also differ (Wiliams *et al.*, 2008). Fresh water from these small water bodies have become a rare commodity due to over exploitation and pollution (Ghosh and Basu, 1968; Patil and Tijare, 2001; Singh and Mathur, 2005; and Gupta and Shukla, 2006) hence its analysis needed.

Water quality gives idea about the concentration of various components at a given area and at a time (Lloyd, 1992). The nature and composition of pond soil play important role in the fertility of ponds and consequently on the growth of fishes (Kumar *et al.*, 2012).

The present work aims in assessing the physico-chemical properties of water and soil of a freshwater village pond of Magdalla, Surat District of Gujarat in India in relation to rural development by developing fish culture.

MATERIALS AND METHODS

Water samples were collected in acid washed polythene bottles. Simultaneously, soil samples were collected in polythene bags during morning hours between 7.00 a.m. to 9.00 a.m.

For Dissolved Oxygen samples were collected and fixed at the site. Water temperature and pH were recorded at the sampling locations. Both samples were brought immediately to laboratory of Department of Aquatic Biology, Veer Narmad South Gujarat University and analyzed for important physico-chemical parameter for fish culture (water temperature, turbidity, total solids, total dissolved solids, total suspended solids, pH, total hardness, calcium hardness, magnesium hardness, total alkalinity, dissolved oxygen, biological oxygen demand, chloride, phosphate, silicate, nitrate, nitrite and ammonical nitrogen etc. following standard methods of APHA, (2005), Trivedi and Goel, (1986), and Gupta, (1999). Similarly significant physico-chemical parameters of soil viz., pH, moister content, carbon, organic matter, available phosphorous and available nitrogen were also analyzed as per as APHA, (2005) and Trivedi and Goel, (1986).

RESULTS AND DISCUSSION

Values of water and soil parameters recorded during the study period are depicted in table 1 and table 2 respectively. The values of physico-chemical parameters of water during the study period were observed for temperature (25.833±3.512°C), pH (8.167±0.414), total dissolved solid (380.417±124.799 mg/L), total hardness (139.667±18.932 mg/L), calcium hardness $(89.823\pm10.535 \text{ mg/L})$, magnesium hardness $(12.163\pm3.527 \text{ mg/L})$, total alkalinity (172.667±42.128 mg/L), dissolved oxygen (3.371±1.530 mg/L), biochemical oxygen demand (2.500±1.035 mg/L), chloride (99.400±26.393 mg/L), phosphate (0.231±0.129 mg/L), silicate (0.180±0.071 mg/L), nitrate (2.921±2.728 mg/L), nitrite (0.017±0.027 mg/L), and ammonical nitrogen (0.021±0.006 mg/l). Average values for soil sample were as moister content (34.106±3.928 %), pН (8.667±0.227), organic matter $(0.877 \pm 0.537),$ nitrate (2.826±1.763mg/100g) and available phosphorous (7.772±3.284 mg/100g).

S.N.	Parameter	Min. value	Max. value	AV	SD
1	Water temperature (°C)	19	30	25.833	3.512
2	Turbidity (NTU)	1	82.2	18.620	22.702
3	Total solids (mg/L)	240	730	461.100	233.262
4	Total dissolved solids (mg/L)	200	590	380.417	124.799
5	Total suspended solids (mg/L)	10	170	67.600	52.514
6	pH	7.2	8.5	8.167	0.414
7	Total hardness (mg/L)	114	166	139.667	18.932
8	Calcium hardness (mg/L)	73.98	103.99	89.823	10.535
9	Magnesium (mg/L)	7.81	18.55	12.163	3.527
10	Total alkalinity (mg/L)	130	264	172.667	42.128
11	Dissolved oxygen (mg/L)	1.21	6.48	3.371	1.530
12	Biochemical oxygen demand	0.81	4.05	2.500	1.035
13	Chloride (mg/L)	63.9	142	99.400	26.393
14	Phosphate (mg/L)	0.072	0.395	0.231	0.129
15	Silicate (mg/L)	0.049	0.282	0.180	0.071
16	Nitrate (mg/L)	0.669	9.69	2.921	2.728
17	Nitrite (mg/L)	0.004	0.10	0.017	0.027
18	Ammonical nitrogen (mg/L)	0.0	0.098	0.023	0.034

 Table 1. Water quality of Magdalla village pond

TDS-Total dissolved solids, TH-Total hardness, TA-Total alkalinity, DO-Dissolved oxygen, BOD-Biological oxygen demand

Table 2. Soil quality of Vesu village pond

S.N.	Parameter	Min. value	Max. value	AV	SD
1	Moister content (%)	29.161	41.327	34.106	3.928
2	рН	8.3	9.0	8.667	0.227
3	Organic matter (%)	0.075	0.98	0.508	0.312
4	Nitrate (mg/100gm)	0.129	1.69	0.877	0.537
5	Available phosphorous (mg/100gm)	3.06	16.28	7.772	3.284

The water quality parameters of village pond was compared with the standard for fish culture (Boyd 1998, and Devi & Bhatnagar, 2013). Similarly soil parameters were compared with the details given by Nath (1986). Similar studies of different village ponds of Surat area have been done by Ekhalak Ansari *et al.*, 2015; Mohini *et al.*, 2014; Gadhia *et al.*, 2014; and Ansari *et al.*, 2013). Almost all the parameters of water and soil within the limit. Fluctuations in the some physico-chemical parameters of water and soil exist but these would not impact the suitability of the village ponds for rural development. The village pond of Magdalla may be used for fisheries development, with continuous monitoring of physico-chemical parameters of water and soil.

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The Role of Internet Technology based Agriculture in development of Environment

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<u>ABSTRACT</u> :

Easier access to computers, the modernization of countries around the world and an increase in utilization of smartphones, tabs, Internet of Things, laptops and computers, has created large number of opportunities to people to use the internet more frequently and more conveniently specially, in rural areas.

Agriculture is a backbone and a main income source of the Indian rural people. Around 70% population of India resides in rural area. Indian economy is also known as rural economy which is dominated by agricultural sectors.

In the era of ICT the concept of agriculture is changing. The main aim behind this study is to explore the role of e-technology touched agriculture in the development of environment. Also to think, how to transfer facilities in urban areas to rural areas for helping agriculture by spreading knowledge of e-farming, and suggesting the remedies for the agriculture based environmental development..

Key Words : ICT, IoT,

1] INTRODUCTION :

Today, traditional communication system is replaced by internet based communication system where, smartphones, tabs, Internet of Things, laptops and computers, has created large number of opportunities to people resides specially in urban areas. Internet is helping large number of people by benefitting in different ways.

As mentioned in the report, 'Internet in India 2015', released by the Internet and Mobile Association of India (IAMAI) and (IMRB) International, India will have the world's second largest Internet user base by December, 2015 overtaking the US internet user base. - ^[1] Report by Radhika P. Nair,18 November,2015.

^[1]According to the report (in India) –

User base has increased as compared to last year (2014)	49%
Mobile Internet user base grew in urban India (Oct.2015)	65%
Users access the Internet through mobile phones in Urban India. (Oct.2015)	94%
Users access the Internet through desktop or laptop. (Oct.2015)	64%
Users accessed Internet. (mobile is responsible for this growth) (Oct.2015)	317 million
Internet users by December 2015	402 million
In Rural India, the mobile Internet user base is expected to reach by December 2015	87 million
In Rural India, the mobile Internet user base is expected to reach by June 2016	109 million

"In the next five years, (2016-2020) the country will have full-fledged mobile platforms, and ideal laboratory for new innovations, because India is a young country and smart phones are getting more powerful with each passing day.".... By Mr. Vijay Shekhar Sharma, Founder and CEO of mobile wallet and e-commerce company, Paytm, in his exclusive thought leadership article in the Tech Sparks 2015 Report – "Tech for a Billion^[2]

Figures Graph **Statistic** (in million) Rural Narrowband Narrowband subscribers subscribers 81.35 10% 5% subscribers Broadband Broadband 412.60 Urban subscribers subscribers subscribers 24% 28% Wired subscribers 21.24 Wireless Wireless subscribers 472.72 Wired subscribers subscribers 32% 1% Urban subscribers 348.13 Source : https://en.wikipedia.org/wiki/Internet in India Rural subscribers 145.83

^[3]The following table provides an overview of internet subscriber statistics in India as on 31 March 2018.

Above table provides an overview of internet subscriber statistics in India as on 31 March 2018. It can be seen that the urban subscribers are three times more than rural subscribers. There is considerable impact of internet and mobile technology on agriculture and environment development.

With the help of **E-technology based Agriculture the** farmers can be link to research centres, e-governance policies, market, buyers & sellers, customers etc. E-technology is providing information regarding inputs, practices, weather forecast and crop market prices. The social medias and websites that includes Facebook, Twitter, Google+, Whatsapp, Linkedin, Flickr, etc. can be used to spread, innovative information that can be used for environmental development.

The problems, farmers are facing in rural areas :

- Poor connectivity
- Computer and internet illiteracy
- Ignorant towards learning e-technology effects on environment.
- Faith in traditional techniques and knowledge.
- Rich farmers using technology and are further prospering, but the small farmers are being left out in the process of development.
- Lack of uniformity of in infrastructure for the use of ICT in rural area.

The government, in different ways, showing positive responses by providing e-governance facilities for the development of agriculture and environment.

^[1] Following	are	the	ICT	measures	taken	by	Central	/ State	governments	and	private
organisation	s for	agr	icultu	re develop	oment ^{[3}	³]_					

ICT medias &	Functions
Centres	
ITC- e-choupal	With the help of ICT shows technical videos, movies etc. to farmers to
	increase their awareness on cropping practices.
Kisan Call centre	An expert advisory system for farmers to seek expert advice on different
	agriculture related problems.
Kisan SMS Portal	Provides information regarding marketing of produce, weather forecast,
	soil testing, etc., and advises on mobile from experts, scientists and
	officers through SMS messages. It also includes crop production,
	including horticulture, animal husbandry, dairying and fisheries etc.
	related information.
The Sandesh Pathak	The App enables SMS messages to be read out loudly, for the benefit of
application	farmers who may have reading difficulties.
e-krishi	It helps farmers to provide information which increases the productivity,
(E-Agriculture)	help them to get information of better market prices.
	Management of soil, water, seed, fertilizer, pest, harvest and post-harvest
	are the important components of e-Agriculture. It uses a host of
	technologies like remote sensing, computer simulation, assessment of
	speed and direction of wind, soil quality assays, crop yield predictions and
	marketing etc.
Irrigate via smart	Mobile plays a vital role in monitoring and controlling crop irrigation
phone:	systems. With the right equipment a farmers can control their irrigation
	systems from a phone or computer instead of driving to each
	field. Moisture sensors situated in the ground communicates the
	information about level of the moisture present at the certain depth of the
	soil. This gives more precise control of water and fertilizer applied by
	irrigation pivot.

^[1]Following are the E-Governance policies providing different aid to farmers :

 National Policy for Farmers, 2007 : It provides important provisions for use of Technology such as - enhance productivity of land and water needed, biotechnology, information and communication technology, renewable energy technology, space applications and nano-technology provides opportunities for launching an "Evergreen Revolution" capable of improving productivity in perpetuity without harming the atmospheric gases level.

- National Telecom policy, 2012 : Spreads focus on improving the broadband penetration.
- Bharat Nirman Kendras : It is being used to provide 'm' service to farmers, giving them
 right information at right time. For farm credit, service of ICT is being attached like
 Smart Cards, Internet Kiosks and cell phone messaging, and also disbursement of all
 social security benefits through electronic benefit transfer to all rural areas.
- **Mobile-enabled kisan card system** : Helps the agricultural community to get engage in cashless transactions.
- Kisan credit card : Started by the <u>Government of India</u>, <u>Reserve Bank of India</u> (RBI), and <u>National Bank for Agriculture and Rural Development</u> (NABARD) in 1998-99. It help farmers to access timely and adequate credit. Repayment can be rescheduled if there is a bad crop season, and extensions are offered for up to four years.

2] LITERATURE REVIEW :

For the said research, following literature is reviewed to collect required information.

Through exchanging the knowledge from different agriculturally developed individuals and nations, improvement of techniques and advancement of this sector can be achieved. ICT supports methods like computerized farm machinery that applies for fertilizers and pesticides, electronic sensors and identification systems to fed and monitor animals, selling or buying farm products online etc. ^[1]

- The digital payments apps are increasing in numbers. Paytm, PhonePe, Mobikwik, Google Pay, PayPal and Razorpay and others have to fight for a tiny share. Farming related payments can be settled down with the help of these apps. ^[3]

- The last decade has seen information communication technologies (ICT) dramatically transforming the world, enabling innovation and productivity increases, connecting people and communities, and improving standards of living and opportunities across the globe. It is an important instrument for bridging economic and social divides and reducing poverty. ^[4]

3] RESEARCH METHODOLOGY :

A Research is, "A process of investigation, experimentation, testing, exploration analysis, factfinding, examination, groundwork, scrutinization, probing etc. ... *Source - Little Oxford English Dictionary*.

A questionnaire survey method was adopted for collecting research data, The data collected from 100 numbers belonging to rural population. It includes farmers and other farming related people and businesses. The analysis was done and graphs & tables were generated using MS-Excel.

4] ANALYSIS :

TABLE 1 : For what purpose do you use Internet Technology ?							
		%					
Valid	Providing internet security land, animals and property	1.33					
	Buying and selling agricultural products						
	Getting knowledge about climate, atmosphere and farming techniques						
	Reduce paper utilization (save trees, save environment)	13.33					
	Save transportation cost	20.00					
	Online communication (e-mail, conferencing etc.)	52.00					
	Total	100					





Purpose of using internet technology

The above graph shows the purpose of using Internet technology. The respondent with highest percentage i.e. 52% agreed that, they use e-technology for 'Online communication (e-mail, conferencing etc.)', 20% use to 'Save transportation cost', 13.3% for reduce paper utilization, save trees and save environment through EDI and EFT, 12% for 'Getting knowledge about climate, atmosphere and farming techniques (e-learning)', and 1.3% for 'Buying and selling agricultural products' and for 'Providing internet security land, animals and property.'

TABLE : 2 – Are the following issues related to internet technology areharmful for the environment?							
	CO ₂ emission	e-garbage Pollution	Global warming	Harmful signals	Extra Electricity usage		
Always	53	67	64	52	65		
Rarely	23	7	8	16	9		
Never	24	27	28	32	26		



The above graph shows the analysis of emerging issues related to internet technology are harmful for the environment. For answering questions, three options like 'Always', 'Rarely' and 'Never' were used.

- In case of ' CO_2 emission', 53 respondents selected 'Always' option, 23 respondents selected 'Rarely' option, while 24 respondents selected 'Never' option.

- In case of '**e-garbage Pollution**', 67 respondents selected 'Always' option, 7 respondents selected 'Rarely' option, while 27 respondents selected 'Never' option.

- In case of '**Global warming**', 64 respondents selected 'Always' option, 8 respondents selected 'Rarely' option, while 28 respondents selected 'Never' option.

- In case of '**Harmful signals**', 52 respondents selected 'Always' option, 16 respondents selected 'Rarely' option, while 32 respondents selected 'Never' option.

- In case of '**Extra Electricity usage**', 65 respondents selected 'Always' option, 9 respondents selected 'Rarely' option, while 26 respondents selected 'Never' option.

5] CONCLUSIONS AND SUGGESTIONS :

On the basis of literature reviewed and surveyed data following Conclusion and suggestions are made.

CONCLUSIONS :

- ICT is helping farmers through sending SMS messages, that provides information and advises on mobile from experts, scientists, about produce, weather forecast, soil testing, etc. It also includes crop production, including horticulture, animal husbandry, dairying and fisheries etc. related information.
- Different government bodies and companies are working jointly for helping farmers to have better access to information which increases the productivity, help them to get better prices through providing information of change in market prices, agriculture, national and international markets, increasing production efficiency and creating a conducive policy environment that can result into beneficial outcomes of e-Agriculture which enhance quality of life of farmers.

- ICT is providing information related to Agriculture/horticulture, Fisheries, Live stock, Water resources, Tele health care, Awareness programmes, Women empowerment, Supplementary education, Computer literacy, Micro credit, Micro finance, Skill development / vocational training for farmers.
- Mobile phones are playing important role in monitoring and controlling crop irrigation systems.
- The ICT tools can change the ideas, activities and knowledge of the farmers. Farmers feel empowered and can adopt appropriate measures at the time of need.

As per the analysis, following conclusions are made -

- The highest percentage i.e. 52% shows that the greater number of surveyed population use internet technology for 'Online communication (e-mail, conferencing etc.)' in the study area. The percentage for 'Buying and selling agricultural products' and for 'Providing internet security to land, animals and property.' is very low i.e. 1.3% each.
- Further, 53 number, shows that the greater number of respondents have raised the question regarding the **Emission of carbon di oxide** due to working of crore of machines for accessing internet. This is unbalancing atmospheric gases level.
- The highest percentage i.e. 67 shows that the greater number of respondent, raised the questions regarding **pollution caused by e-garbage**, 7 respondents selected 'rarely' option, registered rarely occurrence of pollution because of e-garbage while the 27 numbers have registered 'Never' option having less knowledge regarding e-garbage.
- The highest number i.e. 64 shows that the greater number of respondent, raised the questions regarding **occurrence of Global warming**. 8 respondents selected 'Rarely' option, while the 28 respondents were selected 'Never' option for the occurance of 'Global warming' option.
- The highest number i.e. 52 shows that the greater number of respondent have admitted that internet **produces harmful signals in the atmosphere**. 16 respondents selected 'Rarely' option, while 32 respondents have registered 'Never' option for the presence of harmful signals in the atmosphere due to internet.
- The highest number i.e. 65 shows that the greater number of respondent have complaint 'Extra Electricity usage' due to usage of internet and hardware devices. 9 respondents selected 'Rarely' option, while 26 have registered 'Never' option for the utilization of 'Extra Electricity usage'

SUGGESTIONS :

- Technology is fundamentally changing the way we live, work, relate to one another and to the external world. The E-technology has potential to transform environmental protection. Today as our civilization faces a new unprecedented challenge, technology can play a crucial role in decoupling development and environmental degradation. ^[6]

Technology can transform how we identify, measure, track and value the many services and resources nature provides us with.

- The satellite can be used as a cost-effective GPS tracking devices to 'see' and understand global fishing and global vessel traffic.
- On land as well, remote sensing plays an important role in planning, monitoring, and evaluating impact on the ground. It has enabled WWF to monitor the developments of extractive industries in socially and ecologically-sensitive areas, including World Heritage sites.
- Environmental problems like; CO₂ emission, pollution, global warming etc. because of heat produced by computers and other peripherals, can be controlled by switching off the devices when not in use, and by providing electricity connections with proper earthing.
- By having the necessary information concerning agricultural activities, farmers can adopt ICT based modern methods, for the production of local crops.
- The knowledge of modern agriculture can be acquired through various websites and from various countries through internet can help farmers to be more aware of factors to consider before making their decisions.
- ICT had the potential to transform agriculture into a better prospect in the wake of climate change and decrease in the cultivable land.
- It can be apply for bridging and linking Urban-Rural Divide through establishing elearning centers, and by transferring ICT facilities available in urban areas rural areas.
- The social medias can be used for strengthening rural governance, institutions and agricultural market, maintaining compatibility with global market, empowering small land holders and marginal farmers, administration and management of lands and extending the benefits for the development of agriculture etc..

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Conservation of Wild relatives of cultivated crops and sustainable development with reference toNagzira Wildlife Sanctuary,Gondia district, Maharashtra, India.

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Abstract

In India there are <u>c</u> 166 cultivated crop plants and c 320 wild relatives of cultivated plants. Among them <u>c</u> 250 spp. in India are having horticultural importance are distributed in different phytogeographical regions of India. Of which<u>c</u> 60 spp. are rare or endangered due to over exploitation in their natural habitats. Crop wild relatives are an important socio-economic resource that is leading with the sustainable development, these are the live gene bank.for the production of genetically modified plant of cultivated crop plants,The present study has revealed <u>c</u> 12 species of wild relatives of cultivated plants in the areas studied.

Key words :- Wildlife, cultivated, sanctuary, endangered.

INTRODUCTION

Plants have many and diverse uses which have direct or indirect bearing on the civilization of human society .India harbours over 45,000 species plants ($\underline{c}11$ percent of world's flora). This includes Bacteria and viruses (850 spp.), Algae (6,500 spp.), Fungi (14,500 spp.), Lichens (2,021 spp.), Bryophytes (2,850 spp.), Pteridophytes (1,200 spp.), Gymnosperms (48 spp.), and Angiosperms (17,500 spp.). Among them there are number of plants with botanical interest e.g. insectivorous ($\underline{c}41$ spp.), Orchids ($\underline{c}1087$ spp.) and Parasites ($\underline{c}135$ spp.).Because of this rich Biodiversity, India is recognized as one of the 12 mega diversity regions of the world (Kothari & Singh,1998;Singh&Singh,2002.).

The rich floristic diversity in India is not withstanding i.e. \underline{c} 1700 spp. of Indian flowering plants are threatened with extinction to-day (\underline{c} 7 percent of 26,106 globally threatened spp. are from India).During last 400 years \underline{c} 654 spp. have become extinct (WCMC, 1992). During past two centuries, India has lost about 17 spp. like *Sterculiakhasiana* and number of other spp. also could not be relocated due to natural (abiotic) and manmade (biotic) causes Therefore for *In-Situ* conservation of biological diversity under articles 8, India to-day has elaborated network of \underline{c} 578 protected areas covering an area of c 1,55,508.54 sq.km as including 13 Biosphere reserves, 89 National parks and 489 Wildlife Sanctuaries (Rodgers *et al.*, 2002)., This includes 5 national parks and 35 wildlife Sanctuaries in Maharashtra.

.However with unplaned use of these natural resourses by man and climate change the future resourses will be exhausted form the nature. The gene pool of wild relatives can be the future resourse for production of the new adaptive variety as well as high productive variety of crop through the plant breeding, to meet food requirement for the high population of man'
ABOUT THE STUDY AREA



Nagzira Wildlife Sanctuarty, Maharashtra , India

The wildlife sanctuary (BiogeographicalProvience 6D) was constituted as per the notification No. WLP/1669/22860/Y/dt.3/6/1970, covering an area *152.81 sq. km*. The Sanctuary is the miraculously preserved as 'Green Oasis' in the eastern most part of the Maharashtra State and has

a great importance from bio-diversity conservation point of view.

The name Nagzira Wildlife Sanctuary is basedon idol Nagdev and Nagziralake

Location: The sanctuary is situated in Sakolitahsil of Bhandara district and Arjuni (Sadak), Goregaon&Tirodatahsil of Gondia District (Maharastra State) under the Nagzira range at 790 58' E to 80 o 11'E longitude and 21 o12' N to 21 o 21' N latitude



Bio-geographic Zonation: -

As per the wildlife Institute of India, Dehradun, This Sanctuary is classified as follows :-

1)Bio-geographical Kingdom- Paleotopical.

2)Sub-Kingdom- Indomalyosian.

3) Bio-geographical Zone-6- Deccan peninsula.

4)Biotic Province -6B-Central Deccan.

The Bio-geographic zone is one of the least protected zone in India. Though rich in floral and faunal diversities. Hence it needs high degree of protection. The entire area [152.81 sq. km,old Reserved Forest] of this Sanctuary is covered by 4 Topo-sheets bearing numbers 55(0/15), 55(0/16), 64(C/3) & 64(C/4).

MATERIALS AND METHODS:

To study the floristic composition of the NagziraWildlife Sanctuary, plant exploration tours were arranged in different seasons during 2001 to 2008. Flowering and fruiting specimens were

collected. Field observations regarding habit, habitat, colour of the flowers, local names, relative abundance, associated plants etc. were noted. Close-up of flowering / fruiting material and habit along with associated plants were also photographed. Plants were processed in customary way and studied in the regional herbarium of Botanical Survey of India, Pune and deposited (*BSI*).

RESULT AND DISCUSSION

Wild relatives of cultivated plants: In India there are <u>c</u> 166 cultivated crop plants and c 320 wild relatives of cultivated plants. Among them c 250 spp. in India are having horticultural importance are distributed in different phytogeographical regions of India. Of which 60 spp. are rare or endangered due to over exploitation in their natural habitats (Singh & Kothari, 1996). The present study has revealed c 12 species of wild relatives of cultivated plants in the areas studied. These are Amorphophalluspaeoniifolius, Cajanusscarabaeoides, Canavaliaensiformis, Dioscoreabulbifera, Ensetesuperbum, Jasminummalabaricum Mucunapruriens, . Rauvolfiaserpentina, *Sphenostylisbracteatus* Thespesiapopulnea, Vignavexillata, Ziziphusoenoplia. Arora&Nayar (1983), Rao&Hajra (1986) joined that the wild relatives are also affected due to shifting cultivation and developmental programmes. According to Singh & Rethy (1995) "Agroforestry system" using native species as an alternative to Jhum or shifting cultivation, this will reduce pressure on land and loss of species in the area.

The faunistic diversity depends on rich floristic diversity. This inter dependence was emphasized by Gilbert (1980) that loss of a Keystone mutalist (typical plant) would cause loss of mobile links (animals) followed by link of dependent plants. A noted conservationist Myer (1984) also concludes that at least one species is disappearing each day in tropical forests alone and in a few more years there will be species loss each hour. The disappearing plant can take with it 10-30 dependent species such as insects, higher animals and even other plants (Jain & Sastry, 1980). Hence for future security of food for man and the fooder for domestic animal, it is esential to preserve plant diversity.

The most recent report by the Intergovernmental Panel on Climate change(IPCC) suggests that crop yield will decrease by an average of 2% per decade due to the negative impact of climate change, this worrying statistic is compounded by another equally concerning prediction that is increase in human population over the next 90 years will require global food production to

increase by up to 70% in order to ensure future food security. (Porter JR,XieL,ChallinorAJ,Cochrane K et al, 2014

List of some Wild-relative of Crop Plants

Sr.No.	Name of the plant and Family	Local Name
1	Amorphophalluspaeoniifolius(Dennst.)	SURAN
	Nicolson, ARACEAE	
2	Cajanusscarabaeoides(L.)du Petit-	RAN-TUR
	Thours. FABACEAE	
3	Canavaliaensiformis, (L.) DC.	JACK-BEAN
	FABACEAE	
4	Dioscoreabulbifera L.	AIR-POTATO
	DIOSCOREACEAE	
5	EnsetesuperbumRoxb.	WILD-BANANA
	MUSACEAE	
6	Jasminummalabaricum Wight.	WILD-JASMIN
	OLEACEAE	
7	Mucunapruriens L.DC.	'Khachkuiri'
	FABACEAE	
8	Rauvolfiaserpentine(L.) <u>Benth.exKur</u> z	
	APOCYNACEAE	
9		'Beans'
	Sphenostylisbractea (Baker) Gillate	
10	FABACEACE	(D. 1.1. 1')
10	Thespesiapopulnea(Cav.) Dalz.	'Ran-bhendi'
	&GIDS.	
	MALVACEAE	
11	Vignavexillata (L) A.Rich	
	FABACEAE	
12	Ziziphusoenoplia (L) Mill	'Bor'
	ZINZIBERACEAE	

ENVIRONMENTAL IMPACT

The vegetation of NawegaonNational Park and Nagzira Wildlife Sanctuaryis affected by number of biotic and abiotic factors.

Biotic factors : Biotic factors like 'overgrazing' by domestic and wild animals, indiscriminate illicit cutting of wood for fuel and building purpose, tourists and tourisum development to entertain thousands of visitors in the National Park and Wildlife Sactuary and plant collectors have affected the growth and development of the plant diversity. "Over-exploitation" of many economic plants like *Diospyrosmelanoxylon* (Tendu) for bidi leaves, *Madhucalongifolia* var. *latifolia* (Moha) for beverages, *Pongamiapinnata* (Karanj) and *Jatrophagossypifolia* for biodiesel and medicinal plants like *Rauvolfiaserpentina* (Sarpgandha), *Sterculiaurens* (Karu) for its gum etc. have affected the distribution of the rare species in the Sanctuary as well as other places

in Maharashtra and India. Because of this over-exploitation for commercial purpose, these species have become rare, threatened and species like *Sphenostylisbracteata* (Thapti-sheng) as vulnerable.

Abiotic factors: Abiotically, land slides due to heavy rainfall in the year 2002 and 2007 and forest-fire (natural as well as man-made) have resulted in the degradation of the floristic diversity. There are number of species recorded by earlier workers forest officials (Working plan of the National Park and Sanctuary) but could not be traced out. Perhaps these species havebecome rare, threatened or extinct due to abiotic as well as biotic factors. The greatest threat to the species in the present century is the habitat destruction of plant communities (Nayar, 1984).

DISCUSSION AND CONSERVATION

Discussion :Khoshoo (1991) has described 'Biological diversity' as a sum total of species including number of plants, animals and micro-organisms living in a Ecosystem. To protect the Flora and Fauna from the above mentioned biotic and abiotic factors, Govt. of India has taken certain steps such as ban on export of plants like *Rauvolfiaserpentina, Aconitum* spp., *Nardostachysgrandiflora* and beautiful orchids for commercial purposes under Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) which was organized in 1973 and activated in 1975.

To conserve plants in their natural habitat (*In situ conservation*) 13 biosphere reserves, 89 National parks and 489 Wildlife Sanctuaries including 5 National parks and 35 Wildlife Sanctuarirs (Area 14747.84 sq. km) in Maharashtra have been declared by Govt. of India. However, Batisse (1982) and Gadgil (1983) concluded that National parks and Wildlife Sanctuaries have not yielded the desired results and hence biosphere reserves are the only remedy for conservation. Sankhala (1991) has also observed that "National parks are in great pressure due to grazing, human population and illicit felling of trees. Same is true for the present National Park and Wildlife Sanctuary.

The faunistic diversity depends on rich floristic diversity. This inter dependence was emphasized by Gilbert (1980) stating that loss of a Keystone mutalist (typical plant) would cause loss of mobile links (animals) followed by link of dependent plants. A noted conservationist Myer (1984) also concluded that at least one species is disappearing each day in tropical forests alone and in a few more years there will be species loss each hour. The disappearing plant can take with it 10-30 dependent species such as insects, higher animals and even other plants (Jain &Sastry, 1980). Hence to preserve the animal diversity, it is essential to preserve plant diversity.

Conservation: Conservation of wild flora and fauna and their habitat is now receiving attention all over the world. Certain endangered taxa and plants with horticultural and medicinal value as well as animals like Tigers, Rhinos etc. need particular attention. To conserve them, 14 tiger reserves and 9 other tiger habitats including Nawegaon National Park &Nagzira Wildlife Santuary in Gondia District (Maharashtra) have been established in India by Indian Wildlife Board, National MAB Committee, Central and State forest depts., Botanical Survey of India(BSI) and Zoological Survey of India (ZSI) etc. contribute to these efforts (Jain &Sastry,

1983). To conserve such rare Floristic &Faunistic elements various international organizations are also active .e.g: IUCN, BGCS, WWF, CITES, CGCR, IABG, WCMC, TPU etc.

The NawegaonNational Park and Nagzira Wildlife Sanctuary are not only rich in Floristic diversity but also support carnivores like tigers, leopards, wild dogs etc. along with herbivores like Sambar, Gaur, barking deer etc. The area is an ornithologist's paradise with large lake adjacent to National park. There are about 209 species of water-birds (Dharankar, 1976). Therefore for effective conservation of biodiversity, under article –8, Govt.ofIndia has taken necessary action to elaborate network of 578 protected areas including 89 National parks (Area-37,534 sq. km.) and 489 Wildlife Sanctuaries (Area 1,17,974.53 sq.km.). In Maharashtra there are 5 National parks viz. Gugamal,*Nawegaon*,Pench, Sanjay Gandhi ,Tadoba and 35 wild life sanctuaries including Nagzira Wildlife Sanctuary (Singh & Singh, 2002). An account of two National Parks has been published in bookform (cf. Pradhan*et al.*,2005 ; (Malhotra&Moorthy, 1992.).

International Union for conservation of Nature & Natural Resources (IUCN) with the advice of co-operation & financial support of the United Nations, EnviornmentalProgramme (UNEP) and the World Wildlife Fund (WWF) has prepared a world conservation strategy on 5 March 1980 with 3 main objectives viz.1) Maintenance of essential ecological processes and life- support systems; 2) Preservation of Genetic Diversity and 3) Sustainable utilization of species and ecosystems . Through the efforts of IUCN, The Indian Wildlife (Protection) Act 1972 has also further been amended to include plants for their conservation.

Thus, to save the biodiversity of the NawegaonNational park and Nagzira Wildlife Sanctuary from above mentioned threats (biotic and abiotic) it is our moral duty to create awareness among the common people through all medias (Radio, Television, News papers),flower shows etc.starting from children education .To stop destruction of the above mentioned biological wealth,frequent seminars in regional and accepted national languages regarding conservation should also be organised for constant hammering among the intellectual people in particular and masses in general For conservation and awareness, Botanical Survey of India has published 4 volumes of the *Red Data books of Indian plants* (Singh & Singh, 2002).

Crop domestication and improvement can be described as a process of successive rounds of selection that ultimately result in the isolation of genetic diversity valuable to agriculture from ancestral wild species (Ross-Ibarra et al. 2007)

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Pattern of Sex Ratio of Dode Gurjar community of Jalgaon district of Maharashtra (India)

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ABSTRACT:-

Human population is studied within different areas of knowledge but demography is directly related to it. There are various elements studied in demography. But birth rate, death rate, migration and age-sex structure are known as major demographic processes while other elements are studied within their preview. Now- a-days the number of females per 1000 males decreasing in many parts of India. It also varies with Religion to religion and community to community.

In Gurjar community of Jalgaon district of Maharashtra, sex ratio and Child sex ratio both are decreasing alarmingly even though there is no dowry system in Gurjars and even though the marriage expenditure is the responsibility of males. The low sex ratio can create many social problems in future. It may be due to pre-natal sex determination and sex selective abortions, and there is strong social or psychological pressure to have a son (son preference attitude) in the family due to certain social customs & compulsions.

This paper is devoted mainly to a discussion of the Literacy Rate and Sex Ratio of Dode Gurjar community of Jalgaon district of Maharashtra.

Key words: - Sex Ratio, Gurjar Community

Introduction:- Gurjars reside in all the districts of Khandesh i.e. Jalgaon, Dhule and Nandurbar. In different parts of Khandesh different subclasses of Gurjars inhabit. Which includes Dode, Leva, Dale, Kadwa, Gahiri, Londhare, Khapra, Surywanshi, Badgurjar etc. This study focused on only Dode Gurjars in Jalgaon district, Dode Gurjar community is selected for the present study from many sub caste of gurjars in the district.

In Khandesh there are total 123 villages of Dode Gurjar community. Dode Gurjars in Khandesh are dominantly distributed in Jalgaon district Out of 123 total villages of gurjars in Khandesh, 95 villages are located in Jalgaon district.. Gurjars have been scattered in the most of the tahsil like Chopda, Dharangaon, Jalgaon, Jamner, Erandol, Yawal, Raver and Muktainagar. But in the tahsil like Chopda, Jalgaon, Dharangaon, the Gurjar population and number of villages dominated by gurjars are more.

This study has a great importance because the scientific research on Dode Gurjars of Jalgaon district has not been done by anybody ever before.

Database and methodology

• The study is mainly based on primary data. Out of the 95 villages of Dode Gurjar community in the district. The statistical data was collected from 65 sample villages in the year 2013. Sample 65 villages are selected randomly on various bases to represent each and every element regarding the study.

- Statistical data & information are mainly collected by **Schedule cum questionnaire method**. from 1941 families in 65 villages.
- As it is a micro-regional analysis it is desirable to work it out with smaller geographical units. Hence villages were considered and the study has been computed on village basis and some time on tahsil basis and some time on an average of 65 villages. Simple methods are used for the analysis of the data and for the presentation of demographical data.

Study Area:- Jalgaon district of Khandesh situated in ranges of Satpuda and Ajanta. It has been made fertile and prosperous by the Tapi and its tributaries.

Location & Extension of the district

Jalgaon District is located in the north–west region of the state of Maharashtra .It lies between $20^{\circ} \& 21^{\circ}$ north latitude and $74^{\circ} 55^{\circ} \& 76^{\circ} 28$ East longitude. It forms an upland basin, but together with Dhule District, it is Distinguished from the rest of the upland Districts, by Westward aspect. While the rest of the district are Drained to the East.



MAP NO.1 INDEX MAP OF STUDY AREA

LOCATION MAP OF JALGAON DISTRICT

Jalgaon district has an area of 11765 sq. km. Constituting 3.82 Percent of the total area of the state and has a population of 36, 79,936 the density of Population 313 Person's per sq.km. This is slightly higher than the state averages

RATIONALS

- About Topic:-Scientific research on Dode Gurjars of Khandesh has not been done by anybody ever before.
- The impact of any community's custom, traditions and way of life, reflects on the demographic aspects of the community, so the caste wise study of population is more effective than regional study as a whole.
- > It will guide and help to make healthy development of the community,

Objectives of the study-

To analyze and compare the Sex Ratio and Child Sex Ratio of Dode Gurjar community of Jalgaon district of Maharashtra.

Scope of the study-

- > The geographical area of the study has been limited to only Jalgaon district.
- Dode Gurjar community in selected for the present study from many sub caste of gurjars in the district.
- The relevant data has been collected from selected 65 villages of Dode Gurjars from 10 tahsils.
- > The focus of the study is 'Sex Ratio' of Dode Gurjar community of Jalgaon district.

Map No.2 Political Setup of Jalgaon District



Map No.3 Jalgaon District: Physical



Results and Discussions:-

Among the various elements of population, sex composition, age composition & economic composition hold a prime place in the study of population. The separate data for males and females are important for various types of planning and for the analysis of other demographic characteristics such as natality, mortality, migration, marital status, economic characteristics

etc. The imbalance between two sexes affects the social and economic relationship within a community. Because two sexes play partly contrasting & partly complementary roles in the economy and society

SEX COMPOSITION

The numerical measurement of sex composition of a population is often expressed in terms of sex ratio. This ratio is calculated differently in different countries. In India the sex ratio is calculated in terms of number of females per thousand males. It is calculated as under –

PfSex ratio = --- x 1000
Pm

Where: PF represent number of Females and Pm of males. Average Sex Ratio of Gurjar Community

> Total no. of Female Sex Ratio = \dots X 1000 Total no. of male 4881= \dots X 1000

> > 5760

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= 847
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Comparative Figures of sex ratio

1) Gurjar community of Jalgaon District (2013)	847
3) Maharashtra *	925
4) India *	940
*Census of India2011	

Above table is reveals that:-

Sex ratio of Gurjars is too much lower than the State and National level.

- This is surprising thing about Gurjars as there is no dowry system in Gurjars and even the marriage expenses is the responsibility of brides.
- ➤ It may be due to pre-natal sex determination and sex selective abortions even it is banned bylaws.
- ➤ Another major reason of low sex ratio in Gurjars is that still in Gurjar community there is strong social or psychological pressure to have a son due to certain social customs & compulsions.
- Low sex ratio is an effect of out migration of people for various purposes also.

In future the problem of scarcity of girls will also be alarming because of very low sex ratio in Gurjars.

Name of the District	Name of the Tehsil	Total Gurjar Population in sample villages	Male Population	Female Population	General Sex Ratio
Jalgaon	Amalner	323	183	140	765
_	Bhusawal	273	141	132	936
	Chopda	3826	2068	1758	850
	Dharangaon	2308	1262	1046	829
	Jalgaon	1793	952	841	883
	Jamner	346	193	153	793
	Muktainagar	104	60	44	733
	Pachora	237	129	108	837
	Raver	692	381	311	816
	Yawal	717	380	337	887
	District Total	10641	5760	4881	847

The parents in their old age depend upon their sons because there is a strong social prejudice against the parents living with their daughters. It is in this context, that the desire to have a son is strongest in Gurjar Community.

As discussed above decreasing numbers of Females in Gurjars can create major social problems. In Future the problem off scarcity of women will also be alarming because of very low child sex ratio in Gurjars.

Table No.1 Tehsil wise General Sex Ratio- Khandesh Gurjars Above table is reveals that:

- In most of the tehsils of the Khandesh districts the sex ratio of Gurjars is in between 800 to 900.
- Only in the tehsil of Bhusawal, the sex ratio is above 900, and it is equal or more than national average.



CHILD SEX RATIO

Child sex ratio is calculated as like the normal sex ratio, only difference is that the population of males and Females below 6 years is considered to calculate the child sex ratio.

Child Sex ratio = $\frac{PF(0-6)}{Pm(0-6)} \times 1000$ Where: PF represent number of Females in the age group of 0 to 6 and Pm of males in the age group of 0 to 6 335Child Sex ratio = $\frac{335}{519} \times 1000$ =645

Child sex ratio of Khandesh Gurjars is only 645.

It means that **645** girls of below 6 years per 1000 males of the same age groups. This is very serious social problem in Gurjar community.

Table No. 2:	Comparative	picture of	Child Sex	Ratio with	State and	National	average
	_	±					0

Sr. No.	Name of the District	Child Sex Ratio
1	Dode Gurjar in Jalgaon District (2013)	645
2	Maharashtra*	883
3	India*	914

* Census of India 2011

Above table show that –

- Child sex ratio of Gurjars is the lowest of all i.e. below 700
- > Child sex ratio of Maharashtra in India is around 900.
- As discussed above decreasing numbers of females in Gurjars can create major social problems. In Future the problem off scarcity of women will also be alarming because of very low child sex ratio in Gurjars.

Fable No.3:	Tehsil wise	Child Sex Ratio:	- In Gurjars	of Jalgaon District
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Name of the District	Name of the Tahsil.	Popu	lation of 0–0	Child Sex Ratio	
		Male	Female	Person	
	1)Amalner	11	09	20	818
1)Jalgaon	2)Bhusawal	12	03	15	250
	3)Chopda	204	123	327	603
	4)Dharangaon	102	62	164	608
	5)Jalgaon	88	59	147	670
	6)Jamner	20	13	33	650
	7)Muktainagar	13	07	20	538
	8)Pachora	07	14	21	2000
	9)Raver	33	26	59	788
	10)Yawal	29	19	48	655
1	District Total	519	335	854	645



Above table/Graph is reveals that:-

- > There is too much variation in the tehsil wise child sex ratio,
- ▶ It may be due to pre-natal sex determination and sex selective abortions.
- It may be due to the small size of the data. For short data the result can fluctuate from the mean value.
- But whatever the data got of child sex ratio is very alarming and surprising for demographers as well as for social leaders in the community.

Conclusion

- Sex ratio of Gurjars as compares to others is lowest of all.
- Another major reason for low sex ratio in Gurjars is that still in Gurjar community there is strong social or psychological pressure to have a son in the family due to certain social customs & compulsions.

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SOME COMMON ETHNOVETERINARY PLANTS IN PADMALAYA FOREST IN JALGAON. DISTRICT.

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Abstract : Wild plants play important role in human as well as animal health. The present study deals with the ethnoveterinary use of certain wild plant species. Many tribal communities like Bhil ,Pawra ,Tadvi , Vanjari utilized these plants as veterinary medicines to treat their animals . They use these plants to cure their cattle suffering from different diseases . Present paper deals with twenty different cattle disease and 15 plant species utilized by tribals and villagers of Padmalya forest area as ethnoveterinary medicine.

Key Words: Ethnoveterinary plants, Animal diseases, Tribals, padmalaya

Introduction : During ethnobotanical field trips in Padmalaya forests area the author came across a large number of tribal people ,Bhil , Pawra, Tadvi, Vanjari and local practitioner of veterinary medicines of villages who also using wild plants for remedies to cure their cattle suffering from different diseases also .The presented here have been collected by personal contacts in which informants were taken to the forest along with the identification and collection of plants uses of the plants were recorded.

Observations and Results :

In the following enumeration ,the plant species are arranged in alphabetical order ,their botanical names, family ,local names followed by their uses.

1. Abrus precatorious: (Papillionaceae) Gunj

The seeds are abortifacient and oxytocic ,hence fed to cattle immediately aafter delivery to hasten placenta.

2. Acacia nilotica L. Mimosaceae Babool/Bhabul

I it is galactagogue property ,hence given to goats ,cows and buffaloes to increase lactation .Leaves and pods boiled in water and made into paste and applied externally on inflammation of eyes due to conjuctivitis to relieve pain and swelling.

3. Alianthus excels roxb. Simaroubaceae Rukhdo

Decoction of stem bark is used to wash parts affected due to any skin diseases.

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4. Balanites roxburghii Planch Balanitaceae Hinganbet

The plant parts are anthelmintic .Stem bark ,unripe fruits and leaves are made into paste ,which is fed to cattle to cure constipation and to expert or destroy intestinal worms .

5. Butea monosperma Lam. Papillionaceae Palas

The flowers have detergent properties, and diuretic. water boiled crushed fresh or dried flowers are applied on abdominal parts and decoction is administered orally to cure blocked urination .the ash of leaves mixed with edible oil is applied on affected parts of skin to cure fungal skin diseases and also decaying ulcers.

6. Calotopis procera Ait R.Br. Asclepediaceae

Rui

Mature leaves are applying mustard oil are warmed slightly and placed on inflammation to relieve swelling and pain .The latex is applied externally on wounds to prevent decay.

7. Cassia auriculata Caesalpiniaiceae

Awali

The leaves are anthelmintic .they are crushed with leaves of whole plant of viocea auriculata() and made into paste ,which is mixed with water then the mixture is administrated internally to cure constipation .

- 8. Cassia fistula Ceasalpinnaceae
 - Bahava

The fruit pulp has purgative properties. The extract of fruit pulp is mixed with water and then the mixture is administered internally to cure constipation.

9. Cassia tora L. ceaslapinniaceae

Tarota

The seeds are externally used as germicide, antiviral and antiparasite. The seeds crushed with water and made into a paste are applied on affected parts of the skin to cure ringworms, scabies and other and other fungal diseases. To increase lactation in cow .the powder of seeds is fed daily ,as it possesses galactagogue property .

9. Datura innoxia L. var. Solanaceae

Datura

The leaves are used in diarrhea and skin diseases .The leaves are antiseptic .The fresh juice of leaves mixed with powdered rhizome of the curcuma longa (halad) and applied over swelling to relieve pain .the fruit is fed to the cattle to bring them to heat .the mixture of fresh leaves of this plant and fodder is fed to cattle to stop diarrohea.

10.	Ficus hispida L. f. Umber	Urticaceae
	Latex is applied externally on swollen no	eck of bullocks to relieve pain and swelling.
11.	Helicteres isora L. Murad sheng	Sterculiaceae
	The leaves crushed with leaves of avai and sores for fast healing.	and made into paste which is applied on ulcers
12.	Holoptelea intergrifolia Roxb. Papada	Ulmaceae
	Stem bark and leaves are antibacterial crushed and warmed with edible oil are of animals for fast healing.	and antifungal properties .stem bark and leaves applied on injury ,ulcers ,sores and decaying parts
13.	Plumbago zeylenica L. Chitrak	Plumbaginaceae
	The root after crushing made into paste a	and is applied over ulcers.
14.	Tamarindus indica L. Chinch/ Imli	Caesalpinniaceae
	The tender leaves have cooling effect . into paste ,are applied on inflammation erelieve pain .	The leaves crushed with leaves of avli and made of ankles ,joints fractures to reduce swelling and to
15.	Vitex nugundo Ve Nirgudi	erbenaceae

The leaves are externally antiseptic and discutient .the fresh juice of leaves is antibacterial and insecticidal hence applied on ulcers to remove foetid discharge and kill worms from ulcers.

The author is highly thankful to all the tribal informants and practitioners of veterinary medicines for their co-operation and help during the field trip in the forest area.

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Study the Cropping Pattern Using Methods of Crop Concentration and Crop Diversification in Yawal Tehsil, District Jalgaon

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Abstract:

The spatio-temporal variation of crop concentration and diversification in Yawal tehsil in Jalgaon district has analyzed in this study. Crops concentration defines the differences in the density of some crop agricultural area on specified durations. The crop diversification is an idea which is contradictory to crop concentration. The present paper is an effort to definite the crop concentration and crops diversification in Yawal tehsil of Jalgaon district, Maharashtra. Tehsil is a geographical situated in the north part of district along satpuda mountainous range. In present research examined area has excessive disparity in agricultural system, fertility quality of soil, transformation of agricultural technology, river irrigation system etc. responsible for high yield of crops. In this analysis observed that the maximum concentrations under nonfood crops has found such as cotton, banana, oilseed etc. selected study region has been very famous for banana production and near about 50% and more banana crop export in Maharashtra have recorded form same this agricultural region. Given research adopted methods of crop concentration and crop diversification congruently using Bhatia's method for crop concentration and Gibbs and Martin's (1962) formula for crop diversification. Using graphs and maps make by Microsoft excel and Arc GIS software.

Keyword: Crop concentration, crop diversification, Arc GIS, Yawal tehsil.

Introduction

Agricultural statistic is an important element in agricultural data analysis; crop concentration and crop diversification are useful method in illustration of agricultural cropping pattern and distribution of crop landuse. The study of crop concentration is helpful in many ways in deriving relevant conclusions about crop distribution. Higher the crop concentration index, higher is the level of interest in the production of that crop. It helps in taking important decisions regarding marketing, storage, and trading of the crop produce. Agricultural crop diversification is an important stress relieving option for economic growth of the farming community. Crop concentration and diversification can be derivate regional climatically conditions. Yawal is an agrarian economy, where about 90% of the population is engaged in agriculture. Yawal tehsil is located at the Satpuda region of Maharashtra with reach fertile soil of basalt rock.

Study Area

The Yawal tahsil is located in the northeast part of Jalgaon district as well as north part of Maharashtra. The latitudinal and longitudinal extension of the tehsil is N 21° 05' 00" to N 21°

24' 16" and E 75°31'20" to E 75° 53' 07" with an area 95438 ha. Total population of this tahsil was 63340 in year 2011(2011 Census). Yawal tehsils has 83 villages and 5 revenue circles under.



Fig. 1.1: Location Map

Objective

The objective of the present research work is to identified the crop concentration and crop diversification of selected crops in Yawal tehsil, district Jalgaon, Maharashtra.

Data and data methodology

This research is based on secondary data which is collected from tahsil office of Yawal. The crop concentration has been calculated in near about 83 villages using Bhatia's method and in order to measure the crop diversification, Gibbs and Martin's (1962) formula has been used. Here, it should be mentioned that higher index values represent high concentration and vice versa. On the other hand, if value of diversification comes close to 1, the diversification will be higher.

Crop Concentration

Crop concentration refers to the variation in the density of crops cultivated in an area at a given point of time. It is remarkably influenced by the nature of terrain, rainfall and soil characteristics. In the study of cropping pattern, it is essential to know the areas where different crops dominate. This helps to take decision in future agricultural planning. For this purpose, a comparison of the relative strength of various crops is made by ranking them (Bhatia, 1965). In term of types of concentration, crops may be identified by a single or multiple nuclei of concentration and to more widespread low density distribution (Singh and Dhillon, 2004).

The following formula has been used to delineate crop concentration areas of the study area-

C(*Crop Concentration Index*) = x/y/x'/y'

Where, \mathbf{x} is the area of particular crop in the unit area \mathbf{y} is the total cropped area in the unit area $\mathbf{x'}$ is the area of particular crop in the region $\mathbf{y'}$ is the total cropped area in the region here; the high index values represent high concentration and low values show lower level of concentration. Using the mentioned method, the crop concentration indices for all blocks have been calculated for major crops like paddy, jute, wheat, potato and mustard.

Distribution of crop concentration

Table no. 1 shows the village wise distribution of concentrations index in Yawal tehsil. Above table described category wise concentration in Yawal tehsil here; low category indicates below 1 concentration index, medium category indicates 1 to 2 concentrations index of crops and lastly high category indicates above 2 crop concentrations index.

Sr. No.	Crons	No.	No. of Villages			
51. 140.	Crops	Below 1	1 to 2	Above 2	Villages	
1	Jawar	45	31	04	80	
2	Wheat	25	12	06	43	
3	Black Gram	43	22	07	72	
4	Green Gram	50	20	09	79	
5	Soybean	26	08	09	43	
6	Cotton	27	44	08	79	
7	Banana	57	17	06	80	
(Source: Compiled by Desearcher)						

T_⊕ble No. 1: Village wise distribution of crop concentration index (2011)

(Source: Compiled by Researcher)

Map No. 1 reveals that village wise spatial distribution of Jawar crop concentration index during 2011. It indicates the 45 villages occupied the concentration index up to 1. The 31 villages of tahsils occupied concentration index 1 to 2. Above 2 concentration index define 04 villages. Jawar crops is major and high ranking crop in the study area and concentration found in total 80 villages out of 83 villages. Map No. 2 shows that wheat crop concentration in the study area. 25 villages show in low category, 12 villages indicates medium category and 6 villages under high category. Wheat is second ranking crop in food grain category in Yawal tehsil. Total 43 villages indicate concentration of this crop out of 83 villages.

Map No. 3 and 4 define concentration under major pulses. Given map indicate concentration index of Black gram and Green gram. Black gram show 72 villages of concentration index and green gram shows 79 villages of concentration index out of 83 villages of Yawal tehsil. Map no. 5,6 and 7 represent of concentration index respectively soybean, cotton and banana. As per given three maps soybean indicates very low concentration i.e. only 43 villages out of 83 villages of study area. It is less concentration index as compare than cotton and banana. These crops show large villages under concentration like Jawar i.e. 79 villages for cotton and 80 villages for banana.

Given conditions responsible for increased banana and cotton production in the given area, Banana can grow from the poorest to the richest type of soil with varying success. Availability of deep, rich loamy and salty clay loam soil with pH 6-7.5. It's most preferred for banana cultivation. The study area is mold in subtropical latitude and cotton is a tropical and subtropical crop. Cotton required deep black (Regur) soil for cultivation and irrigation during plant growth.





Crop Diversification

Crop diversification is an idea which is totally opposite to crop specialization. The farmers everywhere throughout the world, particularly in the developing nations, attempt to grow a several crops in their field in an agricultural year. The degree of crop diversification to a great extent relies upon the geo climatic/socioeconomic conditions and innovative develop-ment in a region. When all is said in did, higher the degree of farm technol-ogy, lesser the degree of diversification. Besides, the rich farmers like to represent considerable authority in agricultural endeavor while poor people and sub-sisted farmers are commonly progressively inspired by the diversification of crops.

Index of diversification = $1 - \sum x^2 / (\sum x)^2$

Here, \mathbf{x} represents percentage of total cropped area occupied by each crop. If the index of value goes towards 1, the diversification is relatively high and vice versa.



Based on index values, in map No. 8 the village wise distribution of crop diversification have been grouped into high, medium and low categories. Low category of crop diversification is found in 25 villages; whereas 29 villages come under second highest category. High diversification is observed in 29 villages. Increased of crop diversification availability because of the implementation of modern technology and increased population from the last few decades.

Conclusion

The cropping pattern of the Yawal tehsils is mainly dry farming oriented as Jawar as food and cotton and banana as cash crops. A concentration of those crops found in all villages of Yawal tehsils. Green grams and black grams are major pulses in the study area which is utilized in daily diet of people. Soybean, cotton and banana are economical important crops, its production use as final as well as raw material in industries. The local farmer gain maximum profit of the given crops and given second preference of other food and nonfood crops.

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An eco-friendly approach for the synthesis of Schiff base under solvent free condition

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Abstract:

Schiff base was synthesized by condensation of Aniline with substituted aromatic aldehyde catalyzed by Tartaric acid under solvent free condition. Advantages of reaction are mild reaction condition, work up to afford the high yield of product. The product is characterized by IR spectra.

Keywords: Schiff base, Tartaric acid, IR Spectra etc.

Introduction:

When any primary amine condensed with an aldehyde or a ketone under specific conditions form a Schiff's Base is named after Hugo Schiff [1]. A Schiff base is also known as imine or azomethine.It is a nitrogen analogue of an aldehyde or ketone in which the carbonyl group has been replaced by an imine or azomethine group. Schiff bases are widely used organic compounds. They are used as catalysts, pigments and dyes, intermediates in organic synthesis, and as polymer stabilizers [2].Schiff bases have also exhibit a broad range of biological activities, including antibacterial, antifungal, anti-inflammatory, antimalarial, antiviral, antiproliferative, and antipyretic properties [3].

The preparation of imines was first reported in the 19th century by Schiff (1864). Since then a variety of methods for the synthesis of Schiff base have described using Bro"nsted-Lowry or lewis acids used for the synthesis of Schiff bases include ZnCl₂, TiCl4, MgSO₄-PPTS, Ti(OR)₄, alumina, H₂SO₄, NaHCO₃, MgSO₄, Mg(ClO₄)₂, H₃CCOOH, Er(OTf)₃, P₂O₅/Al₂O₃, HCl [4-16].lemon juice[17],water[18] etc. solvent free chemical reactions have several advantages in preparative, simplifying work-up, formation of cleaner products, enhanced selectivity, reduction of by products, reduction in the waste produced, and much improved reaction rates. This technique involves as an alternative reaction media to replace hazardous and expensive solvents routinely used in organic synthesis [19].

Here we have describe solvent free synthesis of Schiff base by two component synthesis by condensing substituted aromatic aldehyde with Aniline by using easily available, non-toxic tartaric acid as catalyst.

Experimental:

All the chemicals were purchased from Aldrich/Merck and used without further purification. Melting points were determined in open capillaries using Thermocal Analab apparatus and are uncorrected. The progress of the reactions as well as purity of Compounds was monitored by thin layer chromatography with F254 silica-gel percolated sheets using hexane, ethyl acetate (9 :1) as eluent; UV light vapour were used for detection. IRspectra were recorded on Agilent Cary 630FTIR Instrument, and values are expressed in cm⁻¹.

General Procedure:

A mixture of Substituted benzaldehyde (0.01 mole) and 4-methoxy aniline (0.01mole) and tartaric acid (20mol %) were grinding in a mortar pestle for appropriate time at room temperature. The progress of the reaction was monitored by TLC. After the completion of the resulting solid was filtered and recrystallized from ethanol. All these synthesized compounds were characterized by their melting point and I.R. spectral study.



R = 4-NO₂, 4-OH, 4-Br, 4-Cl

Table No.1 Analytical data of synthesis of Schiff base

Sr. No.	Aldehyde	Product	Time (Min)	yield	Melting point (⁰ c)
1.	H O NO ₂	O ₂ N (<i>E</i>)- <i>N</i> -(4-nitrobenzylidene)benzenamine	22	79	103
2.	H O OH	HO 4-((<i>E</i>)-phenylimino methyl)phenol	32	75	113



Results and Discussion:

We have develop new method for the synthesis of Schiff base which utilizes a one-pot reaction of substituted aromatic aldehyde and aniline in presence of readily available, inexpensive, mild and common laboratory chemical tartaric acid as a catalyst.



R = 4-NO₂, 4-OH, 4-Br, 4-Cl

IR Spetral data of synthesized compound summarized below

1 (E)-N-(4-nitrobenzylidene) benzenamine:

1640 (C=N), 1511.4 (Aromatic C=C), 3065.7 (Aromatic C-H), 1008.27 (C-N)

2. 4- ((E)-N-(phenylaminomethyl) phenol:

1642 (C=N), 1572.9 (Aromatic C=C), 3049(Aromatic C-H), 1243.1(C-N)

3. (E)-N-(4-bromobenzylidene) benzenamine:

1617.7 (C=N), 1575.4.5 (Aromatic C=C), 3065.7(Aromatic C-H), 1164.8(C-N)

4. (E)-N-(4-chlorobenzylidene) benzenamine:

1652 (C=N), 14832.5 (Aromatic C=C), 3065.7(Aromatic C-H), 1075.3(C-N)

Conclusion:

Schiff bases were synthesized by coupling various substituted aromatic aldehydes and aniline using tartaric acid under solvent free conditions. This reaction has attractive features include shorter reaction times, low cost, easy work-up and excellent yields. This procedure is convenient economical and ecofriendly.

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Physico-Chemical Analysis of Drinking Water at Different Places Arround Panzara River from Akkalpada to Dhule.

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Abstract:

The water of Panzara-Kan or Panzara River is the important source of domestic and potable use. The water samples were collected from the river from different points and analyze for different physic-chemical parameter in beginning of winter season. Effect of municipality savage, domestic savage and agricultural runoff on river water has to be in consideration. The area selected to sampling between the Akkalpada and Dhule at Eight different points. In physico-chemical analysis various parameters was studied like pH, Turbidity, Electrical conductivity, TDS, PH, TS, EC,BOD, COD etc, out of which only physical parameters are studied in this paper.

Key Words: river water, pH, TDS,EC.

Introduction:

Water is important part of environment as well as life. The fresh water is most precious thing which is essential for life (1). Water is the most widely present and abundant substance found on the earth, and main thing is that our planet is wash with water, in total there is 1400 million billion liters of water but most of this water is cannot be used for drinking because 97% is sea water and only 3% is fresh water, out of which 2% is ledged in the polar ice caps and glaciers. Only 1% of water available for portable use, where as more water is utilized for irrigation than drinking, sanitation and all other use (WHO-2004) Along with it is used for food product, industrial, waste disposal and for agriculture (2-3). Due to the urbanization and industrialization there is spoil of water take place, for agriculture tremendous amount of water is required in rural area where there is no alternatives like dam, river, or canals . During last two decades the level of ground water decreases dramatically because of exploration of human intervention and therefore water borne diseases has been seen which cause health hazards. The physic-chemical study of water in the given region is great aspect of aquatic environmental chemistry in which the study of sources, composition, reaction and transportation of water occurs. The quality of water is highly concerned with human being and is directly linked with human welfare (4-6). The present work is an attempt to measure the quality of various sample of water from Panzara-Kan or Panzara River from different places in Dhule district (MS).

Experimental:

Study Area:-

The study area comprises of Panzara-Kan or Panzara River from different places, between the Akkalpada and Dhule in Dhule district of Maharashtra. The area is situated In Khandesh region of Maharashtra. The samples of water collected from different places, between the Akkalpada and Dhule. In the present study only physical parameter of water samples taken from river. The location is sample studied is given as:

Sample No.	Location
1	Akkalpada
2	Bhadane
3	Morane
4	Kusumba
5	Khede
6	Morane (Aklad)
7	Kundane (Vaar)
8	Dhule

Water Sampling:-

In the present study of water samples, the water samples were collected in polythene bottles which are cleaned with acid water and again with distilled water (7). The analysis is carried out with standard method.

Methodology:-

The P^H, EC, TDS was measured using soil and water analysis kit. Turbidity with Digital Turbidity meter.

Sr. No.	Sample No	P ^H	EC	TDS	Turbidity
1	1	6.08	185	180	1
2	2	6.10	274	181	1
3	3	8.28	275	292	2
4	4	7.20	269	178	2
5	5	7.07	278	185	1
6	6	7.10	274	181	1
7	7	7.15	274	181	2
8	8	8 30	295	381	2

Table1: Study of physical parameter of Dam water samples

Sr. No	Parameter	Minimum	Maximum	Mean	ICMR(Desirable limit)
1	P ^H	6.08	8.28	7.18	7.0-8.5
2	EC	185	295	240	-
3	TDS	180	381	280.5	500
4	Turbidity	1	3	2	5 NTU

 Table2: Comparison of Dam water at the study area with Standard value

Table No: 3 Classification of well water sample on the basis of TDS

Sr. No	Classification of Water	TDS(Mg/l)	No. of sample
1	Non Saline	< 1000	8
2	Slight saline	1000-3000	Nil
3	Moderate saline	3000-10000	Nil
4	Vary saline	>10000	Nil

Table No: 4 Desirable limits of physical parameters

Parameter	B.I.S		I.C.M.R		WHO	
	Highly	Max.	Highly	Max.	Highly	Max.
	Desirable	Permisible	Desirable	Permisible	Desirable	Permisible
EC	No desirable standard					
TDS	500	1500	500	1500	500	1500
P ^H	6.5-8.2	6.5-9.2	7-8.5	6.5-9.2	7-8.2	6.5-9.2

1. pH: - The Ph of given sample at any temperature represent the potential of hydrogen ion concentration which can be measured quickly. It plays an important role in environmental engineering for water supply, water softening and disinfection and corrosion control.

Low pH affects the corrosion, high pH cause taste, soapy feel and pH greater than 8 is preferable for the effective disinfection with chlorine (Maiti 2004). Wetzel (1995) reported that the value of pH ranges from 8 to 9 unit in Indian water (Sisodia &Maundiotiya 2006). The average pH of ground water in Dhule district is around 8 slight alkaline.

2. Electrical conductivity:- The Electrical conductivity is ability to carry current due to the presence of ions such as Cl⁻, SO₄⁻⁻, CO₃⁻, HCO₃⁻, NO₃⁻, Ca⁺⁺, Mg⁺⁺, Na⁺ and K⁺ are responsible for carry electric current.

Sr.No	Туре	EC	No of samples
1	Excellent	<250	0
2	good	250-750	6
3	Doubt	750-2250	2
4	Unsuitable	>2250	0

As per the EC there is no sample belongs to the excellent category. All samples has good category as per EC.

3. Total Dissolved Solids (TDS):- Natural water contain uncountable solids such as Cl⁻, Fe, SO₄⁻, CO₃⁻, HCO₃⁻, NO₃⁻, Ca⁺⁺, Mg⁺⁺, Na⁺ and K^{+.} Simply TDS can be express as sum of the cations and anions concentration expressed in mg/l. Cl⁻ is major inorganic constituent in natural water (Maiti-2004).It may come from soil, rocks, discharge of agriculture, industrial and domestic waste water.

Distribution of TDS of Dam water

Sr.No	Range	Туре	No of samples
1	<300	Low	8
2	300-600	Average	0
3	>600	High	0

Result and Discussion:-

The water samples of river from the study area has no colour, odour and taste. The taste of the water sample almost all location is pleasant in taste. The study of physical parameters of given water sample are given in table. All water samples are compared with standards is given by WHO. The p^{H} of water sample shows variation in its range which indicate they are in the range of quality parameter permissible limit. The EC of water shows high variation in all samples of all sites. TDS also shows variation in its range out all these samples are in desirable limit.

Conclusion:-

In the present study of Panzara-Kan or Panzara River and sample of water which people are used to domestic and consume in the given study area, the result of chemical analysis of sample water shows considerable variation. Almost all of the water samples comply with ICMR and WHO standard for drinking purpose. The water quality in the investigated area is found to be suitable for drinking in all the locations except few. It need not requires regular chemical analysis to ensure that the quality of water is not contaminated.

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Growth and Characterization of some doped and undoped Bismuth trisulphide Crystals by Gel method

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Abstract:

Bismuth tri sulphide $[Bi_2S_3]$ crystals were grown by single diffusion gel technique. Growth conditions were optimized. Optimum growth conditions are reported. The crystals were doped by material Fe.Influence of metal Iron dopant on the structural and optical properties of the Bismuth tri sulphide crystals have been studied. Structural properties of Fe doped Bi₂S₃ are studied by X-ray diffraction (XRD) and micro structural properties by Scanning Electron Microscope (SEM). The broadness of XRD peaks indicates the nanocrystalline nature. Crystallite size estimated from X-ray line broadening of the maximum intensity peak using the Scherrer's formula. Thermal studies of doped and undoped crystals are reported. The UV-VIS analysis gives the energy band gap of gel-grown crystal.

Keywords: Gel growth, Doping, XRD, UV-Vis spectroscopy. SEM, TGA&DTA.

1. INTRODUCTION

A large no of crystals required for the purpose of research and application can be grown by gel technique. Crystal growth plays an important role in all parts of materials science and in industries that Depend upon the usefulness of different materials. Modern technology is widely demanded in materials for catalysis, semiconductors, pharmaceuticals, and optoelectronics devices due to the interesting properties of crystals such as piezoelectric, optical property etc.

The influence of single crystal is noticed in the semiconductors, optics and acoustics, in various medical applications and in jewellery industries [1-3] now a day, various crystals are used in electronic industry for controlling the frequency of radio waves, optical property in polarizing microscopes, in microwave communication, in digital telephonic instrumentation, in wireless and optical communication, in electronic and photonic devices [5-9]. Bismuth Sulphide has been attracting a considerable interest owing to its potential application in thermoelectric, electronic and optoelectronic devices and IR spectroscopy, etc.

2. Experimental

Single diffusion experiments were attempted. Test tubes of diameter 2.5 cm and height 25 cm Were used as crystallization apparatus. All experiments have been carried out in silica gel. Gel was Prepared from aqueous solution of sodium meta silicate. The gel was acidified by acetic acid. The Chemical used for growth of doped and undoped Bismuth tri sulphide crystals were CH₃COOH, Na₂SiO₃, H₂S(water Sol), BiCl₃, FeCl₃. All chemicals used were of AR grade.

To prepare silica gel, sodium meta silicate is titrated with acetic acid to attain pH of mixture varying from 4 to 4.7, 15 ml the aqueous solution of H_2S (Gas Water solution) was added as inner reactant with constant stirring. After titration mixture were transferred to several test tubes. Leave it for some time to set in gel form. The test tubes were sealed by cotton and kept undisturbed at room temperature. Gel setting time is strongly depending on the pH of a solution. Higher the pH

of solution lesser time taken to set the gel. After confirming gel setting, a supernatant solution of 0.5M bismuth Chloride (BiCl₃) and 0.25M FeCl₃ added as supernant over the set gel. The outer reagent was added down the sides of the test tube using a pipette and ultimately on to the gel medium. The diffusion of the outer reactant into the gel medium. Its reaction with inner reactant, Nucleation was observed with in within 48 Hours of addition of the outer reactant

The experiment was carried out at an ambient temperature of about 28° C. The reaction between Bismuth Chloride, dopent H₂S gas water solution in gel medium resulted within the growth of Fe-doped bismuth Tri-Sulphide crystals. Shown in Fig. 1. The reaction to grow Fe doped Bismuth tri sulphide crystals is,

 $(2-x)BiCl_3 + xFeCl_3 + 3H_2S \rightarrow Bi_2 - xFe_xS_3 + 6HCl$



Fe doped Bi_2S_3









Fig. 3 X-ray diffract gram of Fe-doped Bismuth tri sulphide

The Figs 2 and 3 show X-ray diffract grams of Bi_2S_3 and Fe-doped Bi_2S_3 From XRD, it is clear that impurities are induced only in certain planes, since the intensity of radiation is enhanced only in certain planes. Impurities cause a slight change in lattice parameters. The calculated values of lattice parameters and volume of undoped and doped crystals along with the reported values are represented in Table1.

Lattice	Undoped		Fe-doped
parameters	Reported	Observed	
a A^0	11.136	11.153	11.145
b A ⁰	11.256	11.283	11.254
$c A^0$	3.981	3.978	3.986
β ⁰	9.36	93.36	93.36
α^0	93.36	93.36	93.36
γ ⁰	93.36	93.36	93.36
V	3.060 eV	3.060 eV	3.060 eV

Table 1. Lattice parameters of Bismuth tri sulphide crystals

Almost all peaks in the pattern could be indexed to orthorhombic Bi_2S_3 with cell constants of a = 11.153 0A b = 11.283 0A , c = 3.978 0A , which are closed to the reported literature. The diffraction peaks were narrow and sharp; indicating that the products were of high degree of crystalline with their atoms residing in crystalline lattice. The sharpness of all the peaks implies that the sample is crystalline even at room temperature. Grain sizes were calculated from the broadening of XRD peaks using the Scherer's formula.

3.2 Thermal analysis

Thermal analysis, mainly, Thermo Gravimetry (TG), Differential Thermal Analysis (DTA) are Widely used in the investigation of both physical and chemical phenomena. Numbers of reviews Available on applications of thermo analytical methods definite amount of sample was taken and heating was carried out TGA. Thermal spectra of undoped Bismuth tri sulphide and Fe-doped Bismuth tri sulphide represented in Figs. 4 and 5 respectively. DSC spectra of undoped Bismuth tri sulphide and Fe-doped Bismuth tri sulphide represented in Fig.6.



Fig. 4 TGA curve of undoped Bismuth tri sulphide



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Fig.5 TGA curve of Fe-doped Bismuth tri sulphide



Fig. 6 DSC Curve of Fe-doped Bismuth tri sulphide

The initiation temperature is $30.^{\circ}$ C and equilibrium temperature is 161.1° C at 30° C (initiation temperature) initiation of phase change starts and is completed at peak endo-down temperature of 84.5 $^{\circ}$ C transition temperature The temperature at which the sample and the reference come to the thermal equilibrium by thermal diffusion appears to be at 161.1 $^{\circ}$ C.

3.3 SEM analysis

In order to understand the surface features scan electron microscopy is useful. In the present work sample of undoped and iron Bismuth tri sulphide crystals were used for the scan. The SEM images are shown in fig.7.





c) Fig.7. SEM images

d)

SEM images of the powdered sample of Bismuth Sulphide were taken at common width 8.5 mm and EHT magnification 15 KV. The shape of most of the grown crystals appeared spherical and in few cases, they formed small aggregates. In fig.4 (a to d) Aggregation of the nanoparticles.

3.4 UV-Vis spectroscopy

The optical property of Iron doped Bi_2S_3 crystal crystal was studied by using UV-VIS spectrophotometer. The UV-Vis study of Fe doped Bi2S3 crystals were taken by SHIMADZU UV-2450. UV-Vis spectrophotometer over the wavelength range 200 – 800 nm at Nano Research

Laboratory, Department of Physics, Pratap College, Amalner. The graph of UV-VIS analysis is given in fig. From graph, it clears that grown crystal have sufficient and approximately equal transparency in the ultraviolet and visible region. The absorption coefficient is maximum at 216 nm. but the variation of absorbance (A) is studied in wavelength range of 400-800 nm for all the samples.

Absorption %



Wavelength in nm

The high values of absorption coefficient validate their use in photovoltaic applications. Optical conductivity and thermal conductivity also show good values. The optical absorption spectrum of grown crystal shows a good absorbance in the entire visible region. This is useful for optoelectronic applications. The resulting spectrum obtained on Fe-doped Bi_2S_3 is shown in Figure the spectral data recorded showed the strong cut off at 600 nm; where the absorbance value is minimum.

Band Gap Energy (E) = $h*C/\lambda$ h = Planks constant = 6.626 x 10⁻³⁴ Joules sec

 $C = Speed of light = 3.0 \times 10^8 meter/sec$

 λ = Cut off wavelength = 600x 10⁻⁹ meters

 $E = h x \frac{c}{\lambda} = 6.626 x 10^{-34} x 3.0 x 10^{8}/600 nm = 2.07 eV$

Where $1eV = 1.6 \times 10^{-19}$ Joules (conversion factor)

4. Conclusions

Iron doped Bi2S3 crystals can be grown by single diffusion gel technique. Gel density, gel aging,

pH, concentration of reactants, and impurities affect the growth in a limited manner. Unit cell parameter values match very well with the reported ones.

The shape of most of the grown crystals appeared spherical and in few cases, they formed small they formed small aggregates. Aggregates and size variation is seen. The UV–Vis measurements indicate the band gap energy range of 400of the Fe-doped Bi_2S_3 crystals the Variation of absorbance (A) is studied in the wavelength -800 nm Band gap energy E=2.07eV In conclusion, SEM pictures shows plate like morphology of the grown crystals and no morphological or structural changes take place due to Iron doping.

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USE OF INFORMATION TECHNOLOGY IN INDUSTRIAL POLLUTION CONTROL

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INTRODUCTION: -

One of the most alarming issues in modern cities is the air quality level, where air pollution has caused 120 deaths out of 100,000 per year based on a worldwide study (Green Car Congress, 2019). The World Health Organization emphasized that 97% of cities in low- and middle- income countries with more than 100,000 inhabitants do not meet World Health Organization (WHO) air quality guidelines. The National Air Quality Index (AQI) was launched in New Delhi on September 17, 2014, under the Swachh Bharat Abhiyan. The Central Pollution Control Board along with State Pollution Control Boards has been operating National Air Monitoring Program (NAMP) covering 240 cities of the country having more than 342 monitoring stations.

Due to poor air quality, it will increase potential health risks such as risk of stroke, heart disease, lung cancer, asthma and others as well (citation). Hence, there is a need to install an air quality monitoring system in industries to ensure the air is not contaminated. This can be done by installing sensors to monitor dust particles, carbon dioxide, carbon monoxide, nitrogen dioxide and sulfur dioxide levels and this information can be shared with the respective Pollution Control Boards directly through internet connectivity, where the computer desktop application allows board to monitor real-time data of the current air quality level in the area. Hence, through these implementations, better quality of life can be achieved.

METHODOLOGY: -

In order to implement continuous air pollution monitoring system, we need 3 basic entities:

1. Semiconductor Device: -

The MQ135 sensor can sense NH3, NOx, alcohol, Benzene, smoke, CO2 and some other gases. The LM35 is precision temperature sensor. GSM Module is used to establish communication between a semiconductor IoT device and a GSM system. Global System for Mobile communication (GSM) is an architecture used for mobile communication. We will integrate all these components into one single semiconductor device which can be installed on the industrial air discharge units.

2. Internet Server: -

The internet server will establish the connection between the GSM Module on the pollution monitoring device and the end user's computer system. The data once transmitted from the device would be received to the user desktop via internet server. The transmitted data would be stored on cloud network and will be processed and analyzed. Once analyzed the data feed will be given to the user for continuous data monitoring.

3. End User Device: -

Once the data is analyzed, the data would be received by the End User (Respective Pollution Control Board) via a desktop application which would be developed according to the user needs. The live data would be received without any interruptions. Also a mobile application can be developed in order to monitor data from anywhere on the mobile device itself.

All these entities combined will work throughout to provide absolute and quick data feed to the pollution control boards. Those industries which are violating the air quality requirements could be fined heavily or even abandoned in order to provide safer environment to the people residing in that area. This system would also reduce human errors which would help take quicker actions against those not taking air quality law seriously.



Figure below shows the Industrial air pollution monitoring system:

CONCLUSION: -

Air quality is a basic issue that clearly impacts human prosperity. The system to monitor the air of environment IOT Technology is used to improve quality of air. With the use of IOT technology enhances the process of monitoring various aspects of environment such as air quality monitoring.

As live data feed is received quicker implementation of actions can be done so as to ensure a safer and healthy environment for the betterment of humanity and to live a quality life.

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The Cropping Patterns in Jalgaon District of Maharashtra State: A Micro Level Study of Selected Villages in Jalgaon District

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ABSTRACT:

Cropping pattern is a dynamic concept because it changes over space and time. It can be defined as the proportion of area under various crops at a point of time. In other words, it is a yearly sequence and spatial arrangement of sowing and fallow on a given area. In India, the cropping pattern determined by rainfall, climate, temperature, soil type and technology. The choice of crop cultivation of farmer is guided by the factors like Physical, Social and Economic. Sometimes they cultivate a number of crops at their farms and rotate a particular crop combination over a period. Considering the above discussion in mind researcher has attempted to find out cropping patterns in some selected villages in Jalgaon district of Maharashtra state.

KEY WORDS:

Cropping pattern, Crop Cultivation, Crop combination, Cash crop, Agricultural activities

INTRODUCTION TO STUDY REGION:

Jalgaon District is located in the north-west part of the Maharashtra. Out of the total population about 79.73 percent population is literate and about 13.9 percent population belongs to scheduled caste, 10.3 percent scheduled tribes and 36.48 percent population is engaged in agricultural activities. The study region is marked by Satpura upland in the north and Ajanta ranges in the south. All tehsils have different socio-economic status.

LOCATION OF VILLAGES SELECTED FOR CASE STUDY:

Study region is located in the north of Maharashtra, Satpura Ranges in the north, river Tapi and its bad land and between these vast east-west elongated piedmont plain, Girna, Wghur, Purna, Bori river basins are unique physiographic units.

	Table No1 : Surveyed Villages: During the Year 2018					
Sr.	Tehsil	Location(Lat-Long)	Cultivators			
1	Chonda	21.2359 to 75.3548	Rukhankhede	144		
2	Chopua	21.2003 to 75.2756	Majare Hol	138		
3	Pachora	20.8109 to 75.4269	Dhokalkhede	137		
4	r actiona	19.5029 to 74.6758	Lakh	104		
5	Yawal	21.1307 to 75.2756	Vadhode	98		

6		21.0755 to 75.7874	Bhortek	109
7	Amalner	21.1702 to 75.1244	Hingone Sim	119
8	Amamer	21.1736 to 75.1077	Hingone Kh.	135
9	Dharangaon	21.0153 to 75.3762	Chinchpure Bk.	134
10	Dharangaon	21.0017 to 75.3431	Kalyane Kh.	130
11	Jalmon	21.0226 to75.6326	Tarsod	180
12	Jaigaon	20.9540 to 75.4999	Dhanore Kh	114
13	Frandal	20.9546 to 75.4918	Khedi Kh.	156
14	Erandor	20.9261 to 75.4967	Dapori	140
15	Pover	21.0807 to 75.9355	Mangalwadi	131
16	Ravei	21.1222 to 75.9898	Bhamalwadi	136
17	M'Nagar	21.1355 to 76.0852	Kothe	107
18	ivi ivagai	21.0536 to 76.0931	Kund	116
			Total	2328

OBJECTIVES:

- 1) To analyze the villagewise Cropping Patterns of surveyed villages.
- 2) To classify the villagewise data into different Crops.
- 3) To find out the villages in which numbers of crops are reported more in specific season.
- 4) To compare number of crops with every season.
- 5) To compare number of villages with specific crops.

DATA BASE AND SURVEY METHODOLOGY:

Sample villages are selected considering the following criteria:

- Geographical location of the village.
- From each village 30 farmers are personally interviewed and information is collected through questionnaires and personal observations. Thus 531 cultivators are interviewed and analyzed to interpret the cropping patterns.

EXPLAINATION OF VILLAGES SELECTED FOR CASE STUDY

Surveyed Villages Selected for the Case Study:

Researcher has approach to 531 families comprising 2328 peoples to check the ground truth of results obtained after analysis of different cropped area in Jalgaon district. Table No. 1 is showing name of tehsils, geographical location of villages, name of the villages and total surveyed cultivators.

Data Sources:

Authentic data obtained from survey of 18 selected villages of 9 tehsils of Jalgaon district.

Data Analysis Techniques: Microsoft Excel and Access software is used to analyze data. Various Statistical techniques are used.

DISCUSSION:

Cropping Patterns of Surveyed Villages in Jalgaon District:

Table No.2: Proportion of Cropped Area(in acre)										
Sr. No.	Tehsil	Village	Cotton	Banana	Sugarcane	Food grains	Pulses	Oil Seeds	Fruit	Other
1	Chanda	Rukhankhede	57	5.5	3.5	24	3.1	0	4.8	1.4
2	Спориа	Majare Hol	69	0	0	24	13	0	0	0
3	Pachora	Dhokalkhede	63	0	0	22	11	0	3.2	0
4	1 action a	Lakh	91	0	0	5.2	4.2	0	0	0
5	Vawal	Vadhode.	72	0	0	26	2.4	0	0	0
6	1 awai	Bhortek	53	0	0	47	0	0	0	0
7	Amalner	Hingone Sim	56	4	0	30	3.4	4	0.6	2.3
8		Hingone Kh.	74	7.2	0	6	11	0	0	1.2
9	Dharangaon	Chinchpure	60	0	0	26	8.7	5.3	0	0
10		Kalyane Kh.	60	0	0	21	19	0	0	0
11	Jalgaan	Tarsod	52	0	0	24	17	6.9	0	0
12	Jaigaon	Dhanore Kh	37	25	0	23	0	14	0	1.2
13	Frandal	Khedi Kh.	46	21	0	27	0.8	4.5	0	0
14	ETAILUUT	Dapori	38	31	0	22	0	7.3	0	1.5
15	Dovor	Mangalwadi	40	58	0	1.5	0.8	0	0	0
16	Kavei	Bhamalwadi	34	52	4.4	9.1	0	0	0	0
17	MIN	Kothe	33	53	0	14	0	0	0	0
18	winagar	Kund	73	0	0	20	0.4	3	0	3.7
		Average	56	14	0.4	21	5.0	2.5	0.5	0.6

Source: Data Obtained From Village Survey

Table No. 2 showing the proportion of area under different crops in surveyed villages. From this table it is clear that cotton is the major crop in this region.

Chart No.1 reveals that out of the total area about 56% area is covered by cotton crop followed by food grains and banana 21% and 14% respectively. During the field survey researcher has asked the question to the farmers "*why they are giving first priority to producing cotton crop in large scale*"? Many farmers have given the following opinions.

- Cotton is the one of the important cash crop.
- Lowest fluctuations of the prices. The prices are more or less stable in a specific range.
- Farmers are quite satisfied to get market price.
- After the monsoon it requires the least water for irrigation than the other cash crops such as sugarcane and banana. If the irrigation facilities are available the production may be increased, consequently the income from the cotton crop may be increased.

To considering the above opinion by the farmers it is concluded that cotton has become the major crop in the surveyed villages.



Chart No.2 is showing the village wise cropping pattern of the surveyed villages. This chart clears that cotton is the major crop in all villages except the village Mangalwadi, Bhamalwadi, and Kothe. Village Lakh in the Pachora tehsil ranks first in the production of cotton crop, followed by Hingone Kh. Vadhode, Majare Hol, Dokalkheda, Rukhankheda, Hingone Sim and Bhortek. In these villages out of the total cropped area more than 50% area is covered by cotton crop.

Mangalwadi, Bhamalwadi, and Kothe these are major banana producing villages located near the Hatnur dam, therefore the ground water level is sound there.



CONCLUSION:

- 1. In the sample villages about <u>56% area is covered by cotton crop</u> followed by food grains and banana 21% and 14% respectively.
- 2. Cotton is the major crop in all villages except the village Mangalwadi, Bhamalwadi, and Kothe.
- 3. Village Lakh in the Pachora tehsil ranks first in the production of cotton.
- 4. Mangalwadi, Bhamalwadi, and Kothe these are major banana producing villages.

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Macrofungi of Pal forest range Jalgaon

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Abstract :- In present investigation biodiversity studis emploing the survey method were carried out to record mushrooms and macrofungi from Pal forest. The study recorded 20 different types of macrofungi inclusive of several mushrooms, prominent among them being the genera *Aucularia*. *Daldinia*, *ganoderma*, *Laccaria*, *Mycena*, *Schizophyllum*, *Polyporus*, *Xylaria* among several others details of which, as wekk as ecological significance and economic importance of the types recorded in, are mentioned in the research paper.

Key wards: biodiversity, mushroom, macrofungi, polyporaceae, pal forest.

Introduction

Macrofungi are mushroom play important roll in forest escosystem. In the equally interesting to trace the origin of vernacular names of mushrooms. While some, such as amethysttallowgill, those like chest nut bolet, saffron millkcap, scarket hood and yellow morel have names referring to their colours: those like slippery jack, waxycap, velvety psathyrella and smooth volvariella have reference to texture, those such as biter bollet and pungent fiber head refer to taste, while honey mushroom, shell fish scented russula, soap scented trich and sweet bread mushroom bear reference to aroma and flavor, like of black trumpet, pear shaped pullball.

On the diatery frontier, no other food is so wrapped in mystery as he mushrooms (Behl, 1998). Their food value is well acclaimed (Shukla 1991: Patil .2013). hower everdistinguishig between the poisonous and ediable once is a matter of expertise (Khaund and Joshi, 2013.), Cultivation of ediabl mushroomsis a science in itself that has been in the limelite of research (Ram ,2007; Sharma and Thakur 2010) and trend to chaching diatary deficiency of remote area. Amoung the several other used mushroom and macrofungi are their agricultural (Tibuwah,2012; Sendi *et*, *al* 2013), dying, as exhibition articles, as hallucinogens (Kolet and Sonparate, 2011). in spite of the aspects, literature on macrofungi from pal forest. Hence the current investigation was undertaken to study and document mushrooms and macrofungi from pal forest.

Study site :- Pal foreat range Jalgaon (Satpuda range).

Material and Methad s

The study was carried out by empling the survey mthed for collection and documentation of data during the monsoon and post- mansoon season from June to November 2016-17 & 2017-18:wherein a survey of all specimens of macrofungi was carrid out in the area of study. The specimens were identified from standerd literature (

Bakshi, 1971;Keizer,1997; Polese, 2000) and techniques suggested by Buczacki (1992)and (1999).

Result and Discussion

Total 20 types of macrofungi, comprising 17 genera, were recorded during the investigation. Amoung the fungi recocorded 5 forms comprising 3 genera belonged to Ascomycetes, while 20 forms 17 genera were member of Basisiomycetes. The result of the survey are present table 1. Forms such as *Aricularia auricular*, *Daldinia concentric*, *Schizophyllum commune* and *Xylaria sp.* (1) were not uncommon and prominently represented. The current study reveld a rich biodiversity of macrofungi pal forest range Jalgaon.

S. No	Botanical Name	Habitat
	Basidiomysetes	
1	Auricularia auricula	Decaying wood
2	Cantharellusvsp.	Decaying wood
3	Polyporus rubidus	Decaying wood
4	Poria sp.	Decaying wood
5	Agaricus sp.	On humus
6	Trametes sp	Decaying wood
7	Daedalea sp.	Decaying wood
8	Daedaleopsis sp.	Decaying wood
9	Ganoderma lucidum	Decaying wood
10	Sparassis crispa	Decaying wood
11	Mycena sp	Decaying wood
12	Lantinus sp.	Decaying wood
13	Lenizitus sp	Decaying wood
14	Marasmius sp.	Decaying wood
15	Chlorophyllum sp	Decaying wood
16	Amnitia sp.	On soil
17	Pleurotus sp.	Decaying wood
	Ascomycetes	
18	Daldinia concentrica	Decaying wood
19	Xylaria sp.	Decaying wood
20	Hypoxylon sp.	Decaying wood

Table no 1

Conclusion

The survey of mushroom and macrofungi was conducted during monsoon and post momnsoon in current year 2016-17 & 2017-018 from pal forest range jalgaon, India. Total 20 types of mushrooms & macrofungi, belonging to 17genera, were recorded during the study. Amoung them 17 belongs to Bsidiomycetes and 03 genera from Asccomycetes .All the macrofungi exhibit wood rotting activity and carbonic cycle in biosphere

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Studies of Stability constant of Drug molecule [Losartan] with different transition metal ion at constant ionic strength at 303° K

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Abstract:-

The formation of complexes of drug molecule [Losartan] with transition metal ions at 0.02 M ionic strength at room temperature in 10% ethanol:water mixture with various combinations was investigated at 303°K by pH-metric titration technique. The value of proton ligand stability constant [pK] and metal ligand stability constant [log K] calculated from experimental data . it is observed that the metal ions form 1:1 and 1:2 complexes with drug molecule [Losartan].

Introduction: -

The studies of metal-ligand complexes in solution of a number of metal ions with Schiff bases, mannich bases, carboxylic acids, oximes, etc. would be interesting which throw light on the mode of storage and transport metal ion in the biological kingdom.

In the earlier papers extensive data base on metal complexes with substituted heterocyclic drugs was presented.

Hong-Wen Gaoet.al.[1] has studied the stability constant of Cu (II) and Co (II) complexes with CNBAC in water sample spectrophotometrically. Mathieu W.A. Steenland et.al.[2] studies stability constant of Cu(II) and Ni(II) complexes of trans – dioxopentaaza macrocycles in aqueous solution by different technique. Narwade et.al. [3] studies the Formation and Stability constant of thorium (IV) complex with some substituted pyrazolines. Tuba Sismanoglu [4] have studied the stability constant of binary complexes of Nicotinamide with Mn (II) by pH metrically. He also determines change in free energy, change in enthalpy and change in entropy from stability constant at different temperature. Tekade et.al. [5] have been studied complex formation of Cu (II) and Co (II) metal ion complex with substituted isoxazolines. O.Yamauchi et.al. [6] studied stability constant of metal complexes amino acids with charged side chain by pH–metrically. Hayati Sari et.al.[7] studied the stability constant of glyoxime derivative and their Nickel, Copper, Cobalt and Zinc complexes potentiometric and theoretically.

After review of literature survey the detail study of complex under identical set of experimental condition is still lacking. It was thought of interest to study the chelating properties of substituted heterocyclic drugs under suitable condition with transition metal by pH metrically.

Experimental Details :-.

The stock solution of losartan drug was prepared in 10 % Ethanol-Water mixture by dissolving the requisite quantity of the ligands in a minimum volume of solvent subsequently diluted to the final volume. The ligands were acidified with HCl in a 10 % Ethanol-Water mixture and the overall ionic strength of solution was constant maintains by adding(0.1M) NaCl The solutions were titrated with standard NaOH (0.2N) solution . The following three solutions were titrated separately against standard NaOH

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1. Free HCl (A)
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2. Free HCl + Ligand (A+L)

3. Free HCl+ Ligand +Metal ion (A+L+M)

The pH meter reading were taken after fixed interval until stable reading was obtained and data obtained from each titration is plotted as pH Vs volume of NaOH added.

Materials and Method:-

pH measurement were carried out with equip-tronic EQ-610 pH meter (aecuracy \pm 0.01 units) using combine glass electrode at room temperature. Metal ions solution were prepared in triply distill water and concentration estimated by standard method.[8] The solution of drug prepared in solvent .The pH metric reading in 10% ethanol – water mixture were converted to [H⁺] value by applying the correction proposed by Van Uitert Haas. The overall ionic strength of solution was constant and calculated by the equation

$$\mu = \frac{1}{2} C_i Z_i^2$$

The concentration of other ion in addition to Na^+ and Cl^- were also taken into consideration.

Result and discussion:-

Substituted heterocyclic drugs may be ionized as acid having replaceable H^+ ion from -NH group. Therefore it is represented as HL i.e.

HL \longrightarrow H⁺+L⁻

The titration data used to construct the curves between volume of NaOH and P^{H} . They are called acid-ligand titration curves.

It is observed from titration curves for all systems ligand start deviating from the free acid curves at P^H 2.5 and deviating continuously up to P^H =9.5. The deviation shows that dissociation of proton in substituted drugs.

The average number of proton associated with the ligand

 (n_A) was determined from free acid and acid – ligand titration curves employing the equation of Irving and Rossotti [9]. The P^k values were determined from formation curves $(n_A v^s P^H)$ by noting the P^H at which $n_A = 0.5$. The accurate values of pk were calculated by point wise calculations which are presented in table -1. The pK values are found.

Table-1

Determination of proton- ligand stability constant (pK) at 0.02M ionic strength

System	Constant pK				
	Half integral	Point wise calculation			
Losartan	05.65	5.50 ± 0.05			

METAL -LIGAND STABILITY CONSTANT (Log k):-

Metal-ligand stability constant of transition metal ion chelate with drug were determined by employing Bjerrum calvin P^H metric titration method as adopted by Irving and Rossotti . The formation of chelate between transition metal ion with drug was indicated by the significant separation starting from pH =2.4 for transition metal ion with ligand.

System	Logk ₁	Logk ₂	$Logk_2$ - $Logk_1$	$Logk_2 / Logk_1$
Cu(II)-Ligand	2.57	4.05	1.48	1.5758
Ni(II)-Ligand	2.82	4.53	1.71	1.6063
Co(II)-Ligand	2.46	4.10	1.64	1.6666
Fe(II)-Ligand	2.58	4.26	1.68	1.6511
Mg(II)-Ligand	2.45	3.88	1.43	1.5836

Table-2 Determination of metal –ligand stability constant (logK) of transition metal ion with drug at 0.02M ionic strength .

The result shows the ratio of $Logk_2/Logk_1$ is positive in all cases. This implies that there is little or no steric hindrance to the addition of drug molecule .

Acknowledgements

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Assessment of Physico-chemical Properties of Waste Water after Treatment with Adsorbents

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Abstract:

Living organism cannot survive without water because water is most essential thing for every living thing. Now day water pollution become universal problem. Natural water lands becomes polluted due to human activity, industrial waste, agricultural waste, sewage water discharge. In the present study waste water goes out from chemistry laboratory of J.D.M.V.P.S. A.S.C. Nutan Maratha College Jalgaon, is collected and its physico-chemical properties were checked then this water sample treated with dried corn cob powder and dried Sugarcane Bagasse after filtration of this water sample all physico-chemical parameter were re-analyzed. Comparison of these analytical values with standard values it was found that values of all physic-chemical parameters decreases and comes within standard limits.

Key Words:

Water pollution, waste water, waste water treatment, natural adsorbents

1. Introduction:

Water is second most essential thing to survive living organism after air. Water is viability, but it should be pure. Water pollution is large problem in present situation. Water sources become polluted due to various human activities like Industrial biproducts, agricultural waste, sewage etc. Urbanisation and prolonged discharge of industrial effluents, domestic waste, sewage and solid waste dump cause ground water polluted and create health problem[1] This polluted water is harmful for flora and fauna. In the present work the investigator attempt to overcome the problem of polluted water goes out from the Chemistry laboratory of J.D.M.V.P.S. A.S.C. Nutan Maratha College Jalgaon. The number of students in chemistry department of J.D.M.V.P.S. A.S.C. College Jalgaon is from class Higher secondary to postgraduate and Research. A large number of students, when they perform experiment the chemical waste are throwaway in basins which go out to environment through pipes. In the present study this chemical waste water is collected from the pipes of chemistry laboratory and physic-chemical parameter like pH, Electrical conductance, Total hardness, Total dissolves solids, Turbidity, sulphate and chloride were analyses according to standard methods give by APHA [2], then this polluted water is treated with dried corn cob powder and dried Sugarcane Biogases, after filtration all the physic-chemical parameters are re analysed and compared with standard values. Corn cob power and dried Sugarcane Bagasse powder are harmless to living things, easily available low cost and completely biodegradable. The results of this investigation were quite good.

2. Material and Methods:

In the current investigation the corn cobs were collected from local farmers. These corn cobs cut in to small pieces then dried in sun light. Dried corn cob was converted in to powder by grinding similarly Sugarcane Bagasse were soaked in dilute HCl for 24 Hours then wash with water thoroughly to remove dust ,colour causing material and lignin, then it is dried and grind to powder. Laboratory waste water is collected from the out let of chemistry laboratory when students were performing experiments. Physico-chemical properties like pH, EC, Total hardness, Total dissolved solids, Turbidity, Sulphate, chloride were analysed by standard methods given by Goel & Trivedi & APHA. Then in two different containers dried corn cob powder and dried Sugarcane Bagasse is taken 50 ml of waste water is added to both the containers and stirrer vigorously after 20 minutes the water samples were filtered by the use of filter paper. All the physico-chemical parameters were reanalyzed and compared with standard values (WHO)

3. Result and Discussion:

Sr.No	PARAMETER	BEFORE TREATMENT WITH ADSORBENTS	AFTER TREATMENT WITH CORN COB POWDER	AFTER TREATMENT SUGARCANE BAGASSE	WHO STANDARD
1	PH	4.6	8.5	6.9	6.5-8.5
2	Electrical conductance in μ mhos/cm	521.3	320.2	279.0	
3	Total Hardness- mg/lit	628.7	317.8	310.3	500
4	Total Dissolve -Solids mg/lt	592.0	230.2	211.1	500
5	Turbidity - NTU	16.9	5.3	5.00	5
6	Sulphate mg/lt	381	213	180.2	200
7	Chloride mg/lt	480.2	231	203.2	250

Table 1	l
---------	---

3.1 _PH:

 $_{\rm P}$ H of the gives idea about acidity and alkalinity of the solution. The $_{\rm P}$ H value of water sample collected for analysis before treatment with natural adsorbents was 4.6. This value indicates that water sample is highly acidic this is due to presence of strong acids in waste water collected from chemistry laboratory, but it increases to 8.5 and 6.9 after treatment with corn cob adsorbent and dried sugar cane Bagasse respectively. The hydrogen ion concentration of water is considered as an index of environmental conditions. According to Boyd and Pillai [3.]better fish production could possible in pond water with $_{\rm P}$ H 6.5 to 9.0. The _PH 6.9 and 6.6 of the water sample after treatment with adsorbents was found within standard limits of WHO (6.5-8.5) this pH is not harmful for the life of fishes also. But before treatment with adsorbents the _PH of the water sample was towards acidic side(4.6) which is not good for flora and fauna.



Figure 1. pH Graph

3.2 Electrical conductance:

Electrical Conductivity (EC) is a measure of the capability of a substance to conduct Electrical conductance is due to presence of electrolytes in the water sample. Higher value of electrical conductance in waste water collected for physico- chemical analysis indicates presence of large number of electrolytes in waste water sample. In present study EC value in water sample before treatment with corn cob adsorbent was found 521.3 μ mhos/cm but it reduce to 320.2 and279.0 μ mhos/cm after treatment with corn cob adsorbent and dried sugarcane Bagasse respectively. Electrical conductance affects the taste of water [4].





3.3 Total Hardness :

Total hardness in water sample before treatment with natural adsorbent was 628.7 mg/lt which is more than permissible value given by WHO, but it reduces to 317.8 and 310.3 mg/lt after treatment with corn cob adsorbent and sugarcane Bagasse powder respectively comes with in permissible limits given by WHO. Use of hard water causes excessive soap consumption in home, laundries, textile and paper industries [5].



Figure 3. Total Hardness

3.4 Total Dissolve Solids :

Water containing high TDS concentration may cause Laxative or constipation effect [6].Total dissolved solid in waste water sample was found 592.0 mg/lt. before treatment with adsorbent. This value was more than standard permissible value given by WHO. When this waste water sample is treated with adsorbent it decreases to 230.2 mg/lt with treatment with corn cob adsorbent and 211.1mg/lt with sugarcane Bagasse powder adsorbent. It comes under standard limits.





3.5 Turbidity:

Turbidity is an expression of the optical property that causes light to be scattered or absorbed rather than transmitted in straight lines through a water sample. Turbidity can raise surface water temperature above normal because suspended particles near the surface facilitate the absorption of heat from sunlight[7]. Turbidity in water is resulted by the presence of suspended matter such as clay, silt, finely divided organic and inorganic matter, plankton, and other microscopic organisms.

Turbidity in water sample collected from outlet of chemistry laboratory was observed 16.2 NTU which is very high, but after treatment with corn cob adsorbent it reduces to 5.5 NTU

and with sugarcane Bagasse the value was found 5.3 NTU both the values come close to standard value given by WHO.



Figure 5. Turbidity Graph

3.6 Sulphate:

Sulphate in water sample before treatment with adsorbent was noted 381.00 mg/lt. This value is very higher than standard value of sulphate given by WHO. After treatment with corn cob adsorbent sulphate level reduces to 213 mg/lt and with sugarcane Bagasse it was 180.2mg/lt which come close to WHO standard 200 mg/lt.High level of sulphate gives a bitter taste to water [8].



Figure 6. Sulphate Graph

3.7 Chloride:

High concentration of chloride may result both from natural and anthrophogenic sources such as run off containing salts, the use of inorganic fertilizers, landfilleaches, septic tankwaste, animalfeeds, industrial effluents, irrigation drainage [9]

Chloride in untreated water sample was found 480.2 mg/lt. This value is too large than that of standards of WHO, but after treatment with corn cob adsorbent it reduces to 231 mg/lt and 203.2 mg/lt with sugarcane Bagasse . This value is little more than standards. After

treatment it reduces to 246.2 mg/lit and 252.8 mg/lt with treatment with both adsorbents respectively.



Figure 7. Chloride Graph.

4. Conclusion:

From the present investigation it is observed that the drain water goes out from chemistry laboratory is highly chemical polluted. All the parametric values in the sample is beyond standard limits given by WHO. This waste water sample when treated with dried corn cob powder and Sugarcane Bagasse powder as a adsorbent the $_{P}H$ value comes under the standard permissible level but with Sugarcane Bagasse powder investigators get better result. E.C. also decreases with both the adsorbents. Parametric values like Total Hardness, Total dissolved solids, Turbidity were found beyond permissible level in untreated sample but after treatment with dried corn cob powder and dried Sugarcane Bagasse powder as adsorbent these value comes under permissible limit. Sulphate and chloride value were found beyond the permissible value after treatment with adsorbent, sulphate decreases more than that of chloride.

The overall result of use of these natural dried adsorbents was very good, but use of dried Sugarcane Bagasse powder as adsorbent gives better results for all parameters. Corn cob and dried Sugarcane Bagasse powder is bio degradable easily, available and economically good.

5. Acknowledgement:

Author is thankful to the principal J.D.M.V.P.S. A.S.C. College Jalgaon for permission and providing facilities to carry out this work.

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Presentation under – Sectional Session Animal, Veterinary and Fishery Sciences Antipyretic activity of successive extract of flowers of Sphaeranthus indicus Linn. in rat

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ABSTRACT

Pyrexia or fever is caused as a secondary impact of infection, malignancy or other diseased states. Plant has shown potential for used of in treatment of inflammatory. Thus, there is every possibility of developing new useful drugs from medicinal plants with a long history of human use. To search an ideal antipyretic agent of plant origin and its comparison with standard drug to isolate and purify the acute ingredient from the flowers of *Sphaeranthus indicus* by advance technology. Animals with approximately constant rectal temperature were selected for the study. Rats of either sex were divided into seven groups of six animals each. Pyrexia was induced by injecting 20% aqueous suspension of Brewer's yeast 2 ml/kg body weight in normal saline, subcutaneously, below the nape of the neck. Rectal temperature was recorded by clinical thermometer immediately after Brewer's yeast injection, at -18 h and after 18 h that is 0 h. Ibuprofen (standard) (50 mg/kg b.w.p.o), acetone, chloroform, methanol and aqueous extracts at a dose 500 mg/kg b.w.p.o) in Tween-80 were administered orally. A control group was given 0.3 ml normal saline. The temperature was recorded at 1, 2 and 3 after drug administration. At the dose of 500 mg/kg body weight Chloroform, Methanol and

Aqueous extract significantly reduce elevated rectal temperature, $37.07 \pm 0.54^{\circ}$ C and $36.21 \pm 0.25^{\circ}$ C and $37.87 \pm 0.25^{\circ}$ C respectively compared to control ($39.07 \pm 0.66^{\circ}$ C) at 3th h. It can be concluded that, the antipyretic activity of the *Sphaeranthus indicus* extract is attributed due to flavonoids present in it.

Key words: Antipyretic activity, Sphaeranthus indicus Linn.

Introduction

Pyrexia or fever is caused as a secondary impact of infection, malignancy or other diseased states. It is the body's natural defense mechanism to create an environment where infectious agent or damaged tissue cannot survive (Chattopadhaya et al., 2009). Normally the infected

or damaged tissue initiates the enhanced formation of pro-inflammatory mediator's (cytokines like interleukin 1 β , α , β and TNF- α), which increases the synthesis of prostaglandin E2 (PGE2) near peptic hypothalamus area and thereby triggering the hypothalamus to elevate the body temperature (Khan et al., 2007). The temperature regulatory system is governed by a nervous feedback mechanism, so when body temperature becomes very high, it dilates the blood vessels and increases sweating to reduce the temperature, but when the body temperature becomes very low, hypothalamus maintains the internal temperature by vasoconstriction. High fever often increases faster disease progression by increasing tissue catabolism, dehydration and existing complaints, as found in HIV (Paschapur et al., 2009). Most of the antipyretic drugs inhibit cyclooxygenase (COX-2) expression to reduce the elevated body temperature by inhibiting PGE-2 biosynthesis (Cheng et al., 2005). Moreover, these synthetic agents irreversibly inhibit COX-2 with high selectivity but are toxic to the hepatic cells, golmeruli, cortex of brain and heart muscles, whereas natural COX-2 inhibitors have lower selectivity with fewer side effects (Cheng et al., 2005). A natural antipyretic agent with minimal or no toxicity is need of time. Sphaeranthus indicus is an old traditional medicament used for various diseases. Hence, the present study is designed to determine the antipyretic effect of successive extract of flowers of Sphaeranthus indicus using animal model.

Aim and objective

It is well established that secondary metabolites obtained from plant material are Alkaloids, Cynogenic glycosides, Flavonoids, Tannins and Phenolic compounds possesses various biological activity. Plant has shown potential for used of in treatment of inflammatory. Thus, there is every possibility of developing new useful drugs from medicinal plants with a long history of human use. To search an ideal antipyretic agent of plant origin and its comparison with standard drug to isolate and purify the acute ingredient from the flowers of *Sphaeranthus indicus* by advance technology.

Materials and methods

Sphaeranthus indicus Linn is well known in India and from many years as one of the most versatile medicinal plant having a wide spectrum of biological activities. The herb is employed as a fish-poison to remove notorious fish from fish nurseries. It is also stuffed into nesting furrows of crabs to kill them (Kirtikar and Basu, 1993). Antitubercular (Kirtikar and Basu, 1993; Chopra et al., 1956), Anthelmintic (Said, 1956), cures chest-pains, cough, bowel complaints, piles, depurative and has tonic properties. Styptic, useful in liver and gastric

disorders (Chadha, 1976). In unani, the herb is used as laxative, emmenagogue and also it increases the apetite, enriches the blood, lessens, inflammations, cools the brain, gives luster to the eyes, good for sore eyes, jaundice, scalding of urine, gleet, biliousness, boils, scabis, ringworm in the waist, diseases of the chest. The plant is traditionally used for diarrhea (Girach et al., 1994). The whole herb is used in ayuervedic preparation to treat epilepsy and mental disorder. Leaves dried in the shed and powdered are used in doses of 20 grains twice a day in chronic skin diseases as an antisyphylitic and nervine tonic (Nadkarni, 2007 and Prajapati et al., 2003). S. indicus was used to prevent damage by insect pests during storage (Patole and Mahajan, 2007). Flowers are tonic, cooling, alterative and used in conjunctivitis (Chopra et al., 1996) and gives strength to weak eyes (Galani et al., 2011) and also wound healer (Chopda et al., 2010 and Jha et al., 2011).

Collection of plant

The plant is collected from North Maharashtra Region in the period of May 2011. Theplant *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 from North Maharashtra Region Jalgaon District, Maharashtra State, India. The plant flowers were shade dried. After complete drying the material was crushed and grinded to form coarse powder. One kg of dried powderedplant material was exhaustively extracted in Soxhlet apparatus with successive solvents. The successive extracts so obtained were then filtered to remove any suspended impurities. Extracts were concentrated under reduced pressure and controlled temperature (55°C to 60°C) and preserved in dry, cool condition in desiccator. Thus, the successive extracts obtained were screened for their antipyretic activity in rat model.

Animal used The albino rat (*Ratus norvegicus*) of either sex and of approximately the same age, weighing between 180-200gm were procured and they were individually housed, maintained in clean polypropylene cages under standard environmental conditions of temperature $27 \pm 2^{\circ}$ C, 12 h light/dark cycle in a registered animal house of Moolji JaithaCollege, Jalgaon. The animals were fed with standard pellet diet and water *ad libitum*. The experimental protocols 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).

Antipyretic assay

The antipyretic activity of successive extract of flowers of Sphaeranthus indicus on Brewer's

yeast induced pyrexia was evaluated in rats (Hajare et al., 2000). Animals with approximately constant rectal temperature were selected for the study. Rats of either sex were divided into seven groups of six animals each. Pyrexia was induced by injecting 20% aqueous suspension of Brewer's yeast 2 ml/kg body weight in normal saline, subcutaneously, below the nape of the neck. Rectal temperature was recorded by clinical thermometer immediately after Brewer's yeast injection, at -18 h and after 18 h that is 0 h. Ibuprofen (standard) (50 mg/kg b.w.p.o), Chloroform, Acetone, Methanol and Aqueous (500 mg/kg b.w.p.o) in Tween-80 were administered orally. A control group was given 0.3 ml normal saline. The temperature was recorded at 1, 2 and 3 h after drug administration.

Statistical analysis All data were expressed as mean \pm SE and the ANOVA was applied to determine the significance of the difference between the control group and experimental groups.

Results and discussion The results of effect of successive extract of flowers of *Sphaeranthus indicus* on Brewer's yeast induced pyrexia in rats are given in Table 1. After the induction of pyrexia the control rats remained hyperpyretic throughout the duration of the experiment. At the dose of 500 mg/kg body weight Chloroform, Methanol and Aqueous significantly reduce elevated rectal temperature 37.07 ± 0.54 °C and 36.21 ± 0.25 °C and 37.87 ± 0.25 °C respectively compared to control (39.77 ± 0.66 °C) at 3th h. Recently, Nanda et al., (2009) evaluated the antipyretic activity of whole parts of *S. indicus*. They found that chloroform, ethanol and aqueous extract of *S. indicus* suppressed yeast induced fever in rats at a dose of 200 and 400 mg/kg body weight.

Hours	-18	0	1	2	3
Groups					
Control	37.04 ± 0.10	37.18 ± 0.64	37.70 ± 0.77	38.76 ± 0.53	39.07 ± 0.66
placebo	37.44 ± 0.19	37.62 ± 2.13	37.75 ± 1.82	39.01 ± 0.95	39.77 ± 0.66
Ibuprofen	37.57 ± 0.26	37.27 ± 0.99	37.63 ± 1.40	38.86 ± 0.88	37.59 ± 0.47
Chloroform	36.60 ± 0.40	37.62 ± 0.67	37.65 ± 1.15	$37.35 \pm 0.30*$	$37.77 \pm 0.54*$
Acetone	37.02 ± 0.30	37.40 ± 0.52	37.35 ± 0.45	37.85 ± 0.96	38.05 ± 0.13
Methanol	37.10 ± 0.18	37.88 ± 1.92	38.23 ± 1.11	$37.38 \pm 0.69 **$	$36.21 \pm 0.25^{***}$
Aqueous	37.24 ± 0.19	37.65 ± 1.35	38.45 ± 3.86	39.02 ± 0.15	$37.87 \pm 0.25*$

Table 1 Antipyretic activity of the successive extract of flowers of Sphaeranthus indicus in rat

Std. = 50, Chloroform, Acetone, Methanol and Aqueous = 500 mg / kg body weight, each value expressed as mean \pm SE, n=6, *P<0.05, **P<0.01and ***P<0.001Vs Control.

Conclusion

The phytochemical investigation of the plant revealed the presence of flavonoids, alkaloids and others. It can be concluded that, the antipyretic activity of the *Sphaeranthus indicus* extract is attributed due to flavonoids present in it.

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Effect of Tulsi extract supplemented diet on hematological parameters of *Cyprinus carpio*.

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Abstract:

Addition of Herbal extract and herbs added to the feed supplement provide more resistant and healthy fish to the aquaculture. The herbal additives are cheaper, easily available and eco friendly with minimum or no side effect to fish and consumer. In this study *Ocimum tenuiflorum* was added as additive in the food supplement in different concentration feed to fishes twice a day, after 15 days the hematological parameters such as red blood corpuscles (R.B.Cs.) and white blood cells (W.B.Cs) were estimated. The result shows the progressive increase in the hematological parameters of *Cyprinus carpio*.

Key words:

Cyprinus carpio, Red blood cells (R.B.Cs.), White blood cells (W.B.Cs.), *Ocimum tenuiflorum*, food supplement.

Introduction:

Now a day's herbal medicines are one of the promising sources of medicines and drugs. Medicinal plants are economically less expensive, effective, easily available and safe to use. Plants are used as medicine in different countries, these are act as potent and powerful drugs (Shrivastava et al.,1996). Plant produces different bioactive molecules (Nair et. al., 2005) these compounds are alkaloids, flavonoids, steroids, resins, tannins and phenolic compounds etc. These compounds are extracted from different parts of the plant to treat various diseases of human beings all over the worlds from ancient time. Various researches in aquaculture reveled that use of herbal medicine is effective on growth parameters in fishes (Rao et al.,2006, Palacios et al., 2006) A large number of medicinal plants have been used for different treatment and growth promotion purpose in aquaculture (Direkbusarakom and Aekpanithanpong 1992, Rao et. al., 2006, Sharma

et.al., 2010, Harikrishnan 2010, 2011 and Kolkovski & Kolkovski 2011). The oral administration of natural plants products promote various activities like growth promotion, stimulations, antimicrobial properties and stress reducer etc.

Ocimum tenuiflorum which belongs to the family Lamiaceae, commonly known as Tulsi, 'Holy Basil' and Mother Medicine of nature. The name given to the Tulsi is due to number of reasons, it have various medicinal properties like- antibacterial (Phadke and Kulkarni 1989), antipyretic
and anti inflammantory (Singh and Majumdar 1995), antiasthmatic effect (Sharma 1983). Tulsi can be used for curing and preventing diseases like- cough and cold, fever and pain. The present study aims to investigate the efficiency of Tulsi suppimentated fish food diet on hemoglobin content changes in *Cyprinus carpio*.



Figure 1 Ocimum tenuiflorum (TULSI)

Material and method:

Collection of fish:

The common carp (*Cyprinus carpio*) weighing about 100- 150 gm were obtained from the local fish farm. Randomly 20 fishes are divided into four different sets. Each aquarium contains 5 fishes with well sufficient aeration, one aquarium was kept for control group (T_0) and remaining three sets were for (T_1 , T_2 and T_3) show the different concentration of *Ocimum tenuiflorum*. The control group (T_0) feed with normal supplemented diet and another three group (T_1 , T_2 and T_3) were feed with 1%, 2% and 3% tulsi supplemented diet.

Preparation of Tulsi (Ocimum tenuiflorum) extract:

The tulsi leaves were collected locally washed in clean water and powered by grinder and sieved. The paste was then incorporated into fish feed at 5Kg/Kg of feed to prepare experimental fish feed diet and tulsi free fish food was used as a control diet.

Preparation of fish food:

Soyabean meal was taken 80 gm in powder form (soya cake) as main component add other ingredients like milk powder 60 gm, corn flour 20gm and egg 70 gm(only egg albumin), agar powder 4 gm as binding agent and add the paste of tulsi of different concentration 5gm, 10 gm, 15 gm for three types of experimental fish food. All the ingredients mix well and boiled cooled at room temperature after cooling add cod liver oil 3.5ml, vitamin mixture of B complex and vitamin E (in capsule). It was kept in refrigerator for 12 hrs, then after 12 hrs squeezed over polythene sheet and dried at room temperature. The dried nodules were crushed into small pellets and sun dried to avoid fungal growth (S. V. Bhosale et. al., 2010).

Experimental design:

Take 20 fishes of about same size and approximate weight randomly divided into 4 groups T_0 (control), T_1 , T_2 , T_3 (experimental group). The control group fishes feed with the plain fish food, and the experimental groups fishes feed with the tulsi supplemented fish food twice a day according to their weight.

Collection of blood:

Each fish was anesthetized with clove oil (Merck Germany) at the rate of 50ml of clove oil per liter of water before collecting blood samples from fish. Blood was drawn out by using 10 ml hypodermal syringe and 24 guage needle. The collected blood was immediately transferred to vial containing thin layer of EDTA to prevent hemolysis and clotting of blood. The RBCs and WBCs counting was performed with the help of Neubauer chamber, under 40X and 10X power of microscope respectively.

Result and discussion:

Table 1: Effect of supplemented fish food diet of different concentration on RBCs and WBCs of *Cyprinus carpio*.

Sr. no.	Groups	R.B.Cs.	W.B.Cs.
		(million/cumm)	(cumm)
1	T ₀	1.66	64,200
2	T ₁	1.70	64.350
3	T ₂	1.73	64,550
4	T ₃	1.77	64,870









Hematological parameters are used as an indicator of fish health status, in various fish species to detect physiological changes followed by different stress conditions (Agrawal and Mhajan 1980). There are many herbal medicines in the world but *Ocimum* tenuiflorum is considered as a queen of herbs. It is well documented in the Ayurveda for its great medicinal value. The present study revealed that there is significant increase in the content of RBCs and WBCs. We can see in the table 1 and Fig. 2 & 3. As the concentration of herbal constituent in the diet increases the RBCs and WBCs also increases .The same results are correlated with the findings in gold fish by Harikrishnan et al., 2003, 2010. In common carp Guojun et al., 2009.

The outcome of this study shows the use of *Ocimum tenuiflorum* seems to have potential as an additive to fish food, which promote growth and minimizes infections in fishes. That will help to produce healthy fishes for consumption.

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Study of Enthalpy,Entropy and Free Energy of Activation of L-Alaline & L-Valine with Distilled Water at Different Temperatures

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ABSTRACT:

Densities and viscosities of liquid mixtures plays an important role in finding their heat content, mass transport, fluid flow and molecular structures etc. excess molar enthalpy of activation and free energy of activation are useful in understanding the nature of intermolecular interactions, dispersion forces and the extent of hydrogen bonding between two liquids. Enthalpy, entropy and free energy of activation have been calculated from the experimental values of density and viscosity of binary liquid mixtures of L-Alaline and L-Valine with water at different temperature. All the mixtures exhibited endothermic enthalpies, entropy of activation are negative over all composition range, its values suggesting weak molecular interaction, dispersive forces and extend of hydrogen bonding between constituent molecules.

Keywords- L-Alaline, L-Valine, Excess molar volume, Excess molar enthalpy.

INTRODUCTION:

The physical properties of every substance depend directly on the nature of the molecule of the substance. The estimation of physical and thermodynamic properties would provide reliable information regarding mixing properties with varying intermolecular interactions may be generated for pure substance and mixtures at any temperature and composition. The present investigations are regarding the molecular association of binary mixtures having L-Alaline and L-Valine with water. In view of the importance mentioned, an attempt has been mode to elucidate the molecular interaction in mixture of L-Alaline and L-Valine with water at 298.15and 308.15 K. Further excess properties are used to explain intermolecular interactions in these binary mixtures. Amino acids, which are the basic components of protein and are considered to be the model compounds of protein molecules, are suitable for better understanding of the interactions occurring between amino acid molecules and the entities present in the living cell. There are studies on volumetric and thermo chemical properties of amino acids in different salt-water mixed solvents, but very few in amino acids with aqueous

solvents. The transport and thermodynamic study on the binary mixtures containing aniline, acetonitrile, ethyl acetate ,toluene and benzonitrile have been reported previously by Ali et al,¹ Nikam et al²⁻⁴ and Gillet al.⁵ Accurate knowledge of thermodynamic and excess properties used to design different industrial process.

EXPERIMENTAL:

L-Alaline and L-Valine (S.D. fine chem.Industries,Mumbai purity 99%) was kept in desiccator containing CaCl₂ For 24hrs after desiccators it is mixed in distilled water with different concentration. The mixtures of the desired composition were prepared by weighing on a HR-120 (A & D Japan) electronic balance with a precision of \pm 0.0001 g. all mixed solvents were prepared by molality. The prepared solution was used within 12hrs.

The densities of pure liquids and binary mixtures were measured by using 15cm³ double arm pycnometer as describe earlier. ²⁻⁴ The Pycnometer was calibrated by using conductivity water with 0.9970 g/cm³ as its density⁶ at 298.15 K. The pycnometer filled with air bubble free experimental liquid was kept in transparent walled water bath for 10-15 min. to attain thermal equilibrium. The position of liquid levels in the two arms was recorded.

The dynamic viscosities were measured using an Ubbelohde suspended level viscometer³⁻⁷, calibrated with conductivity water. An electronic digital stopwatch with readability of \pm 0.01 sec. was used for the flow time measurement, at least three repetitions of each data reproducible to \pm 0.05 sec. were obtained and the result was averaged. Since all flow times were greater than 200 sec. and capillary radius (0.5 mm) was far less than its length (50 to 60mm.). The kinetic energy and corrections respectively were found to be negligible. The uncertainties in dynamic viscosities are of the order \pm 0.003 m Pa s.

THEORY AND CALCULATIONS :

Experimental values of densities (ρ) have been used to calculate excess and thermodynamic properties⁸⁻¹⁰. The free energy of activation of viscous flow ΔG # is calculated as-

Excess molar volume V^E was calculated from the density measurement by the relationships as follows:—

Dynamic viscosities (η) of Choline chloride urea and water mixtures at different temperatures were calculated by the measuring density and flow time of the mixture (Table 1 and Table 2).

The viscosity deviation was calculated by

$$\Delta \eta = \eta - \{x_1 \eta_1 + x_2 h_2\}$$
 ------(3)

The activation parameters ΔG^* , ΔH^* and ΔS^* were determined using Erying and John's equation-

$$\eta = \frac{hN}{V} \exp\left[\frac{\Delta H}{RT} - \frac{\Delta S}{R}\right] \qquad (4)$$

Where η - is viscosity of mixture, h, N and V are Planck's constant, Avogadro's number and molar volume respectively.

Table 1-: Densities, Viscosities, Excess molar volumes and Deviation in viscositiesfor L-Alaline (1) Water (2) at 298.15 and 308.15 K.

Temp (K)	X ₁	ρ (gm/cm ³)	η (mPaS)	V ^E (m ³ mol ⁻¹)	Δη (mPaS)
298.15	0.0003	1.01224	0.05024	-0.2624	-84.030
	0.0010	1.01276	0.04978	-0.2536	-84.016
	0.0019	1.01472	0.04802	-0.2651	-84.116
	0.0090	1.01834	0.04581	-0.1490	-83.740
	0.0100	1.02087	0.04268	-0.1692	-83.968
308.15	0.0003	1.00998	0.04182	-0.2770	-67.055
	0.0010	1.01029	0.04159	-0.2645	-67.032
	0.0019	1.01253	0.04182	-0.2810	-66.948
	0.0090	1.01593	0.03767	-0.1607	-66.886
	0.0100	1.01740	0.03665	-0.1619	-66.922

Temp (K)	X ₁	ρ (gm/cm ³)	η (mPaS)	V ^E (m ³ mol ⁻¹)	Δη (mPaS)
298.15	0.0002	1.0042	0.04955	-0.1217	-84.1069
	0.0009	1.0085	0.04543	-0.1788	-84.4604
	0.0018	1.0092	0.04486	-0.1665	-84.4411
	0.0090	1.0105	0.04579	0.0059	-83.7399
	0.0108	1.01145	0.04272	0.0361	-83.896
308.15	0.0002	1.0014	0.04067	-0.1254	-67.1762
	0.0009	1.0046	0.0366	-0.198	-67.5363
	0.0018	1.0070	0.03713	-0.1836	-67.4231
	0.0090	1.0124	0.03766	-0.0036	-66.8855
	0.0108	1.00945	0.03358	0.0175	-70.172

Table 2- : Densities, Viscosities, Excess molar volumes and Deviation in viscositiesfor L-Valine (1) Water (2) at 298.5 and 308.15K.

Tabel-3- Thermodynamic Activation Parameters for the L-Alaline+ Water sytem.

N7	Δ H^# x 10 ⁻³	∆ S^#	$\Delta G^{*} = x 10^{-3} (J mol^{-1})$		
X1	(J mol ⁻¹)	(JK ⁻¹ mol ⁻¹)	298.15K	308.15K	
0.0003	13.4294	-0.10489	13.3982	13.4371	
0.0010	12.0557	-4.43971	13.3794	13.4238	
0.0019	11.2583	-6.98162	13.3399	13.4097	
0.0095	13.7096	-1.55546	13.2458	13.2503	
0.0100	12.6644	-4.9444	13.1903	13.1408	

Tabel-4- Thermodynamic Activation Parameters for the L-Valine + Water system.

X 7	$\Delta H^* \times 10^{-3}$	ΔS	$\triangle G^* \ge 10^{-3} (J \text{ mol}^{-1})$		
X ₁	$X_1 \qquad (J \text{ mol}^{-1}) \qquad (JK^{-1} \text{ mol}^{-1})$	(JK ⁻¹ mol ⁻¹)	298.15K	308.15K	
0.0002	15.01662	0.24829	13.3889	13.4014	
0.0009	14.61001	-1.85967	13.1610	13.1725	
0.0018	13.14354	-3.33449	13.1494	13.1660	
0.0090	11.71111	-6.38515	13.1281	13.1442	
0.0108	10.24580	-10.5945	13.1167	13.1208	

RESULTS AND DISCUSSION:

The experimental values of density, viscosity, excess volume and viscosity deviation are presented in Table 1 and Table 2. The sign and magnitude of V^E gives a good estimate to the strength of unlike molecular interactions in the solution phase. Positive V^E indicates the weak interactions, whereas, large negative values of V^E are found, when these interactions are strong. In the present investigation, the values of excess molar volumes are found to be negative indicating strong hydrogen bonding interaction for the entire mole fraction of L-Alaline and L-Valine with water.

The magnitude of $\Delta \eta$, the sign and extent of deviation of this property from ideality depends on the strength of interaction between unlike molecules. The excess viscosity gives the strength of the molecular interaction between interacting molecules; the large negative values of excess viscosity for all the systems can be attributed to the presence of the dispersion, induction and dipolar forces between the components.

The observed values of ΔH^* and ΔG^* for the binary mixture are positive as shown in Table 3 and Table 4. The enthalpy of activation depends on geometrical effect as well as intermolecular interaction¹¹⁻¹³. The values of $\Delta H^{\#}$ are positive for the binary mixtures of L-Alaline and L-Valine with water for entire composition range, suggesting the presence of specific interaction between constituent molecules. A close perusal of Table 3 and Table 4 show that the mixture exhibited endothermic enthalpies which increased quasi-exponentially and then decreased with increasing concentration of L-Alaline and L-Valine. The negative values of $\Delta S^{\#}$ indicate that the formation of activated complex introduces molecular order probably due to interactions between the two components of mixtures. The values of $\Delta G^{\#}$ are positive for all the binary systems studied at all temperatures and the values of $\Delta G^{\#}$ are increases as temperature increases⁹⁻¹³.

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Disaster Management in India

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Abstract

India has been traditionally vulnerable to natural disasters on account of its unique geoclimatic conditions. Floods, droughts, cyclones, earthquakes and landslides have been a recurrent phenomenon. At the global level, there has been considerable concern over natural disasters. Even as substantial scientific and material progress is made, the loss of lives and property due to disasters has not decreased. Disaster management occupies an important place in this country's policy framework as it is the poor and the under-privileged who are worst affected on account of calamities/disasters. Disasters retard socio-economic development, further impoverish the impoverished and lead to diversion of scarce resources from development to rehabilitation and reconstruction. The new approach of Government of India proceeds from the conviction that development cannot be sustainable unless disaster mitigation is built in to the development process.

Introduction:-

Disaster management is the discipline of dealing with and avoiding both natural and manmade disasters. It involves preparedness, response and recovery in order to lessen the impact of disasters. All aspects of emergency management deal with the processes used to protect populations or organizations from the consequences of disasters, wars and acts of terrorism. Disaster management doesn't necessarily avert or eliminate the threats themselves, although the study and prediction of the threats is an important part of the field. The basic levels of emergency management are the various kinds of search and rescue activity. India is exposed to various natural hazards and disasters like drought, flood, cyclones, earthquake etc. year after year. While all the states and union territories in the country are likely to face one or a combination of disaster situation. Disasters occur with unfailing regularity and despite better preparedness to meet all such contingencies, the economic and social cost and account of losses caused by the natural disasters continued to Mount year after year the main Hazard in India are caused by earthquakes, droughts, floods and cyclones since the beginning they have been causing heavy losses of life and property facing man to learn to live with natural disasters.

Disaster management can be defined as the organization and management of resources and responsibilities for dealing with all humanitarian aspects of emergencies, in particular preparedness, response and recovery in order to lessen the impact of disasters. The whole cycle of Disaster Management can be depicted by following figure.



Figure: Etymology

Source of Data - Secondary Data

Definition of Disaster Management

The organization and management of resources and responsibilities for dealing with all humanitarian aspects of emergencies, in particular preparedness, response and recovery in order to lessen the impact of disasters.

Objectives of Disaster Management

- 1. Identifying the hazard and its cause.
- 2. Reducing vulnerability and potential losses of hazard.
- 3. Assessing, reviewing and controlling the risk.
- 4. Increasing the strength among people to survive against disasters.
- 5. Increasing the availability, safety of natural resources.

Types of Disaster

Primarily disasters are triggered by natural hazards or human-induced, or result from a combination of both. In particular, human-induced factors can greatly aggravate the adverse impacts of a natural disaster. Even at a larger scale, globally, the Inter-Governmental Panel on Climate Change (IPCC) has shown that human-induced climate change has significantly increased both the frequency and

intensity of extreme weather events. While heavy rains, cyclones, or earthquakes are all natural, the impacts may, and are usually, worsened by many factors related to human activity. The extensive industrialization and urbanization increases both the probability of human-induced

disasters, and the extent of potential damage to life and property from both natural and humaninduced disasters. The human society is also vulnerable to Chemical, Biological, Radiological, and Nuclear (CBRN) disasters.

Natural Disasters

1) Geophysical:

Geological process or phenomenon that may cause loss of life, injury or other health impacts, property damage, loss of livelihoods and services, social and economic disruption, or environmental damage. Hydro-meteorological factors are important contributors to some of these processes. Tsunamis are difficult to categorize; although they are triggered by undersea earthquakes, and other geological events, they are essentially an oceanic process that is manifested as a coastal water-related hazard.

2) Hydrological:

Events caused by deviations in the normal water cycle and/or Over flow of bodies of water caused by wind set-up.

3) Meteorological:

Events caused by short-lived/small to meso-scale atmospheric processes (In the spectrum from minutes to days)

4) Climatological:

Events caused by long-lived meso - to macro-scale processes (in the spectrum from intraseasonal to multi-decadal climate variability)

5) Biological:

Process or phenomenon of organic origin or conveyed by Biological vectors, including exposure to pathogenic micro-organisms, toxins and bioactive substances that may.

Manmade Disasters

It is rise in population, rapid urbanization and industrialization, development Within high-risk zones, environmental degradation, and climate change aggravates the vulnerabilities to various kinds of disasters. Due to inadequate disaster preparedness, communities, and animals are at increased risk from many kinds of human-induced hazards arising from accidents (industrial, road, air, rail, on river or sea, building collapse, fires, mine flooding, oil spills, etc.). Chemical, Biological, Radiological, and Nuclear (CBRN) hazards rank very high in among the human-induced risks. Terrorist activities and secondary incidents add to these risks and call for adequate preparedness and planning.

Institutional Framework A) National Level

The overall coordination of disaster management vests with the Ministry of Home Affairs (MHA). The Cabinet Committee on Security (CCS) and the National Crisis Management Committee (NCMC) are the key committees involved in the top-level decision-making with regard to disaster management. the NDMA is the lead agency responsible for the preparation DM plans and the execution of DM Functions at the national level. The figure represents merely the institutional pathways for coordination, decision-making and communication for disaster management and does not imply any chain of command.

NATIONAL-LEVEL DISASTER MANAGEMENT - BASIC INSTITUTIONAL FRAMEWORK



Note: This represents merely the institutional pathways for coordination, decision-making and Communicationfor disaster management and does not imply any chain of command.

B) State Level

As per the DM Act of 2005, each state in India shall have its own institutional framework for disaster management. Among other things, the DM Act, mandates that each State Government shall take necessary steps for the preparation of state DM plans, integration of measures for prevention of disasters or mitigation into state development plans, allocation of funds, and establish EWS. Depending on specific situations and needs, the State Government shall also assist the Central Government and central agencies in various aspects of DM. Each state shall prepare its own State Disaster Management Plan.

STATE-LEVEL DISASTER MANAGEMENT - BASIC INSTITUTIONAL FRAMEWORK



Conclusion

India has developed an operational mechanism for disaster warning and their monitoring and mitigation. However, prediction of certain events likes Earthquake, volcanic eruption and flood is still at experimental level. Thus, efficient management of disasters, rather than mere response to their occurrence has, in recent times, received increased attention both within India and abroad. This is as much a result of the recognition of the increasing frequency and intensity of disasters as it is an acknowledgement that good governance, in a caring and civilized society, needs to deal effectively with the devastating impact of disasters.

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Response on yield of Hyacinth bean (*Lablab purpureus* L.) using compost, Vermicompost verses synthetic fertilizers and growth regulator

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Abstract

Hyacinth bean (*Lablab Purpureus* L.) is a protein rich crop belonging to family Fabaceae. But in this crop the flower shedding is a major and common problem which ultimately affects pod set and yield. Through this study, an attempt is made to solve this problem by treating crop with vermicompost, compost, synthetic fertilizer and growth regulator. For this experiment healthy seeds of '*Lablab purpureus*' were sterilized and treated with different concentrations of growth regulator Indole 3 Acetic Acid (viz.25%, 50%, 75%, 100% conc.) and in compost, vermicompost, synthetic fertilizer (Varlakshmi) together with control plant .Various morphological parameters were observed like days of germination, number of cotyledons, mature leaf size, days of flowering, height of plant etc. and recorded. The photographs are taken at various stages of growth. It is observed that as compared to growth regulator IAA & synthetic fertilizer, compost and vermicompost treated plants have given better yield in terms of vegetative and flowering growth. Similarly maximum flowering and fruiting is also observed in the same. Hence, the present study aims to propose the use of compost and vermicompost instead of synthetic fertilizer and growth regulator in improving the yield of Hyacinth bean.

Keywords: Hyacinth bean, Compost, Vermicompost, Growth regulator, Synthetic fertilizer.

Introduction:

Lablab purpureus L. belongs to family Fabaceae. It is known as *Dolichos* bean and have economicaly important as grain legume, vegetable, animal fodder and green manure. It is one of the major crop in Tamilnadu, Karnataka and Andhra Pradesh. It is perennial, twinning or creeping herb generally cultivated as and annual crop most of varieties are with twinning habit and few are bushy, prostrate or semi-erect in habit. Leaves are trifoliate and flowers are white, reddish or purple and borne on axillary recemes. Pods are flat or inflated, linear or broad,1-5 inch long with persistent style. Seeds are globuse, ovate or flat. It is cultivated as single crop or it is mixed with some other crop like corn, groundnut, castor, bajra etc.

Nutritional value:

Lablab purpereus is very nutritious as it contains high level of protein-24.9%, moisture-9.6%, fat-0.8%, fibre-1.4%, carbohydrate-60.1%, ash-3.2%, calcium-0.06%, phosphorous-0.45%, iron-2mg/100gm and nicotinic acid-1.8mg/100gm, vitamin c-7.33-10.26mg/100gm **Uses:**

It is used in the treatment for various diseases like cancers, strokes, alcoholism etc. It is more

traditionally grown as pulse crop for human consumption. *Lablab* is good green manure, clover crop. It improves soil quality. *Lablab* can be grazed or used for hay or silage. It is popular as vegetable in India. Various dishes are prepared both with its immature pods and the dry beans.

Material and methods:

For this study the good quality of seeds of *Lablab purpureus* L. were collected from the market and treated with compost, vermicompost, synthetic fertilizer, and growth regulator IAA (i.e. different conc. like 25%, 50%, 75%, 100%) and grown in different pots of normal size along with controlled plant.

The treated plants are observed for various morphological traits. These are recorded and compared with normal plant.

Observation:

Photo plate.(At the time of fruiting)



Compost



Control



Vermicompost



Synthetic Fertilizer (Varlaxmi)



Growth Regulator 25%



Growth Regulator 50%



Growth Regulator 75%



Growth Regulator 100%

Observati	Observation Table No. 1(Morphological Parameters)							
Morphological Traits	25%	50%	75%	100%	Compost	Vermicompost	Synthetic fertilizer	Control
Days of 50% germination	3	3	4	4	4	4	5	4
No of cotyledon development(days)	4	4	4	4	5	5	6	5
No. of days to developed(2)leaflets	6	6	6	6	6	6	7	6
No. of days to developed(4)leaflets	10	10	10	11	9	9	11	10
Height of plant in 15 days (cm)	21.5	20	19.5	18	22	22.5	17.5	21
Height of plant in 30 days (cm)	40.5	28	33.5	33.5	43.5	34	20.5	35
Height of plant in 45 days (cm)	50.5	49	47	55	55.5	50	53.5	42.5
Height of plant in 60 days (cm)	51.3	50.3	48	57	57.5	51	60	43
No. of leaflets in 15 days	12	9	9	12	14	14	9	10
No. of leaflets in 30 days	29	25	31	35	41	35	25	29
No. of leaflets in 45 days	36	44	28	45	52	43	13	13
No. of leaflets in 60 days	43	51	35	51	63	55	47	39
Width of stem after 30 days(cm)	2.5	2.5	2.4	2.5	2.4	2.5	2	2.5
Width of stem after 45 days(cm)	3.3	3.1	3	3.5	3.2	3.6	2.7	2.8
Width of stem after 60 days(cm)	3.7	3.5	3.4	3.9	3.6	4	3.2	3.4
Length of mature leaf (cm)	7.5	7.5	7.4	7.5	7.4	8.5	6.2	7.5

Observation Table no. 2 (Yield Parameters)								
Yield parameters	25%	50%	75%	100%	Compost	Vermicomposi	Synthetic fertilizer	Control
Days of flowering	36	38	32	39	35	36	49	36
No. of flowers	38	34	21	42	47	48	24	20
Days of fruiting	43	45	42	45	41	43	55	41
No. of fruits	8	6	9	7	12	19	5	4
No. of seeds / pod	4-5	4	3	5	4-5	3-4	4-5	3-4
Pod length(cm)	12	10.5	9	12.5	12	12	12	9
Dry weight of seed / pod	1.428	1.021	1.559	0.905	1.800	1.934	0.503	0.976

Results and Discussions:

The experiment conducted on *Lablab purpureus* plant in order to understand which will be the most effective i.e. growth regulator, vermicompost, compost and synthetic fertilizer to plant.

All the seeds took almost same time (3-4) days for its 50% germination with exception of synthetic fertilizer. Vermicompost shows maximum height in 15 days. After 30 days compost containing plant shows maximum height as compared to others but after 60 days 100% conc. of IAA, compost and synthetic fertilizer containing plant shows maximum height. If the numbers of leaflets were concerned these are many in numbers in compost and vermicompost after 60 days. A leaflet of vermicompost plant significantly greater in size as compared to other.

Compost and vermicompost shows maximum flowering as compared to others after 60 days. Compost and vermicompost containing plant gave highest numbers of flower it was near about 47-48 flowers per plant. Control plant gave only 20 flowers within 60 days. We got more number of fruits from compost and vermicompost near about 12-19. By weighing sample of dry seeds of all plant it was found that the compost and vermicompost also shows maximum dry weight. Synthetic fertilizer containing plant seeds showed minimum weight.

Conclusion:

From the above observation it was concluded that compost and vermicompost shows better growth. If height is concerned compost, vermicompost, varlaxmi, 100% concentration of IAA treated plant show maximum height in 60 days. If we compare all these plants with another parameters such as number of leaflets, width of stem, compost and vermicompost treated plant shows notable positive results. As compared to other, vermicompost showed maximum leaf size, which leads to increase in vegetative growth. Further it is observed that compost and vermicompost applied plant shows maximum numbers of flowers. In *lablab* bean shedding of flower is a common problem , however present study helps to overcome it as observed in compost and vermicompost applied plant. Where number of flower formed at intial stage and then mature into fruit is maximum. Compost and vermicompost not only reduced the problem of flower shedding it also increased numbers of pods, length of pods and seeds per pod. Use of compost and vermicompost leads to increased dry weight of seeds i.e. it also increased the nutritional value of seeds.

Hence from above study it can be concluded that *lablab* bean showed good response to compost and vermicompost and treatment of vermicompost is most suitable for the better growth, yield and quality improvement, over synthetic fertilizer and growth regulator.

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Isolation and characterization of halophilic bacteria from Soil

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ABSTRACT

Halophiles are nothing but "Salt loving" organisms. They are classified into Archae domain. There are also bacterial halophiles as well as some eukaryotes such as alga *Dunaliella salina*. This halophiles are categorized into slight, moderate and extreme depending on the requirement of salt concentration. Isolation of halophiles is done by enrichment method using halophilic medium as a selective media. Single colony was used to perform morphological and biochemical characters. Optimization was done using the effect of temperature i.e. 25° C, 37° C, 45° C, 55° C, 65° C, 70° C and NaCl i.e. 0%, 1%, 5%, 10%, 15%, 20%, 25% on the growth of that isolates. It was found that the isolate was moderate halophile.

Keywords: Halophiles, NaCl, Extremophile, Archae.

Introduction

Microorganisms requiring extreme environments for growth are called extremophiles. Extremophilic microorganisms can bloom in extreme environments such as unusual levels of salt, p^{H} , pressure, temperature etc. (Kumar et al., 2009). Halophilic bacteria are salt loving organism that grow in saline environment and can be differentiated based on their requirements for sodium chloride. Halophilic bacteria are adapted to high osmolarity and can grow in high salt concentration. Upon their response to NaCl, they can be classified into three groups - Slight halophiles, moderate halophiles and extreme halophiles with optimal growth rates at 2-5, 5-20 and 20-30% NaCl respectively (Ventosa et al., 1998).

Halophiles can be found in areas where the concentration of salt is five times greater than salt concentration of ocean such as the Great Salt Lake in Utah, Owens Lake in California, Dead Sea and in evaporation ponds. (Roohi et al., 2014). They include mainly prokaryotic and eukaryotic microorganism with the capacity to balance the osmotic pressure of the environment and resist the denaturing effects of salts. Among halophilic microorganism are variety of heterotrophic and methanogenic archaea, photosynthetic, lithotropic and heterotrophic bacteria, photosynthetic and heterotrophic eukaryotes. (Mohsin et al., 2014).

Halophiles may use a variety of energy sources, they can be aerobic or anaerobic. Anaerobic halophiles include phototropic fermentative, sulfate reducing, homoacetogenic and methanogenic species.(Oren A, 2002).A widespread variety of bacteria that secrete extracellular hydrolytic enzymes such as amylase, protease and xylanases have been isolated and characterized (Sanchez-Parro et al.,2003b).Halophilic amylase can be produced by *Streptomyces*

sp.(Chakraborty et al,2009), *Chromohalobacter* sp.(Prakash et al.,2009). Halophilic protease produced by *Bacillus* sp. Protease used in laundry detergents, food processing, pharmaceuticals, leather and diagnostic reagents, waste management as well as silver recovery (Amoozegar et al., 2007). Halophilic xylanase produced by *Glaciecola mesophila* (Guo et al., 2009) and *Chromohalobacter* sp. (Prakash et al., 2009). Xylanase used in biobleaching of paper and pulp. (Mamo et al., 2009).

The aim of this study is to isolate halophilic bacteria from soil and to examine their morphological, cultural and their biochemical characteristics and optimization of temperature and salt concentration.

Materials and Methods

Sample Collection

Three soil samples were collected from different area of village Akulkheda, Tal- Chopda, Dist. - Jalgaon. The samples were taken in sterile plastic bag. This samples was transported to the laboratory for the isolation of bacteria and processing for further analysis.

Isolation and Enrichment of Bacteria

Take 10 grams of each soil sample and added to 90 ml of sterile water in an Erlenmeyer flask. Subsequently ,1 ml of the suspension was added to 9 ml of sterile distilled water and serial dilution (10⁻¹ to 10⁻⁶) was prepared. 0.1 ml of each dilution was added and distributed onto Halophilic medium containing :Casein acid hydro lysate (10 g/L), Yeast extract (10 g/L), Proteose peptone(5.00 g/L), Trisodium citrate (3.00 g/L), Potassium chloride (2.00 g/L), Magnesium sulphate(25.00 g/L), Sodium chloride (250.00 g/L), Agar (20.00 g/L), pH(7.2\pm0.2).Plates were incubated at 37^{0} C for 3-5 days. Colony was picked and streaked several times to obtain pure cultures. Pure culture was maintained at 4^{0} C temperature.

Characterization and Identification of Isolates

Isolate was examined for Morphological, Physiological, and Biochemical characteristics.

Gram Staining

Gram staining is differential staining which differentiate two kinds of microbes due to cell wall composition of organisms. To perform Gram staining of isolate smear was prepared on clean grease free slide. Add the primary stain crystal violet, which stains both kinds of cells. Then mordant Gram's iodine was added. After addition of decolorizer (70% alcohol) Gram negative bacteria becomes colorless and Gram positive bacteria becomes purple. The counter stain saffranin is responsible to stain Gram negative bacteria and becomes pink. (Aneja, 2003).

Catalase test

In this test, isolate streak on nutrient agar slant and incubated at 37^{0} C for 48-72 hrs. After incubation, add 3% hydrogen peroxide. The effervesces of oxygen gas bubbles indicates positive test while no bubble formation indicates test is negative. (Aneja, 2003).

Amylase test

A loop full suspension of isolate was inoculated on starch agar plates and incubated at 37^{0} C for 48-72hrs. After incubation, iodine solution was poured on the agar and examined for hydrolysis of starch by the production of clear zone around the microbial growth. (Aneja, 2003).

Gelatinase Test

A loop full suspension of isolate was inoculated on gelatin agar plates and incubated at 37^{0} C for 48-72hrs. After incubation, gelatinase production was detected by observing liquefaction (i.e. flooding the gelatin agar medium with mercuric chloride solution and observe the plates for clearing around the line of growth). (Aneja, 2003).

Protease test

The isolate was streak on Skim milk agar plates containing peptone (0.1% w/v), NaCl (0.5% w/v), agar (2.0% w/v) and Skim milk (10% w/v), P^{H} adjusted to 8.0.Plates were incubated at 37⁰C for 48-72hrs. A clear zone of skim milk hydrolysis appeared after incubation. (Seifzadeh et al., 2008).

IMViC

Indole Test

A loop full suspension of isolate was inoculated in 1% peptone and incubated at 37^{0} C for 24hrs. Indole production was detected using Kovac's reagent. Presence of cherry red color indicates indole production. (Aneja, 2003).

Methyl red test

A loop full suspension of isolate was inoculated in MR-VP Medium and incubated at 37^{0} C for 24hrs.After incubation methyl red indicator is added it turns red, which indicates positive test while indicator turns yellow indicates negative test. (Aneja, 2003).

Voges Proskauer test

A loop full suspension of isolate was inoculated in MR-VP Medium and incubated at 37^oC for 24hrs.After addition of Barritt's reagent development of pink color indicates positive test, while no change in color indicates negative test. (Aneja, 2003).

Citrate utilization test

A loop full suspension of isolate was streaked in Simmons's citrate agar slant and incubated at 37^{0} C for 24hrs.After incubation growth on surface of slant turns the color from green to blue this constitutes a positive test .Citrate negative will show no growth and the medium will remain green. (Aneja, 2003).

Effect of Temperature on growth

The effect of temperature on the growth of isolate was determined at various temperatures (25, 37, 45, 55, $65,70^{\circ}$ C). Isolate streak on saline medium and incubated at different temperature for 48-72 hrs.

Effect of salt concentration (NaCl) on growth

The effect of NaCl on the growth of isolates was determined at various salt concentrations (0, 1, 5, 10, 15, 20, and 25%). Isolate streak on saline medium and incubated at 37 ⁰ C for 48-72 hrs. (Mohsin et al., 2014).

Results

After several dilutions and sub culturing in the medium a single colony was isolated under aerobic condition from the sample. This strain was examined and characterized morphologically as well as biochemically.

Colony and Cell Morphology

Isolated colony was found to be circular, tetrad, cream color, sticky organism with entire margin, flat elevation and opaque density .The isolate was rod shaped, Gram positive. (Table 1).

Biochemical Test

Catalase Test

Isolate was found to be catalase positive as bubble formation occurred after the addition of H_2O_2 . (Table 1).

Amylase Test

Isolate was found to be amylase positive as clear zone around the colony later on the addition of iodine solution. (Table 1).

Gelatinase Test

No zone of liquefaction was observed. (Table 1).

Protease test

Zone of proteolysis was observed. (Table 1).

IMViC

Indole Test

No Cherry red color ring was observed at the top of the test tube. (Table 1).

Methyl red test

After addition of methyl red indicator tube turns yellow so test was negative. (Table 1).

Voges Proskauer test

Pink color was developed after addition of Barritt's reagent it indicate that test was positive. . (Table 1).

Citrate utilization test

Isolate showed no color change and it remained green hence test was negative. (Table 1).

Effect of Temperature on growth

The growth condition of isolate was optimized for temperature. The purpose of optimization was to find their optimum growth in different temperature. The optimum temperature of the isolate was found to be 37^{0} C temperature.

Effect of salt concentration (NaCl) on growth

The optimum NaCl concentration of the isolate was found to be 20%.

Conclusion

It is evident from this study that the isolated strain is able to grow and tolerate 20% NaCl concentration which reduces the risk of microbial contamination. This offers a multitude of potential applications in various industries.

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Characteristics	Isolate
Gram staining	Gram Positive
Cell Type	Rod
Catalase	Positive
Amylase	Positive
Gelatinase	Negative
Protease	Positive
Indole	Negative
Methyl red	Negative
Voges proskauer	Positive
Citrate	Negative

Table 1.Morphological and Biochemical characters of isolate.

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Seasonal Variation in Density and Diversity of Zooplankton of Ranipur dam Shahada Taluka District Nandurbar (M.S.) India.

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Abstract:

Zooplankton diversity is one of the most important ecological parameters in water quality assessment. The present paper deals with seasonal variation in density diversity of Zooplankton of Ranipur dam water near Shahada in Nandurbar district, Maharashtra. Ranipur dam water is mostly used for drinking, irrigation and domestic purposes. The Zooplankton dynamics can greatly influence the water quality of this dam. Therefore the population composition and seasonal variation of zooplankton were carried out. For study samples were collected from the three different sampling stations (A, B and C) of Ranipur dam. The quantative analysis of Zooplankton has revealed the fact that Rotifers, Cladoceran, Copepodes and Ostracods were the major components of its total bulk in Ranipur dam. The values of number of Zooplankton species indicating the pattern of diversity has exhibited a different dominating trends of its major sub groups as given Rotifera > Cladocera > Copepoda > Ostracoda. The Ranipur dam had moderate diversity of total Zooplankton with 45 species of Zooplankton were recorded belongs to four taxonomic groups. Out of 45 species, 25 species belongs to Rotifera, 09 species to Cladocera, 06 species Copepoda and 05 species to the Ostracoda.

Keywords:

Ranipur dam, Zooplankton, Seasonal variation, diversity.

Introduction:-

The Zooplankton comprises of wide range of organisms that are classified on their size, depth at which found, geographical distribution and mainly in relation to their life cycle (Santhanam *et al.*, 2018). Zooplankton plays a key role of converting energy trapped by Phytoplankton in to food suitable for fish and aquatic animals. Zooplankton form an inter remedial link between primary and tertiary production as fishery potential is enormously coupled with the presence of Zooplankton (Kar and Kar, 2016). They acts as main source of food for many fishes and also play an important role in early detection and monitoring of pollution in water (Singh and Talpade, 2018). Zooplankton constitute major link in the energy transfer at secondary level in aquatic food webs between autotrophs and heterotrophs. The distribution and diversity of Zooplankton in aquatic ecosystems depend mainly on the physicochemical properties of water (Harikrishnan and Abdul Azis, 1989). Zooplanktons are good indicators of the changes in the

changes in water quality because they are strongly affected by environmental condition and respond quickly to changes in water quality. Zooplankton are crucial element of fresh water lake ecosystem as they occupy central position of aquatic food web and are important food almost all fresh water species at some stage in their life history (Lampert and Sommer, 1997). The occurrence of Zooplankton depends on the status of productivity of water body. The study of fresh water fauna especially Zooplankton in a particular area is extensive and complicated due to environmental, physical, chemical and geographic variations involving ecological extrinsic and intrinsic factors (Majagi and Vijaykumar, 2009). Zooplankton acts as main source of food for many fishes and plays an important role in early detection and monitoring the pollution of water (Shivshankar and Venkataramana, 2013). The zooplankton can also play an important role in indicating the presence or absence of certain species of fishes in determining the population densities. Study of plankton diversity and their ecology greatly contribute to an understanding of the basic nature and general economy of an aquatic habitat. The study of zooplankton has been fascinating subject for long time. The zooplankton is classified in various groups viz. Rotifera, Cladocera, Copepoda and Ostracoda. The biodiversity of phytoplankton and zooplankton are also rich in nature (Kangasabapathi and Rajan, 2010). The present investigation was undertaken for identification and assessment of monthly variations in the occurrence of zooplankton of Ranipur dam water. The present arms to calculate quantitative analysis of zooplankton and to evaluate density and diversity of zooplankton in Ranipur dam water near Shahada Taluka. The study would emphasize on seasonal variations composition and total population of zooplankton in different sampling stations of Ranipur dam water.

Material and Methods:-

Study area:

Ranipur dam is one of the water bodies selected for study purpose. A Ranipur minor project lies at 21^{0} 45' North Latitude and 74^{0} 74' East Longitude. A Ranipur reservoir is the minor project which is built up during the decade of 2000. The catchment area of Ranipur minor project is 52.63 Sq.Km. The nature of catchment area is hilly and well developed for the collection of water. The dam receives the water by rainfall only. The project is located near Ranipur village for about 500M away and 25Km from Shahada. It is perennial dam and used for irrigation and drinking purposes as well as Pisciculture.

Fig. 1: Satellite image and Panoramic view of Ranipur dam.



Zooplankton Sample collection, Preservation, Identification:-

Present study deals with seasonal variations in density and diversity of zooplankton of Ranipur dam in Shahada Taluka in Maharashtra. The samples of zooplankton were collected monthly from three different sampling stations (A, B and C) in between 8 am to 10 am during June 2012 to May 2014.

The samples were collected by using planktonic net No. 25 of bolting silk with mesh size $64 \,\mu m$. The collected samples were taken in separate vials and preserved by 1 ml of 4% formalin; 1ml of Lugol's iodine was added to it for further qualitative and quantitative studies. The qualitative and quantitative analysis of zooplankton was carried out in the laboratory with the help of 'Sedgewick Rafter cell' counting chamber. Qualitative study of Zooplankton was carried out up to the genus/ species level using the standard and by observing photographs according to keys given by Tonapi (1980), Trivedi (1998), Edmonson (1963), Kodarkar (1998), Dhanapathi (2000) and Battish (1992). The two year study data (June 2012 to May 2014) were pooled for four months and three seasons and analyzed for seasonal changes, with respect to monsoon, Winter and Summer. Further the means, standard error of mean(SEM) were calculated for each season and one way ANOVA with no post test for various parameters for three seasons was performed using graph pad prism version 3.00 for windows (Graph pad software, San Diego California, USA). The correlation between the physicochemical parameters and the zooplankton density were calculated. The Pearson correlation was calculated by keeping plankton as dependent variable and other abiotic and biotic factors as independent variables with the help of SP557.5 for windows. The P value for ANOVA is non-significant if P> 0.05 (NS). Significant if P< 0.05(*) significantly significant (**) if P< 0.001 and highly significant if P< 0.0001. (***)

The number of the species present in an area may be considered as its "species richness" a frequently used measure Hulbert (1971). Species richness can be positively correlated with some measures of ecological diversity. The zooplankton study includes four major groups such as Rotifera, Cladocera, Copepoda and Ostracoda.

Results and Discussion:

A Total 45 species of zooplankton were recorded from Ranipur dam. Among 45 species Rotifera was dominant with Rotifera 25 species followed by 09 species Cladocera, 06 species Copepoda and 05 species Ostracoda (Table -1). Seasonal variation in density of different groups of zooplankton (No/L) Population is depicted in (Table-1 Fig-3) The abundance of total zooplankton includes four quantitative components and their abundance show significant seasonal variations. The sequence of abundance of various zooplankton groups in decreasing order were recorded as Rotifera (38.25%) > Cladocera (30.94%) > Copepoda (25.61%) > Ostracoda (5.20%).The structure of zooplankton communities is influenced by climatic and physiochemical parameters as well as biological interactions. Here it is observed that the density and the species richness of various groups of Zooplankton have similar tendency in their dominance as is also noted by Dede and Deshmukh 2014.

Table: - 1 Seaso	onal variation in	density of differe	ent groups of Z	Looplanktons (No/L	.) with
two years mean	percentage densit	y at Ranipur Dan	n during June 2	2012 to May 2014.	

Parameters	F- value	Monsoon	Winter	Summer	Two years
Total	F _{2 21} 32.99	1901±129.9	1114±73.24	2336±112.5	%
Zooplankton					
Rotifera	F _{2 21} 22.8	672.9±79.2	387.1±31.99	985.8±67.1	38.25
Cladocera	F _{2 21} 54.53	597.9±23.83	363.5±23.68	694.3±21.64	30.94
Copepoda	F _{2 21} 30.25	492.1±30.45	310.6±19.21	567.5±20.81	25.61
Ostracoda	F _{2 21} 23.19	138.4±11.27	52.25±6.34	88.13±8.65	5.20

Fig.2:- Biannual Percentage density of different groups of Zooplankton at Ranipur dam during June2012 to May2014.

Pearson Correlation- Physicochemical Parameters and Zooplankton of Ranipur Dam

	DEN.	DEN.	DEN.	DEN.	DEN.
	CLADO	COPE	OSTRA	ROTI	TOTAL
AT	.836**	.802**	.570**	.786**	.833**
CA	.383	.362	325	.476*	.396
CL	.598**	.636**	.151	.684**	.652**
CO2	.844**	.812**	.574**	.796**	.842**
DEN. CLADO	1.000	.951**	.574**	.905**	.969**
DEN. COPE	.951**	1.000	.518**	.945**	.983**
DEN. OSTRA	.574**	.518**	1.000	.378	.527**
DEN. ROTI	.905**	.945**	.378	1.000	.976**
DEN. TOTAL	.969**	.983**	.527**	.976**	1.000
DO	454*	465*	068	496*	476*
MG	.1 77	.222	345	.464*	.305
NO3	077	172	.651**	324	174
PH	.756**	.782**	.329	.826**	.810**
PO4	.428*	.436*	.481*	.381	.435*
SO4	.430*	.349	.843**	.186	.344
TDS	.926**	.937**	.507*	.929**	.954**
TH	.307	.319	347	.523**	.390
TRNS	555**	550**	497*	366	486*
TS	.871**	.851**	.755**	.792**	.869**
TSS	.000	073	.674**	199	068
WC	878**	876**	614**	848**	894**
WT	.817**	.813**	.503*	.820**	.843**

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

 Table 2: Pearson correlation of total Zooplankton Density along with individual group with abiotic parameters of Ranipur dam during June 2012 to May 2014.

Fig: - 3 Seasonal variation in density of different groups of Zooplankton at Ranipur Dam during June 2012 to May 2014.





Graph 5: RD

Rotifera: - The Rotifers are commonly called wheel animals. They play an important role in an aquatic food chain. Rotifera is a group of primary freshwater invertebrates that plays a pivotal role in many freshwater ecosystem (Wallace *et al.*, 2006). Rotifers are also essential food source for Indian major carps. The Rotifer was the major dominant (abundance) group at Ranipur dam with 25 species. Rotifers play a vital role in the tropic status of freshwater impoundments and serve as living capsule of nutrition (Suresh Kumar *et al.*, 1999). Rotifers are regarded as bioindicators of water quality (Sladecek 1983; Saksena 1987). The Rotifers community structure depends on a variety of environmental factors that include biological parameters, such as predation or competition as well as various physico chemical factors. (Arora and Mehra 2003 and Anna and Natalia 2009). In the Ranipur dam density of Rotifers is maximum in summer and minimum in winter (Fig. 3). In present study, Rotifer density was significantly positively correlated with the density of total phytoplankton (Table-2).

Cladocera: - Cladocera is an order of small crustaceans. Commonly they are called by "water fleas" (Singh et al., 2002). Most of the Cladocera species are primary consumers and feed on microscopic algae and the fine particulate matter in the detritus thus influencing cycling of matter and energy in benthic food chain of an ecosystem. It has been reported that the density and biomass of Cladocerans was primarily determined by food supply (Singh et al., 2002). The factors like water, temperature, dissolved oxygen (DO) and transparency play significant role in controlling the diversity and density of Cladocera. Maximum density of Cladocerans recorded in summer in Ranipur dam due to the rising temperature causing increase in the density of algae, detritus and bacteria, it is the major food for Cladocerans that ultimately leads to increase in overall density of Cladocerans. In the present study the Cladocerans density is significantly positively correlated with AT, WT, TS, TDS, pH, CO₂, PO₄⁻³ and SO₄⁻ while negatively significant correlation with water cover (WC) and DO(Table-2) indicates variable influence of biotic and abiotic factors on Cladocerans density. In present research work total 09 species of Cladocera belonging to 08 genera were recorded. Maximum species richness was recorded in summer while minimum in winter. Ranipur dam were the most frequent Cladocerans at Ranipur dam were Diaphanosoma species, Ceriodophnia Cornuta and Moina Micrura. While four taxa Monia, Ceriodaphania, Microthrix and Diaphanosoma are predominantly herbivorous typically found in tropical water bodies (Dodson and Frey 2001).

Copepoda: - Fresh water copepods constitute one of the major Zooplankton communities occurring in all types of water bodies, which serve food for many fish and play a vital role in ecological pyramids. Copepods are considered as important food items for fish, play a key role in the energy transformation at different trophic levels. Copepods prefer more stable environments and generally are regarded as pollution sensitive taxa (Verma *et al.*, 1984, Dhamija and Jain 2000). In the present study, copepods showed higher population density in summer season (567.5 \pm 20.81 No/L) and lower in winter (310.6 \pm 19.21 No/L) (Fig. 3). Copepods diversity of Ranipur dam was comparatively poor as only 6 species belonging to 6 genera were recorded. The recorded 6 species of study area is *Rhinedioptomus indus, Diaptmus species, Ectocyclops*

Phaleratus, Cyclops ladakanus, Mesocyclops hyalinus and *Microcyclops bicolor* belonged to calaniid family.

Ostracoda: - Ostracods commonly known as seed shrimps and found in both fresh and marine water. It is bivalve and appears like small seed. They have a wide range of diets and the group includes herbivores, carnivores, scavengers and filter feeders. It is used as model group for several ecological and evolutionary studies (Martens and Reid 2007, Perez *et al.*, 2010). In the present study the maximum density of ostracoda was recorded in monsoon (138.4±11.27 No/L) and minimum in winter (52.25±6.34 No/L). (Fig. 3)Maximum density of ostracods in monsoon may be due to abundance of detritus whereas; the decrease in winter and summer may be due to feeding presence of stocked fishes. During the present investigation the ostracoda was occupied last position in terms of population and lowest quantitative components (5.20%). Species richness of ostracoda at Ranipur dam was very low with only 5 species. During the present study at Ranipur dam only five species of ostracods were recorded. These are *Cypris subglobosa*, *Eucypris, Hemicypris anomala, Cyprinotus incongruens* and *Indiacypris dispar*. The present study was the first attempt to investigate the status of this dam. The ostracoda density is positively correlated with AT, TS, TSS, NO₃ and SO₄ at the level 0.01 and negatively significant correlated with Trans at 0.05 level.

Checklist of Zooplankton from Ranipur Dam.

- Rotifera
- Brachionous caudatus (Barrois and Daday, 1894)
- Brachionous plicatilis (Muller, 1786)
- Brachionous bidentata (Anderson, 1889)
- Brachionous qudridentatus (Hermann, 1783)
- Brachionous fulcatus (Zacharias, 1898)
- Brachionous diversicornis (Daday, 1883)
- Brachionous forficula (Wierzejski, 1891)
- Brachionous caliciflorus (Pallas, 1776)
- Brachionous urceolaris (Muller, 1773)
- Keratella cockleris (Gosse, 1851)
- Keratella procurva (Thorpe, 1891)
- *Keratella tropica* (Apstein, 1907)
- Platyias quadricorniz (Ehrb., 1832)
- Lapadella patella (Muller, 1786)
- Lapadella ovalis (Muller, 1786)
- Lacana luna (Muller, 1776)
- Monostyla bulla (Gosse, 1851)
- Monostyla lunaris (Ehrb., 1832)
- Trichocera cylindrical species
- Asplanchna priodonta (Gosse, 1850)
- Filina opaliensis (Zach, 1898)
- Filina logesita (Ehrb., 1834)
- Testidunella mucranata (Gosse, 1886)
- Rotaria rotatoria (pallas, 1776)
- Rotaria neptunis (Ehrb., 1832)
- Cladocera
- Diphanosoma sarsi (Richard, 1895)
- Ceriodaphnia cornuta (Sars, 1888)
- *Ceriodaphnia reticulate (Jurine, 1820)*
- Simocephalus exspinosus (Koch, 1841)
- Moina micrura (Kurz., 1874)
- Bosmina longirostris. (Muller, 1776)
- Chydorus spp.
- Alona rectangula (Sars, 1862)
- Indialona ganpati (Petkovaski, 1966)
- Copepoda
- *Rhinediaptomus indicus (Kiefer, 1936)*
- Diaptmus species (Westwood, 1836)
- Ectocyclops phaleratus (Koch, 1838).
- Cyclops ladakanus (Kiefer, 1936)
- Mesocyclops hyalinus (Rehberg, 1880)
- Microcyclops bicolor (Sars, 1863)
- Ostracoda
- Cypris subglobosa (Sowerby, 1840)
- Eucypris spp.
- Hemicypris anomala (Klie, 1938)
- Cyprinotus incongruens (Ramdohr, 1808)
- Indiacypris dispar

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Volumetric, Viscometic and Ultrasonic Velocity studies of Binary mixtures of 2- Propanol and 1-Heptanol with o-Nitrotolune at 298.15 and 308.15k

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Abstract :

The physicochemical properties like ultrasonic velocities, viscosities and densities of binary liquid mixtures of 2-propanol and 1-heptanol with o-nitrotolune were reported at 298.15 and 308.15 K. The Excess molar volume (V^E), Isentropic compressibility(ΔKs) and viscosity deviation ($\Delta \eta$) have been calculated. These values were fitted with Redlich –Kister type polynomial equation. The results were interpreted in terms of molecular interaction between the components of the mixtures.

Keyword: Ultrasonic velocity, viscosity, density, Excess molar volume (V^E), Isentropic compressibility(Ks) viscosity deviation ($\Delta \eta$) molecular interactions.

Introduction

The viscosity ,Density and Ultrasonic velocities measured find various application in chararacterising the physico-chemical properties of liquid mixtures ¹⁻³ and the study of molecular interaction . The ultrasonic velocity of liquid is related to the binding forces between atoms in the molecules .Ultrasonic velocity has been also employed in understanding the nature of molecular interactions in pure liquid ⁴and binary mixtures .The method studying the molecular interaction from the knowledge of variation thermodynamics parameters and their excess value with composition gives an insight into the molecular process ⁵⁻⁷. The investigation regarding the molecular association in organic binary mixtures having one alkanol group as one of the components is of particular interest since 1- alkanol is highly polar and can associate with any other group having some degree of polar attraction. O-nitrotolune is strongly associated due to highly polar N=0 gro

In view of the importance mentioned , an attempt has been made to elucidate the molecular interactions the mixture of O-nitrotolune with 2- propanol and 1 – heptanol respectively at 298.15 and 308.15K further in the excess values of some of associated ultrasonic velocity , density and viscosity of mixture

Materials and Methods:

The chemicals O-nitrotolune with 2- propanol and 1-heptanol used were of analytical grade (A.R) minimum assay of 99.9% obtained from s. d. fine chemicals India. Which are used as such without further purification. The densities of pure components and binary

mixtures were measured by using a Bi-capillary pycnometer. The purities of the above chemicals were checked density determination. The binary liquid mixtures of different known concentration were prepared in stopper measuring flask. The weight of the sample was measured using electronic digital balance with an accuracy of ± 0.1 mg. The viscosity was measured using ubbelohde viscometer (20ml) and the efflux time was determined using a digital clock to within ± 0.015 . The ultrasonic velocity (U) in liquid mixtures have been measured using an ultrasonic interferometer (Mittal type, model F-81) working at 2 MHz frequency The accuracy of sound velocity was ± 0.1 ms⁻¹

Theory and Calculations:

Excess volumes of the mixtures have been calculated using density and mole fraction data given by equation:

$$V^{E} = (M_{1}X_{1} + M_{2}X_{2})/\rho_{12} - (M_{1}X_{1})/\rho_{1} - (M_{2}X_{2})/\rho_{2} - (1)$$

Viscosity of Binary Mixtures is calculated by:

$$\ln\eta_m = X_1 \ln\eta_1 + X_2 \ln\eta_2 \qquad \qquad --(2)$$

The measured viscosities of the mixtures have been used to obtain deviation in Viscosity parameters on the basis of linearity in following way,

Deviation in Viscosity of Binary Mixtures is calculated by :

$$\Delta \eta_{m} = \eta_{12} - X_{1} \eta_{1} - X_{2} \eta_{2}$$
 --(3)

Deviation in isentropic compressibility have been evaluated by using the equation

$$\Delta k_{S} = k_{S} - (\Phi_{1} k_{S1} + \Phi_{2} k_{S2}) - -(4)$$

where k_{S1} , k_{S2} and K_S are isentropic compressibility of liquid mixtures and Φ is volume fraction of pure ith component in the mixture and is defined as

$$\phi = (xi Vi) / (\Sigma xi Vi) --(5)$$

where x1 and Vi are mole fraction and molar volume of ith component in the mixture

Results and Discussion

In pure state, the self association of alkanols decreases with increasing chain length, when alkanols mixed with o- nitrotolune then there is interaction between their individual functional groups (-OH and $-NO_2$). The presence of electron withdrawing group on benzene ring decreases electron densities. The polarity of alkanols is less hence there is degrees of self association is less an compare to nitrotolune⁹.

The experimental values of density, viscosity and ultrasonic velocity and value of excess volume, viscosity deviation and deviation in isentropic compatibility parameter for the two binary liquid system at 298.15 and 308.15 are given table 1 and 2.

The excess volume and viscosity deviation are negative over the entire mole fraction of alkanol 298.15 and 308.15K temperature.

The excess of parameter of particular mole fraction of alkanols becomes less negative with increases of temperature. The negative value may be attributed to existence of dispersion and dipolar forces between unlike molecules and related to the differences in size and shape of molecules ¹⁰.

The magnitude of Δn and ΔKs , the sign and the extent of deviation of these properties depends on the strength of interaction between unlike molecules. According to Fort et.al. the excess viscosity gives the strength of the molar interaction between in molecules.

It is found that for the solution a good agreement was found in between Redlich - Kister parameters the solution of the fifth degree polynomial obtained with V^E , Δn and ΔKs .

The measurement of viscosity in binary mixture yield some reliable in the study of molecular interaction from the given table it shows that the value of excess viscosity and deviation in isentropic compressibility decreases with increases in concentration of alkanols but however it found to increases with elevation of temperature.

Conclusion

The experimental data of ultrasonic velocity, density and viscosity are reported by binary mixture of 2- propanol and 1- heptanol with 0-nirotolune over entire range of mole fraction at 298.15 and 308.15 K calculated viscosity deviation, excess molar volume and the change with isentropic compressibility are fitted with Redlich –Kister type polynomial equation. Very large negative deviation are observed for the both the investigated system. This reveals the existence of molecular interaction in the binary mixtures . The present investigation shown that greater molar interaction exist in binary mixtures. 4

Table.1.	Values	of	densi	ties,viscos	itie	es,ultrasonio	c ve	elocity,l	Excess	mol	lar	volumes	a	nd
Deviation	in visc	ocity	y and	deviation	in	isentropic	con	npressib	ility fo	or bir	nary	system	of	2-
propanol	and O-r	nitrot	olune	at 298.15	and	d 308.15 K.								

Temp	X1	Р	Π10 ³	U (M	$V^{E}x10^{6}(m$	Δ	Δksx10
Κ		(gm	(Nsm^{-2})	S ⁻¹)	³ /mole)	ηx10 ³ (K	11
		$/cm^3$)				$g m^{-1}s^{-1}$)	(m^2N^{-1})
	0.0000	0.78350	2.08560	1387.7	0.0000	0.000	0.00
	0.0466	0.81010	1.85160	1400.8	-0.4924	-22.694	-2.59
	0.0991	0.83560	1.69940	1443.6	-0.7602	-37.094	-24.57
	0.1583	0.86810	1.61090	1483.2	-1.5956	-45.020	-40.65
	0.2270	0.89470	1.52700	1582.5	-1.6993	-52.337	-80.88
298.15	0.3049	0.93150	1.50610	1623.2	-2.7000	-53.211	-81.07
	0.3972	0.97230	1.49910	1655.7	-3.9114	-52.471	-71.67
	0.5058	1.02060	1.46730	1681.7	-5.7272	-53.955	-56.33
	0.6375	1.02880	1.45500	1699.1	-3.4271	-53.130	-18.65
	0.7980	1.04500	1.35240	1715.9	-1.5128	-60.884	20.14
	1.0000	1.06920	1.92950	1932.0	0.0000	0.000	0.00
	0.0000	0.77480	1.45920	1365.8	0.0000	0.000	0.00
	0.0466	0.80130	1.41450	1389.5	-0.5004	-5.176	-17.48
	0.0991	0.82700	1.31860	1399.2	-0.8000	-15.545	-16.55
	0.1583	0.85910	1.28920	1450.0	-1.6187	-19.364	-49.36
	0.2270	0.88530	1.22250	1480.2	-1.6889	-27.053	-53.93
308.15	0.3049	0.92190	1.20010	1496.9	-2.6927	-30.449	-50.46
	0.3972	0.96180	1.18030	1590.2	-3.8401	-33.799	-85.70
	0.5058	1.01040	1.17260	1637.8	-5.7178	-36.181	-88.01
	0.6375	1.01870	1.16990	1642.0	-3.3734	-38.405	-49.95
	0.7980	1.04940	1.13030	1666.4	-3.0338	-44.747	-25.17
	1.0000	1.06030	1.60760	1719.2	0.0000	0.000	0.00

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Temp K	X ₁	Р	Π10 ³	U (M S ⁻	V ^E x10 ⁶ (m ³ /mo	$\Delta\eta x 10^3 (Kg$	Δksx10
		(gm/cm^3)	(Nsm^{-2})	1)	le)	$m^{-1}s^{-1}$)	11
							(m^2N^{-1})
298.15	0.0000	0.82070	5.74700	1600.2	0.0000	0.000	0.00
	0.0863	0.85270	4.98620	1613.2	-2.0436	-43.193	-7.49
	0.1750	0.87130	4.26110	1567.8	-1.6845	-81.841	27.38
	0.2662	0.89940	3.77290	1616.1	-2.6439	-95.846	5.55
	0.3609	0.93350	3.28970	1633.5	-4.2036	-108.014	1.83
	0.4585	0.95640	2.88330	1653.3	-3.9412	-111.395	4.43
	0.5599	1.01500	2.09660	1672.4	-8.0920	-151.356	-3.01
	0.6640	1.08070	2.40630	1682.7	-12.3500	-80.646	-4.56
	0.7716	1.08630	2.10070	1707.4	-9.4644	-70.129	9.68
	0.8841	1.09700	2.02170	1717.3	-7.0081	-35.082	30.02
	1.0000	1.06920	1.92950	1932.0	0.0000	0.000	0.00
308.15	0.0000	0.81390	4.22880	1553.9	0.0000	0.000	0.00
	0.0863	0.84550	3.72660	1574.4	-2.0388	-27.641	-16.76
	0.1750	0.86380	3.21210	1599.5	-1.6543	-55.841	-25.78
	0.2662	0.89150	2.86000	1604.8	-2.5988	-67.146	-26.40
	0.3609	0.92700	2.51220	1612.2	-4.4185	-77.103	-29.63
	0.4585	0.94830	2.29520	1660.9	-3.9518	-73.220	-44.23
	0.5599	1.00610	1.70280	1664.7	-8.1005	-105.881	-48.62
	0.6640	1.07170	1.99200	1669.6	-12.4513	-49.675	-52.42
	0.7716	1.07700	1.76820	1682.9	-9.5132	-43.851	-38.04
	0.8841	1.08800	1.70680	1689.2	-7.0812	-20.502	-21.02
	1.0000	1.06030	1.60760	1719.2	0.0000	0.000	0.00

Table.2. Values of densities, viscosities, ultrasonic velocity, Excess molar volumes and Deviation in viscocity and deviation in isentropic compressibility for binary system of 1-heptanol and O-nitrotolune at 298.15 and 308.15 K.

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Fig. 1) Ultrasonic velocity against mole fraction for 2-propanol and 1-heptanol at 298.15 K

Fig. 2) Excess molar volume against mole fraction for 2-propanol and 1-heptanol at 298.15 K



Fig. 3) Viscosity deviation against mole fraction for 2-propanol and 1-heptanol at 298.15 K



Fig. 4) Viscosity deviation against mole fraction for 2-propanol and 1-heptanol at 298.15 K



State of the Employment among Muslims in Jalgaon: A Geographical Analysis

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Abstract:

Muslim Population is one of the major minority community constituting the Indian Population. According to the 2011 census, 79.8% of the population of India practices Hinduism, 14.2% adheres to Islam, 2.3% adheres to Christianity, and 1.7% adheres to Sikhism. As per Rajinder Sachar commission Muslim population is one of the most deprived in term of social, economic, health and other parameters. They have very little representation in government services and political sphere. Majority of the Muslim population is engage in the private jobs for their livelihood.

Jalgaon is a Municipal Corporation city in district of Jalgaon, Maharashtra. It is one of the largest city in North Maharashtra Region constituting significant number of Muslims. As per census 2011, total population of Jalgaon district was 4,229,917. Hinduism constitutes 81.74% of Jalgaon population. Muslims are minority in Jalgaon state forming 13.25% of total population. The Jalgaon city is divided into 69 wards. The Jalgaon city has population of 460,228 of which 240,590 are males while 219,638 are females.

Muslims in Jalgaon city are engaged in variety of jobs such as Government Service, Business, Salesmen at Shops and super markets, laborer in grain market, vendors, auto driver, workers in Industries etc. The level of general health condition and education is less. In general observation the standard of living of Muslims in Jalgaon city is not at par with the other minority population as well as the majority communities in the city. In the present research paper, the authors have studied the occupational pattern in Muslim community spatially.

Key Works: Livelihood, Poverty, BPL, Five Year Plan, Millennium Development Goals.

Introduction:

The Muslim community is the largest minority section of Indian Society. Spatial study of Muslim population is one of the most important field of research in present socioeconomic and politico-scenario of India.

In India, spatial studies on Muslim population have not gained much momentum. There is a strong need to study every aspect of Muslim Population spatially. As compared to last two decades, Muslim community is transforming rapidly in response to the current socioeconomic progress and development of India. No authentic inclusive information and empirical data about their socio-economic, occupation, health, development etc. are available with government or with non-government organization.

After the Independence of India deliberate steps have been taken to promote education and welfare among Muslim population in India. Many Government committees and commissions constituted to review socio-economic development conditions of Muslim Population in India. They had recommended many steps and suggestions for the over all developments of Muslims. But due to various reasons, still the socio-economic conditions of Muslim are not achieved to the desired level.





Jalgaon city is a district head quarter of Jalgaon district of Maharashtra State. This is the main market as well as it has many urban functions catering the district. Jalgaon is a large city in northern Maharashtra, as per the Census 2011 it had 4,60,228 population of which male and female are 240,590 and 219,638 respectively. It is one of the major centers of the state's industry, education, and health care, with a number of large business enterprises and governmental / private health care and educational institutions. It is also a cultural center and a tourist destination, with numerous attractions and points of interest like Ajanta Caves, Ganesh Temple of Padmalaya, Mehrun Lake, Pal Sanctuary, and so on. Jalgaon city, geographically it has central location in the district and centrally connected by the Railways and Road Transportation. Jalgaon city lies on the crossing of 21° 0' 15" N latitude and 75° 33' 50" E longitude.

Jalgaon City	Total	Male	Female		
City Population	460,228	240,590	219,638		
Literates	355,368	192,090	163,278		
Children (0-6)	53,086	29,304	23,782		
Average Literacy (%)	87.28 %	90.91 %	83.37 %		
Sex Ratio	913				
Child Sex Ratio	812				

Description	Total	Percentage		
Hindu	350,341	76.12 %		
Muslims	84,086	18.27 %		
Buddhist	14,761	3.21 %		
Jain	7,887	1.71 %		
Christian	1,077	0.23 %		
Not Stated	914	0.20 %		
Sikh	800	0.17 %		
Others	362	0.08 %		

Population Composition:

Hinduism is majority religion in Jalgaon city with 76.12 % followers. Islam is second most popular religion in city of Jalgaon with approximately 18.27 % following it. In Jalgaon city, Christianity is followed by 0.23 %, Jainism by 1.71 %, Sikhism by 0.17 % and Buddhism by 0.17 %. Around 0.08 % stated 'Other Religion', approximately 0.20 % stated 'No Particular Religion'.

Aims and Objectives:

- 1. To study the Occupational Patterns among the Muslim Community in Jalgaon City.
- 2. To study the Economic condition among the Muslim Community in Jalgaon City.
- 3. To study the level of Education among the Muslim Community in Jalgaon City.

Methodology:

The Primary data was collected by the door to door Interview technique with the help of standard questionnaire. The primary data was collected by using random sampling method. Total 5% households from these wards were surveyed. The collected data was analyzed and represented with the help of tables and suitable diagrams. The primary data was collected from 13 Muslim majority wards of Jalgaon city viz. Shivaji Nagar, Dudh Federation, Rash Krishna Nagar (Ward No. 01), Shani Peth, Baliram Peth, Bhavani Peth Polan Peth (Ward No. 13), Khandesh Mill Housing Society, Indira Nagar (Ward No. 15), Valmik nagar, Ambedkar nagar, Koli Peth (Ward No. 31), Rachana Colony, Ekta Nagar, Salar Nagar (Ward No. 37), Ganesh Nagar, Dangal Grast Colony (Ward No. 40), Tamabapur (Ward No. 55), Mehrun Village (Ward No. 56), Mehrun Gaothan (Ward No. 60), Santoshi Mata Mandir Area, Master Colony and Supreme Colony and MIDC Area (Ward No. 69).

Hypothesis:

the hypotheses of this research paper are as follows.

- 1. Most of the Muslim population is engaged in Private Jobs.
- 2. Representation of Muslims in Government Services is very less.
- 3. The Level of Higher Education among Muslims is very low.
- 4. Majority of Muslim Population is worked as an unskilled labor.
- 5. Most of the Muslim Population belongs to lower income group.

Result and Discussion:

1. Proportion of Male and Female:

Table 1

Percentage of Male and Female Population in Jalgaon City

Total Households	Total Population	Male	Male %	Female	Female %	
487	2435	1365	56.06	1070	43.94	

Source: Field Survey 2019

The primary data was collected from 487 Muslim households. Out of total Muslim population surveyed 56.06% were Males and 43.94% were Females.







Among the Children Surveyed under 6 years age, 20.88% were Male and 22.34% were Females.

2. Family Type:

While analyzing data for the type of families, 19.73% Muslims families were joint families and 80.27% were Nuclear families.



3. Literacy:

Table 2 Percentage of Literacy Among Muslim Population in Jalgaon City-2019

Total Population	Total Male Population	Numbers of Male Literates	Percentage of Male Literates	Numbers of Female Literates	Total Female Population	Percentage of Female Literates
2435	1365	1185	86.81%	888	1070	82.99%

Source: Field Survey 2019

In Jalgaon city 92.61% (2255) Muslim Population were Literate. Which is more than the average of Maharashtra State and India.



4. Education:



As shown in the Graph, among Muslims in Jalgaoncity 49.51% Male and 50.49%Female had primary education, 47.12%Male and 52.88%Female had Middle Education, Male 57.86 % and Female 42.14 % had Secondary Education, 65.35%Male and 34.65 %Female had Higher Secondary Education, 56.10 %Male and 43.90 %Female were Under Graduates, 80.36 %Male and 19.64 %Female were

Graduates, 57.14 % Male and 42.86 % Female were Post Graduates and 71.93% Male and 28.07% Female had Professional and Diploma Education.

5. Occupation:



In term of Occupation, at Jalgaon city 8.62% Muslims were engaged in Government Services, 30.60% had Private Jobs, 21.77% had Unskilled Labour Jobs, 13.96% had Skilled Jobs, 17.45% having their own Business and 7.60% Muslim Population are Pensioners.

6. Income Group:



As per the primary data collected form the study region, 46% Muslim Population belongs to Lower Income Group, 37% were form Middle Income Group, 16% were form High Income group and 1% Muslim Population belongs to Below Poverty Line.

7. Conclusion:

Overall Muslim Population is one of the deprived sections of Indian society. Many schemes and plans of government as well as some private groups have not given desired results of Muslim development. Various government commission also recommended many measures for the socio-economic upliftment and developments of Muslim Population in India. Now, positive signs of development are visible due to government persistence efforts.

In Jalgaon city, also the percentage of Literacy among Muslims had increased but still they are away from higher education. Dropout rate among Muslim students increases after secondary school education. Comparatively more percentage of Muslim Male are getting higher studies than Females. Due to urbanization types of Muslim family also affected. More number of Muslim families has nuclear type.

In term of occupation, most of the Muslim population are busy in Private Jobs and are working as an Unskilled Labour. They have very less representation in Government Services. 83% Muslim families belong to Low and Middle-Income Group.

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Some Very Severe Fungal Disease of Economically important Trees of, Jalgaon District's

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Abstract:

During the extensive and intensive survey in 2017-18, and 2018-19 in order to collect and observe the severe fungal disease of trees of , Jalgaon Districts was conducted. Out of trees plants affected,, 20 plants were found affected from severe fungal diseases. These plants are – Azadirachta indica, Albezia procera, Albezia lebbeck, Madhuca latifolia, Pongamia pinnata, Tectona grandis, Termenilia arjuna, Termenelia bellerica, Ficus religiosa, Ficus benghalensis, Dalbergia sisso , Cassia fistula. Bridelia retusa were seriously affected.About 17leaf spot, 5 rust, and 7 wilt disease and 16 heart rot were observed during two years . Pathogens were identified with the help of available literature and confirmed by experts.

Introduction

Forest are one of the most important renewable natural resources. Obviously, they play an important role in the country ecosystem development and growth in various ways and maintain the ecological balance and stability of nature. The forest serves as a source for timber, fuel, fodder and minor forest produce to human along with conserving soil & water, moderating climate, offering food & shelter for wildlife and adding to the aesthetic value & recreational needs of man. There is a close relationship of plants and the environment.

Study area – Manudeviforest, yawal forest, PAL Forest, Nursery of Yawal, Forest Deppt, farmers field., Nursery of Social forestry, J.K.Park, Mehrun, jalgaon Material and Method :

The material method used by, Baksh, B.K.1976)

Collection and identification : (Baksh, B.K. 1976)

- 1. A survey was conducted in the forest of Jalgaon)
- 2. The symptom logy and other information such as place of collection, locality, local names of the plant and date of collections were noted.
- 3. The sample was kept in the polythene bag and brought in the laboratory.
- 4. In the laboratory, host name was confirmed with the help of herbarium, Dept of Botany, H. J. Thim College of Arts and science, Mehrun, Jalgaon
- 6 Tentative identification was done with the help of monographs and, reference book

Result and discussion

1) Leaf Spot disease and powdery mildew

	Trees sp	Pathogen	Place	Period of occurrence	Symptoms
1	Azadirecta indica	Psuedocercospora meliae	J. K. Social forestry, Nursery, plantation,and open area.	September to December	Black and brown symptom appear leading to short hole formations.
2	Azadirecta indica	Phom jolyana	,,	September to December	Black spot round on the upper surface initially. Finally in the both surfaces.
3	Bridelia retusa	Colletotrichum gloeosporides	Jalgaon	October to February	Rust in the lower surface. Compound Teleuto spores
4	Lannae coromandelica	Stigmina lannae	Manudevi forest	October to February	Rust in the lower surface. Compound Teleuto spores
5	Madhuca latifolia	Scopella echinulata	Yawal forest	September to January	Brown spot.
6	Pongamia pinnata	Fusicladium pongamiae	Road side plantation	October to January	Brown and black spots on the lower surface of leaf surrounded by necrosis spot.
7	Chloroxylon swietena	Psuedocercospora chloroxyliae	Pal Forest,	October to January	Black spot, on lower surface
9	Tectona grandis	Uncinulla phylactinae	Manudevi forest	October to February	Powdery mildew symptoms on the upper surface of the leaf. Mycelium is ectoparacyte.
10	Termenilia arjuna	Sphaceloma termanaliae	Yawal forest	October to February	Leaf rust. fruiting of the rust presented on the lower surface of the leaf
11	Tectona grandis	Olivea tectonae	Manudevi forest	October to February	Brown spot
12	Dalbergia sissoo	Phyllactina dalbergia	Road side plantation	October to February	Powdery mildew symptom on the upper surface of the leaf.
13	Termenelia bellerica	Asteroma sp	Road side plantation	September to December	Leaf Spot Brown to Black causing early defoliations.
14	Ficus religiolosa	Phoma sp	Farmer field	September to January	Brown spot to black spot, circular.
15	Ficus benghalensis,	Coniothyrium olivaceum	Pal forest	August to February	Oval and dark brown empheginous spot in the lamina and on the margin of the leaf,.
16	Cassia fistula	Fusarium solani	Leaf spot and fruit rot	August to September	Wilt symptoms leading to complete death of the plants.
17	Ougenia dalbergioides	Phomopsis sp	Manudevi forest	September to March	

Rust Diseases

	Trees sp	Pathogen	Nursery	Period of occurrence	Symptoms
1	Albezia procera	Ravenelia sessilis		September to December	Black and brown symptom appear leading to short hole formations.
2	Albezia procera	Ravenelia indica	,,	September to December	Black spot round on the upper surface initially. Finally in the both surfaces.
3	Pongamia pinnata	Ravenelia hobonii	Road side Plantation	October to February	Rust in the lower surface. Compound Teleuto spores
4	Ficus glomerata	Cerotelium fici	Pal forest	October to February	Rust symptom
5	Ficus carica	Cerotelium fici	Yawal Forest	October to February	Rust symptom

Wilt disease

	Trees sp	Pathogen	Place	Period of occurrence	Symptoms
1	Cassia fistula	Fusarium solani	Nursery	September to December	Wilting in seedling
2	Azadirachta indica	Fusarium solani	,,	September to December	Wilt disease
3	Teminalia arjuna	Fusarium solani	Nursery	October to February	Wilt disease
4	Teminalia bellirica	Fusarium solani		October to February	Wilt disease
5	Peltaforum sp	Fusarium solani	,	September to January	Wilt disease
6	Albizia procera	Fusarium solani		October to January	Wilt disease
7	Dalbergia sissoo	Fusarium solani		October to January	Wilt disease.

	Host	Pathogen	Site/ Location	Duration	
1	Lager stroemarma pariflora	Ganoderms lucidum Curt;Fr).Karst	Scrubbed forest, Jalgaon, MIDC area,	July to December	
2	Delibergia sisso	Ganderma lucidium Curt;Fr).Karst	MIDC and Ajanta road. Dhule road, Bhusaval Road	July to December	
3	Albezzia lebbeck	Ganoderma lucidium Curt;Fr).Karst	University Campus. Jalgaon	August to January	
4	Albezzia procera	Ganodema lucidum Curt;Fr).Karst	Bahina Bai Garden	August to January	
5	Delonix regia	Ganoderma lucidium Curt;Fr).Karst	J.k.Park, Jalgaon	August to January	
6	Azadirecta indica	Ganoderma lucidium Curt;Fr).Karst	North Maharashtra University, Jalgaon	August to January	
7	Dead trunk	Ganoderma Sp.	Dhule Road	August to January	
8	Tamarindus indica	G. lucidum Curt;Fr).Karst ahmadiSteyaert	Nehru garden, Jalgaon	August to January	
9	Butea monosperma	Ganoderma lucidium Curt;Fr).Karst	Scrubbed forest aroud jalgaon	v August to January	
10	Muraya koenigii	Ganoderma lucidium Curt;Fr).Karst	Farm house	August to January	
11	Accacia catechu	G. ahmadiSteyaert	MIDC, Jalgaon	August to January	
12	Terminatia arjuna	Ganoderms sp.	Manudevi forest	August to January	
13	Jacranda mimososifolia	Ganoderma lucidium	Bahina bai garden	August to January	
14	Mangefera indica	Ganoderma sp.	Jalgaon	September to January.	
15	Morus alba	Ganoderma lucidum	Road side plantation	August to January August to January	
16	Bauhinia variegate	Ganoderma lucidum	MI.D.C., Jalgaon	August to January	

Heart rot and root rot Diseaes.



Fig. 1. Cut stump with numerous

Suggestion to prevent and control of the pathogenic outbreak

Rust or fungal is very hard to treat. Fungicides such as Mancozeb or Triforine may help but may never eradicate the disease. Some organic preventative solutions are available and Sulfur powder is known to stop the growth of rust and any other fungal species. In the studies going on at our center showed significant pesticide activity against rust by a Neem oil based bio-pesticide.

For the wilt disease before planting the seedling, soil should be treated with hot water to kill the soil borne fungi. Villagers and farmers generally use ash powder with butter milk to control powdery mildew of the crops. It may also be treated in the forest nursery.

Conclusion :

This study was based on 2 yearcontinue survey of different sites of the forest and nursery of social forestry department of Jalgaon, Maharashtra. About45 plants in the forest of important trees of variable importance found affected by various fungal diseases. About 17leaf spot, 5 rust, and 7 wilt disease and 16 heart rot were observed during two years . Pathogens were identified with the help of available literature and confirmed by experts.

They cause significance loss to the trees in the earliest stage at the seedling stage. Foliage diseases are very important because they occur even in plantations and tree stage. To control these diseases is very important. Suggestions have been given to control the pathogen.. (Jamaluddin, Rizvi and Bilgrami (2008)

Acknowledgement :

I am very thankful to the Principle H.J.Thim college of arts and science for providing laboratory facilities and forest department of Jalgaon district, permitted me to survey in nursery.

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Role of Coriander (*Coriandrum sativium L.*) on Accumulation and Depuration of Cadmium in *Bellamya bengalensis*(*L*.)

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Abstract:

Present study aimed to examine the usefulness of Coriander (*Coriandrum sativium L.*) extract for elimination of heavy metal bioaccumulated in the whole body tissue of the experimental model animal gastropod snail *Bellamya bengalensis (L.)* The accumulation and elimination of cadmium (Cd) was examined by exposing the snail *Bellamya bengalensis(L.)* to 0.228ppm (CdCl₂) cadmium chloride with and without Coriander (*Coriandrum sativium L.*) extract for 7, 14, 21 days. After 21 days treatment the snails were allowed to cure naturally in normal water and with coriander extract up to 21 days separately. The whole body tissue samples were taken out after every 7 days for metal analysis. There was a gradual increase in heavy metal content with increase in exposure period for mercury. The concentration of cadmium during depuration was found to be decreased with increase in period. However the recovery was faster in those which are treated with coriander extract as compaired to those which are allowed to cure naturally in normal water of the antioxidation, heavy metal detoxification, elimination and chelating aspects of coriander.

Key words:

Coriander, Heavy Metal, Cadmium, Bioaccumulation, Depuration, Gastropod, *Bellamya bengalensis L.*).

Introduction:

Heavy metal pollution in aquatic ecosystem has been recognized as a serious environmental problem .In many cases heavy metals occurs in natural water bodies at levels bellow their toxic threshold, however due to their non degradable nature, such low concentrations may still pose risk of damage via uptake and subsequent bioaccumulation by organisms, which cannot effectively metabolized and excrete the absorbed metals (Wayker et al. 2013). Metal bioaccumulation can be of importance of public health point of view, especially when a human consumes the accumulators. Secondly, this phenomenon is now being exploited in assessment of environmental quality, in addition to chemical survey of water and sediments (Javanshir and Shapoori 2011).Heavy metals are persistent and non biodegradable and may pose high toxicity on the aquatic organisms. Mercury is considered as toxic metal that causes environmental problems and can be very harmful even at low concentration (Devagi Kanakraj et al. 2009).

As the concentration of metal increases, the accumulation of metal and its damage effect increases (Cain and Louma 1986; Buschiazzoa et al. 2004). Cumulative effects of metals or chronic poisoning may occur as a result of long term exposure.

The gastropod snail Bellamya bengalensis (L.) was chosen to determine the ability for the bioaccumulation of Mercuric chloride (Hgcl₂) in their soft parts and to show the extent of their tolerance towards these pollutants in the fresh water ecosystem.

Coriander is a well known herb for its antioxidant properties and contains compounds that are free radical scavengers .Coriander contains the active phenolic acid compounds like caffic acid, chlorogenic acid, vanillic acid, p-coumatic acid, ferulic acid (cis and trans forms) (Rajeshwari et al., 2010, Nambir *et al.*, 2010). The flavonoids in coriander leaves have been identified as quercetin (an important free radical scavenger), kaemferol and acaetin (Rajeshwari et al., 2011, Nambir *et al.*, 2010, Deepa *et al.*, 2011). The research of Dr.Yashiki Omura showed that consumption of clientro lowered the level of Mercury in patients via chelation mechanism(Omura,1996).Coriander's antioxidant properties are seen as treatment with SOD, CAT, GPx levels in the tissue of liver and kidney (Sharma , 2011).

In the light of above mentioned medical properties of coriander, this study was carried out investigate the possible protective properties of coriander extract against heavy metal bioaccumulation and elimination from the whole body tissue of model animal Bellamya bengalensis during chronic toxicity treatment of Cadmium chloride.

Material and Methods:

Selection and collection of experimental animals:

The gastropod snail *Bellamya bengalensis* (Viviparus) were collected from the suki dam near Garbardi village Tal.Raver Dist.Jalgaon (M.S.). The gastropods were acclimatized to laboratory condition for 2 to 3 days, before setting the experiments. Water was changed after every twelve hours. Healthy and active animals of approximately same size (25 to 30 mm) and weight were chosen.

Preparation of aqueous leaves extract:

The fresh green leves of *Coriandrum sativium* (L) (1kg) were collected from a local market in Raver. The leaves were dried at atmospheric temperature .After complete drying the leaves were ground to a fine powder of which 100 gm powder was added to

500 ml distilled water After 24 hours maceration was done at room temperature , the mixture was then heated for 30 min. in the water bath at 65° c. The extract was filtered, concentrated by heating over the water bath at $(65^{\circ}$ c). The extract was stored at 4° c and used to treat animals as needed.

Experimental design:

Healthy and active animals of approximately equal size (25 to 33mm) and weight were selected to avoid the experimental bias during the research work. The acclimatized active gastropods were divided in to three groups as A, B and C. The group 'A' gastropods was maintained as control. The group 'B' gastropods was exposed to chronic concentration of heavy metal salt Cadmium chloride 0.0.228 ppm (CdCl₂) up to 21 days treatment, The group 'C' gastropod was exposed to chronic concentrations of respective heavy metal and 5 ml/lit. of *coriandrum* extract up to 21 days.

After 21 day's exposure, the gastropod snails from group 'B' were divided in to two sub groups as group 'D' and group 'E'. The snails of group 'D' were allowed to self cure naturally in normal water. The snails of group 'E' were allowed to cure in 5 ml/lit extract of *Coriandrum sativium (L.)* up to 21 days. During experimentation the snails were fed on fresh water algae.

Collection and processing of tissue samples:

The tissue mass of whole body of the gastropod snail, *Bellamya bengalensis* (L.) were collected after every seven days and were dried at $80^{\circ c}$ in an oven till constant weight was obtained and stored in air tight specimen bottles by waxing the cork outside. The 50 mg sample was taken for digestion. The tissue was digested in 10 ml of acid mixture of Hcl: HNO₃ in (3:1) ratio on hot plate till dryness. The digested mixture was kept in water bath for 5-7 hour until the samples were cooled. Cool digested samples were filtered (Whatman grade 541). The samples were analyzed on the instrument atomic absorption spectrophotometer (A.S.).

Observation table:

Bioaccumulation of Cadmium(Cd) in the whole body tissue mass of the gastropod snail, *Bellamya bengalensis* (L.) after chronic exposure to Cadmiumchloride 0.228ppm with and without coriander extract and recovery in normal water and in coriander extract has been summarized in table 1.1 and 1.2

Table	1.1. Cadmium	content (□gm	/Kg dry	weight) in	whole	body	tissue	of	Bellamya
bengal	lensis (Lamark)	after chronic tre	eatment .						

Treatment			Cd content □gm/Kg dry weight		
			7 days	14 days	21 days
During 21 days	А	Control	487	489	487
exposer	B	0.228ppm CdCl ₂	1487	2514	2676
0.228ppm CdCl ₂	D		+66.938•	+81.622•	+81.801•
		0.228ppm CdCl ₂ +5	997	1656	1991
	С	ml coriander extract	+51.135•	+70.471•	+75.539•
			-47.743®	-51.811 ®	-34.404 ®

Table 1.2. Cadmium content (\Box gm /Kg dry weight) in whole body tissue of *Bellamya bengalensis* (*Lamark*) after chronic treatment during recovery.

	Treat	ment	Hg content □gm/Kg dry weight		
			28days	35 days	42days
After21days	D	Normal water(recovery)	2562	2502	2496
exposer to			+80.991•	+80.455•	+80.488•
0.228ppm CdCl ₂			-4.449 #	-6.954 #	-6.676 #
	Е	Normal water+5	2456	1948	1769
		ml/llit coriander	+80.171•	+74.897•	+72.470•
		extract (recovery)	-8.957 #	-37.371 #	-51.211 #

•-Compaired with respect to A

 Δ - Compaired with respect to B.

*-Compaired with respect to 21 days of B.

Result:

The bioaccumulation data from Table no. 1.1 and 1.2 indicates that the amount of Cadmium(Cd) accumulated in whole body tissue of animals on exposure to csdmium chloride (0.228ppm CdCl₂), gets increased with increase in exposure period from 7, 14 and 21 days as compaired to control group 'A'. The cadmium (Cd) contents are expressed in μ gm/kg dry weight. The control groups of animals showed minute quantity of cadmium (cd) as compaired to the experimental group 'B' and 'C'.

The control group of animals showed 487.0 μ gm/kg cadium in whole body tissue, while the amount of accumulation of cadmium in Presence of cadmium chloride (0.2288 ppm) in the

snails group 'B' for 7 days was 1473.0 μ gm/kg. The concentration in the tissue was raised after 14 days which was 2514.0 μ gm/kg. While after 21 days the rate of accumulation was 2676.0 μ gm/kg. There was a minute change in the accumulation in control group animals. The rate of accumulation was lower in CdCl₂ and coriandrum sativium extract (5 ml/lit) exposed snail groups 'C' as compaired to those exposed to only Cdcl₂ treated group 'B' in respective period of exposure and for 7 days it was 917.0 μ gm/kg, after 14 days it was 1656.0 μ gm/kg, while after 21 days it was 1991.0 μ gm/kg.

The gastropod snail *Bellamya bengalensis* (L.) Pre-exposed to cadmium chloride (0.2288 ppm), showed fast detoxification and recovery in presence of *Coriandrum sativium extract* (5 ml/lit.) than those allowed to cure naturally in normal water. The accumulation as observed after 28 days was 2456.0 μ gm/kg., after 35 days was 1948.0 μ gm/kg., while after 42 days the amount of cadmium was 1769.0 μ gm/kg. and those allowed to cure naturally in normal water , the rate of accumulation observed for 28 days was 2562.0 μ gm/kg., after 35 days was 2562.0 μ gm/kg., after 35 days 2496.0 μ gm/kg.

Discussion:

Many workers found that the accumulation patterns of heavy metals are dependent on both uptake and elimination rates (Hakman 1984, Goma *et.al.* 1995).The accumulation of metals in aquatic invertebrates can be divided in to three phases 1) Metal intake, 2) Metal transport, distribution, and sequestration (detoxification) with the organism and 3) Metal excretion (present/ absent).Accumulation strategies of invertebrates vary intra specifically between metals and inter specifically for the same metal in closely related organisms (Rainbow; 2002).

High cost modern medicines and many side effects of these medicines lead people to switch around from modern medicines to herbal medicines for the treatment of many infectiocious diseases (Ambuja s.k.s.; 2012). Mitra et.al (2012) reported that the coriander leaves are rich in photochemical such as poly phenol, carotinoids and essential oils like linalool which shows higher free radical scavenging activity.

In present study the accumulation of heavy metal mercury in the whole body tissue of *Bellamya bengalensis* (*L*.) was found to have similar pattern to that report previously for several gastropod species exposed to various concentrations of heavy metals. In response to increased concentrations of mercury chloride, high level of mercury was observed as compaired to control group of animals. The gastropod snail *Bellamya bengalensis* (*L*.) pre exposed to chronic concentration of mercury chloride along with 5 ml/lit *Coriandrum sativium* (*L*.) extract showed the poor bioaccumulation as compaired

to exposure of chronic concentration of respective heavy metal only. *Bellamya* bengalensis (L.) pre exposed to mercury chloride showed fast detoxification recovery in presence of *Coriandrum sativium* (L.) than those allowed to cure naturally in normal water.

Significance of study:

The present proposed research work would be useful as, to provide protective and curative measures against heavy metal toxicosis, to provide the knowledge about interaction of coriander extract with heavy metals in to the body, to provide the knowledge about importance of coriander in preparation of food, to provide the safe remedy to the peoples living in heavy metals affected areas. In city's automobile exhaust release lead and hence content in air is high. This study may give protective and curative use of coriander.

Conclusion:

The coriandrum sativium extract shows free radical scavenging and chelating activity against heavy metal bioaccumulation and removes the heavy metal bioaccumulated in the body.

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Role of Solar, Wind and Biomass Energy Resources in Rural Development of India

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Abstract

Today there is an urgent need for transition from petroleum based energy systems to one based on renewable resources. In the world energy security, economic growth and environment protection are the national energy policy drivers for any country. Solar, wind and biomass energy has the potential to create many employment opportunities at all levels, especially in rural areas of India. Enhancing the regular use, promoting deployment, innovation and basic research in renewable energy technologies, resolving the barriers to development and commercial deployment of solar, windand biomass technologies in rural area of India is today's need. In this research paper, solar, wind and biomass energy resources, their potential of producing electricity, cost effectiveness, efficiency, applications, limitations and storage problems are focus of attention.

Keywords: solar, wind, biomass, rural, development

Introduction

Sun is a powerful source of energy. India receives solar energy in the region of 5 to7 kWh/m^2 for 300 to 330 days in a year. This energy is sufficient to set up 20 MW solar power plants per square kilometer land area. It is considered renewable energy because the technology used to convert the sun's power into electricity does not produce smoke. Tapping the sun's energy does not usually destroy the environment. Without the sun, there will be no life. This is the most recognized renewable energy source [1-5]. Unfortunately, the sun does not available in the night, and in some days, clouds and rains and other natural conditions prevent the sun's powerful rays to reach earth. This means that it is not always available. Energy from the sun is captured using cells made from silicon materials and then converted into electricity. The biggest factor in solar cell production is cost.

Total installed capacity of wind electric generators in the world is 23270 MW. Germany 8100 MW, Spain 3175 MW, USA 4240 MW, Denmark 2417 MW and India1426 MW top the list of countries. India has been rated as one of the most promising countries for wind power development, with an estimated potential of 20,000 MW. There are 39 wind potential stations in Tamil Nadu, 36 in Gujarat, 30 in Andhra Pradesh, 27 in Maharashtra, 26 in Karnataka, 16 in Kerala, 8 in Lakshadweep, 8 Rajasthan, 7 in Madhya Pradesh, 7 in Orissa, 2 in West Bengal, 1 in Andaman Nicobar and 1 in Uttar Pradesh. Out of 208 suitable stations 7 stations have shown wind power density more than 500 Watts/m². Hence, India ranks fifth in the world in wind power generation [6-7].

Biomass is plentifully available in the rural regions. It is already being used by the rural people as a major source of energy, mainly in cooking food, which constitutes almost 50% of the total energy consumption. Biogas is a clean and efficient fuel, generated from cow dung, human waste or any kind of biological materials derived through anaerobic

fermentation process. The biogas consists of 60% methane with rest mainly carbon-di-oxide (CO₂). Using only local resources, namely cattle waste and other organic wastes, energy and manure are derived [8-10].Biogas is a safe fuel for cooking and lighting. Hence, the biogas plants are the cheap sources of energy in rural areas. Byproduct is usable as high grade manure. Biomass fuels account for about one third of the total fuel used in the country. It is the most important fuel used in over 90% of the rural households and about 15% of the urban households.

The sum ofestimates of approximate potential capacities of solar energy 20,000MW, Wind energy 47,000MW and Biomass energy 19,500MW is 86,500 MW, it is greater than the current total installed energy generating capacity of India. Enhancing the regular use of above available renewable energy sources, promoting deployment, innovation and basic research in renewable energy technologies, resolving the barriers to development and commercial deployment of solar, wind, and biomass technologies in rural area of India is today's need.

Discussion

Solar Energy

Fig.1 shows the technique of conversion of solar energy into the electric power. Solar cells are devices that convert light energy directly into electrical energy. In these cells, there are semiconductors. Solar cells are also called photovoltaic cells or PV devices.Solar panels are different to solar cells. Solar panels do not generate electricity directly. Instead they heat up water directly. A pump pushes cold water from a storage tank through pipes in the solar panel. The water is heated by heat energy from the sun and returns to the tank. They are often located on the roofs of buildings where they can receive the most sunlight. In solar thermal route, solar energy can be converted into thermal energy with the help of solar collectors and receivers known as solar thermal devices. Low grade solar thermal devices are used in solar water heaters, air heaters, solar cookers and solar dryers for domestic and industrial applications [11, 12].



Fig. 1 Technique of conversion of solar energy into the electric power.

Solar water heaters

Most solar water heating systems consists of a solar collector and a storage tank. The most common collector is called a flat plate collector. It consists of a thin, flat, rectangular box with a transparent cover that faces the sun, mounted on the roof of building. Small tubes run through the box and carry the fluid either water or other fluid, such as an antifreeze solution to be heated. The tubes are attached to an absorber plate, which is painted with special coatings to absorb the heat. The heat builds up in the collector, which is passed to the

fluid passing through the tubes. An insulated storage tank holds the hot water. It is similar to water heater, but larger in size. In case of systems that use fluids, heat is passed from hot fluid to the water stored in the tank through a coil of tubes. Solar water heating systems can be either active or passive systems. The active systems, which are most common, rely on pumps to move the liquid between the collector and the storage tank. The passive systems rely on gravity and the tendency for water to naturally circulate as it is heated [13]. Fig. 2 shows solar water heater and the technique of conversion of solar energy to heat the water.



Fig. 2 Solar water heater.

Solar Cooker

Solar cooker is a device, which uses solar energy for cooking, and thus saving fossil fuels, fuel wood and electrical energy to a large extent. However, it can only supplement the cooking fuel, and not replace it totally. It is a simple cooking unit, ideal for domestic cooking during most of the year except during the monsoon season, cloudy days and winter months.

Box type solar cookers

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The box type solar cookers with a single reflecting mirror are the most popular in India. These cookers have proved immensely popular in rural areas where women spend considerable time for collecting firewood [14]. A family size solar cooker is sufficient for 4 to 5 members and saves about 3 to 4 cylinders of LPG every year. The life of this cooker is near about 15 years. This cooker costs around Rs.1000 after allowing for subsidy. Solar cookers are widely available in the market. Fig. 3 shows box type solar cooker.

Reflector mirror Double glazing Cooking vessel Absorber tray

Fig. 3 shows box type solar cooker.
Parabolic concentrating solar cooker

Fig. 4 shows parabolic concentrating type solar cooker. A parabolic solar concentrator comprises of sturdy fiber reinforced plastic shell lined with stainless steel reflector foil or aluminized polyester film. It can accommodate a cooking vessel at its focal point. This cooker is designed to direct the solar heat to a secondary reflector inside the kitchen, which focuses the heat to the bottom of a cooking pot. It is also possible to actually fry, bake and roast food. This system generates 500 Kg of steam, which is enough to cook two meals for 500 people. This cooker costs upward of Rs.50, 000.



Fig. 4Parabolic concentrating type solar cooker.

Solar Electricity Generation Solar Photovoltaic (PV)



Fig. 5 shows solar cell, module and array.

Photo means 'light' and voltaic means 'electric'. PV cells are usually made of silicon, an element that naturally releases electrons when exposed to light. Amount of electrons released from silicon cells depend upon intensity of light incident on it. The silicon cell is covered with a grid of metal that directs the electrons to flow in a path to create an electric current. This current is guided into a wire that is connected to a battery or DC appliance [15, 16]. Typically, one cell produces about 1.5 Watts of power. Individual cells are connected together to form a solar panel or module, capable of producing 3 to 110 Watts power. Panels can be connected together in series and parallel to make a solar array, which can produce any amount of Wattage as space will allow. Modules are usually designed to supply electricity at 12 Volts. PV modules are rated by their peak Watt output at solar noon on a clear day. Fig. 5 shows solar cell, module and array.

PV tracking systems

This is an alternative to the fixed, stationary PV panels. PV tracking systems are mounted and provided with tracking mechanisms to follow the sun as it moves through the sky. These tracking systems run entirely on their own power and can increase output by 40%.

Back-up systems

These are necessary since PV systems only generate electricity when the sun is shining. The two most common methods of backing up solar electric systems are connecting the system to the utility grid or storing excess electricity in batteries for use at night or on cloudy days.

Solar Water Pumps

Fig. 6 shows solar water pumping system consists of a photovoltaic array mounted on a stand and a motor pump set. In solar water pumping system, the pump is driven by motor run by solar electricity instead of conventional electricity drawn from utility grid. A SPV water pumping system consists of a photovoltaic array mounted on a stand and a motor pump set compatible with the photovoltaic array. It converts the solar energy into electricity, which is used for running the motor pump set. The pumping system draws water from the open well, bore well, stream, pond, canal etc.



Fig. 6 shows solar water pumping system consists of a photovoltaic array mounted on a stand and a motor pump set.

Limitations of producing solar energy

Clean climate is necessary condition. In the rainy season all the environment is cloudy so in that period this technology is not useful. The lives of solar cells are not long, skilled technicians are required to fit the solar cells. Initial investments are more.

Wind Energy



Fig. 7 shows the technique of conversion of wind energy into the electric power.

Wind power is growing rapidly, and is becoming a well-recognized renewable energy resource. The kinetic energy of the wind is converted to electrical energy. Fig. 7 shows the technique of conversion of wind energy into the electric power. Using wind power to turn turbines that generate electricity can provide a cheap source of energy. Building and maintaining equipment could provide thousands of jobs and cost efficient and clean electricity [17]. Wind power could be used in areas where there is a great deal of wind, and a lot of open spaces. Wind power is used for grinding grains, pumping water, sailing ships in the century. Now wind power is harnessed to generate electricity in a larger scale with better technology.

Wind Energy Technology

The basic wind energy conversion device is the wind turbine. Although various designs and configurations exist, these turbines are generally grouped into two types, Vertical axis wind turbines, in which the axis of rotation is vertical with respect to the ground whereas Horizontal axis turbines, in which the axis of rotation is horizontal with, respect to the ground [18]. Fig. 8 illustrates the two types of turbines and typical subsystems for an electricity generation application. The subsystems include a blade or rotor, which converts the energy in the wind to rotational shaft energy, a drive train, usually including a gear box and a generator, a tower that supports the rotor and drive train, and other equipment, including controls, electrical cables, ground support equipment, and interconnection equipment.



Horizontal Turbine

Vertical Turbine

Fig. 8 illustrates the two types of turbines and typical subsystems for an electricity generation.

Wind Electric Generators (WEG)

Wind electric generator converts kinetic energy available in wind to electrical energy by using rotor, gear box and generator. There are a large number of manufacturers for wind electric generators in India who have foreign collaboration with different manufacturers of Denmark, Germany, Netherlands, Belgium, USA, Austria, Sweden, Spain, and U.K. etc. At present, WEGs of rating ranging from 225 kW to 1000 kW are being installed in our country. Wind farms are not particularly popular. They can impact local environment and wildlife, and even provide noise pollution. Many people feel that the equipment used obstructs scenic views. It is possible to construct wind turbines in various sizes. They can be made for single residential use, and they can be constructed on a large scale as well. Technology is making this mode of renewable energy more efficient and less intrusive [19].

Wind Potential

For a wind energy system to be feasible there must be an adequate wind supply. A wind energy system usually requires an average annual wind speed of at least 15 km/h. A wind generator will produce lesser power in summer than in winter at the same wind speed as air has lower density in summer than in winter. Similarly, a wind generator will produce lesser power in higher altitudes as air pressure as well as density is lower than at lower altitudes. The wind speed is the most important factor influencing the amount of energy a wind turbine can produce. Increasing wind velocity increases the amount of air passing the rotor, which increases the output of the wind system [20, 21]. The towers are generally placed 100 meters away from the nearest obstacle. The middle of the rotor is placed 10 meters above any obstacle that is within 100 meters. Table 1 represents a guideline of different wind speeds and Table 2 potential of producing electricity in India.

Average Wind Speed km/h (mph)SuitabilityUp to 15 (9.5)No good18 (11.25)Poor22 (13.75)Moderate25 (15.5)Good29 (18)Excellent		
Up to 15 (9.5) No good 18 (11.25) Poor 22 (13.75) Moderate 25 (15.5) Good 29 (18) Excellent	Average Wind Speed km/h (mph)	Suitability
18 (11.25) Poor 22 (13.75) Moderate 25 (15.5) Good 29 (18) Excellent	Up to 15 (9.5)	No good
22 (13.75) Moderate 25 (15.5) Good 29 (18) Excellent	18 (11.25)	Poor
25 (15.5) Good 29 (18) Excellent	22 (13.75)	Moderate
29 (18) Excellent	25 (15.5)	Good
	29 (18)	Excellent

Table 1 A guideline of different wind speeds.

Sr.	State	Gross	Total	Technical Potential
No.		Potential	capacity	
01	Andhra Pradesh	8275	101.3	1750
02	Gujarat	9675	218.05	1780
03	Karnataka	6620	274.2	1120
04	Kerala	875	2	605
05	Madhya Pradesh	5500	26.35	825
06	Rajasthan	5400	212	895
07	Tamil Nadu	3050	1683.6	1750
08	Maharashtra	3650	411.15	3020
09	West Bengal	450	1.1	450
10	Others	2990	3.1	-
	Total	45195	2884.75	12875

Table 2 Wind Power Potential of producing electricity in India (MW).

Applications

Utility interconnected wind turbines generate power which is synchronous with the grid and are used to reduce utility bills by displacing the utility power used in the household and by selling the excess power back to the electric company. Wind turbines for remote homes generate DC current for battery charging. Wind turbines for remote water pumping generate 3 phase AC current suitable for driving an electrical submersible pump directly. Wind turbines suitable for village scale, wind power range from 500 watts to 50 kilowatts.

Limitation of producing wind energy

Wind cannot blow continuously all the time. It can be produced at the top of hill or mountains or at coastal regions by establishing wind mills where wind velocity is more than 25 Km/hr. When wind velocity is less than 25 Km/hr, production of wind energy cannot possible. Initial cost is too large for the establishment of wind mills. Also, it is very difficult to establish new wind mills at distant areas in India.

Biomass

Biomass is a renewable energy resource derived from the carbonaceous waste of various human and natural activities. It is derived from numerous sources, including the by products from the wood industry, agricultural crops, raw material from the forest, household wastes etc. Bio-energy, in the form of biogas, which is derived from biomass, is expected to become one of the key energy resources for global sustainable development. Biomass offers higher energy efficiency through form of Biogas than by direct burning. It is an important source of energy and the most important fuel worldwide after coal, oil and natural gas [22, 23].

The biomass comes from things that once lived, known as Natural Material. The wood products, dried vegetation, crop residues, aquatic plants and even garbage produce biomass fuels. Plants used up a lot of the sun's energy to make their own food. They stored the foods in the plants in the form of chemical energy. As the plants died, the energy is trapped in the residue. This trapped energy is usually released by burning and can be converted into biomass energy. Wood is a biomass fuel. It is renewable and widely utilized source of energy, probably due to its low cost and indigenous nature, that it accounts for almost 15% of the world's total energy supply and as much as 35% in developing countries, mostly for cooking and heating[24,25].Fig. 9 shows the technique of conversion of biomass energy into the electric power.Other ways in which organic matter can be converted into energy include decomposition and fermentation.



Fig.9 shows the technique of conversion of biomass energy into the electric power.

Decomposition

Things that can rot, like garbage, human and animal waste, dead animals and the like can be left to rot, releasing a gas called biogas. Methane can be captured by a machine called Micro turbine and converted into electricity. Sometimes, animal waste can also be converted into methane by a machine called Anaerobic Digester.

Fermentation

Ethanol can be produced from crops with lots of sugars, like corn and sugarcane. The process used to produce ethanol is called gasification.

Biogas Plants

A typical biogas plant has the following components. A digester in which the biomass fermented, an inlet tank for mixing the feed and letting it into the digester, gas holder in which the generated gas is collected, outlet tank to remove the spent slurry, distribution pipeline to transport the gas into the kitchen, and a manure pit, where the spent slurry is stored. Fig. 10 shows a typical biogas plant.



Fig. 10 shows a typical biogas plant.

Biomass Briquetting

The process of densifying loose agro-waste into a solidified biomass of high density, which can be conveniently used as a fuel, is called Biomass Briquetting. Briquette is also termed as 'Bio-coal'. It is pollution free and eco- friendly. Fig. 11 shows biomass briquetting. Some of the agricultural and forestry residues can be briquetted after suitable pre-treatment. A list of commonly used biomass materials that can be briquetted are Corn Cob, Jute Stick, Sawdust, Pine Needle, Bagasse, Coffee Spent, Tamarind, Coffee Husk, Almond Shell, Groundnut shells, Coir Pith, Bagasse Pith, Barley straw, Tobacco dust, Rice Husk, De oiled Bran.



Fig. 11 shows biomass briquetting.

Biomass Gasifies



Fig. 12 shows comparison of product of biomass direct burring and biogas.

Biomass gasifies convert the solid biomass into a combustible gas mixture normally called as producer gas. The conversion efficiency of the gasification process is in the range of 60% to 70%. The producer gas consists of mainly carbon-monoxide, hydrogen, nitrogen gas and methane, and has a lower calorific value (1000–1200 kcal/Nm³). Gasification of biomass and using it in place of conventional direct burning devices will result in savings of at least 50% in fuel consumption. The gas has been found suitable for combustion in the internal combustion engines for the production of power. Fig. 12 shows comparison of product of biomass direct burning and biogas.

Applications

Biomass briquetting

Some of advantages of biomass briquetting are high calorific value with low ash content, absence of polluting gases like sulphur, phosphorus fumes and fly ash, which eliminate the need for pollution control equipment, complete combustion, ease of handling, transportation & storage because of uniform size and convenient lengths.

Water pumping and Electricity generation

Using biomass gas, it is possible to operate a diesel engine on dual fuel mode (part diesel and part biomass gas). Diesel substitution of the order of 75% to 80% can be obtained at nominal loads. The mechanical energy thus derived can be used either for energizing a water pump set for irrigational purpose or for coupling with an alternator for electrical power generation 3.5 KW-10 MW.

Heat generation

A few of the devices, to which gasifier could be retrofitted, are dryers for drying tea, flower, spices, kilns for baking tiles or potteries, furnaces for melting non-ferrous metals, boilers for process steam, etc. Direct combustion of biomass has been recognized as an important route for generation of power by utilization of vast amounts of agricultural residues, agro industrial residues and forest wastes. Gasifiers can be used for power generation and available up to a capacity 500 KW.

High Efficiency Wood Burning Stoves

These stoves save more than 50% fuel wood consumption. They reduce drudgery of women saving time in cooking and fuel collection and consequent health hazards. They also help in saving firewood leading to conservation of forests. They also create employment opportunities for people in the rural areas.

Limitations of producing bio-fuel

Bio-diesel can be produced from all kinds of plant oils. But oil produced from edible oil is not beneficial because oil produced from edible oil become very costly. It is very difficult to fulfill increasing demand of mineral oil by replacing bio fuels. The boiling point of bio diesel $(191^{\circ}C)$ is greater than mineral oil $(110^{\circ}C)$.

Conclusions

Theisolated systems are needed to be linked with rural industry. Innovative financing is also a requirement. Main streaming of renewable is very essential. A disparaging part of the solution lies in promoting renewable energy technologies as a way to address concerns about energy security, economic growth in the face of rising energy prices, competitiveness, health costs and environmental degradation. The cost effectiveness of solar, wind and biomass energy should also be taken into account. An emphasis should be given on presenting the real picture of massive renewable energy potential; it would be possible to attract foreign investments to herald a Green Energy Revolution in India. Specific action include promoting deployment, innovation and basic research in renewable energy technologies, resolving the barriers to development and commercial deployment of solar, wind and biomass technologies in rural area of India.

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Problems and Remedies to Control Noise Pollution in the Areas of Jalgaon City

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Abstract :

Noise pollution in nature has been a one of a kind circumstance which makes it hard to enough contrast noise and other natural contaminations. In spite of the fact that it is enticing to think about its similarity with water, air or strong waste issues, noise ought to be viewed as a thoroughly independent element. Noise, a physical poison, isn't effectively perceived. This is on the grounds that the affectability of human ear gets naturally acclimated to the encompassing dimension of sound and hence moderate increments in the surrounding level go unnoticed. Along these lines noise keeps on doing the harm, quietly. Noise is a disturbance to the human environment that is escalating at such a high rate that it will become a major threat to the quality of human lives. In the past thirty years, noise in all areas, especially in urban areas, has been increasing rapidly. There are numerous effects on the human environment due to the increase in noise pollution. The influence of noise on the human body can be due to the direct effects upon the auditory system, on non-auditory physiological processes and on purely psychological mechanisms.

Key words:Nausea, Noise, unpleasant, remedies, urbanization, industrialization, physical poison.

Introduction :

Noise is derived from the Latin word "nausea" implying 'unwanted sound' or 'sound that is loud, unpleasant or unexpected'. Pollution, when all is said in done, is a result of some basic capacities or then again exercises. In this way, it is practically difficult to totally wipe out the contamination, yet can be controlled or decreased. The majority of the toxin can be endured up to a specific dimension, the dimension being subject to the kind of the toxin. At the point when the dimension of pollution keeps on expanding, it moves toward becoming important to know the sum by which as far as possible has been surpassed with the goal that their expansion can be checked by the presentation of appropriate guidelines. To know the dimension of pollution must be estimated. In the instance of noise pollution, estimations are even more fundamental due to the inability of our sound-related framework to perceive moderate changes in the noise levels.

Noise pollution is a major problem for the quality of life in urban areas. Noise affects everybody and is likely to continue as a major issue well into the next two decades. To understand noise we must understand the different types of noise, where noise comes from, the effect of noise on humans and the various ways of measuring it, and its hazards.

Jalgaon is one of the rapidly growing city in Maharashtra. It is located in western India, northern part of Maharashtra in Jalgaon district. Jalgaon has a municipal corporation and had 4,60,468 residents at the 2011 Census. It is District place so, various government offices are situated in the city. The population of the city increases speedily with fast physical expansion of the city. Due to rapid growth of population, number of vehicles also increases with increasing population; this causes one of the major role for noise pollution in the city. Rapid urbanization, industrialization, expansion of road network and infrastructure cause the noise pollution (Pathak et al. 2007). Urbanization is cause of increase in number of vehicles. (Behzad et al. 2007) Noise has harmful effects on human health. Noise is major source of friction among individuals (Jobair et al. 2001). In the present time noise pollution become a huge problem which has adverse effects on community.

Study Area :

Jalgaon city is a Head quarter of Jalgaon District in Nasik Revenue Division of Maharashtra State. Jalgaon city is one of the fast growing cities in Maharashtra. The city enjoys a central position and reflects the glorification of North Maharashtra and Khandesh. It is situated on right bank of Girna River and on the Dhule-Nagpur National Highway No. 6. It is also situated on the Mumbai-Delhi, Mumbai - Bhusawal - Kolkata, Bhusawal -Surat railway routes to important urban centers of Maharashtra State and neighboring states.

Jalgaon City (earlier known as 'East Khandesh') isa district headquarter situated in the northern part of Maharashtra state. It is 420 Kms. away from Mumbai, the capital of Maharashtra and 413 kms. From Nagpur. It lies between 20° 58' 22.40" North to 21° 01' 26.35" North Latitude and 75° 31' 36.39" East to 75° 36' 05.30" East Longitude (CSP, 2010)and having about 208.5 meters height from mean sea-level



(SOI, 1977). The study region has an area of 68.24 sq. km. administratively it is divided into 69 wards shows the wards no's, ward names of Jalgaon city.

The villages, namely Pimprala, Khedi Bk., Nimkhedi and some parts of Mehrun, Jalgaon, Avhane, Kusumbe, Asoda and Manyarkhede have included in the municipal limit.

Aims & Objectives :

- 1. To make extensive and intensive survey of Levels of Noise Pollution in Jalgaon city.
- 2. To identify the highly Noise polluted areas of Jalgaon city.
- 3. To identify the impact of Noise pollution on general masses.
- 4. To give remedies to reduce the Noise pollution.

Research Methodology:

With the help of instrument 'Sound Level Meter' researcher will measure the level of sound pollution in the different six locations of Jalgaon city which includes, Ajanta Chowk, AkashwaniChowk, Shiv Colony Chowk, Tower Chowk, ShivajiChowk andSwatantraChowk, same are represented by Station A to Station F respectively.

The measurement of sound pollution has been done on three times in a day that is Morning (8.00 AM), Afternoon (12:30 PM) and Evening times (5:30 PM) and the same is represented by T1, T2 and T3 respectively. The collected data has been tabulated, formulated and represented with the help of maps, graphs and tables.

Result & Discussion :

Table 1 represent the noise pollution at different locations, in which noise levels were recorded at different timing. The measurement of sound pollution will done three times in a day that is Morning (8.00 AM), Afternoon (12:30 PM) and Evening times (5:30 PM) and the same is represented by T1, T2 and T3 respectively.

i) Analysis of Noise Pollution at Sample Stations from A to F :

Table 1 shows that at Station A-Ajanta Chowk, the highest sound level was 90.1 dB at morning time (T1) and the lowest sound level was 68.1 dB at afternoon (T2). At Station B-AkashwaniChowk, the highest sound level was 83.1dB observed at evening time (T3) and lowest sound level was 69.37dB at morning time (T1). Station C- Shiv Colony Chowkdisplay highest sound level, that is 83.02 dB at evening time (T3) and lowest at 66.94 dB at afternoon time (T2). Station D-Tower Chowk reveals that highest sound level 81.96 dB was observed at afternoon time (T2) and lowest was at 69.41 dB at morning time (T1). Station E-ShivajiChowk, the highest sound level was 81.72 dB at afternoon time (T2) and the lowest sound level was 69.89 dB at afternoon (T2). Station F-SwatantraChowk, the highest sound level was 82.63 dB at morning time (T2) and the lowest sound level was 70.03 dB at afternoon (T2).

Sr.	Time	Stations (Unit in dB)									
No.	1 ime	Α	В	С	D	Ε	F				
	T1	90.1	77.19	78.04	74.07	74.47	82.63				
1	T2	68.1	77.7	81.44	75.35	81.72	74.71				
	Т3	77.67	83.1	81.44	75.94	75.82	77.42				
	T1	89.87	69.37	73.71	69.41	70.30	70.84				
2	T2	74.83	76.84	68.94	81.96	75.90	72.33				
	Т3	76.93	76.87	70.8	80.18	80.18	80.48				
	T1	79.2	70.78	75.36	74.31	74.7	73.67				
3	T2	75.14	82.85	82.52	81.74	69.89	70.03				
	Т3	80.82	79.22	76.83	75.4	75.39	77.08				
	T1	73.5	73.3	73.8	70.91	79.19	75.38				
4	T2	76.27	76.21	66.94	70.24	72.92	81.85				
	T3	75.97	69.62	83.02	75.94	76.22	81.54				
T1 - Morning $T2 - Afternoon$ $T3 - Evening$											

Table No. 1 Analysis of Noise Pollution at Sample Stations from A to F

T3 = EveningT I = Morning $I_2 = Anternoon$



Remedies to control Noise Pollution :

Following are the remedies to control the noise pollution.

- Plantation of trees near schools, hospitals, offices, industries and road side areas.
- Heavy vehicles and old vehicles may not be allowed in the populated areas.
- Limitation of vehicle speeds and alteration of roadway surface texture.
- Use of traffic controls that smooth vehicle flow.
- To reduce braking and acceleration and innovative tire design and other methods.
- Proper town planning is to be done to avoid noise hazards.
- Legislation can ensure that sound production at various functions.
- Unnecessary horn blowing should be restricted especially in vehicle congested areas.
- There should be silent zones for example educational institutes, hospitals, etc.

Conclusion :

Noise was studied selecting six prominent locations in the City of Jalgaon where there is more traffic and near cross roads and signals. It was also observed that highest noise pollution was produced in the evening time. The necessary protocols of recording sound are observed.

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In-vivo bio-control of fungal pathogens through antagonistic fungi

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Abstract:

Stringent new restriction on the use of chemicals and elimination of some effective toxic pesticide from the market could be option but alternative biopesticide application are needed for the control of several diseases and such strategies should be made with the help of public concern regarding pesticide pollution due to indiscriminate use..

For assessment of antifungal activity against ten targeted fungal pathogen following different methods were adopted. Three *Trichoderma* species, namely *Trichoderma viride, Trichoderma koningii* and *Trichoderma hamatum* were evaluated against ten phytopathogenic fungi of leafy vegetables. Biological control of ten fungal pathogens of leafy vegetables were carried out by using three *Trichoderma species* as a biocontrol. *In-vivo* studies showed that *T. viride* was more effective and revealed 68.14% disease reduction, while *T. koningii* and *T. hamatum* had 43.43% and 36.02% disease reduction among eight leafy vegetables at field conditions.

Keywords: Biocontrol, Antagonstic fungi, Trichoderma spp., In-vivo.

Introduction:

Biological control of plant pathogen by microorganism has been considered more natural and environmentally acceptable alternative to the existing chemical methods $[^2]$. The biological control agents have enormous antimicrobial potential. They are effective in treatment of infectious diseases, simultaneously mitigating many of the side effects which are associated with pesticides. So there is growing realization in the people that biological control can be successfully exploited as an agricultural method for soil borne pathogens $[^{3,15}]$.

The principles of control mechanism of biocontrol agent are mycoparasitism and specially antibiosis. *Trichoderma Spp.* proved the potential as biological agents antagonistic to several soil borne plant pathogens [¹²]. Disease suppression by biocontrol fungal agent is sustained manifestation of interaction among the plant, pathogen, biological agent and physical environments [¹⁰].

Material and method:

A) In vivo antagonistic assay by fungal biocontrol agents:

For the assessment of antagonistic assay at field condition, sowing of each leafy vegetable was carried out in 12×24 m plot of the field. After 10 days of interval, 200 ml spore suspension of each targeted fungal pathogen was mixed in the soil separately. After seven days of duration, the diseases symptoms were developed on the leafy areas of respective leafy vegetables. Later 200 ml spore suspension of

Trichoderma species was sprayed directly on the infected leafy vegetables. Half quantity of spore suspension was sprayed on infected plants and remaining half quantity of spore suspension was mixed in the soil. This treatment was applied twice at an interval of eight days to all leafy vegetables. In all cases, leafy vegetable without *Trichoderma* spore treatment served as control and tagged. Simultaneously all treated leafy vegetables were also tagged. After 10 days of treatment, among each treated leafy vegetable plants, the total number of leaves on each plant and total number of infected leaves on each plant were counted and average in triplicate was recorded. The effectiveness of each *Trichoderma species* was evaluated by calculating the Percent Diseases Incidence [PDI] and Percent Diseases Reduction [PDR] over control by using following formula,

PDI = <u>Number of diseased leaves on each plant</u> × 100 Total number of leaves on each plant PDR = <u>PDI in control – PDI in treatment</u> × 100 PDI in control

Result:

A] In vivo assay:

The assessment of three *Trichoderma species* was carried out at field conditions to analyze the efficacy of *Trichoderma spp.* in controlling the disease incidence on eight leafy vegetables. The effectiveness of each *Trichoderma species* was evaluated by calculating the Percent diseases incidence [PDI] and Percent diseases reduction [PDR] over control.

The efficacy of *Trichoderma species* spore treatment revealed that *T. viride* was more effective in controlling the disease incidence followed by *T. koningii*. Whereas *T. hamatum* was less effective as compared to others.

The percent disease reduction with *T. viride* treatment was maximum, ranging from 50-77.78% followed by *T. koningii* ranging from 00-74.82%. Whereas percent disease reduction with *T. hamatum* was 00-63.64% which showed least disease control as compared to others [Table. 1].

From the above results, it is clear that *T. viride* was more effective in disease reduction on an average as 68.14% followed by *T. koningii* as 43.34%. Whereas *T. hamatum* showed 36.02% disease reduction which is less effective as compared to others.

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Leafy	Trichoderma	Cont	Control		Control Treated		ed	PDI in	PDI in	PDR
vegetables	species	No. of	Total no.	No. of	Total no.	control	treated	[%]		
		infected leaf	of leaf	Infected leaf	of leaf					
A. gaevolens	T. viride	9	17	2	16	52.94	12.5	76.38		
	T. koningii			2	15		13.33	74.82		
	T. hamatum			4	17		23.52	55.57		
B. oleraceae	T. viride	5	10	1	9	50	11.11	77.78		
	T. koningii			2	10		20	60		
	T. hamatum			2	11		18.18	63.64		
C. tinctorius	T. viride	5	14	2	14	35.71	14.28	60.01		
	T. koningii			4	14		28.57	19.99		
	T. hamatum			3	15		20	43.99		
C. esculanta	T. viride	2	5	1	5	40	20	50		
	T. koningii			2	5		40	00		
	T. hamatum			2	5		40	00		
C. sativum	T. viride	7	20	3	20	35	15	57.14		
	T. koningii			5	21		23.80	32		
	T. hamatum			6	20		30	14.28		
R. vesicarious	T. viride	8	25	2	24	32	8.33	73.96		
	T. koningii			4	25		16	50		
	T. hamatum			5	25		20	37.5		
S. oleracia	T. viride	4	14	1	13	28.51	7.69	72.99		
	T. koningii			2	14		14.28	49.91		
	T. hamatum			2	15		13.33	53.24		
T. foenum-	T. viride	5	15	1	13	33.33	7.69	76.92		
graecum	T. koningii			2	15		13.33	60		
-	T. hamatum			4	15		26.66	20.01		

Table : 1. In-vivo effect of Trichoderma speci	es on leafy vegetable disease reduction.
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All values of mean of triplicate. Where PDI = Percent diseases incidence and PDR = Percent diseases reduction.

Discussion:

Three fungal antagonistic of *Trichoderma species* were screened for their antagonistic activity against ten fungal pathogen of leafy vegetables. [¹⁹] over 75 years ago demonstrated that antagonistic nature of fungal species from the genus, *Trichoderma*. Among these several species of *Trichoderma* are well documented mycoparasite and have been used successfully against certain pathogenic fungi [¹⁵]. There have been numerous attempts to use *Trichoderma species* on soil borne plant pathogen such as *Sclerotia, Fusarium, Pythium* and *Rhizoctonia species* [^{1,7,11}]. The mycoparasitism ability of *Trichoderma species* against some economically important aerial and soil borne plant pathogen [^{6,7,15}].

In-vivo assessment of three *Trichoderma species* was carried out at field conditions to analyze the efficacy of *Trichoderma spp.* in controlling the disease incidence on eight leafy vegetables. The percent disease reduction with *T. viride* treatment was maximum, ranging from 50-77.78% followed by *T. koningii*, ranging from 00-74.82% Whereas percent disease reduction with *T. hamatum* was 00-63.64% which showed least disease control as compare to others. Therefore *T. viride* was more effective in disease reduction averagely as 68.14% followed by *T. koningii* as 43.34%. Whereas *T. hamatum* showed 36.02% disease reduction which is less as compare to others in field condition. [¹⁶] reported that *T. viride* was more effective than other *Trichoderma* isolates in field conditions.

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Synthesis and Luminescent, Electrical Resistivity Properties ofCdTe Thick Film

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Abstract

Semiconductor nanoparticles are currently being extensively studied due to their unique size dependent properties. It has been demonstrated by several groups that nanocrystalline II-VI semiconductors show enhanced luminescence and electrical properties. Polymers are able to achieve surface passivation, prevent particles from agglomeration, which are in favour of controlling the particles size and size distribution effectively. CdTe an important II-VI semiconductor material, which is very useful for a variety of electro-optical devices and solar energy conversion. CdTenanocrystalline thick films have been prepared by screen-printing method and characterized byluminescent, electrical resistivity techniques. CdTe nanoparticle thick filmhave been prepared using cadmium acetate as cadmium source and tellurium dioxide as telluride source. The photoluminescence spectra of the CdTe films exhibited red band emissions corresponding to the luminescence emission.Electrical resistivity studies showed that the films are semiconducting nature and the room temperatureelectrical resistivity of the film decreases with the increasing temperature.

Keywords: Co-precipitation, Thick film, CdTe, Semiconductors, Luminescent, Electrical Resistivity Properties.

1. Introduction

Semiconductor nanomaterial's are of great interest for their unique size dependent optical and electrical properties. As size of the particle reduces to nano it gets high surface to volume ratio and increased surface states, which influence the chemical reactions by altering transitions of electrons and holes. Metal oxides and telluride's play a very important role in many areas of chemistry, physics and material science. These can adopt a vast number of structural geometries with an electronic structure that can exhibit metallic, semiconductor orinsulatorcharacter. In technological applications, these are used in the fabrication of microelectronic circuits, sensors, piezoelectric devices [1]. In recent years, nanomaterial's have shown keen interest because of their unusual chemical and physical properties, which are significantly different from the bulk materials. Semiconductor nanomaterial's have been attracted extensive attention due to their size dependent properties and important potential applications in photovoltaic solar cells; light emitting devices, chemical/biological sensors and photo catalysis [2]. In recent years, there has been growing interest in the synthesis of nanometer-sized II-VI binary semiconductor materials.

CdTe is an important II-VI semiconductor material, which is very useful for a variety of electro-optical devices and solar energy conversion [3]. CdTe nanoparticles have been the subject of numerous investigations. Because of high quantum efficiency and multicolor availability, CdTe nanoparticles can find applications in solid-state lighting, displays, optical communications, sensors, as well as in biological imaging and detection.

Many fabrication techniques have been attempted for depositing CdTe nanoparticles. Some are controlled atmosphere based techniques like sputtering, thermal evaporation, e-beam evaporation, Molecular Beam Epitaxy (MBE), Co-precipitation, and Metal-organic Chemical Vapour Deposition (MOCVD) [5]. All these techniques are extremely expensive and require specialized equipment. Among these, co-precipitation is the most convenient method because of its simplicity, low cost, easy to add doping materials and the possibility of varying the film properties by changing composition of starting solution.

2. Experimental

CdTe layers were deposited on borosilicate glass substrates of 1 mm thickness by the screen printing technique. In the present work, powder of CdTe nanoparticles was prepared by the chemical precipitation method using AR grade cadmium acetate Cd(CH₃COO)₂.2H₂O and Tellurium dioxide (TeO₂) as a starting compounds. Chemical reaction was carried out at room temperature, 50 ml solution of 1M Cd(CH₃COO)₂.2H₂O and 50 ml solution of1M TeO₂ were prepared separately using distilled water. Then dissolved solutions of tellurium dioxide were added drop wise into cadmium acetate solution and the mixture continuously and vigorously stirred for 3 hours at constant stirring at 800 rpm and consequently a dark greyish CdTe precipitate formed which was filtered out and washed several times with distilled water and methanol. Finally, the product was dried for 24 hours in dry air. After drying the precipitate was crushed to fine powder by grinding process using a mortar and pastel.

A paste for the preparation of CdTe thick film was prepared by mixing as-synthesized powder with ethyl cellulose (Ethocel) a temporary binder, organic solvents such as butyl cellosolve (2-Butoxyethanol, butyl glycol) $C_6H_{14}O_2$, 1 Acetoxy-2 butoxy ethane, and terpineol anhydrous $C_{10}H_{18}O$. The ratio of inorganic part to organic part was kept as 75:25 in formulating the paste. The prepared paste was screen printed on glass substrates which was pre-cleaned. The obtained film was dried under the IR lamp and then fired at 120°C for 1 h to remove organic binder and to avoid the cracks in the film [6, 7].

The photoluminescence properties of CdTethickfilm were studied by photoluminescence spectra taken at room temperature with Horiba spectrofluorometer (Fluromax-4). The electricalresistivity of the films has been measured using standard two-probe method.

3. Result and discussions

3.1 Photoluminescence (PL) studies

PL spectroscopy is an important tool to characterize the optical properties of a semiconductor. PL intensity may be directly correlated with the defect density in a nanomaterial. The luminescent properties of the nanopowders are strongly dependent on the crystal structure of host materials. **Fig. (a)**is the photoluminescence emission spectra of the CdTe thick film. PL spectra have been recorded at room temperature with an excitation wavelength of 740 nm. The spectrum contains a broad and sharp photoluminescence emission centred at 824.06 nm. Emissions from semiconductor nanoparticles originate from electrons in the conduction band, excitonic states and trap states. It is important to note that any physical property that is dependent on the size of a quantum dot could also be used for predicting its size and distribution. It is well known that emission is very sensitive to nature of nanoparticle surface because of the presence of gap surface states arising from surface non

stoichiometry and unsaturated bonds. Broad low energy spectrum is always attributed to trap state emission arising from surface defects [8].



In thephotoluminescence emission spectra the peak is found to be broaden. The inhomogeneous broadening of peaks can be attributed to high concentration of defects. The broadening of peaks can be ascribed to the fact that large crystals tend to harbour more defects than small crystals. These defects may act as non-radiative recombination centres, which can quench theradiative band edge recombination [9]. In the nanocrystalline regime, since the number of molecules in the surface is more, surface defects play a vital rolein determining the luminescence characteristics. In nanocrystals traps are more likely to be located at the surface. The smaller the particle diameter larger would be the surface area, leading to strong contribution from defect related luminescence emission.

3.2 Electrical Resistivity Studies

The measurements on electrical resistivity of the CdTe thick film for [Cd]/[Te] ratios = 0.23were carried out in the temperature range 300-423°K on rectangular-shaped samples with typical size of 20 mm², using a standard DC two point probe method under dark. The variation of log ρ versus inverse of absolute temperature (1000/T) for the films shown in **Fig.** (b)reveals that the resistivity variation obeys the Arrhenius relation Eq. (1),

$$\rho = \rho_0 \exp\left(\frac{Ea}{kT}\right) \tag{1}$$

It is clear from figure that the resistivity decreases as the temperature increases, showing semiconducting behaviour of the CdTe thick films [10]. The room temperature electrical resistivity (low and high) values of the thick films for different [Cd]/[Te] ratios are in the range between 3.65 x $10^6\Omega$ cm and 2.80 x $10^7\Omega$ cm respectively. The values of activation energy Ea is calculated by using the relation **Eq. (2)**

Ea = 2.303 x k x slope

(2)

where Ea is the activation energy and k is the Boltzmann constant. The values of activation energy Ea are found to be 0.6 eV. The activation energy values indicate that the prepared samples are semiconductors.



Fig.(b): Plot of log ρ versus 1000/T for [Cd]/[Te] ratio= 0.23.

4.Conclusion

In this work, nano-sized crystals of pure CdTe were successively synthesized by precipitation method at room temperatureand films are prepared by screen printing method. The photoluminescenceand electrical resistivity of CdTe thick film has been done. The film prepared with the optimized deposition parameters shows the photoluminescence spectra of the CdTe films exhibited red band emissions corresponding to the luminescence emission. Electrical resistivity study showed that the films are semiconducting nature and the room temperature resistivity of the film decreases with the increasing temperature.

Acknowledgments

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A preliminary survey on algae (Euglenineae and Myxophyceae) from sewage from Bhusawal city.

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ABTRACT

Algae are natural inhabitants of water and serves as indicators of water quality in various ways.Sewage water contains1-6 times more of organic matter which enhance the growth of algae. Most of taxa of Euglenineae and Cyanophyceae collected from sewage water, moist soil near to sewage pools/puddles / nallies of Bhusawal city.Present communication includes genera like*Euglena* Ehr., *Phacus* Dujardin, *Microcystis* Kuetz.,*Chroococcus*Naeg., *Gloeocapsa*Kuetz., *Aphanocapsa*Naeg., *Aphanothece*Naeg., *Synechocystis*Sauv.*Merismopedia*Meyen, *Arthrospira*Stizenb., *Spirulina*Turpin em. Gardner, *Oscillatoria*Vaucher, *Phormidium*Kuetz., *Lyngbya*Ag., *Nostoc* Vaucher, and *Anabaena* Bory.

Key words : Algae, sewage, Bhusawal, Euglenineae and Myxophyceae.

INTRODUCTION

Bhusawal city is located on a small tributary of river Tapi at latitude $21^0 00'20.56''$ north and longitudes $76^0 01'31.31''$ east. Bhusawal is a city as well as a municipal council in the Jalgaon district in the Indian state of Maharashtra and is the second biggest town in the district. Situated on river Tapi and National Highway 6 passes through it. The population of Bhusawal in 2011 is 187,421 While in end of 2018 would be *215 948*. There is no proper drainage facility in certain specifically in new area.

The temperature ranges $18 - 46^{\circ}$ sometimes it lowest up to 9.5° , humidity 52-82 %, while rain fall is ranges 10mm-310mm.

MATERIALS AND METHODS

The collections were made early in the morning between 7.00 to 9.00 am during 2017-2018 from Bhusawal city (M.S.). All the collected samples were studied fresh as far as possible and later preserved in 4 % formalin for further studies. Camera Lucida drawings were made with the help of mirror type of camera Lucida. The identification of taxa is based on the monograph Desikachary (1959),Asaul (1975) and relevant research paper publications. The material is deposited in the Department of Botany, Smt.P.K.KotechaMahilaMahavidyalaya,Bhusawal, district Jalgaon, (M.S.).

OBSERVATIONS AND RESULTS

List includes 46 taxa of Euglenineae and Cyanophyceae . 16 taxa of Euglenineae of mainly two genera *Euglena* Ehr. and *Phacus* Dujardin while 30 taxa of Myxophyceaebelogs to

genara*Microcystis*Kuetz.,*Chroococcus*Naeg., *Gloeocapsa*Kuetz., *Aphanocapsa*Naeg., *Aphanothece*Naeg.,*Synechocystis*Sauv., *Merismopedia*Meyen, *Arthrospira*Stizenb., *Spirulina*Turpin em. Gardner, *Oscillatoria*Vaucher, *Phormidium*Kuetz., *Lyngbya*Ag., *Nostoc* Vaucher, and *Anabaena* Bory.

Euglena acus Ehr.var. hyalinaKlebs Euglena agilis Carter Euglena agilis Cartervar.piriformisGojdics Euglena caudataHuebn.var. minorDelf. Euglena geniculataDuj.emend Schmitzvar. geniculata Euglena gracilisKlebs f.gracilis Euglena minimaFrance Euglena pisciformisKlebs Euglena proximaDang. Euglena spathirhynchaSkuja Phacus acuminatus(Stokes) Huber - Pest PhacuscurvicaudaSwir. PhacusdangeardiiLemm. PhacushamatusPochm. Phacus orbicularisHuebner Phacuspleuronectes(Ehr.)Duj. Microcystiselabens (Breb.)Kuetz. Microcystisflos-aquae(Wittr.) Kirchner MicrocystisstagnalisLemm. Chroococcus minor(Kuetz.) Naeg. Chroococcusminutus(Kuetz.)Naeg. ChroococcusmontanusHansgirg f.banaresensis(Rao, C.B.) Chroococcustenax (Kirchn.)Hieron. Chroococcusturgidus(Kuetz.)Naeg. Gloeocapsastegophila(Itzigs.) Rabenh.var. crassaRao, C.B. AphanocapsaelachistaW. et G.S. West SynechocystisaquatilisSauv. Merismopedia minimaBeck Merismopedia glauca(Ehr.)Naeg. Merismopedia punctataMeyen Arthrospiraplatensis(Nordst.)Gom. Spirulina meneghinianaZanard.exGomont *Oscillatoriaamphigranulata*vanGoor

Oscillatoriabrevis(Kuetz.) Gomont *Oscillatoria formosa*Bory *ex* Gomont OscillatorialimosaAg.exGomont Oscillatoriaokenii Ag. exGomont OscillatoriaornataKuetz.exGomont OscillatoriaprincepsVaucherexGomont Oscillatoriaprofunda Kirchner f.conicaKam. OscillatoriatenuisAg.exGomont Phormidiumtenue(Menegh.) Gomont Lyngbya polysiphoniaeFremy Nostoc communeVaucherex Born.etFlah. Anabaena constricta(Szafer)Geitler Anabaena sphaericaBorn.etFlah.

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A study temporal variation in landuse pattern of Muktainagar tehsil at

Jalgaon district.

Dr. Atul C. Badhe¹ Smt. G. G. Khadse College, Muktainagar. Dr. R. V. Bhole² Sardar Vallbhabhai Patel College, Ainpur.

Introduction:

'Land' is one of the finite resources. The General Land use is distributed under various categories like forest, agriculture, settlement, waste etc. The geographical, climatic, economic, and human factors directly affect the land use. The Geographical factors that affect the land use are- the types of land including terrain, slope, soil, soil texture, soil color, altitude, and drainage. The Climatic factors include sunshine, fog, temperature, humidity, winds, cloud cover, frost and precipitation. The socio cultural, economic, political, technological and infrastructural factors affect the land use. These factors are based on land holding, land tenancy, irrigation, and availability of technology, accessibility of market, agricultural inputs, political interference and level of economy. The land use is also affected by the factors like 'Time' and 'space'. The general land use is also influenced by external factors like population growth, industrialization, urbanization, construction and development of roads, the increase in railway roots etc.

Objective - To study the Temporal Variations in Land use Pattern in the study region of Muktainagar Tehsil at Jalgaon district.

Study area:

The study region is located at 21°03′08″N 76°03′18″E, which is situated towards eastern part of Jalgaon city of Maharashtra state. Total area of Muktainagar Tehsil is found to be 64612 hector.

Source of Data:-

The present study will be based on collection, tabulation, Compilation, Computation, analysis and interpretation of data. The main body of data used, will be collected from the secondary sources.

The broad picture of present pattern of land utilization, cropping pattern, trends of production and yield will be prepared with the helping secondary data obtained from socio-economic review, district census handbooks; Wikipedia, the free encyclopaedia, Gazetteers, Agricultural periodicals and crop reports published by the Department of Agriculture. Data regarding consumption of fertilizers high yielding varieties, pesticides will be obtained from Zillah Perished office of the district.

The collection of the data and information will be analysed; tabulated and presented in the forms of Map and graphs with a purpose to co-relate and explain the various aspects of agriculture in the study region.

Methodology:

For studying changes in land-use pattern five measure land use categories i.e. area under forest, area not available for cultivation. Other uncultivable land, fallow land and net sown area are considered. In order to smooth but unusual-fluctuations five years moving averages will be calculated from 1971-76 up to till 2006-10. Percentage of area under each category of land to the geographical area will compute.

Description and Result:

In resents days the study of land use is playing a key role in the development of lands. While studied the spatial land use pattern in the study region, there are some important aspects need to study-

- i) Net sown area
- ii) Land not available for cultivation
- iii) Cultivable waste
- iv) Fallow land
- v) Forest area

Below table shows the temporal variation in land use pattern in the study region from 1971-76 to 2006-10.

	Muktainagar Land use in %								Volume
Land use Types	1971-	1976-	1981-	1986-	1991-	1991- 1996-		2006-	change in
	75	80	85	90	95	2000	05	10	Landuse
Net shown Area	54.56	57.12	55.50	64.20	54.80	46.28	43.86	60.75	6.19
Land not available for cultivation	16.33	14.86	14.88	3.44	4.95	17.65	17.25	15.33	-1.00
i) Land put to Non Agriculture Use	0.02	0.15	0.16	1.45	1.55	3.41	3.38	1.41	1.39
ii) Barren and uncultivated land	16.31	14.71	14.73	1.99	3.41	14.24	13.87	13.92	-2.39
Cultivable waste	8.20	6.04	7.13	8.14	12.07	13.16	12.63	4.87	-3.33
i) Land under miscellaneous use	0.00	0.00	0.47	0.36	0.00	0.00	0.79	0.00	0.00
ii) Permanent Pasture & grazing land	6.17	5.88	5.89	6.87	10.53	9.60	8.63	0.00	-6.17
iii) Land under trees, shrubs, horticulture	2.03	0.15	0.78	0.90	1.55	3.56	3.21	0.00	-2.03
Fallow land	1.08	2.48	2.95	1.45	5.88	4.02	5.63	0.25	-0.83
i) Current Fallow	0.30	2.01	1.40	0.54	3.25	3.10	2.61	0.19	-0.11
ii) Other Fallow	0.78	0.46	1.55	0.90	2.63	0.93	3.01	0.06	-0.72
Forest area	19.83	19.50	19.53	22.78	22.29	18.89	20.63	18.80	-1.03

Source: Data Calculated by Author



The study region had noticed 54.56% net sown area in 1971-76 and 60.75% in 2006-10. Net sown area in the study region was increased by 6.19% within these 35 years. This positive change was done in net sown area due to irrigation facility and modern techniques used in agriculture.

Land not available for cultivation category details under these categories in study region covered 16.33% land in 1971-76 and it was decreased up to 15.33% in 2006-10 by 1.0%.

In 1971-76, study region 8.20% area under cultivable waste categories was noticed it seems decreased to 4.87% in 2006-10.

Other fallow land is land which is kept uncultivated for the last two to five years due to lack of agricultural knowledge, indebtedness of farmers, unavailability of capital etc. In 1971-76 area under other fallow land was 1.08% and it's decreased to 0.25 % in 2006-10.

The total average land under this category in the study region was -0.83% due to increasing population pressure.

As per above table in 1971-76, average area under forest was noticed 19.83% in the study region, it seems decreased up to 18.80% in 2006-10.

Conclusion:

The study reveals that growing population and its pressure the cultivated area and deducts fallow land, waste land, forest area, grazing and pasture land etc. Because of the increasing demand of increasing population urban population expert more pressure on the land than the rural one, so that land use is more intensive in urban area than rural.

Reference:

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A study temporal variation in landuse pattern of Yawal tehsil at Jalgaon district.

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Introduction:

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Objective - To study the Temporal Variations in Land use Pattern in the study region of Yawal Tehsil at Jalgaon district.

Study area:

The study region is located at 21°16′81″N 75°69′92″E, which is situated towards northern part of Jalgaon city of Maharashtra state. Total area of Yawal Tehsil is found to be 77,465 hectors.

Source of Data:-

The present study will be based on collection, tabulation, Compilation, Computation, analysis and interpretation of data. The main body of data used, will be collected from the secondary sources.

The broad picture of present pattern of land utilization, cropping pattern, trends of production and yield will be prepared with the helping secondary data obtained from socioeconomic review, district census handbooks; Wikipedia, the free encyclopaedia, Gazetteers, Agricultural periodicals and crop reports published by the Department of Agriculture. Data regarding consumption of fertilizers high yielding varieties, pesticides will be obtained from Zillah Perished office of the district.

The collection of the data and information will be analysed; tabulated and presented in the forms of Map and graphs with a purpose to co-relate and explain the various aspects of agriculture in the study region.

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Description and Result:

In resents days the study of land use is playing a key role in the development of lands. While studied the spatial land use pattern in the study region, there are some important aspects need to study-

- i) Net sown area
- ii) Land not available for cultivation
- iii) Cultivable waste
- iv) Fallow land
- v) Forest area

Below table shows the temporal variation in land use pattern in the study region from 1971-76 to 2006-10.

	Yawal								Volume
Land use Types	1971- 75	1976- 80	1981- 85	1986- 90	1991- 95	1996- 2000	2001- 05	2006- 10	change in Landuse
Net shown Area	71.11	66.11	69.89	68.48	66.24	72.65	72.67	72.04	0.94
Land not available for cultivation	7.08	8.80	8.28	8.56	9.04	5.55	5.48	1.25	-5.83
i) Land put to Non Agriculture Use	0.17	0.39	0.25	0.26	4.33	2.06	2.14	0.80	0.63
ii) Barren and uncultivated land	6.90	8.41	8.03	8.30	4.71	3.48	3.34	0.45	-6.46
Cultivable waste	4.33	6.60	5.40	5.71	3.95	3.61	3.39	9.67	5.33
i) Land under miscellaneous use	0.04	0.26	0.25	0.39	0.13	1.16	1.04	0.00	-0.04
ii) Permanent Pasture & grazing land	3.64	6.34	5.02	5.19	3.57	1.81	1.73	0.00	-3.64
iii) Land under trees, shrubs, horticulture	0.66	0.00	0.13	0.13	0.25	0.65	0.63	0.00	-0.66
Fallow land	0.77	2.20	0.63	0.91	2.42	2.45	1.52	0.69	-0.08
i) Current Fallow	0.38	1.81	0.13	0.65	1.02	1.16	1.17	0.24	-0.14
ii) Other Fallow	0.38	0.39	0.50	0.26	1.40	1.29	0.35	0.44	0.06
Forest area	16.71	16.30	15.81	16.34	18.34	15.74	16.95	16.35	-0.36

Source: Data Calculated by Author



The study region had noticed 71.11% net sown area in 1971-76 and 72.04% in 2006-10. Net sown area in the study region was increased by 0.94% within these 35 years. This positive change was done in net sown area due to irrigation facility and modern techniques used in agriculture.

Land not available for cultivation category details under these categories in study region covered 7.08% land in 1971-76 and it was decreased up to 1.25% in 2006-10 by 5.83%.

In 1971-76, study region 4.37% area under cultivable waste categories was noticed it seems decreased to 9.37% in 2006-10.

Other fallow land is land which is kept uncultivated for the last two to five years due to lack of agricultural knowledge, indebtedness of farmers, unavailability of capital etc. In 1971-76 area under other fallow land was 0.77% and it's decreased to 0.69 % in 2006-10.

The total average land under this category in the study region was -0.08% due to increasing population pressure.

As per above table in 1971-76, average area under forest was noticed 16.71% in the study region, it seems decreased up to 16.35% in 2006-10.

Conclusion:

The study reveals that growing population and its pressure the cultivated area and deducts fallow land, waste land, forest area, grazing and pasture land etc. Because of the increasing demand of increasing population urban population expert more pressure on the land than the rural one, so that land use is more intensive in urban area than rural.

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