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REVIEW OF RESEARCH

Content

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BIODEGRADATION OF PLASTIC BY MICRO ORGANISMS ISOLATED FROM GARBAGE SOIL

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ABSTRACT :

Plastic wastes accumulating in the environment are posing an ever increasing ecological threat. Plastics that are biodegradable can be considered eco-friendly; they have an increasing range of potential application and are driven by the growing use of plastics in packaging. In this study, the biodegradation of polythene bag was analyzed by varying period of incubation in liquid culture media. The microbial species associated with the polythene materials were identified as ***Bacillus subtilis, Aspergillus niger and Aspergillus flavus.****The efficacy of microbes in the degradation of plastics was studied comparatively by bacteria (Bacillus subtilis) and fungal species (****Aspergillus niger and Aspergillus flavus).*** *The present study shows that the fungal species can degrade more as compare to bacterial species.*

INTRODUCTION

Any physical or chemical change in polymer as a result of environmental factors such as light, heat, moisture, chemical conditions and biological activity is termed as degradation of plastic. Biodegradable polymers are designed to degrade upon disposal by the action of living organisms. Microbial degradation of plastics is caused by enzymatic activities that lead to a chain cleavage of the polymer into monomers. Microorganisms utilize polythene film as a sole source of carbon resulting in partial degradation of plastics. They colonize on the surface of the polyethylene films forming a biofilm. Cell surface hydrophobicity of these organisms was found to be an important factor in the formation of biofilm on the polythene surface, which consequently enhances biodegradation of the polymers. Once the organisms get attached to the surface, starts growing by using the polymer as the carbon source. In the primary degradation, the main chain cleaves leading to the formation of low-molecular weight fragments (oligomers), dimers or monomers. The degradation is due to the extra cellular enzyme secreted by the organism. These low molecular weight compounds are further utilized by the microbes as carbon and energy sources. The resultant breakdown fragments must be completely used by the microorganisms, otherwise there is the potential for environmental and health consequences. The purpose of this study was to isolate microorganism from dumped soil area and screening of the potential polyethylene degrading microorganisms and indentifying the high potential microorganism that degrade the plastics.

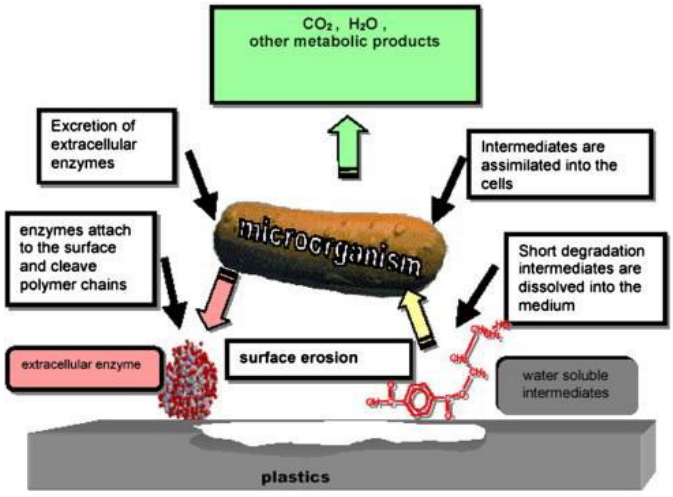

Fig.1: General mechanism of plastic biodegradation under aerobic conditions

Anaerobic consortia of microorganisms are responsible for polymer deterioration under anoxic conditions. The microbial biomass, Carbon dioxide, methane and water

are the primary products under methanogenic (anaerobic) conditions (e.g. landfills/compost) (Fig. 1).

OBJECTIVES

This investigation proceeds with following different objectives

1. Isolation of microorganisms degrading plastics from plastic waste plastic polyethylene.
2. Determination of the percentage of degradation of polyethylene sample.
3. Comparative study of degradation of low density polyethylene/plastic by bacteria and fungus.
4. The final determination of low density polyethylene by measuring its final weight.

MATERIALS AND METHODS

1) **Sample collection:**Plastic sample was collected from the MNC dumping ground located behind D.S.M. College, Parbhani
2) **Isolation of plastic degrading microorganism:**

a) **Serial dilution:**After the collection of plastic sample and 1gm of this sample was cut into pieces and added to 9 ml of sterile water to make 1:10 dilution, adding 1ml of the 1:10 dilution of 9ml of sterile water to obtain a 1:100 dilution and so on.

3) **Identification :**Identification of the isolates were performed on the basis of their morphological, cultural characters by following Bergey's Manual of Systematic Bacteriology. All the isolates were subjected to Gram staining.
4) **Enrichment:** The nutrient agar and Potato dextrose agar medium is used for bacterial and fungal enrichment.

GRAM STAINING:

METHOD: A clean grease free slide was taken and a smear of the bacterial culture was made on it with a sterile loop. The smear was air-dried and heat fixed. Then it was subjected to the following staining reagents:

1. Flooded with Crystal violet for 1 min. followed by washing with running distilled water.
2. Again, flooded with Gram's Iodine for 1 min. followed by washing with running distilled water.
3. Then, the slide was flooded with Gram's Decolourizer for 30 seconds.
4. After that the slide was counter stained with Safranin for 30 seconds, followed by washing with running distilled water.
5. The slide was air dried and cell morphology was checked under microscope.

COLONY MORPHOLOGY:

This was done to determine the morphology of selected strains on the basis of shape, size and colour.

MOTILITY TEST: The motility test was done to determine the motility of the organism. Bacterial cultures were stabbed into the motility test medium (Himedia) and were incubated at 37^0 C for 48 hrs. Turbidity and observation of growth besides the stab line indicated a positive reaction whereas clear visibility with growth indicated a negative reaction.

OXIDASE TEST: The oxidase test was done with the help of commercially available disc coated with a dye N-tetramethyl paraphenylene diamine dihydrochloride (Himedia), to detect the presence of cytochrome 'c' oxidase which is responsible for the oxidation of the dye. Rubbing a small quantity of bacterial culture by means of a sterile toothpick on the disc causes formation of purple colour within 10-30 sec indicating positive reaction whereas no colour change indicates a negative reaction.

CITRATE UTILISATION TEST: This test determines the ability of bacteria to convert citrate (an intermediate of the Kreb's cycle) into oxaloacetate (another intermediate of the Kreb's cycle). Citrate is the only carbon source available to the bacteria in this media. If bacteria cannot use citrate, it will not grow. Positive result is seen if the bacteria grows and the media turns into bright blue colour as a result of an increase in the pH of the media.

GAS PRODUCTION FROM GLUCOSE: Gas production from glucose was assessed by inoculating the isolated strains in MRS broth containing glucose containing Durham tube in inverted condition and incubated at 37oC for 48-72 hrs. The upward movement of inverted Durham tube indicates positive reaction (gas production).

CARBOHYDRATE UTILIZATION TEST: For carbon utilization pattern HiCarbo Kit(Part A, Part B, and Part C) (Himedia catalog no. KB009) was used. Bacteria produce products that are acidic in nature when they ferment certain carbohydrates. The carbohydrate utilisation tests are designed to detect the change in pH that occurs if fermentation of the given carbohydrate occurred. Acids lower the pH of the medium which causes the pH indicator (phenol red) to turn yellow. If the given carbohydrate is not fermented by bacteria then the media remains red.

Isolation of soil fungi, associated with materials (polyethylene bags and plastic bags) :

-1g of dried soil sample was transferred into a conical flask containing 99ml of sterile distilled water.

-The contents were shaken and serially diluted. Fungi, associated with materials (polyethylene bags and plastic bags**)** were isolated by pour plate method using PDA.

-These plates were incubated at 28°C for 7 days.

-The fungal growth was isolated and sub-cultured to obtain pure colonies.

-Then, sub cultured colonies were preserved in slant at 5 ^{0}C in refrigerator

Microbial Degradation of Plastics in Laboratory Condition:

Determination of Weight Loss:

Pre-weighed the piece of polythene bags were aseptically transferred to the conical flask containing 150 ml of culture broth medium, inoculated with different bacterial species. Control was maintained with the piece of polythene bags in the microbe-free medium. Different flasks were maintained for each treatment and left on the surface. After completion of incubation period the polyethylene piece were collected, washed thoroughly using distilled water, and ethanol air-dried and then weighed for final weight. The degradation of polyethylene was calculated by putting the collected data in the following formula.

$$\text{Degradation (\%)} = \frac{\text{1-Final weight}}{\text{Initial weight}}$$

RESULT AND DISCUSSION

The bacteria fungi were identified to be ***Bacillus Subtilis, A.niger***and***A.flavus*** fungi degrades plastic more than that of bacteria. Bacteria has less capacity to degrade plastic as compared to fungi. The isolated microbes were native to the site of polyethylene disposal and shown some degradability in natural conditions, yet they also exhibited biodegradation in laboratory conditions on synthetic media. This study has covered the major concerns about the natural and synthetic polymers, their types, uses and degradability also it has looked at the disposal methods and the standards used in assessing polymer degradation. Another area examined has been the biodegradation of plastics by the liquid culture method. It is clear that most recalcitrant polymers can be degraded to some extent in the appropriate environment at the right concentration.

The present study deals with the isolation, identification and degradative ability of plastic degrading microorganisms from soil. Different types of changes are produced by the microorganism during morphological and biochemical analysis. Synthetic plastic sample was

collected from the dumped soil of hostel garden was used in this study. This plastic was used to study their biodegradation by microorganisms isolated from them.

Microbial degradation of a solid polymer like polyethylene requires the formation of a biofilm on the polymer surface to enable the microbes to efficiently utilize the non-soluble substrates by enzymatic degradation activities. Development of multicellular microbial communities known as biofilm, attached to the surface of synthetic wastes have been found to be powerful degrading agents in nature. When the total biodegradation process of any organic substrate is considered the formation of microbial colony is critical to the initiation of biodegradation. Thus, the duration of the microbial colonization is an important factor that effects total degradation period.

In the present study, plastics were inoculated in the liquid culture medium containing bacterial and fungal isolates and kept for varying days of period(30,40,50,60 respectively) to observe the percentage of weight loss by microbes. The result shows the degradative ability of the microorganisms after incubation. The percentage of weight loss due to degradation was found more by fungi. This shows it has the greater potential of degradation compared to other bacteria.

Table no.1: Percentage degradation by bacteria (*B.subtilis*).

Incubation Period(Days)	Treatment	Initial weight(gm)	Final weight (gm)	% weight loss/days(%)
	Control	0.036	0.036	00.00
30	*B.subtilis* -Sample 1	0.031	0.025	31.45
40	*B.subtilis* -Sample 2	0.029	0.016	33.93
50	*B.subtilis* –Sample 3	0.029	0.012	34.06
60	*B.subtilis* –Sample 4	0.029	0.008	34.20

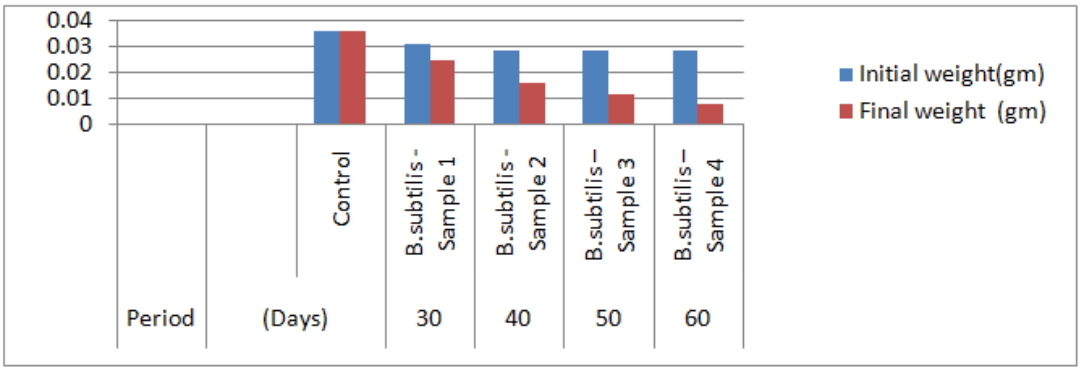

Table no.2: Percentage degradation by *A.niger species.*

Days	Treatment	Initial weight(gm)	Final weight (gm)	% Weight loss/days (%)
	Control	0.036	0.036	00.00
30	*A. niger* -Sample 1	**0.042**	**0.034**	**23.00**
40	*A.niger* –Sample 2	**0.021**	**0.015**	**46.90**
50	*A.niger* –Sample 3	**0.021**	**0.010**	**47.14**
60	*A.niger* –Sample 3	**0.21**	**0.015**	**46.90**

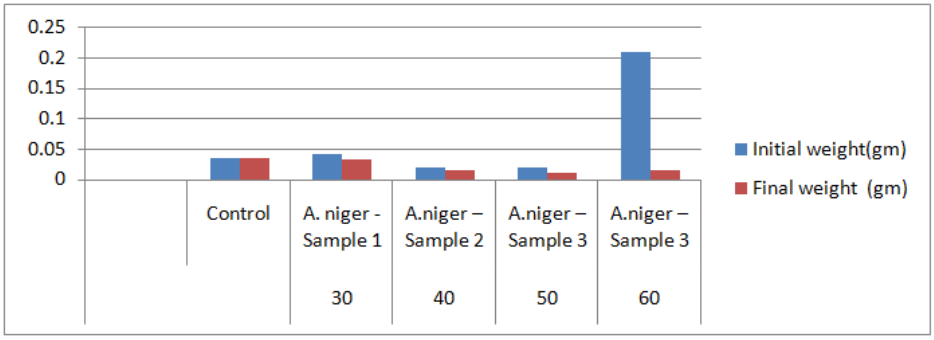

Table no .3 Percentage of degradation *by A.flavus species.*

Days	Treatment	Initial weight(gm)	Final weight (gm)	% weight loss/days (in %)
	Control	0.036	0.036	00.00
30	*A.flavus* -Sample 1	0.058	0.045	16.46
40	*A.flavus* -Sample 2	0.036	0.026	37.07
50	*A.flavus* -Sample 3	0.11	0.020	44.50
60	*A.flavus* -Sample 4	**0.13**	**0.013**	**66.92**

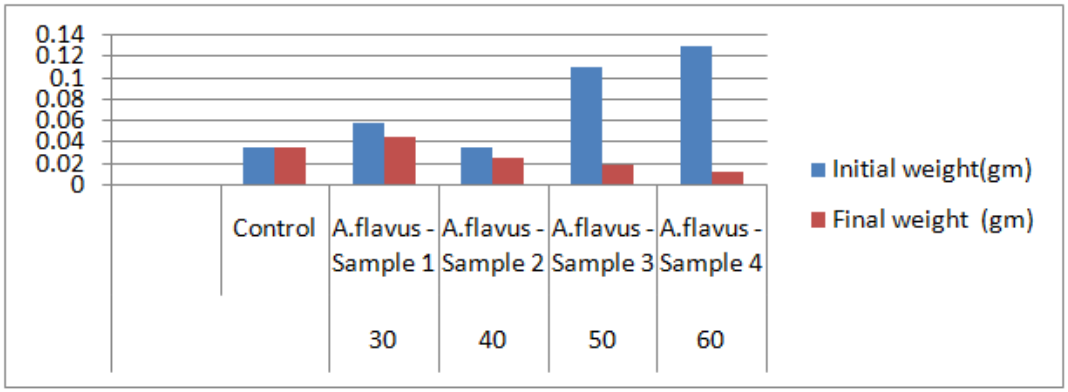

Table no.4: Result of Biochemical Test

Species	Catalase test	Oxidase test	Motility test	Citrate utilization test	Gas production from glucose
B.subtilis	+ve	+ve	Non motile	+ve	-ve
A.niger	+ve	+ve	Non motile	+ve	-ve
A.flavus	+ve	+ve	Non motile	+ve	-ve

CONCLUSION

- The bacteria fungi were identified to be ***Bacillus Subtilis, A.niger*&*A.flavus***
- Fungi degrades plastic more than that of bacteria.
- Bacteria has less capacity to degrade plastic as compared to fungi.
- The isolated microbes were native to the site of polyethylene disposal and shown some degradability in natural conditions, yet they also exhibited biodegradation in laboratory conditions on synthetic media.

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DOCUMENTATION OF INDIGENOUS AGRICULTURAL KNOWLEDGE PRACTICES OF NASHIK FARMERS

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ABSTRACT :

In India agricultural field tremendous uses of chemicals for different purposes. Modern practices effectively working butit'scontributing for pollution. In old time farmers applied indigenous agricultural knowledge in large scale. Indigenous agricultural knowledge reliable, ecofriendly, but modern farmer unaware about indigenous knowledge. Present work little contributed to documentation of indigenous agricultural knowledge and high lighting importance of indigenous knowledge for modern farmers.

INTRODUCTION

Now a day's India is fast developing country, tremendous advancement in science, agricultural& industrial field. a craze of globalization created adverse effects on ecosystem. In agricultural area every day new pesticides & fertilizers introduced to control pest & increase productivity. No doubt the new invention in agricultural field help to increase productivity of land but it's also breaks a delicate balance of environment. In India food supply is limited & population is more, thousands of people consumed only one time food due to poverty& shortage of food. High population put huge pressure on agricultural field for production purposes. Shortage of water, less productive land it's another problems for farmers.Present day modern practices in agricultural field contributed to contaminate environment, this practices created toxic stress on ecosystem.In ancient time in India traditional knowledge, skill, experienced, ideas of old peoples applied in agricultural field for tackle food shortages problems repel pest & conservation of nature. But due to modernization communication gap between village farmer & citizen increase, Indigenous Knowledge is diminishing because no proper documentation of Indigenous Knowledge.

Scientist in different field also showing interest on indigenouspractices, thereare limited works done on Indigenous Knowledge. This knowledge confined in localized area, Indigenous Knowledge passed only oral communication. Indigenous practice necessary to maintaining ecological balance & play important role in sustainable development. The present work highlighting importance of Indigenous Knowledge &increase awareness among the young farmers.

Material and Methods

The present data author collected by interaction with experienced farmers & group discussion with farmers from different villages of Nashik region of Maharashtra state of India.

Results and Discussion

Modern techniques contaminate environment despite that modern farmers not serious about that, now its need to applied old techniques, skills, naturalmethods in agricultural practices to control pollution. Several scientists also supported the Indigenous practices of farmers,farmers easily adopt this technique, it's feasible & ecofriendly .In Japan, China,USA farmers shift to organic farming & old practices avoiding uses of chemicals.

(Elliot et al.,2010 and Joshi CP et al.,2006) discussed that old agricultural practices such as Intercropping rotation ,green manures etc high potential to enhanced nature & become sustainable .Another researcher S.kumaret.al (2011) stated that Bihar farmer's marginal & small farmers. Theyhighly applied indigenous knowledge for agricultural productivity. Indigenous Knowledge provided valuable resources for sustainable development.Leelesh Kumar et al (2018) conducted study in Chhattisgarh area,in this region rice is main crop cultivated. Old Farmers applied Indigenous Knowledge effectively for cultivation of rice & increase productivity. In nashik area farmers using Indigenous Knowledge in agricultural area and it's beneficial for sustainable development. Indigenous Knowledge eco friendly, proper documentation and collaboration with modern techniques helpful for ecosystem.

Table- Documented Indigenous Knowledge used by farmers

Sr.No.	Indigenous Agricultural Practices	Action
1	Guava leaf powder spraying on crops	Control rice weevil (Sitophilusorzyae)
2	Paddy seeds+ Neem leaves (Azadiractaindica)	Repel& kill pest
3	Salt apply on paddy leaves	To control jowar stem borer
4	Milk + paddy mixture	reduce leaf spot
5	Seed + Pudina (Menta sativa)	Protect plant from viruses infection
6	T -shape bamboo stands for birds in crop field	To control insects& larvae
7	Jamun Branches (Euycinajambolona) placed at corner of of sugarcane field	Fox will not entering field
8	Mango sapling during full moon phase	Healthy & vigor plants
9	Sprinkled lime solution over banana bunches	Early ripening of fruits
10	Spraying tobacco leaf extract on banana crops	To control leaf spot
11	Sprinkled cow urine on crops	To prevent plant diseases
12	Neem leaves (Azadiractaindica) placed at storage container's bottom	Protect stored grains
13	Seed stored in earthen pots	Storage for longer period
14	Food grains stored in container coated with cow dung & Mud	Protect from pest
15	Dark cloud color ,wind direction West to East	Indicates heavy rain
16	50 gmsJaggery + 100 gms ginger (Zingiberofficinale)	To treat mouth disease of livestock
17	Aloe vera **+** Neem leaves (Azadiractaindica)	To treat skin diseases of cattle
18	Turmeric paste	For treating injury
19	Cotton seed + Jaggery mixtures	For enhancing milk production of cattle
20	Castor seed extract mixing with water	Treating constipation of live stock
21	Tulsi(*Ocimum sanctum) +* Neem leaves (Azadiractaindica)	To control Ectoparasite of live stock
22	Ants carrying eggs in their mouth	Indicates heavy rain
23	Fire flies seen at night on trees	Indicates early monsoon
24	Birds taking dust bath	Indicates early monsoon
25	Garlic (Allium sativum) paste	To Treat cough of live stock
26	Pure Honey liquid	To treat eye problems
27	Eggs + honey mixtures	To treat hooves diseases

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LABORATORY EXPERIMENTS AND DECOMPOSITION OF ENVIRONMENTAL HAZARDOUS CHEMICALS BY USING GREEN CHEMISTRY PRINCIPLES

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ABSTRACT :

The basic principles of Green Chemistry cover a wide range of issues for Organic Synthesis of chemical compounds: To design organic synthesis of process to maximize prevention of waste, atom economy, the use of less hazardous chemicals and safer or environmentally eco-friendly solvents, renewable raw materials, energy efficiency and catalysis. Also, Green Chemistry is interested for the best form of waste disposal and design for degradation of chemical products after use, complying with pollution, prevention measures and sustainable development. In the present paper we offer some important examples of Organic Synthesis with innovative "greener" techniques which has been used for teaching or/and applying in a chemical laboratory of a university. The "greener" organic synthesis of IBUPROFEN (active ingredient of many painkillers) is a typical example. The original synthetic route involved six consecutive steps and an overall atom efficiency of only 40%, while 60% of the mass of atoms ended up in waste products. The organic synthesis of Adipic acid (AA), a feedstock used to make nylon, using better oxidizing agents, a reaction without organic solvents and much less waste than the conventional route. Some examples of replacement of hazardous starting chemicals, the best selectivity and the "greener" synthetic route. Microwave assisted organic reactions is another example that can apply to teaching laboratories, as well as ultrasound-assisted organic synthesis.Organic chlorinated chemical solvents are the most hazardous environmental pollutants because of the low biodegradability and their accumulation potential in soil, water and biological tissues.

KEYWORDS : Environmental Energy, Green Chemistry, Synthesis, Microwaves Activation, Photocatalysis.

INTRODUCTION

Organic chemistry chemicals are the important starting materials for a great number of major chemical industries. The production of organic chemicals as raw materials or reagents for other applications is a major sector of manufacturing polymers, pharmaceuticals, pesticides, paints, artificial fibers, food additives, etc. Organic synthesis on a large scale, compared to the laboratory scale, involves the use of energy, basic chemical ingredients from the petrochemical sector, catalysts and after the end of the reaction, separation, purification, storage, packaging, distribution etc. During these processes there are many problems of health and safety for workers in addition to the environmental problems caused by their use and disposition as waste. Green Chemistry with its 12 principles would like to see changes in the conventional ways that were used for decades to make synthetic organic chemical substances and the use of less toxic starting materials. Green Chemistry would like to increases the efficiency of synthetic methods, to use less toxic solvents, reduce the stages of the synthetic routes and minimize waste as far as practically possible. In this way, organic synthesis will be part of the effort for sustainable development. one to three Green Chemistry is also interested for research and alternative innovations on many practical aspects of organic synthesis in the university and research laboratories of institutes. By changing the methodologies of

organic synthesis health and safety will be advanced in the small scale laboratory level but also will be extended to the industrial large scale production processes through the novel techniques.

Basic Principals of Green Chemistry:

1) Atom Economy; Synthetic methods should be designed to maximize the incorporation of all materials used in the process into the final product i.e. Reduce waste at the molecular level.
2) Prevention; It is better to prevent the production of waste than to treat or clean up waste after it has been created.
3) Less Hazardous chemical synthesis; wherever practicable, synthetic methods should be designed to use and generate substance that possesses little or no toxicity to human health and environment.
4) Design for energy efficiency; choose the least energy demanding chemical route. Ambient temperature and pressure are optimal.
5) Solvents and auxiliaries; Chose the safest solvents available for any given step and avoid whenever possible.
6) Designing Safer Chemicals; Chemical products should be designed to affect their desired function while minimizing their toxicity and environmental destiny throughout the design of the process.
7) Use of renewable feed stocks; Use chemicals which are made from renewable (i.e. Plant based) resources rather than chemicals originating from depleting resources.
8) Design for degradation; Design chemicals that degrade and break down into harmless products which do not persist in environment at the end of their function.
9) Catalysis; Use catalytic reagents (as selective as possible) rather than stoichiometric reagents in reactions.
10) Reduce derivatives; minimize the use of temporary derivation such as blocking group, protecting groups.
11) Safer chemistry for accident protection; Choose and develop chemical procedures andsubstances that are safer and minimize the potential for chemical accidents, explosions and fires. Here are some of the fields involved in everyday life where green chemistry has been applied to some extent.
12) Real time pollution prevention; Monitor chemical reaction in real time, in process andcontrol prior to the formation of hazardous substance.

Methodology:

a) **Microwave-assisted** heating under controlled conditions has been shown to be an invaluable technology in number of areas, from the organic synthesis on solid phase supported to the preparation of functional nonmaterials. The heating is due to the agitation of water molecules contained in the compound. Under the influence of the microwave, the water molecules will begin to change direction at the same frequency of 2.45×10^9 times per second corresponding to a frequency of 2.45 GHz. The microwave-assisted synthesis is used in the pharmaceutical, agrochemical and chemical related industries in the primary discovery and in development processes. Reduction of reaction times and the amount of solvent, increase in product yields, the saving energy for heating by focusing efficient energy on the sample and enhancing product purities avoiding possible side reactions. Moreover, the selectivity of certain manufacturing processes could be positively influenced by this technology [7]. In addition, microwave synthesis allows the discovery of new reaction pathways, which serve to expand "the chemical and the biological space". Two different approaches for microwave synthesis on a large scale have emerged: batch synthesis in larger multimode reactors or continuous/stop flow techniques [8]. The scale-up of microwave synthesis from the laboratory to process and production scale is a challenging area.

b) **The Photocatalysis** under visible light is different method use in wonderful chemistry. In the asymmetric organo catalysis has been extensively studied as a very useful technique of organ metallic catalysis. Light can be considered as an ideal reagent for environmentally eco-friendly, green chemical synthesis. Unlike many traditional reagents, light is abundant, non-toxic and generates do not waste.

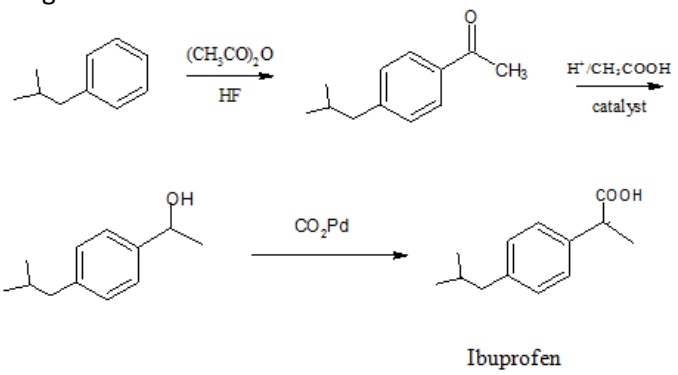
Nowadays, the development of photoredox catalysis initiated by visible light is of real importance. The one-electron reactions are often performed using, as photoredox catalysts, organo metallic complexes containing ruthenium or iridium. However, the toxicity of the ruthenium or the iridium salts as well as their future limited availability is the major weakness of these metal-based methods for the manufacturing of fine chemicals and pharmaceuticals. For example, the combination of a photocatalytic process and organocatalysis is an excellent method to develop enantioselective reactions [9].

c) Green Route Of Chemical Synthesis

Green Chemistry provides to design and redesign of chemical synthesis [12, 13] and chemical products to prevent pollution and to solve environmental problems. The research applications for the principle of green chemistry include: Clean Synthesis [14].

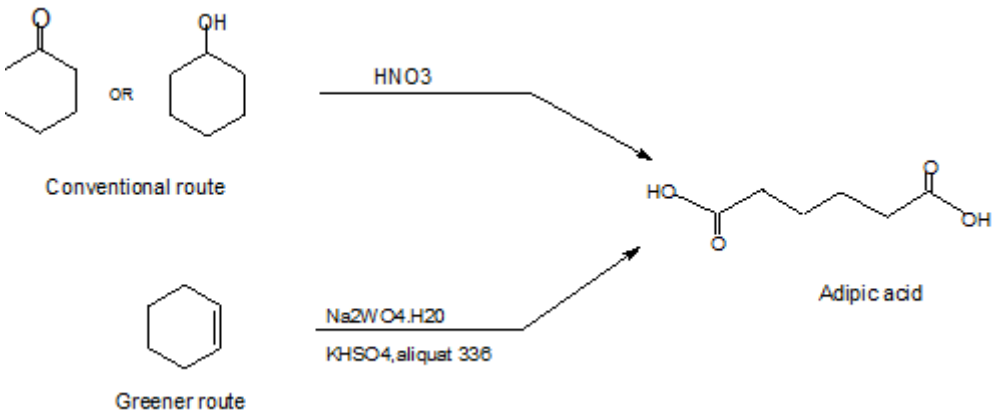
i) Green Chemistry Alternative Synthesis of Ibuprofen:

This method is a more efficient and enhanced atom utilization. The changing of stoichiometric reagents [15]for catalytic oxidation using air only consumable source of oxygen. Different type of new solvents and reaction use of supercritical fluids [16] and reactions in ionic liquids. In convertible reaction replacement for hazardous reagents use of solid acids [17].



Ibuprofen

ii) Green Chemistry Alternative Synthesis of Adipic Acid replacing Conventional acids:



In above reaction greener route for the novel separation techniques [18].

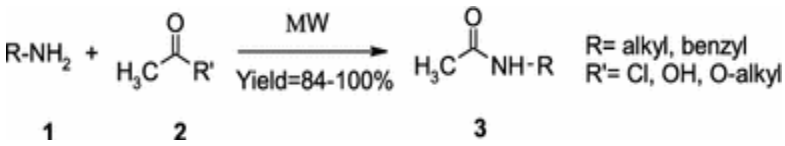
Results and Discussion:

Microwaves assisted solvent – free amidation

To synthesize these lipophilic azapyridinomacrocycles we had to prepare a linker via an amidation reaction. The satisfactory results obtained under microwaves activation led us to develop a method to

control the chemo- and regioselectivity in the amidation of polyamines. Previous studies have shown that microwave assisted amidation reactions result in a specific nonthermal microwave effect. This effect can be explained by an increase of the polarity of the dipolar transition state. The applications implement high power which leads to high temperatures, usually inconsistent with the control on selectivity in polyfunctional molecules.Thanks to the specific effect of microwaves, we have achieved the amidation reactions without solvent, in a few minutes at 2–25 W with excellent yields (85–100 %) [6].

The uncatalysed amidation under microwave-assisted solvent-free conditions of primary amines **1**, we performed the reaction with various esters as acyl donors **2** in a CEM Discover™ microwave synthesizer. Neat compounds were mixed in a sealed microwave reaction tube and irradiated under 25 W or 100 W for few seconds to few minutes. The reactions were monitored by GC–MS analysis and the purity of the desired products was evaluated by NMR spectroscopy. The desired compounds **3** were afforded with yields of 84–100%. Microwave-assisted amidation of primary amine under mild condition.



Conclusions:

Nowadays, green Chemistry plays as a very important role producing minimal waste by the development of inventive strategies from raw materials and renewable energy. For the different physicochemical activation techniques such as biotransformation, microwaves and photocatalysis are better for the environment by using less energy, emit less solvent and allow increasing efficiency in the preparation of new compounds. They are untold tools to complement the modern methods used in organic synthesis.

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STUDY ON DNA POLYMORPHISM OF THE THREE INDIGENOUS DESI BREEDS IN THE STATE OF MAHARASHTRA BY RAPD-PCR METHOD

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ABSTRACT :

The genetic diversity among three indigenous cow breeds was explored by random amplified polymorphic DNA (RAPD) analysis. The DNA samples were pooled from three breeds of Desi cow viz, Red Kandhari, Khillari and Deoni and twenty random primerswere screened. All the three desi cow breeds were successfully typed for RAPD analysis. The five selected primers showed most repeatable pattern in amplification. The UPGMA dendrogram constructed by computer program for clustering these three breeds revealed Red Kandhari breed exhibit separate cluster and had maximum genetic distance compare to other two breeds. The study revealed enables the determination of genetic relations andfingerprints of the three cow breeds

INTRODUCTION

The relationship between human and bovine population in India has religious doctrine and also play important role in the rural economy by providing meat, milk, leather, dung and use in draft purposes[1].The world cattle inventory in 2017 is at *998.3 million* head and India ranks first with 303.3 (30.39 %)million head. India has 37 pure cattle breeds of which Red Kandhari , Deoni and Khillari are most common in the Maharashtra, India. All these indigenous cattle breeds are known by local term'Desi Cow'.The Deoni (Dongari) breed was evolved through the crossbreeding of the Gir cattle with the Dangi breeds and local desi cattle of Nizam [2]. Based on their body colour pattern Deoni breed has evolved into three morphological types viz Balankya (complete white body coat and without any spot on the body), Wannera, (white body and black shades on sides of the face) and Waghya (white and black shades/spot/patches scattered all over the body)[3]**.** Red Kandhari is purest Indian breed with almost universal deep red coloured skin.The Khillari cattle breed is characterised by presence of long and pointed horns follow thebackward curve of the forehead. The Red Kandhari and Khillari breed is raise for draft purpose while the Deoni is for dual purpose cattle.

RFLP, RAPD, AFLP and VNTR are routinely used genetic markers for taxonomiccharacterisation of organismat nuclear level,[4]. RAPD is a PCR based technique for identifying geneticvariation by using single arbitrary primer in a PCR reaction, resulting in amplification of many discrete DNA. It is rapid and efficient method used to screen for DNA sequence based polymorphism at a very large number of loci without use of any sequencing technique[5]**.**RAPD has been routinely used for breed characterization in cattle [3**,** 6]**.** Present study aimed to determinethe breed-specific primers and RAPD fingerprints and genetic diversities in Khillari,Deoni and Red Kandhari cattle breed**.**

MATERIALS AND METHODS

Selection of Animal and Collection of Blood Samples:

The three breeds of Desi cow viz Red Kandhari, Deoni and Khillari were selected for RAPD analysis, based on their morphmetric features. About 15 blood samples of each breed were collected from different locations of Maharashtra. The blood samples of Deoni cow were kindly provided by College of Veterinary and Animal Sciences (COVAS), Udgir, Dist. Latur. The blood samples of Red Kandhari and Khillari cow were collected from the local veterinary practioners of Parbhani, Nanded, Hingoli and Kolhapur district. Before the collection of blood samples these regions were surveyed for the availability of cattle breed.

3 mL of blood was aseptically collected from jugular vein of each animal in a 5 ml EDTA vacutaine in November-December 2016. The blood samples were gently mixed with EDTA (present in the vacutaine) and carried to the laboratory. The blood samples were further spotted on Whatman filter paper and were dried for 24 hours at room temperature and stored at 4^0C until further use.

Extraction of DNA

A method described by Nguyen [7] was used here for the extraction of DNA from dried blood samples. The blood cells were lysed by Lysis Buffer I and Proteinase K. Lysis buffer I was prepared by using Tris 10mM HCl, 5mM MgCl2 , 1% Triton X100(v/v), 1% SDS (w/v) , 10mM

EDTA, adjusted with pH 8.0. The dried blood spot on filter paper was vortexed with300µl Lysis buffer Ifor 30s and followe by incubation at 85^0C for 20 min., The lysates were cooled down to room temperature for 10min and mixed with 0.02mg Proteinase K was added with proper vortex for 30s and incubated at 65^0C for 1hr. The same amount of buffer phenol: chloroform: isoamyl-alcohol (25:24:1) was added in the sample and mixed well for 30s. The mixture was then centrifuged at at 10,000 rpm for 4min at room temperature and the upper phase was taken out and treated with Sodium Acetate (3M, pH 5.2), and Iso-Propanol. Finally the sample was washed by70% Ethanol and DNA was collected by elution with 50µl dH2O. The concentration of DNA was determined using UV- 1800 spectro -photometer (SchimadzuCorporation). The DNA was stored at -20^0C for further use.

PCR amplification:

Initially 20 RAPD primers were used for the PCR amplification and out of these 20 primers, only 5 primers were taken further for final analysis. The list of the selected primers used is given in table 1 . PCR amplification was performed using Biometra thermal cycler. The PCR mixture contained 2.5µl of 10X buffer, 1µl of primer, 2.5µl of 2.5mM of each dNTP, 2.5 Units of Taq DNA polymerase and 1µl Template DNA. The PCR amplification cycle consisted of, a cycle of 5 min at 94 °C; 35 cycles of 45 sec at 94 °C, 45 sec at 36 °C, 1 min and 30 sec at 72 °C; and 1 cycle of 5 min at 72 °C.

Gel electrophoresis

Gel electrophoresis was performed using 1.4% agarose to analyse the size of amplified PCR product. SYBR DNA staining dye was used for staining of DNA bands. The gel was observed under Green view illuminator.

Analysis of RAPD Data:

For RAPD analysis of electrophoretograms obtained with five selected primers of three breeds were displayed on a computer screen and transformed manually into a binary data matrix, i.e. the presence or absence of bands scored as either 1 or 0 respectively. For the phylogenic analysis of data software PAST(Version-3.14) were used .The genetic similarity (GS) between two breeds were calculated by the Nei and Li equation[8]formula GSij=2Nij/(Ni + Nj).Where

Nij indicates the number of common bands between breed i and j;Ni denote total number of bands in breed i whereas Nj represents total number of bands scored for breed j. The genetic distance(GD) between two breeds were obtained from Lynch equation [9]**:** GDij = 1- GSij. Two assumptions (same position

on the gel were not occupied by markers from different loci and presence of band represents dominant genotype in Hardy-Weinbergequilibrium) were made for the analysis of RAPD data. The phylogenetic cluster tree was constructed by using unweighted pair group method of analysis (UPGMA)with the matrices of Nei coefficient.

RESULTS AND DISCUSSION

RAPD assay is most easy and cost effective assay for finding the bias in genetic characters of an organism. This was the first study carried out for comparison of genetic diversity in three breeds of indigenous cow from Maharashtra,India

The RAPD analysis in three breeds of cow showed variability in genetictraits. The concentration of DNA obtained in three breeds Red Kandhari, Deoni and Khillari after extraction from representative blood samples ere 40.0; 36.4 and 53.1 µg/ml respectively. The absorbance ratio of extracted DNA 260/280 nm was fall in the range of 1.8-2.0 indicates highest degree of purity. The molecular weightladder used for this analysis was ranged from100-10,000 bp.

Figure-1: Electrophoretic bands of DNA obtained from dried bloodsamplesof three breeds-A) Red KandhariB)Deoni and C) Khillari. Electrophoretic band pattern L indicates molecular weight marker.

Each breed produced breed specific fingerprint. Sample A-C produced the fingerprints of three breeds Red Kandhari, Deoni and Khillari respectively. Out of 20 random primers tested on the DNASamples 15 were discarded based on reproducibility,thickness, size and,expected segregation observed in a mapping sample. The sequence of remaining 5 primers selected for final analysis to evaluate genome variabilityis presented in table I.

Table-I: Selected primers used for PCR amplificationOf three breed samples.

Primer	Sequences 5'-3'
OPA09	GGGTAACGCC
ABA05	AGGGGTCTTG
ABA07	GAAACGGGTG
ABA16	AGCCAGGCGA
UBC478	CGAGCTGGTC

Primers with ten nucleotides and a (G+C) content of at least 50% are often used in RAPD study. Primers having high (A+T) content may frequently results in DNA primer hybrid melting during polymerization [2]. All the five primers used in the RAPD analysis were 10-mer long with GC content of 60-70%.The amplified products obtained after electrophoresis with selected primers ranged from 200 bp to 1200 bp in size.

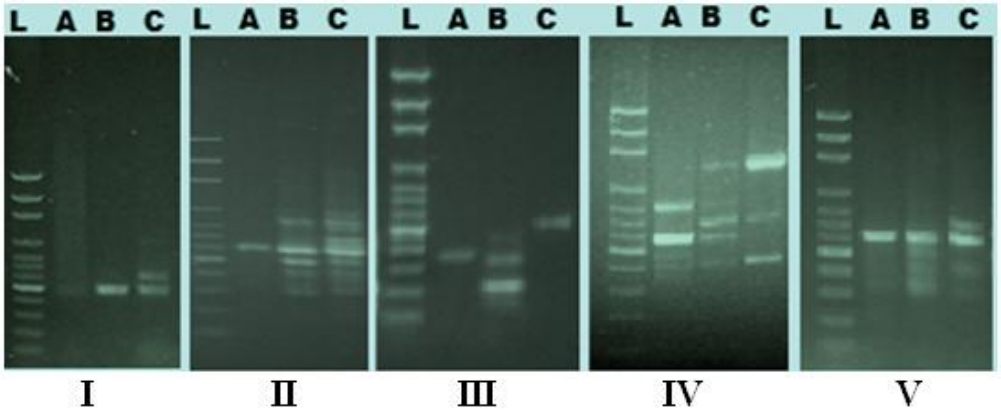

Figure-2:RAPD pattern generated using fiveprimers on three experimental breeds. The alphabetsA,B,C corresponds to,Red Kandhari,Deoni and Khillari respectively.The roman numerals I,II,III,IV and V at the base of each plate corresponds the RAPD primers OPA09, ABA05, ABA07, ABA16 and UBC478 respectively

The highest degree of polymorphim was observed in the Red Kandhari breeds (58%) compare to Deoni (31%) and Khillari (47%).The highest degree of polymorphism in Red Kandhari breeds may be due to their distribution in large geographical area for the draught purpose.It was found that the highest value of Nei genetic distance coefficient (0.74) was between Red Kandhari and Deoni breeds. Lower values of genetic similarities indicated a high degree of genetic diversity between these two cattle. On the other hand, the lowest distance coefficient (0.69) observed between Deoni and Khillari indicates, the genetic relationship between local cattle population was closer than others. Red Kandhari and Deoni localised within similar area and they had less significant distance coefficient values, this may be due to differences in their breed development programme[10]. The highest genetic diversity is disquieting as it indicates that the population may depreciate due to crossing with other populations of either native or exotic breed.

Table2. Estimation of pair wise genetic similarity and distancecoefficient between experimental Indigenousbreeds.

	Red Kandhari	Deoni	Khillari
Red Kandhari	0.00	0.74	0.73
Deoni	0.26	0.00	0.69
Khillari	0.27	0.31	0.00

Genetic similarities were studied through analysis of RAPD data from the three breed's shows genetic relatedness. Using the Nei's genetic distance matrix values, a dendrogram was constructed to obtain the clustering of three breeds. The UPGMA dendogram based on genetic distance was differentiated into two main clusters viz, clusters-I and II. Cluster I is further subdivided into two sub-clusters, I (A) and I(B) respectively.

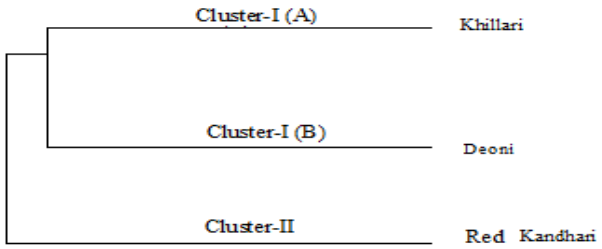

Figure-3: UPGMA dendogram based on Nei's genetic distance data regarding clustering of three experimental breeds.

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EFFECT OF DIFFERENT DIETARY PROTEIN LEVELS ON THE BODY COMPOSITION OF JUVENILE CRAB SCYLLASERRATA (FORSKAL, 1775)

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ABSTRACT :

The crab juveniles were stocked at a rate of one crab in each circular HDPE tank of 0.24 m^2 area with a water level of 4-5 cm. Totally, five semi-purified pelleted diets containing variable protein levels: 38 (T_1), 40 (T_2), 42 (T_3), 44 (T_4) and 46% (T_5) but with a constant level lipid (8%) were prepared.Mud crab juveniles having initial length in the range of 4.05 ± 0.06 to 4.30 ± 0.04 cm and initial weight in the range 39 ± 0.67 to 42.50 ± 0.51 g were selected for experiment by using 10 – 6% feeding ration. At the end of experiment, the crabs belonging to T_3 recordedhigher values of protein (11.59 ± 0.20%) and lipid (3.6 ± 0.07%); lowest and best moisture; ash and fibervalues was recorded in T_3 (69.79 ± 0.28); (7.17 ± 0.07) and (1.42 ± 0.03) respectively, as compared to the crabs in other treatments ($P < 0.05$). Thus, considering body composition parameters, pelleted feed containing 42% crude protein and 8% lipid was found to be most suitable diet for better feed utilization for juvenile of Scylla serrata. The rearing experiment was conducted for a period of 90 days with four replicates for each protein level following CRD.

Keywords: Formulated feed, Body composition, Mud crab juveniles, *Scylla serrata,* etc.

INTRODUCTION

The mud crabs belonging to the genus *Scylla* represents a valuable components of small scale costal fisheries in many countries of tropical and subtropical Asia and African coasts. They are strongly associated to mangrove areas from their post larval stages, grow fast, attend maturity and form lucrative fishery in estuaries, backwaters and lagoons. With great demand for live, frozen and soft shelled crabs in global market along with increased price, the fishery and aquaculture of mud crabs have gained importance in India as well as in adjoining Asian countries. Over the last two decades, the exploitation of mud crab from natural habitats has been increased, posing a threat to natural biota. The history of mud crab aquaculture is of hundred years in China and for at least thirty years throughout Asia (Unnikrishnan and Paulraj, 2010).

Studies on the body composition of edible organisms are important from the nutritional point of view. That much published works are not available on the influence of feeds on the body composition of commercial crustaceans particular on the crabs Manivannan et al. (2010).

MATERIAL AND METHODS

Feed preparation:

A test diet was formulated consisting of marine and plant ingredients, such as fish meal, shrimp head meal, wheat gluten, squilla meal, *Acetes* spp. and sargassum. These were powdered in a grinder and passed through 0.25 mm sieve to obtain fine powder require for feed formulation. Five semi-purified pelleted diets were prepared by using locally available ingredients and containing variable protein level at 38, 40, 42, 44, and 46% all feed contained 8% lipid.

The different feed ingredients were weighed separately as per requirement and mixed thoroughly. Dough of mixed ingredients was prepared by addition of freshwater at the rate of 45 ml per 100 g of feed mixture. The dough was steam-cooked for 15 minutes and cooled at room temperature (30°C). The cooled dough was pressed through pellet machine to prepare pellets of 2.0 mm diameter. The pellets were spread uniformly on polythene sheet and kept at room temperature for drying. After 24 hours, pellets were separated out from the polythene sheet and oven-dried at 60 ± 50C for 2 hours. After cooling, the pellets were packed in plastic pouches and stored in dry place. The composition of the five experimental diets and their proximate composition are shown in Table 1.

Table 1. Ingredients and proximate compositions of the experimental diets

Ingredients (g/100 g^{-1})	Diets				
	T_1	T_2	T_3	T_4	T_5
Fish meal	16	15	14	14	14
Sargassum	12	16	16	15	12
Shrimp Head meal	10	11	11	11	11
Wheat gluten	12	10	10	13	16
Squilla meal	9	11	10	9	9
Acetes whole	10	10	11	11	11
Casein[a]	8	11	14	14	14
Cod liveroil	6	6	6	6	6
Gelatin[a]	6	3	2	2	2
Dextrin	4	2	1	1	1
Vit& min mix[b]	3	3	3	3	3
CMC[c]	4	2	2	1	1
Total	100	100	100	100	100
Proximate Composition (%)					
Moisture	8.82	8.5	8.01	8.4	8.6
Crude protein	37.82	40.37	42.07	43.77	46.32
Crude lipid	8.05	8.08	8.05	8.07	8.1
Crude ash	4.5	4.8	4	4.4	3.7
Crude fiber	2.01	2.2	1.9	2	2.5
NFE	38.80	36.05	35.97	33.36	30.78
Gross energy (MJ kg^{-1})[e]	19.0717	19.2091	19.5859	19.5443	19.7116

a. Obtained from Hi-media, India
b. Vitamin (100 g^{-1})- Vitamin B1- 200 IU, Vitamin B2- 200 IU, Vitamin B6- 150 IU, Calcium Pantothenate-700 IU, Inositol- 4000 IU, Biotin - 0.2 IU, Folicacid - 0.2 IU, PABA- 1000 IU, Cholinechloride- 6000 IU, Vitamin B12 - 0.01 IU, α – tocopherol - 40000 IU, Vitamin A - 30000 IU, Vitamin C – 20000 IU, Menadion- 40 IUMineral (100 g^{-1}) - $CaHPO_4$ - 200000, $K2SO_4$ - 100000, $MgSO_4$ - 90000, $FeSO_4$ $7H_2O$ -4000, $MnSO_4$ H_2O - 2000, Zn SO_4 H_2O - 1000, Cu SO_4 H_2O - 1000, Co C_{l2} $6H_2O$ - 200, KI - 100, Na SeO_3 - 1, Filler – 1690.
c. Carboxyl Methyl Cellulose
d. Nitrogen-free extract (Nitrogen free extracts including crude fiber = 100 – (Crude Protein + Crude Lipid + Crude Ash + Crude Fibre).
e. Gross energy, calculated based on 23.9, 39.8 and 17.6 MJ kg^{-1} for protein, lipid and NFE, respectively (Schulz et al., 2007).

Feeding trials

Juvenile of crabs were collected from a wild and were acclimatized for a week to the laboratory conditions in high density polyethylene (HDPE) circular tanks of 125 L capacity. During acclimatization, the

crabs were reared in 25 ppt salinity and were fed formulated diet for about 15 – 20 days. The pelleted feed was provided twice at 10:00 and 17:00 hrs everyday. About 20 to 30% water exchange was carried out daily. Uneaten feed and faecal matter was removed by siphoning out water regularly. At inception of research work, initial length and weight of crabs were recorded. The stocking density maintained was 1 crab tank 1.

Experimental procedure

Each tank was cleaned properly and filled with seawater up to 4-5 cm level, for the experimental use. Mangalore tile were placed as shelters in each tank. The juvenile with initial length ranging from 4.1 ± 0.2 cm and weight 40 ± 2 g were stocked at the rate of 1 crab tank $^{-1}$. Crabs were fed on a daily ration equal to 10 - 6% of body weight. Feeding was done twice daily in equally divided doses, at 10.00 hrs and 17.00 hrs.The experiment was conducted for a period of 90 days with four replicates for each protein level following Completely Randomized Design. During the experiment, the water temperature, salinity, pH, dissolved oxygen, total alkalinity, free carbon dioxidewas measured by standard methods given by Boyd (1981).

Analysis of samples

The proximate composition of the ingredients, experimental diets and samples of pooled whole crabs was analyzed as per the standard methods given by AOAC (2005).

Statistical analysis

The experimental data were analyzed by One-way ANOVA. Significant differences were indicated as $P< 0.05$, among the treatments means (Zar, 2010).

RESULT

The proximate composition of experimental animals (Table 2) revealed that there was significantly ($P<0.05$) increase in moisture, crude protein, lipid and ash in crabs fed with formulated diet compared to the initial crabs respectively, (Table2).

Table 2. Proximate composition of test animals fed on formulated feed with different protein levels

Particulars	Dietary protein levels (%)					
	Initial	38	40	42	44	46
Moisture (%)	63.2 ± 0.67	71.62 ± 0.34	71.35 ± 0.41	69.79 ± 0.28	70.59 ± 0.28	72.28 ± 0.27
Protein (%)	9.11 ± 0.01	10.10 ± 0.23	10.48 ± 0.21	11.59 ± 0.20	10.70 ± 0.11	10.43 ± 0.19
Lipid (%)	1.72 ± 0.01	2.68 ± 0.02	3.18 ± 0.01	3.60 ± 0.07	2.93 ± 0.09	2.53 ± 0.09
Ash (%)	6.32 ± 0.12	7.71 ± 0.03	7.91 ± 0.03	7.17 ± 0.07	7.61 ± 0.07	8.03 ± 0.07
Fiber (%)	1.29 ± 0.04	1.52 ± 0.02	1.63 ± 0.03	1.42 ± 0.03	1.58 ± 0.04	1.64 ± 0.04
NFE (%)	16.34 ± 0.10	15.20 ± 0.30	15.34 ± 0.13	15.30 ± 0.29	15.31 ± 0.12	15.24 ± 0.14

Water parameter

Water quality parameters such as temperature (°C), pH, salinity (ppt), dissolved oxygen (mg L^{-1}), total alkalinity (mg L^{-1}), and free carbon dioxide (mg L^{-1}) were observed in the range of 23 – 28°C, 6.5 – 8, 23 – 27 ppt., 5.2 – 6.4 mg L^{-1},70 – 80 mg L^{-1}, 0.9 – 3.5 mg L^{-1} during experiment period of 90 days.

DISCUSSION

Appropriate protein sources and its appropriate proportion also play a vital role in the economics of the culture of candidate species. In the mud crab culture practices, a protein percentage of 30 to 55% has been used by (Mu et al., 1998; Hutabarat, 1999; Catacutam, 2002; Ali et al., 2008; Unnikrishnan and Paulraj, 2010; Luo et al., 2011; Shelley and Lovatelli, 2011; Li et al., 2012; Jin et al., 2013; Huo et al., 2014; Nguyen et al., 2014). In the present experiments, protein levels of 38, 40, 42, 44 and 46% have been used. In order to find out the influence of added protein to the crab diets, composition of the carbs before and after the experiments was assessed. The results of the present study showed positive influence of protein in the diet which reflected in the growth of crab juveniles. During the experimental duration, the crabs were fed with pelleted feed with the protein percentage of 38 to 46%. At end of the experiment protein percentage showed increase in protein composition. Similar results have been observed by Anil and Suseelan (2001), Ali et al. (2008), Unnikrishnan and Paulraj (2010), Jin et al. (2013), Nguyen et al. (2014).

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BIOCHEMICAL LIPID ESTIMATION IN AMOEBOTAENIA JADHAVAE N. SP. FROM GALLUS DOMESTICUS AT SOYGAON, AURANGABAD (M.S. INDIA)

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ABSTRACT :

The present paper deals with description & Lipid estimation of Amoebotaenia jadhavae.n.sp.from Gallus domesticus at Soygaon.Dist.Aurangabad, Worms are medium ,having large number of segments;total number of proglottids are 44 in number;scolex large in size,rectangular in shape,broader than long;rostellum large,oval in shape;rostellar hooks arranged in single circle in rostellum; suckers medium,four in number,oval in shape;neck absent;mature segments two times broader than long;testes 53-56 in number,oval in shape,small,evenly distributed;cirrus pouch oval,small;cirrus small,thin,straight tube,contained within cirrus pouch;vas deferens small,thin tube;genital pores opening anterior side of segment,unilateral,oval,marginal & regularly alternate;genital atrium small,thin,oval;ovary transversely elongated,bilobed,marginally irregular;vagina thin tube,opening posterior to vas deferens in cirrus pouch,opens into ootype;vitelline gland posterior to ovary,oval;excretory canals longitudinally placed,lateral side of segment and thin & the worm is identified as Amoebotaenia jadhavae n.sp.The amountof lipid in the worm Amoebotaenia jadhavae n.sp.are 21.42 mgs/100 mg and the amount of lipid in the host infected intestine are 19.45 mgs/100 mgs.

Keywords: Lipid,*Amoebotaenia jadhavae*,*Gallus domesticus.*

INTRODUCTION

The genus *Amoebotaenia* was erected by Cohn in 1900 with its type species *Amoebotaenia brevis* (Linst,1884) collected from *Charadrius pluvialis* as *Amoebotaenia brevis*.The present paper deals with description and biochemical lipid estimation of new species *Amoebotaenia jadhavae* n.sp. from *Gallus domesticus* at Soygaon in the month of June,1998. Lipid content in the *Amoebotaenia jadhavae* n.sp. & its host *Gallus domesticus* of lipid in intestine can be observed.

MATERIAL AND METHODS

The worms were collected from alimentary tract of *Gallus domesticus*.Then flattened and preserved in 4 % formalin.These cestodes stained by Harris haematoxyline or Borax carmine,Washed in distilled water ,dehydrated in ascending grades of Alcohol,cleared in Xylene,Mounted in D.P.X. & drawings are made with the aid of Camera Lucida.Identification was carried out with the help of Systema Helminthum vol.I.Yamaguti (1957) [15].

Fourteen intestines of Hen *Gallus domesticus* dissected & observed to see degree of infection of cestode parasite,few intestines heavily infected with cestode parasites,some cestode parasites free and collected in 4% formalin for taxonomic study ,some flattened processed and stained for morphological & anatomical studies and identified as *Amoebotaenia jadhavae* n.sp.

The intestines dissected and were found to be infected with cestode parasites.Those parasites of host were kept separately and intestines of host were also kept separately in previously weighed watchglass.This material was taken on a blotting paper to remove excess of water and then it was weighed on a sensitive balance to obtain the wet weight of the tissue.The tissue then kept at 80^{o}c till it dried

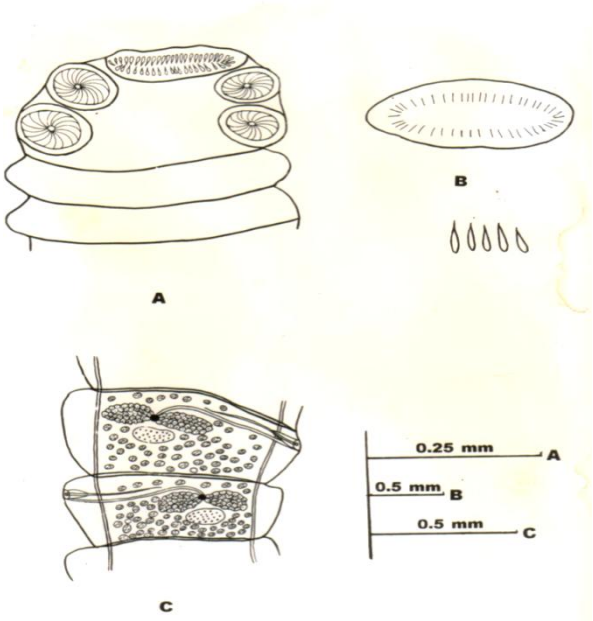
completely.The tissue then powdered in morter pastle and preserved for further studies.Lipid content was estimated by Barner's and Black Stock Method (1973).Few worms from host were kept for taxonomic studies.

DESCRIPTION

Seventeen cestodes collected from intestine of Hen,*Gallus domesticus* from Soygaon Dist: Aurangabad, M.S. India in month of June, 1998.Worms are medium ,having large number of segments;total number of proglottids are 44 in number;scolex large in size,rectangular in shape,broader than long;rostellum large,oval in shape; rostellar hooks arranged in single circle in rostellum;suckers medium, four in number,oval in shape;neck absent;mature segments two times broader than long;testes 53-56 in number,oval in shape,small,evenly distributed;cirrus pouch oval,small;cirrus small,thin,straight tube,contained within cirrus pouch;vas deferens small,thin tube;genital pores opening anterior side of segment,unilateral,oval,marginal & regularly alternate;genital atrium small,thin,oval;ovary transversely elongated,bilobed,marginally irregular;vagina thin tube,opening posterior to vas deferens in cirrus pouch,opens into ootype;vitelline gland posterior to ovary,oval;excretory canals longitudinally placed,lateral side of segment and thin & the worm is identified as *Amoebotaenia jadhavae n.sp.* The amount of lipid in the worm *Amoebotaenia jadhavae* n.sp.are 21.42 mgs/100 mg and the amount of lipid in the host infected intestine are 19.45 mgs/100 mgs in its host,Gallus domesticus.

RESULTS AND DISCUSSION

Worms are medium ,having large number of segments;total number of proglottids are 44 in number;scolex large in size,rectangular in shape,broader than long;rostellum large,oval in shape;rostellar hooks arranged in single circle in rostellum; suckers medium,four in number,oval in shape;neck absent;mature segments two times broader than long;testes 53-56 in number,oval in shape,small,evenly distributed;cirrus pouch oval,small;cirrus small,thin,straight tube,contained within cirrus pouch;vas deferens small,thin tube;genital pores opening anterior side of segment,unilateral,oval,marginal & regularly alternate;genital atrium small,thin,oval;ovary transversely elongated,bilobed,marginally irregular;vagina thin tube,opening posterior to vas deferens in cirrus pouch,opens into ootype;vitelline gland posterior to ovary,oval;excretory canals longitudinally placed,lateral side of segment and thin & the worm is identified as *Amoebotaeniajadhavae n.sp.*The lipid content was very high in worms as compared to their host.Lipid level was 21.42 mg/100 mgs in cestode parasite *Amoebotaenia jadhavae n.sp.* where as it was 19.45 mg/100 mgs in its infected intestine of host *Gallus domesticus* .It is revealed from the present study that there is high content of lipids in the parasites and is also reveals that the parasite is taking advantages of host and is absorbing the most of the nourishing material.The parasite is fulfilling its needs from the host and is in a way causing hindercane in the proper development of the host.In cestode infections lipid alternation in the parasite tissue commonly occur but no generalized trend can be given for such alterations.In the present investigation different quantities of lipids are observed by the parasite,probably due to the difference in the amount of unsaturated fatty acids that can permeate through parasite.



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AEGELMARMELOS (L.) CORR.: EFFECTIVE DRUG YIELDING TREE AGAINST FUNGI

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ABSTRACT :

Aegelmarmelos (L.) Corr. a member of family rutaceae, Commonly called Bael(Bengal Quince) is a tall tree grows up to a height of 3 to 6 meters with long, stout thorns; young parts are pubescent. Leaves, fruits, bark and roots of the plants used in preparations of indigenous medicines. The parts of the plants are used variously as fruit pulp is used as a mild laxative,used to cure inflammation of the mucous membrane having a free discharge,recommended for the cure of asthma. Reduces or eliminates fever,promotes the removal of mucous secretions from the bronchial tubes for the abnormal accumulation of liquid in the cellular tissue accompanied with constipation and jaundice.

The juice of leaves is used orally to treat Jaundice, diabetesand eye disease. The poultice of leaves is used to treat eye diseases. Decoction of roots is anthelmintic and antipyretic. Powder of bark is used to control dysentery, diarrhea and dyspepsia. The fruits are most significant as the pulp or syrup of ripened fruit is gastro protective used in dyspepsia, debility and fever. It is also treats bleeding piles and constipation.Unripe fruits are astringent, stomachic and digestive. They are used to cure diarrhoea (Anonymous, 1948-76).Root extract is used against rabid dog bite, gastric trouble. Stem extract is used to cure dysentery and stomach disorder. Leaves are used for diabetes, jaundice, diarrhoea, dysentery and gastric troubles (Jain, 1991).Root bark extract, dried leaves are used to cure typhoid fever. Leaf extract is used as a remedy against night blindness, diabetes, male sterility, intestinal ulcer (Pawar and Patil, 2008).

In the present investigation the antimicrobial effect of***Aegelmarmelos***leaf andfruit extract was evaluated on bacterial strains like *Escherichia coli*, *Staphylococcus aureus*, *S. paratyphi, S. dysentry* and fungal strains like *Candida albicans*, *Fusariumstionifer, F. oxysporum*and*Aspergillusniger.* The solvent used for the extraction of plants were distilled water, methanol, alcohol, chloroform and acetone.

INTRODUCTION

Successful prediction of botanical compounds from plant materials is largely dependent on the type of solvent used in the extraction procedure. The traditional healers or practitioners make use of water primarily as a solvent but present study showed that organic solvent and particularly methanol extracts of these plants were certainly much better and powerful. This may be due to better solubility of activity compound in organic solvent (de Boer *et. al.,* 2005).

MATERIAL AND METHOD:

a. Microbiological assay – To study efficacy of drug against micro flora related to human, the extracts of five plants were prepared in four different solvents of each using standard method (Chessbrough, 2000). The antibacterial assay was conducted by agar well diffusion method. (Perez, 1990). Antibacterial assay was performed using four different bacteria namely *Staphyllusaureus, Escherechia coli, Salmonella paratyphi, Shigella dysentery*. While antifungal assay was performed using four fungi namely *Aspergillusniger, Fusariumoxysporum, Candida albicans and Rhizopusstolonifer.*

b. Preparation of plant extracts - The plant materials were ground in a grinding machine in laboratory. 100 gm. of each paste was mixed with 1000 ml. of solvents like Chloroform, Methanol, Ethyl acetate and distilled water separately. The mixture kept for 24 h. in tightly sealed vessels at room temperature for maceration and stirred constantly on mechanical stirrer. The mixture was protected from sunlight to prevent loss of active components. This mixture was filtered through Whatmann No. 1 filter paper. The extracted liquid was subjected to evaporation in order to remove solvent. The semisolid extract produced was stored in an airtight container at 4^0C in refrigerator for further use. All the dried extracts were exposed U.V. rays (200-400 nm) for 24h and checked frequently for sterility on nutrient agar plates (Chessbrough, 2000).

c. Anti bacterial assay- The antibacterial assay was conducted by agar well diffusion method (Perez, 1990). Sterile molten Nutrient Medium was inoculated with 0.5 ml of inoculums. A well of 6 mm diameter were punched in Nutrient agar and filled with 50 μl solvent extracts. Plates were kept in refrigerator for 20 min for proper diffusion of extracts. Later on the plates were incubated at 37^0 C for 24 h. Microbial growth was determined by measuring diameter of zone of inhibition. For each bacterial strain control were maintained where pure solvents were used instead of the extract. The experiment was conducted three times and means values were considered. The results were compared with a standard antibiotic gentamycin (10 μg/m disc).

d. Antifungal assay – The assay was conducted by agar well diffusion method. The fungal strains grown of Potato Dextrose Agar (PDA) at 37^0 C for 24 h. were suspended in saline solution (0.85 % NaCl). Using Neubergh chamber microbial spores were adjusted to be uniform in each 10 ml of sample. The suspension was used to inoculate 90 mm diameter Petri dish containing 15 ml of PDA. Well of 6 mm diameter were punched in PDA agar and filled with 50 μl extracts. The control plates were also prepared with all solvents including distilled water. Plates were incubated at 37^0 C for 24 h. Antifungal activities were evaluated by measuring inhibition zone diameters. The experiment was conducted thrice.

RESULTS AND DISCUSSION:

Assay of antibacterial activity of plant extract:

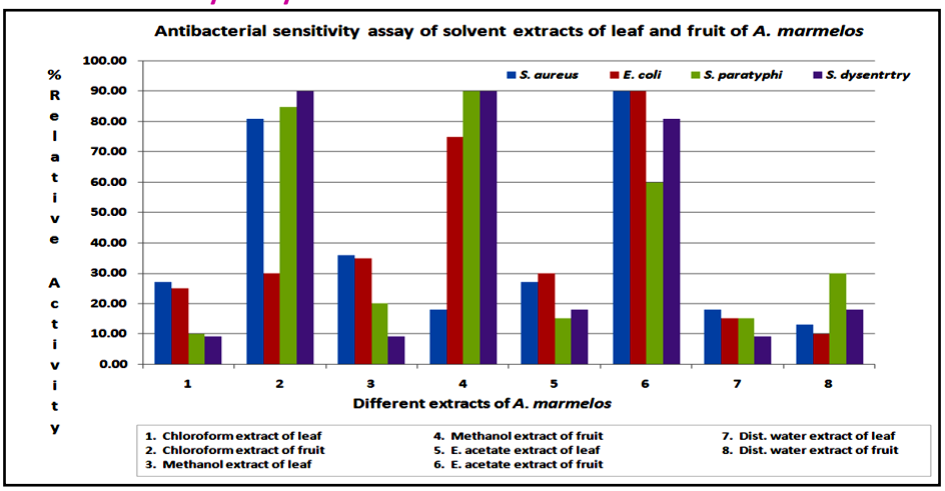
The antibacterial sensitivity assay of solvent extracts of leaf and fruit of *A. marmelos* against four pathogenic strains of bacteria showed following results.(Table 1 and Graph 1)

Table 1 - Antibacterial sensitivity assay of solvent extracts of leaf and fruit of *Amarmelos*

Sr. No.	Different extracts of *A. marmelos*	Dia. of Inhibitory zone (mm) / % inhibition			
		S. aureus	***E. coli***	***S. paratyphi***	***S. dysentery***
1	Chloroform extract of leaf	6 / 27	5 / 25	2 / 10	2 / 9
2	Chloroform extract of fruit	18 / 81	6 / 30	17 / 85	20 / 90
3	Methanol extract of leaf	8 / 36	7 / 35	4 / 20	2 / 9
4	Methanol extract of fruit	04 / 18	15 / 75	**18 / 90**	**20 / 90**
5	E. acetate extract of leaf	6 / 27	6 / 30	3 / 15	4 / 18
6	E. acetate extract of fruit	20 / 90	18 / 90	12 / 60	18 / 81
7	Dist. water extract of leaf	4 / 18	3 / 15	3 / 15	2 / 9
8	Dist. Water extract of fruit	3 / 13	2 / 10	6 / 30	4 / 18
9	Gentamycin	22	20	20	22

The methanolic extract of fruit exhibit maximum activity against *S. dysentery* (90%), moderate against *E. coli* (75%) and minimum against S. aureus and *S. paratyphi* (18%). The chloroform extract of fruit shows maximum activity against *S. dysentery* (90%), moderate against *S. aureus and S. paratyphi* (81, 85 %) and minimum against *E. coli* (30%). Ethyl acetate extract of fruit shows maximum activity against *S. aureus and E. coli* (90%) each, moderate against *S. dysentery* (81%) while lower activity against *S. paratyphi* (60%). Aqueous extracts of fruit showed however very less sensitivity towards all strains. It shows maximum activity against *S. paratyphi* (30%).

Graph: 1 Antibacterial sensitivity assay of solvent extracts of leaf and fruit of *A. marmelos*



DISUCSSION:

THE DIFFERENCE IN DEGREE OF ACTIVITY IN DIFFERENT TYPES OF SOLVENTS AGAINST THE SAME BACTERIAL STRAINS MAY BE DUE TO DIFFERENT SOLUBILITY OF ACTIVE SUBSTANCES PRESENT PLANTS. AS DIFFERENT SUBSTANCES OF PLANTS HAVE DIFFERENT ACTION, THE BACTERIAL STRAINS HAVE RESPONDED IN THE MANNER. THE CHLOROFORM EXTRACT OF LEAF SHOWED MAXIMUM INHIBITION OF GROWTH AGAINST *S. AUREUS AND E. COLI* (27,25 %), AND MINIMUM AGAINST *S. PARATYPHI AND S. DYSENTERY* (10,9 %). THE METHANOLIC EXTRACT OF LEAF SHOWED CONSIDERABLE LEVEL OF ACTIVITY AGAINST *E. COLI AND S. AUREUS* (35, 36 %), WHILE LESS EFFECTIVE AGAINST *S. PARATYPHI AND S. DYSENTERY* (18, 9 %). ETHYL ACETATE EXTRACT OF LEAF ALSO SHOWED MODERATE ACTIVITY AGAINST *S. AUREUS AND E. COLI* (27,30 %), AND MINIMUM ACTIVITY AGAINST *S. PARATYPHI* AND *S. DYSENTERY* (15,18 %). AQUEOUS EXTRACT OF LEAF SHOWED LESS ACTIVITY AGAINST *S. DYSENTERY* (9%), AND MODERATE AGAINST REMAINING THREE STRAINS OF BACTERIA, BETWEEN 15-18 %.

When the degree of activity was determined comparing with the activity of standard antibiotics. The fruit extracts of *A. marmelos*were found to be very effective as compared to leaf extracts and extracts of organic solvents were found to be more effective than aqueous extract. The fruit extract however, showed more or less equal activity against all forms of bacteria and found to be sensitive against all four strains, particularly against Gram-negative strains. (Photo plate 1)

Photographs of Antibacterial activity of *A. marmelos* *(Photo plate- 1)*

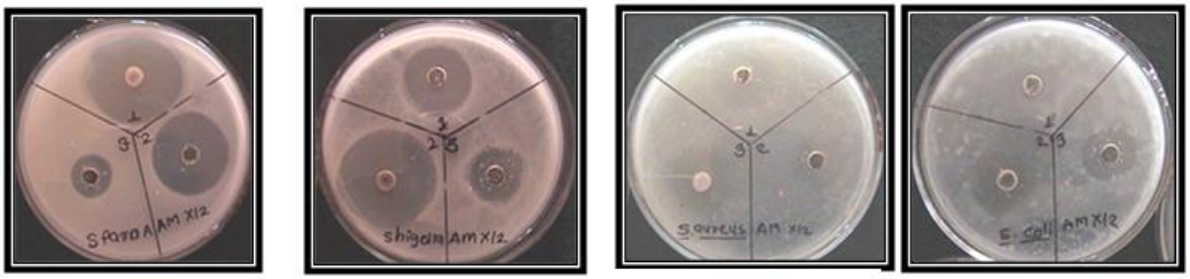


Table 2 Antifungal sensitivity assay of solvent extracts of flowers and seeds of *A. marmelos*

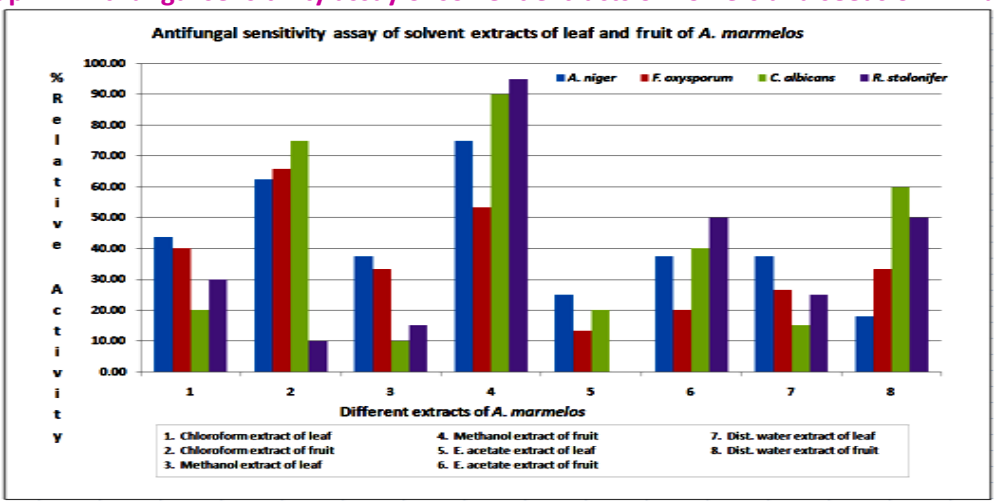
Sr. No	Different extracts of *A.marmelos*	Dia. of Inhibitory zone (mm)* / % inhibition			
		A.niger	***F.oxysporum***	***C.albicans***	***R. stolonifer***
1	Chloroform extract of leaf	14 / 43.75	12 / 40	04/ 20	06 / 30
2	Chloroform extractof fruit	14 / 62.5	20 / 66	15 / 75	18 / 10
3	Methanol extract of leaf	12 / 37.5	10/ 33.33	02 / 10	03 / 15
4	Methanol extract of fruit	18 / 75	16 / 53.3	18 / 90	19 / 95
5	E. acetate extract of leaf	08 / 25	04 / 13.3	04 / 20	00/00
6	E. acetate extract of fruit	12 / 37.5	06 / 20	08 / 40	10 / 50
7	Dist. water extract of leaf	12 / 37.5	08 / 26.6	03 / 15	05 / 25
8	Dist. water extract of fruit	09 / 18	10 / 33.3	12 / 60	10 / 50
9	Griseofulvin (5 mg/ml)	32	30	20	20

(Values are mean of three replicates; Diameter of cork borer is subtracted.)

The chloroform extract of fruit showed maximum inhibition against *R. stolonifer* (90%), moderate against *C. albicans* (75%) and minimum against *F. oxysporum* and *A. niger* (66, 62%). The methanolic extract of fruit showed most activity against *R. stolonifer* (95%), and *C. albicans* (90%), moderate against *A. niger* and least against *F. oxysporum* (53%). The fruit extract in ethyl acetate showed moderate inhibitory zones against *R. stolonifer* (60%), and less moderate against *C. albicans and A. niger* (40,37 %) and very less activity against *F. oxysporum* (20%). Aqueous extract of fruit seemed to be equally effective against *R. stolonifer and C. albicans* (60%), moderately active against *A. niger* and least active against *F. oxysporum* (33%).

In all methanolic extract of fruit was most effective as compared to other extracts and it was most sensitive for *R. stolonifer* and *C. albicans*. All fruit extracts were most effective against *R. stolonifer and C. albicans*while efficacy was less about *F. oxysporum and A. niger.*

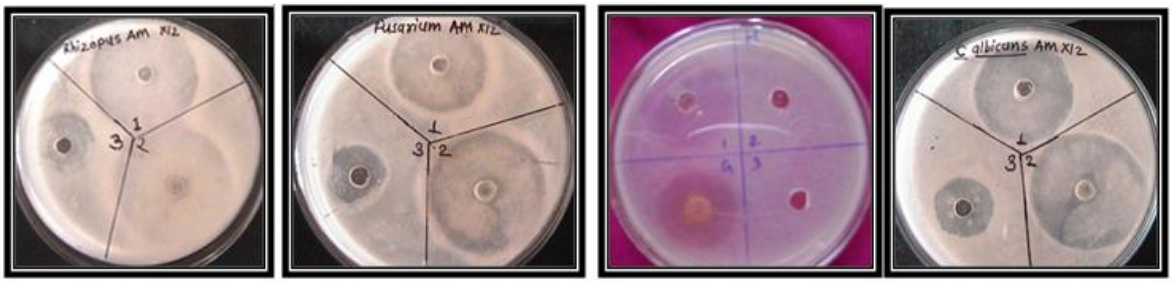
Graph 2:Antifungal sensitivity assay of solvent extracts of flowers and seeds of *A. marmelos*



The chloroform extract of leaf showed maximum inhibition against *A. niger* (43%), moderate in *F. oxysporum* (40%), and less in *C. albicans and R. stolo*nifer (30,40 %). The methanolic extract of leaf was also more or less effective against *A. niger and F. oxysporum* (37,33%), while it was least effective against *C. albicans and R. stolonifer* (10,15%). Ethyl acetate extract of leaf showed moderate inhibitory action against *A. niger* (25%), while its sensitivity was very less against *F. oxysporum* (13%), moderate against *C. albicans* (20%), and no effect against R. stolonifer. Aqueous extract of leaf however, showed moderate activity against *A. niger* (37%), *F. oxysporum* (26%), and *R. Stolonifer* (25%), and least active against *C albicans*

(15%). In all, the leaf extracts were sensitive against *A. niger and F. oxysporum*, while less sensitive to *R. stolonifer*. The fruit extracts of organic solvent showed marked antifungal activity. (Photo plate 2).

Photographs of Antifungal activity of *A.marmelos(Photo plate 2)*



CONCLUSION:

Phytochemical study of *A. marmelos* reveals presence of primary metabolites starch, proteins, fats, carbohydrates and secondary metabolites tannins saponnins, glycosides. Alkaloids, reducing sugars, in addition to inorganic constituents like calcium, sodium, potassium and iron. Due to presence of the secondary metabolites the fruits and leaf extracts in organic solvents found effective against pathogenic bacteria and fungi of this investigation.

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STUDIES ON ICHTHYOFAUNAL DIVERSITY OF LANJI LAKE

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ABSTRACT :

The present investigation deals with the fish diversity of Lanji Lake Tq. Ahmedpur Dist. Latur, India. This paper deals with the survey of freshwater fishes. The study was carried out during the year 2010-2011. The nutritive and medicinal value of fish has been recognized form time immemorial. Fresh fish flesh provides an excellent source of animal protein for human diet. This protein is relatively of high digestibility, biological and growth promoting value for human being. From the recent few years,"Blue revolution" has emerged to fulfill the essential animal protein diet need for the under nourished people in India by inland fisheries development.The results of present investigation reveal the occurrence of 12 fish species belonging to six orders and four families. The order cyprinifernes found dominate followed by siluriformes.

Keyword: *Ichthyofauna, Diversity, Commercial value of fish, Lanjilake*

INTRODUCTION

India has a vast, varied and rich freshwater resources and it contributes the richest resources in the world. However the Principle Rivers in India including their main tributaries have a total length about 27355km thus about 6.0 million hector area is available for undertaking fishery acitivites.

In India inland water bodies are the sources of fish productions lakes and ponds are mainly constructed for irrigation, storage of water, seepage water, water for drinking purpose.

In India lake, ponds and reservoirs is important from socio-economic point of view as it has the potential of providing employment to about 2.0 million people Khan (1991). The Maharashtra has a area of lakes and ponds under fish culture actively and produces more than 523 tones of fish productions.

In the present investigation reported the diversity of fish fauna from Lanji Lake. This lake is constructed on the route of small stream or nala, called as lendinala which flows near to the village lanji. Tq. Ahmedpur Dist. Latur (M.S.) India. The fish diversity of different water bodies have been reported by Banarjee and Roy 1979, Sarkar and Banarjee(2000)&Shastri and Pendse(2001).

Fishes of the inland water bodies have been studied since last century by various workers as Day (1994), Jayram (1991), Rao et. al (1999), Sakhare and Joshi (2002), Pawar et al (2006), Pathak (2008).

MATERIAL AND METHODS:

The Lanjilake is constructed in the year 2003-2004 on the rute of Lendi Stream near Lanji Village. It is constructed for the purpose of seepageing the water and increase the water level in nearby area. The latitude of the Lake 18'42'30" and Longitude as 76'58'32".

The Department of fisheries Latur district has leased out this lake to AhmedpurMacchiyasayic Co-operative society, Ahmedpur during the study period 2010-2011. Near this lake Lanji village is situated around its catchment area. The fishermen goes for daily fishing on this lake.

During the study period 2010-2011 the data of fish catch and fish fauna has taken on the basis of interviews of members of fisheries co-operatives society and individual fishermens, and fish fauna is collected.

The fishermen were fishing throughout the year on this lake but occasionally and when they required large and definite catch. They operate gal net, cast net on large scale. Drag net is also used locally it is called as wadap. Captured fishes were taken out and brought to the laboratory and assed for faunic study, collected fish species are kept in 4% formal in solution and classified them by using K.C. Jayarams"Thefreshwater fishes of India" and F-Day 1889, The fauna of British India, including cyclone &berma, fishes Vol. I & II.

Different fish species were identified in following orders,families,genus and species.

RESULT AND DISCUSSION

Following orders,families,genus and species were found in Lanji lake waters:

1) Order –Cypriniformes	Genus- Amblypharyngodon
Family – Cyprinidae	Species - A.mola
Genus–Catla	Genus – Chela
Species – C. catla	Species - C. phulo
Genus – Labeo	**ii)** Family – Rasborinae
Species – L.rohita	Genus-Rasbora
Genus –Labeo	Species - R. danicorinus
Species – L.calbasu	**iii)** Family- Cobitidae
Genus- Labeo	Genus- Nomacheilus
Species –L. bata	Species - N. botia
Genus–Carrhina	**3) Order- Mastacembeliformes**
Species - C.mrigala	Family-Mastacembelidae
Genus–Barbus	Genus- Mastacembealus
Species -B.ticto	Species - M. armatus
Genus- Cyprinus	**4) Order- Channiformes**
Species - C.carpio	Family- Channidae
Genus - Ctenopharyngodon	Genus- Channa
Species- C. idella	Species – C. maurillus
Genus–Discognathus	C. punctatus
Species -D.modestus	**5) Order- Clupeiformes**
2) Order – Siluriformes	Family- Notopteridae
Family- Siluridae	Genus- Notopterus
Genus- wallago	Species - N. notopterus(capirat)
Species - O. bimaculatus	N. Chitala
Family – Bagridae	
Genus- Rita	
Species - R. rita	

On the interviews and visiting of members of fisheries co-operative societies and individual fishermens. Fish fauna which was so for studied during the year Oct-2010 to May-2011.

Fishermen operate different mesh sized nets during fishing. The data is comprised in seasonal conditions. The captured fishes were grouped intothree category for our convenience of study as majorcarp, cat fishes and miscellaneous. The catch was grouped into group wise so far collected fishes were studied.There have been about five orders and seven families are recorded. Among which cypriniformes orders is major order and dominant peak landings throughout the year but specially catches were more

dominant during the summer months. Followed to cypriniformes cat fishes and last the miscellaneous groups which are very poor landings.

As per as catch data is concerned there is no any government policy to regular fish production. There is no confirmed record of fish catch available so we adapted the method on the interview of the local fishermen and data will be collected and computed.

During study period groupwise fish catch is given in thetable. Monthly fish catch data will not be available because fish catching is done in irregular way as the fishermen want to catch the fish into lake.Maximum and minimum fish catch of major carp tabulated into table-1.

During the study period the mean average lowest fish catch production is in winter season and maximum fish catch was recorded in summer season where as from June to September there is no fish catching. In these month there is ban on catching of fishes.

During study period major carp production were at peak in April month and low during October month. Local measures were more in April months where as miscellaneous or local minor were abundance during march.

During winter fish catch production is less,this might be due to low temperature range and cold water condition and growth is slows down the same result was observed form Ingole – 2008, Popatwar – 2002.

Fish seed will release in July last in the lake there after three months fish catching is strictly avoided and fish give chance to grow and increase. After three months fish catching is occur in this lake. In rainy season July to September the inflow from the catchment area in the form of foliage, dung, decay matters, basin soil runoff and lake area should be dried in summer months. It might be effect the water quality of the lake and therefore the fish production will be growing faster in this lake.

Generally major carps grow faster as compared to other fish species. Among which Catla is faster growth and average Catla production is more as compared to other fishes. From the study it is interesting to note that the major carp production in this lake are forming an important group as they yield highest production and without any culture practices this lake give tremendousproduction within six months period. It could be because of the favorable physic-chemical nature of the water as well as biological factor as food. It indicate that this lake will give within six month fish seed stocking it gives maximum yield and it is a good for fish farmers.

Table1: GroupWise fish catches from lake -2010-2011

Month	Major carp	Local major	Miscellaneous
Oct-2010	30kg	20kg	10kg
Nov-2010	45kg	32kg	17kg
Dec-2010	42kg	35kg	30kg
Jan-2011	97kh	71kg	65kg
Feb-2011	155kg	122kg	92kg
Mar-2011	187kg	131kg	152kg
April-2011	277kg	171kg	78kg
May-2011	73kg	56kg	43kg

Table – 2 Showing fish catch during study period.

Groups	Oct-2010	Nov-2010	Dec-2010	Jan-2011	Feb-2010	March-2011	April-2011	May-2011	Total in Kg.
Major carps	30kg	45kg	43kg	97kg	155kg	187kg	277kg	73kg	907kg
Local major	20kg	32kg	35kg	71kg	122kg	131kg	171kg	56kg	638kg
Miscellaneous	10kg	17kg	30kg	65kg	72kg	152kg	78kg	43kg	487kg
Total in Kg	60kg	94kg	108 kg	233kg	369kg	470kg	526kg	172kg	2032kg

From the study of the fish fauna in this lake there is great fish production within six months for fish culturist and fish farmers.

As possible as these small lakes in this area will be stocked at fingerlings in early monsoon and harvested in summer season. It will be good opportunity to produce the high fish production within short period. It is the best example in this area. And farmers should adopt this techniques definitely fish production will be increased and it is used to upliftment of socio economic condition of fishermen's.

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HEPATO-PROTECTIVE ROLE OF FLOWER EXTRACT OF COUROUPITAGUIANENSIS AUBL AGAINST CHLORAMPHENICOL INDUCED HEPATO-TOXICITY IN MUSMUSCULUS

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ABSTRACT :

The medicinal plants have been used traditionally by the physician worldwide for the prevention and treatment of various liver disorders with no ill effects. The plant kingdom have main role in the life of human beings as well as animals. Considerable studies have been carried out to assess the hepato-protective activities. The clinical research in this century has confirmed the efficacy of several medicinal plants in the treatment of liver disease.

The flower extract of *Couroupitaguianensis*(FE of CG) was evaluated for its protective role against chloramphenicol induced hepato-toxicity in mice. The activities of serum marker enzymes of liver injury like serum glutamate pyruvate transaminase (SGPT), serum glutamate oxaloacetate transaminase (SGOT), alkaline phosphatase (ALP),which are increased by chloramphenicol treatment was found to be reduced by the treatment of flower extract of*Couroupitaguianensis*at 250 mg/kg body weight except SGPT which was increased. The lipid peroxidation in liver, the marker of membrane damage was found to be nearly normal level and bilirubin content in serum was found to be at significantly low level in the extractgroup, indicating its protective role. The treatment with extract produced enhancement of antioxidants enzymes like catalase (CAT) and reduced glutathione (GSH). The result suggest that the protective role of the flower extract of *Couroupitaguianensis*against chloramphenicol induced hepato-toxicity. The phytochemicals estimated from the plant was swietenine, sapropterin, usnic acid, lupeol and gamma tocopherol. The possible mechanism of action of flower extract may be due to its antioxidant activity and free radicals.

Keyword: Chloramphenicol,*Couroupitaguianensis*, antioxidants, free radicals, hepato-protection.

I. INTRODUCTION

Chloramphenicol is an antibiotic derived from the bacterium Streptomyces venezuelae or produced artificially and effective against a broad spectrum of micro-organisms. Chloramphenicol is a highly effective and well tolerated broad–spectrum antibiotic. However, it has several featuresthat demand careful use in companion animals and that have led to prohibition of its use in food producing animals in several countries, including USA and Canada (Kahn, 2005).

Chloramphenicol is excessively used in the developing and undeveloped countries against the microbial infections because it is cheap and effective. However, the high dose of chloramphenicol causes liver-toxicity due to formation of free radicals or reactive oxygen species (ROS). Free radicals produce deleterious effect on lipid plasma membrane as well as cellular components thereby producing peroxidation of lipids which leads to cell death **(**Ryter et al., 2007)**.**

Medicinal plants possess scavenging activity for free radicals and boost the antioxidant defence mechanism in body and have a protective role against tissue damage induced by chloramphenicol (Kumar K B H and Kuttan R, 2005). *Couroupitaguianensis*Aubl. was the selected medicinal plant for the research study. Many parts of *Couroupitaguianensis*have been used traditionally to treat various diseases, like the decoction of its flowers is used to boost the immune system for fighting a number of diseases (Kokate, C. K., 1988).The

extracts of leaves and flowers are used as microbial activities (Al. Dhabi, N. A. et. al., 2012). It is used extensively as an ingredient in many preparations which cure gastritis, scabies, bleeding piles, dysentery, scorpion poison and the flowers of *C. guianensis*showed analgesic and anti-inflammatory activity and immunomodulatory activity (Geeta M, et al., 2005, Pradhan D, et al., 2008 and FarrukhAqil, et al., 2006).

II.MATERIALS AND METHODS

I Plant material and authentication

The flowers of plants collected from local region of Mumbai and the plant is authenticated by BLATTER HERBARIUM, ST. Xavier's college, Mumbai-400001, India.

II Preparation of plant extract

The Flower powdered was first extracted with petroleum ether (60-80°C) to remove the fatty contents and the extract was discarded. The residue was exhaustively extracted in a soxhlet apparatus for at least 12 hour with methanol and the extract was used for experiment. The solvent from extract was removed under reduced pressure controlled temperature (40°-50°c). The yield of methanolic extract was approximately 16/17 % w/w. The dried semisolid extract was kept in lightly closed container in refrigerator till further analysis. (Vinod H. Gupta,et al., 2012).

III Animals- mice

The animals used for the studies of toxicity and for efficacy were healthy Albino Swiss mice (Musmusculus), weighing between 30-35 gm obtained from Haffkins Institute, Parel (E), Mumbai- 400012. Under the Animal Maintenance permit Registration Number Invochem Laboratory, 226, "Gauri" Commercial Complex, Station Road, Vasai Road (E), Dist. Thane-401210; CPCSEA Registration No. 851/C/04/CPCSEA, from the ministry of Social Justice and Empowerment, Government of India. After procurement, the male and female mice were kept in same cage. The cages were provided with rice husk bedding and were cleaned daily. The house was maintained at 28±2^{o} c and exposed to 10-12 hours of day light and a relative humidity of 30-70 %. The animals were provided with drinking water ad libitum and fed on commercially available feed supplied by AMRUT FEED.

IV Drug- chloramphenicol

Chloramphenicol was procured from Mehta Pharmaceutical Limited, 315, Janki Centre, Plot No. 29, Shah Industrial Estate, off Veera Desai road, Andheri (W), Mumbai, India. It is kept in below room temperature. Chloramphenicol is beneficial to control the growth of gram positive and gram negative bacteria, however chloramphenicol at high concentrations results in hematotoxicity, linkage to fatal aplastic anaemia (Saba et al., 2000) **9** and hepatotoxicity. LD_{50} of chloramphenicol is 2300 mg/kg body weight of mouse according to Pfizer material safety data sheet, 2007.

V Experimental protocol

Group I (6 mice) were used as controls. Group II (6 mice) received chloramphenicol i.e. 500 mg/kg. Group III (6 mice) received 200 mg of flower extract of *Couroupitaguianensis.* Group IV (6 mice) received chloramphenicol i.e. 500 mg/kg and 200 mg/kg of flower extract of *Couroupitaguianensis*.

VI Blood sample collection and analysis

Blood sample was collected by puncture of retro- orbital vein and put the blood in EDTA vial for all hepatological analysis like SGPT, SGOT, ALP, superoxide dismutase (SOD), catalase (CAT), reduced glutathione (GSH) and lipid peroxidase (LPO).

Statistical analysis

The obtained DATA was expressed as mean ± SD. Statistical significance of differences between the control and experimental groups was assessed by Analysis of variance (ANOVA) two ways without replication. The value of probability less than 5 % ($P<0.05$) was considered statistically significant.

III.RESULTS

Table 1 show there was significant increase in hepatic marker enzymes like SGPT, SGOT, ALP in all groups as compare to control group except ALP was lower than control group. While table 2 showsthere was

improvement of CAT and GSH in prophylactic group, while SOD and LPO werenot improved in flower extract as well as prophylactic groups.

IV.DISCUSSION

Assessment of liver damage can be made by estimating the activities of serum enzymes SGPT, SGOT, ALP which are originally present in higher concentration in cytoplasm. When there is hepatopathy, the enzymes leak into the blood stream in conformation with the extent of liver damage (Tanaka K and Lizuka Y; 1968). The increased level of these marker enzymes observed in the toxin group i.e. chloramphenicol treated mice in the present study correspond to the more liver damage induced by toxin. The reduced concentrations of SGOT and ALP as a result of flower extract of *Couroupitaguianensis*Aubl administered to mice thereby decreasing enzyme linkage. It may be due to presence of swietenine, sapropterin, usnic acid, lupeol and gamma tocopherol indicating hepato-protective potential of flower extract of *Couroupitaguianensis*Aubl.

It is suggested that swietenine, sapropterin, usnic acid, lupeol and gamma tocopherol in the flower extract of *Couroupitaguianensis*Aubl. play an important role as antioxidant for prevention of hepatic damage. These phytocompoundsof flower extract of *Couroupitaguianensis*Aubl. may able to stabilise ROS by reacting with them and oxidizes subsequently to more stable and less reactive radicals.

As flower extract of *Couroupitaguianensis*has swietenine, sapropterin, usnic acid, lupeol and gamma tocopherol which have extra electron, it shared with free radicals which already have one electron less. So the plant extract recovered the toxicity effect which is caused by chloramphenicol. However SGPT, SOD and LPO values were not decreased, so the damaged liver was not recovered completely.

TABLE-1

Hepatologicalobservations after treatment and recovery with the help of flower extract of *Couroupitaguianensis*Aubl *in* mice.

Groups	SGOT IU/L	SGPT IU/L	ALP IU/L	SOD U/mg	CAT OD/mg	GSH ug/mg	LPO nmoles/gm
I- Control	178±16.4	45±6.03	249 ± 43.61	35.6±7.23	3.8±0.44	4.78±0.77	117.27±2.66
II- Chloram	194±46.38	47.67±4.92	292 ± 39.86	24.9±5.71	1.93±0.78	2.88±0.28	161.54±15.85
III- FE of CG	154 ± 13.5	53 ± 6.9	238 ± 56.9	24.5±7.98	3.71±0.54	3.76±0.73	125.45±8.71
IV-Chloram + FE of CG	157 ± 20	54±5.43	313 ± 92	21.3±5.31	2.6±0.028	3.29±0.52	171.71±21.49

values< 0.05 by 'f' test. The values are expressed as Mean ± SE from 6 rats in each group.
FE of CG means flower extract o*f Couroupitaguianensis*

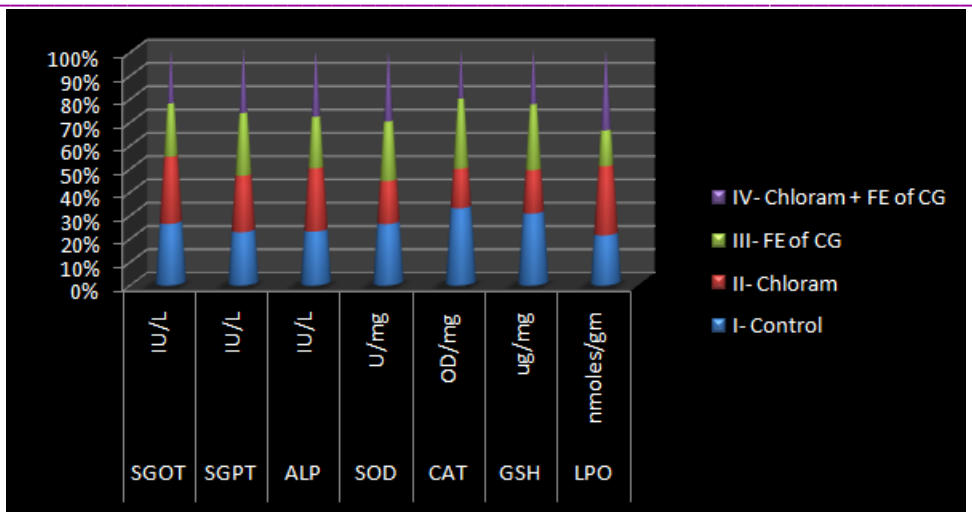

Fig. 1 – Effect of flower extract of *Couroupitaguainensis* on liver function markers of mice with chloramphenicol – induced hepatological changes (values are mean ± SE from 6 mice per group. P values: < 0.05; compared normal control group, chloramphenicol group 500 mg/kg body wt, recovery group i.e. flower extract of *Couroupitaguainensis* (200 mg/body wt/day*)* group and chloramphenicol 500 mg/kg body wt with flower extract of *Couroupitaguainensis* (200 mg/body wt/day*)* group *).*

V.CONCLUSION

The biochemical evidences show that the treatment of flower extract of *Couroupitaguianensis*protected mice moderately against chloramphenicol induced hepato-toxicity. The phytoconstituents of the flower extract of *Couroupitaguianensis*have active antioxidant role toprotect the liver from LPO as well as marker enzymes. The further studies should be conducted to know the role of phytochemicals to protect the other organs also.

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The author thank to Mehta Pharmaceuticals LTD, Andheri (w), Mumbai for getting pure form of chloramphenicol. Secondly thank to Dr.Mrs.M. N. Gandhi, SAIF/CRNTS department, IIT, Powai, Mumbai for the phytochemical analysis of medicinal plants which was performed under her guidance.

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MEDICINAL PLANTS USED BY LOCAL TRADITIONAL HEALERS OF MAHUR RANGE FOREST OF NANDED DISTRICT, MAHARASHTRA, INDIA

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ABSTRACT :

Mahur forest is rich in medicinal plant biodiversity since ancient times. The tribal people and medicinal plant practitioners of this region are using medicinal plants for the treatment of different diseases. The present study reveals the enumeration of 40 medicinal plants collected from ethnomedicinal practitioner. Tribal and local people were totally depending on medicinal plants of the vicinity. Each tribe has its own formulation and dosages based on individual experiences and it is passed on one generation to other generation. Information of ethnomedicinal recipes, dosage and their mode of administration etc. was recorded form tribal of this area. The enumerated angiospermic plants species are employed by the tribal in the form of infusion, juice, extract vapors or fumes, decoction and paste either as a sole drug or in combination with other plant drugs to treat various ailments. The enumerated plants are arranged alphabetically with their family, botanical names, and local names.

Keyword: Medicinal plant diversity, Mahur, tribal, Maharashtra.

INTRODUCTION

The Mahur forest of Nanded district of Maharashtra has been widely acknowledged for medicinal plants. The tribal and rural population of Mahur taluka is composed of different communities. The principle tribes in Mahur are *Andh, Kolam, Naikede, Gond* and *Pradhan*. Tribal people fulfill their needs of plant medicines form nearby forests for curing different ailments. The valuable indigenous knowledge about plants of this area is an important Indian heritage. Tribals are good at knowledge of herbal wealth and related vegetation in the immediate vicinity. The region is still ethnobotanically under exploration. The present investigation was carried out to collect the information regarding ethnomedicinal values from the tribals of Mahur Taluka of Nanded District, Maharashtra.

Geographically the Mahur taluka is situated between $19^0$49`to$19^0$83` North latitude and 77^0 91` to $77^0$55` East longitude. The total geographical area of taluka is 52160 hectares of which 14397.39 hectares area covered with forest and 37762.61 hectares are non-forested area and its population is 86782 (Census-2001), out of this 15.5 percent is inhibited by tribal population of aborigines like *Andh, Kolam, Gond, Naikede and Pradhan* (Pawade *et al*., 2008).

MATERIALS AND METHODS

Topography:

Mahur taluka is a thick forested area of Nanded District**.** The main river is Penganga which flows from the South to North direction. Mahur taluka is located in northern part of Nanded district. It is bounded North and South by Yavatamal district. East part by Andhra Pradesh and West by Pusad taluka of Vidarbh region.

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Methods of Collection:

Ethnobotanical data was collected between 2008-2011; the information was mainly gathered through semi structured interview. Most of the interviews and discussions were held in Mahur Taluka. In this study 13 knowledgeable elders (between the ages of 45 to 65) chosen with the assistance of local administrators and community leaders who served as key informants. During the course of the study each informant was visited three times in order to verify the reliability of the obtained data. Repeated visits also helped to get some additional information that was not mentioned during the earlier interviews.

The collected plants were identified with help of standard floras (Naik, (1979); Naik *et al.,* (1998) and Yadav and Sirdesai (2002).The plants were enumerated alphabetically along with botanical name, family and vernacular name.

ENUMERATION

The plant were enumerated alphabetically along with botanical name, family and vernacular name.

Sr. No	Plant Name	Part(s) Used	Disease
1	*Acacia farnesiana* (L.) Willd.	Stem bark, fruit	rickets
2	Acacia leucophloea (Roxb.) Willd.	Stem bark.	Fits
3	*Ageratum conyzoides* L	stem	cough
4	*Balanites aegyptica* (L.) Del.	Seed.	eye diseases cough
5	*Bambusa vulgaris* L.	Tender shoot	Piles
6	*Barleria prionitis* L.	leaf	earache and tympanitis
7	*Benincasa hispida* (Thunb.) Cong.	Fruit.	Rheumatism abdominal pain
8	*Cadaba fruticosa* (L.) Druce.	Leaves	rheumatism
9	*Caesalpinia bonduc* (L.) Roxb.	Seed and Pod	abdominal pain rheumatism
10	*Cajanus cajan* (L.) Millsp.	Leaves	fractured part
11	*Calotropis procera* (Ait.) R. Br.	Root and Leaves.	eczema boils and cough
12	*Capparis divaricata* Lamk.	Fruits.	dysentery intestinal worms
13	*Capparis zeylanica* L.	Root and Fruit	diarrhoea
14	*Carthamus tinctorius* L.	Leaves and seeds.	digestive problem
15	*Curcuma pseudomontana* Grah.	rhizome	cough
16	*Datura metel* L.	leaves and fruit	tumorous neck
17	*Dendrophthoe falcata* (L.*f*.) Etting.	Stem bark and leaves.	weakness
18	*Echinops echinatus* Roxb.	Root and stem	Piles and skin diseases
19	*Eclipta alba* (L.) Hassk.	Leaves	Hepatitis
20	*Euphorbia thymifolia* L.	Whole plant	typhoid
21	*Ficus benghalensis* L.	Aerial root and latex	stop premature hair feet crack
22	*Grangea maderaspatana* (L.) Pior	Entireplant.	earache dysentery
23	*Helicteres isora* L.	Leaves and pod	abdominal pain dysentery
24	*Indigofera cordifolia* Heyne ex Roth	Leaves	rheumatism
25	*Ipomoea pes-tigridis* L.	Leaves	joint pain
26	*Ixora pavetta* Andrews	Stem bark	bleeding of teeth
27	*Leucas cephalotes* (Roth) Spreng	leaves	abdominal pain
28	*Madhuca longifolia* (Koen.) Macbr.	Seed and flowers	cough rheumatism

29	*Mangifera indica* L.	Stem bark	Leucorrhoea hepatitis
30	*Phyllanthus emblica* L.	Leaves and fruit	toothacheasthma
31	*Pongamia pinnata* (L.) Pierre	Leaves and seeds	Wound and swelling
32	*Ruta graveolens* L.	Leaves.	chronic diarrhea
33	*Rorippa indica* (L.) Hiern.	Leaves and seeds	joint pain
34	*Santalum album* L	Stem bark	skin diseases headache
35	*Sapindus emarginatus* Vahl.	Seeds	Headache
36	*Soymida febrifuga* (Roxb.) A. Juss.	Stem bark.	dysentery
37	*Tephrosia hirta* Buch. Ham.	Leaves	Cough
38	*Trigonella foenum-graecum* L.	Seed and leaves	rheumatism
39	*Triumfetta rotundifolia* Lamk.	Leaves.	dysentery
40	*Vanda tessellata* (Roxb.) Hook. ex G. Don	Epiphytic root and stem	paralysis

DISCUSSION

In the present paper it has been revealed that the enumeration of 33plant species belonging to 24 families reported to cure various human ailments. During survey information was gathered from aged medicinal practitioner of this area. The tribal and local people of this area use medicinal plants in their day to day life. The knowledge about medicinal plants and their utilization was passing from generation to generation. Different parts of plant like root, stem, leaves were used medicinally to treat abdominal pain**,** skin diseases**,** joint pain, piles, diarrhea, eczema, boils, cough, and eye diseases. The present survey showed that the tribal of Mahur have detailed knowledge regarding medicinal plants and their utilization in curing various diseases.

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THE PESTICIDE ENDOSULFAN EFFECT ON BIOMOLECULE GLYCOGEN CONTENT OF FRESH WATER FEMALE CRAB BARYTELPHUSA CUNACULARIS

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ABSTRACT :

The pattern of civilization interfering in agricultural issues. According to many biodiversity researchers for controlling crop pest use of endosulfan of lot of emulsified concentration are regularly used. The regular use of endosulfan effects on biodiversity of flora and fauna. Especially the effect occurs in aquatic animals like crab.

The endosulfan is not dissolved in water so far it present in soil, water, on plant debris etc. These residues found in deposited form in body of aquatic animals like crab. When this deposition found, it directly or indirectly effect on various parameters of physiological and metabolically activity.

The study about effect of endosulfan which regularly utilized in paddy field, deposited in water where the aquatic fauna like crab specially female crabBarytelphusa Cunacularis suffering from physiological problem. The glycogen is important bimolecular in life science which play an important role in body building and activity of physiology as well in metabolism. The current study focused about variation found in glycogen content touch the result and discussion with table and graphically.

Keyword: *Endosulfan, Glycogen content, female crab Barytelphusa Cunacularis.*

INTRODUCTION

Glucose occupies the central position of carbohydrate metabolism in an organism, representing complex groups, sequences and cycles of reactions which integrate at various points with reactions concerned with metabolism of lipids and of proteins as these molecules serve the source of carbon in the synthesis of cellular components.

The chief carbohydrate of the solid tissues, while glucose is of the blood and other body fluids. Glycogen, a reserve, or a storage carbohydrate reversibly converted to blood glucose and normally serves to maintain blood sugar level, when supply of carbohydrate from intestinal absorption is inadequate. Glycogen break down into glucose is governed by the extrinsic and intrinsic factors that govern the physiology of organism.

The carbohydrate metabolism essentially constitutes two segments: synthesis of carbohydrates which includes – glycogenesis and gluconeogenesis. While catabolic pathways include – glycolysis, glycogenolysis, pentose pathway, Kreb's cycle and electron transport system. The catabolic pathways not only fulfil the needs of energy demands but also supply the amphibolic intermediates and reduced nucleotides (NADPH), required for protein and lipid metabolism.

Carbohydrates play not only a structural role in the cell but may serve as a reservoir of chemical energy. The major function of carbohydrates is to serve as a fuel and provide energy for the metabolic processes of the animal. In this role total carbohydrate is utilized by the cell mainly in the form of glucose

(Harper, 1983). Carbohydrate metabolism is broadly divided into anaerobic segment or glycolysis which consists of breakdown of glycogen or glucose through Embden-Mayerhalf pathway and aerobic segment which consists of oxidation of acetyl-CoA to carbon dioxide and water through citric acid cycle. During the course of oxidation of acetyl-CoA in this cycle, reducing equivalents are formed which ten enter the respiratory chain, where high energy phosphate bonds are generated in the process of oxidative phsophorylation. The sequences involved in carbohydrate metabolism are well established in several crustaceans including crabs (Sreenivasulu Reddy, 1987). It is well known that organ phosphorous and or organochlorine insecticides are known to alter physiological and biochemical state of animals by inducing variations in the activities of several enzymes (Abidi, 1986). Disturbances in carbohydrate metabolism are a major biochemical lesion arising out of the action insecticides leading to compensatory shifts in overall metabolism (Ramakrishnan, 1973).

The effects of OC insectides on different aspects of carbohydrate metabolism of non-target species have been studied. Eller (1971) observed hyperplasia of the islets of Langerhans in the trout, *Salmoclarki* on exposure to Endrin suggesting changes in carbohydrate metabolism.Shaffi (1979) reported break down of liver, muscle, brain and kidney glycogen with resultant hyperglycemia and hyperlactemia in nine Indian fishes exposed to heptachlor. Rajendraprasad Naidu *et al.,* (1986) observed marked changes in the activities of LDH, ICDH, SDH, G-6-PDH, and phosphorylase, AAT, AIAT and GDH and in the concentrations of hepatopancreatic glycogen.

Endosulfan induced changes in the biochemical composition of the freshwater bivalve molluse, *L. marginalis* (Muley and Mane, 1989). RamanaRao and Ramamurthi (1980) have observed glycogen depletion in the hepatopancreas of the snail *P. globosa* after exposure to sumithion. Increased concentration of pyruvate and lactate were observed under organochlorine insecticides – dieldrin and telodrin, intoxication (Hathway, 1965). It has been reported that chronic and acute poisoning of sheep and chicken with organophosphate insecticides like thiophos, chlorophos and methylnitrophos is accompanied by profound changes in carbohydrate metabolism.

MATERIAL AND METHODS:

Glycogen content was determined according to Anthrone reagent method (Selfers *et al.,* 1956). Carbohydrates are first hydrolyses into simple sugar using dilute hydrochloric acid. In hot acidic medium glucose is dehydrated to hydroxyl methyl furfural. Compound forms with anthrone a green coloured product with an absorption maximum at 630 nm.

Weight 100 mg of sample into boiling tube. Hydrolyse by keeping it in boiling water bath for three hours with 5 ml neutralise it with solid sodium carbonate until the effervescence ceases. Make up the volume to 10 ml & centrifuge. Collect the supernatant and take 0.5 & 1 ml aliquots for analysis. Prepare the standard by take 0.5 & 1 ml aliquots for analysis. Prepare the Standards by taking 0, 0.2, 0.4, 0.6, 0.8 and 1 ml of the working Standard ‘0’ serve as blank. Make up the volume to 1 ml in all the tubes melding the sample tubes by adding distilled water. Then add 4 ml of anthrone reagent, Heat for eight minutes in boiling water bath. Cool rapidly and read the green to dark green colour at 630 nm. Draw a standard graph by plotting concentration of the standard on the X–axis versus absorbance on Y–axis. The Glycogen content was expressed as mg glycogen/gm. wet. Wt. of tissue.

RESULT AND DISCUSSION:

Changes due to the Effect of Endosulfan pesticide on the Glycogen content of leg muscle, gill muscle, hepatopancreas, heart muscle of Freshwater female crab*Barytelphusa Cunacularis*, after exposure to the concentration of Endosulfan for 24, 48, 72 and 96 hours, the values of Glycogen contents were expressed in term of mg glycogen/gm. wet, weight.

Table: Effect of Endosulfan on Glycogen contents inFreshwater Female Crab *Barytelphusa Cunacularis*

Sr. No.	Duration of Exposure	Muscle	Gill	Hepatopancreas	Heart
1.	Control	4.64 ± 0.014	5.21 ± 0.006	6.42 ± 0.031	4.45 ± 0.018
2.	24	3.70 ± 0.022*	5.11 ± 0.022**	4.92 ± 0.021***	5.57 ± 0.020***
3.	48	3.42 ± 0.033**	5.85 ± 0.027***	5.65 ± 0.027**	4.23 ± 0.015**
4.	72	3.34 ± 0.020*	4.65 ± 0.037**	5.80 ± 0.016***	3.92 ± 0.007***
5.	96	3.15 ± 0.013***	4.18 ± 0.015**	5.13 ± 0.018**	3.21 ± 0.024***

Note: 1) Values expressed as mg glycogen/gm wet, weight of animals.
2) Each value is mean of six observations ± S.D.
3) Value are significant at * = P<0.05, ** = P < 0.01, ***=P < 0.001 & NS – Not significant

Figure (a): Effect of Endosulfan on Glycogen Content in *Barytelphusa Cunacularis* (24 hrs.)(Each value is the mean of six observations ± S.D.)

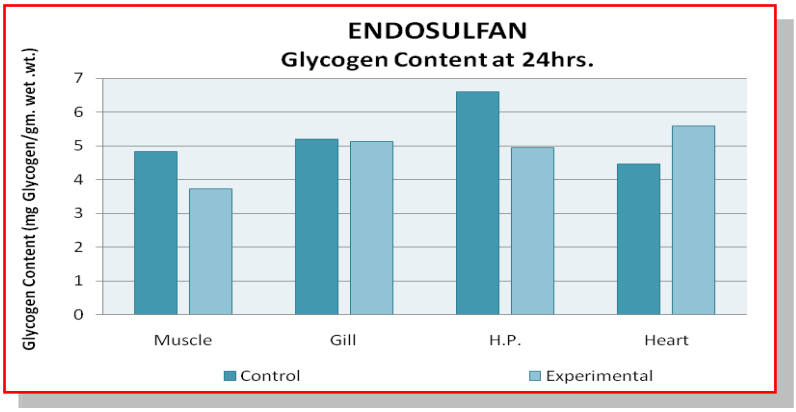


Figure (b): Effect of Endosulfan on Glycogen Content in *Barytelphusa Cunacularis* (48 hrs.)(Each value is the mean of six observations ± S.D.)

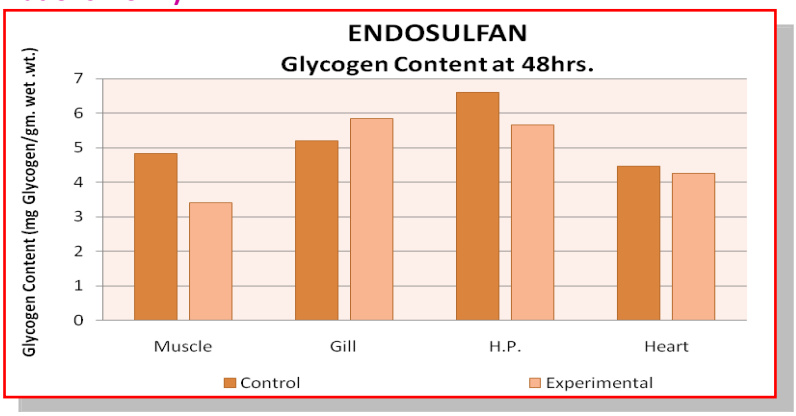


Figure (c): Effect of Endosulfan on Glycogen Content in *Barytelphusa Cunacularis* (72 hrs.)(Each value is the mean of six observations ± S.D.)

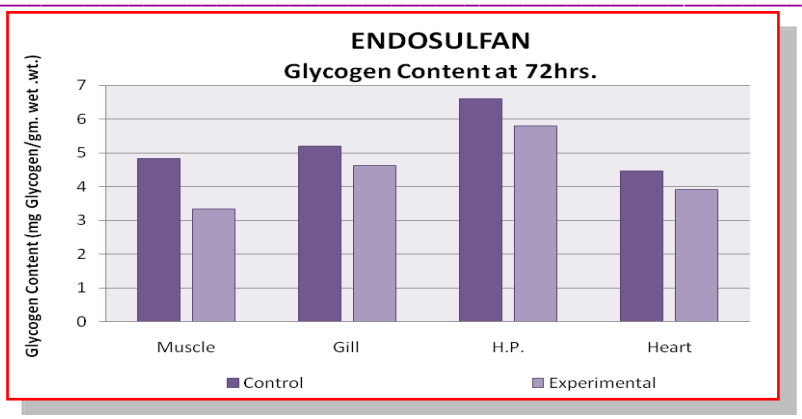
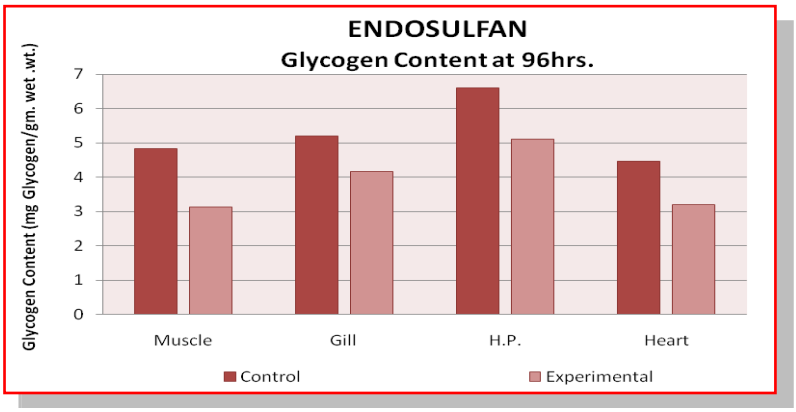


Figure (d): Effect of Endosulfan on Glycogen Content in *Barytelphusa Cunacularis* (96 hrs.)(Each value is the mean of six observations ± S.D.



The variation in the glycogen content due to exposure of pesticide pollutant given in aboveTable. The total glycogen contents expressed as mg/gm. wet. Weight in the tissue varied from 3.13 to 4.84 in leg muscle, 4.16 to 5.86 in gill muscle, 4.94 to 6.62 in Hepatopancreas and 3.20 to 5.59 in heart muscles of endosulfan exposed animals. The glycogen content initially increased in heart muscle at 24 hours and then decreased up to 96 hours, while in gill it increases at 48 hours. Decrease in leg muscle and Hepatopancreas upto 96 hours as compaired to control, shown in Table and graphically represented.

DISCUSSION:

The result shows the variation in the levels of organic reserves of various tissues. The carbohydrates are not only important as structural components but also serve as the source of energy. Excess of glucose store as a glycogen, a polysccharide stored in hepatopancreas in intertebrates and muscle and liver in vertebrates. The hepatopancreas of crustanceans in analogous to the liver of vertebrates and is involved in the synthesis and degradation of several molecules involved in the metabolism. (Chang &O'conor, 1983). It is utilised according to the need of the organism and so it suggest that carbohydrate are mainly used to meet higher energy demand to conbact the stress induced by heavy metals. When energy is required the glycogen is broken down and utilised as a source of energy.

In the preent probe when the freshwter female crab *Barytelphusa Cunacularis* were exposed to sublethalconcentraion of endosulfan which causes initial increase in glycogen level in heart muscle, but decrese in leg muscle and gill muscle and Hepatopancreas. But later on after longer exposure upto 96 hours, there was sharp decline in glycogen level in gill muscle, Hepatopancreas and heart muscle. In dimethoate exposed animals, there was gradual slight increase in glycogen level in hepatopanereas at 24 hours while slight decrease in glycogen level in leg muscle and heart muscle at 24 hours shown in Table. The observed depletion in glycogen content by pesticide pollutant. Several workers results on Crustacean species (NagabhushanamandKulkarni,1981), Pesticides (Rao and Nagabhushanam, 1987).

The decrease in glycogen level in hepatopancreas and muscle of freshwater Snail *Pilaglobose* exposed to endosulfan has been observed by Kulkarni*et al.,* (1984) observed a marked decline in tissue glycogen and carbohydrate level in the tissue of the crab *O. senexsenex* and explained that this might be due to the enhancement of glycogenolysis by increase in phosphorylase activity. Venkata Reddy observed a decline in the glycogen content in the gill, muscle and hepatopancreas of crab, *Oziotelphusasenexsenex* exposed to phosalone and suggested that it may be due to either a reduction in glycogenesis or increased glycogen utilisation through the glycolytic pathway.

The steady decrease in the tissue glycogen clearly indicates its rapid conversion by the respective tissues as a consequence of endosulfan intoxication. Depletion of glycogen would result in the disruption of enzymes associated with carbohydrate metabolism. Glycogen depletion is more prevalent under hypoxic conditions and it is quite likely that a situation similar to hypoxia might be occurring in the tissues of endosulfan exposed crab.

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ZOOPLANKTON BIODIVERSITY AND ITS IMPORTANCE FOR FISH PRODUCTION INVISHNUPURI DAMNANDED DIST NANDED. (M.S.)

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ABSTRACT :

Vishnupuri Dam was constructed on the River Godavari, in Nanded District (M.S.) in 1988, This is one of thelargest lift irrigation projects in Asia.The back water covers 40 k.m. length of the Godavari. Culturable command area of project is 23222 hector and irrigable command area 19514 hector, live storage of project is 80.79 million cubic meters out of which43.95 storage is reserved for drinking purpose and 10.26 million cubic meters for industrial purpose.TheGodavari river has been under constant threat of pollution by sewage and industrial wastes, disposal of dead bodies, deforestation, excessive useof fertilizers and pesticides, bathing and water development programmes. It is great importance for the region because its water is used for human and cattle consumption, power generation, fish production and irrigation. A total of 25 species of zooplanktons and 10 species of fishes were identified.

Zooplankton have a direct bearing in the fish industry. The zooplankton peak was found during summer followed by winter and rainy season. Zooplankton was observed about four groups as Rotifera observed about ten species, Copepoda observed about seven species, Cladoceraobserved six species and Ostracoda observed about two species.

The fish fauna were observed at the Vishnupuridam. There are culture of fish with quick growing varieties of fishes including Indian Major Carps, exotic species have been popular in recent time. There is abundance of the species such asCatlacatla,Labeorohita, Cirrhinamrigal, , Cyprinuscarpio, Silver carp,Barbustitco, Mystusseenghala, Wallagoattu, Mystacenbelusarmatus, Channastaitus, etc. Fish is economically a very important group of animals which is used as food. Fish liver is an important source of oil containing Vitamins A and D, several minerals and protein.

Keyword: *Vishnupuri Dam, Zooplankton, Pollution, Fish production.*

INTRODUCTION

India has a large network of river, canals, lakes and ponds, which contribute more than 30% of the total fish production. Fish form one of the most important group of animals for man. Majority of our people suffer from hunger and malnutrition. Fish is an excellent food for man and provides protein, fat and vitamin A and D, which are essential for the health of man. Fish is also provide source of vitamin B, it food rich in protein is specially preferred for containing essentially amino acid such as Lysine and methionine abundantly required for formation of phospholecithine in gray matter of the brain unsaturated fat in fish also reduce the risk of formation of high blood cholesterol. Phosphorus and several minerals are also present in it. They have good test and easily digestible. Besides being a rich source of food, fishery provides job opportunities also.

The studies of fish diversity from different fresh water bodies of India have been carried out during the last few decades Hamilton Buchanan (1822), Day(1878), Mishra (1962), Jayram (1981) Thomus et.al. (1989), Talwar & Jhingrah (1991), Menon (1992), Rao et.al (1999). Sarkar and Banergee (2000), Mishra et.al.(2003). There are over 19000 reservoirs in India. Covering 3, 15,366 ha. And many more are under

construction. Suguman(2000) Reservoir Fishery in India is also important from social economic point of view as it has the potential of providing employment to about 2 million people (Khan Et.al.1999). According to Shrinivasan (1993) the Maharashtra is endowed with an area of 1,79,430 hector. Under reservoir and the state produces 516 tons of fish of these area the state fisheries corporation was operating in 6,272 hector. Of reservoir and marketing the catches.

The present investigation was under taken to study the aquatic vertebrate animals with reference to fishes from Vishnupuri dam water. It is airrigation project of Maharashtra state. It is situated in the latitude $19^0 06' 43''$ N and longitude 77^0 17'20''E. It is multipurpose type like irrigation and power production and also fishing purposes.

MATERIAL AND METHOD:

Sample collected and preserved in 4 % solution of formalin. The quantitative and qualitative analysis was carried out by taking 20 ml of concentrate obtained by siphoning the supernatant liquid. The genera of Zooplankton were identified and quantitative determination was carried out referring Needhan and work of Edmondson. Zooplankton were counted by drop count method and the results were converted to organisms per ml of water. The counting was done following the work of Edmondson (1965), APHA, AWWA and WPCF (1985), Trivedy and Goel (1984), Tonapi (1980), Standard key & other literature were used for identification of different species and the identified species were expressed in no. per liter.

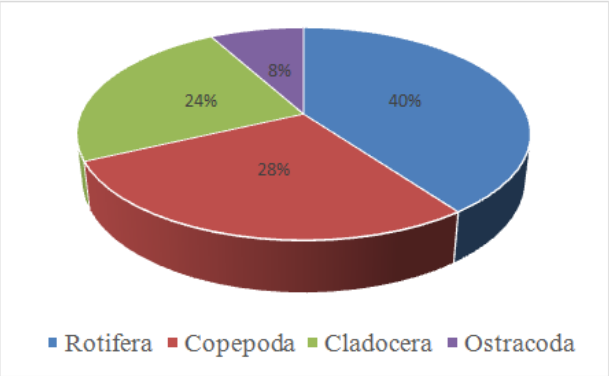
The fishes were collected from the Vishnupuri dam with the help of fisherman during the year June 2017 – May 2018. The specimen were preserved in 10% formalin and subsequently identified following work of Lagler (1956) Menon and Talwar (1972), Day (1878), DattaMunshi&Srivastav (1968), Jayram (1981) and Talwar & Jhingran (1991).

RESULT AND DISCUSSION:

The importance of zooplankton has been clearly demonstrated that the zooplankton constitute the only food for the fish fry and the adult fish not only eat them, but also select them as a delectable item.Thus zooplankton have a direct bearing in the fish industry. In India, several studies were conducted in reservoirs elucidating the characteristics of zooplankton.The zooplankton peak was found during summer followed by winter and rainy season.Zooplankton was observed about four groups as Rotifera observed about ten species, Copepoda observed about seven species, Cladocera observed six species and Ostracoda observed about two species.

Table 01 :List of Zooplankton and their percentage during the year 2017-18

Rotifera	*Asplanchnaintermedia, Brachionusdurgae, B.forficula, B.pallas, B. angularis, B. calyciflorus, B. rubens, Filinaborny, F.terminalis, Philodenasp*
Copepoda	Agrulusfoliaceous, Cyclops strennus, Mesocyclops, Microcyclops, Diaplomus, Phyllodiaptomus, Sinodiaptomus.
Cladocera	Alonarectangularichardisars,Ceriodaphnialaticaudata, C. cornuta, Moniadubia, M. brachiate jurine, Daphnia similis.
Ostracoda	Cypris, Strendesia.



Fish as constitute economically a very important group of animals. A large number of dams and reservoir has been constructing during the recent year to provide water for irrigation and power production. These bodies of water offer immense scope for fish culture for successful fish farming in dam and reservoir.

The Ten species of the fish fauna in this study belonging to four order and six families are given in the table among them order Cypriniformes was dominant with eight species to be followed by the Mastalimbeliformes andOsteoglossifomes each with one species. Sakhare (2001) recorded 23 fish species belonging to 7 orders in Jawalgaon reservoir in Solapur district. Pawar and Madlapure (2002) recorded 11 fish species belonging to 5order in sirurdam. Ingole (2005) recorded 11 fish species occurrence in the Majalgaon dam reservoir.

Table 02 :Fish diversity from Vishnupuri Dam

Class	Sub-class	Order	Family	Speices
Pisces	Teleostomi	Cypriniformes	Cyprinidae	*CatlaCatla*
				Labeorohita
				Cirrhinamrigal
				Cyprinuscarpio
				Silver carp
				Barbusticto
			Siluridae	*Mystusseenghala*
				Wallagoattu
		Mastaembeliformes	Mastamecembelidae	*M. armatus*
		Ophiocephaliformes	Channidae	*Channastaitus*

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FISHERIES OF WAN RESERVIOR, MAHARASHTRA

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INTRODUCTION

The Wan reservoir is a medium sized reservoir near Parli (Vaijyanath) city in Marathwada region.The reservoir was constructed in year 1963 across the river Wan. The reservoir is bounded by latitude 18°53'N and Longitude 76°27'.It is the oldest reservoir in district with water spread area of 347 ha.The reservoir has an opportunity to irrigate 7567 ha of agricultural land. Besides supply of water for irrigation, the reservoir also supplies drinking water to ParliVaijnath town and Vaijnath Co-operative Sugar Factory.The area around reservoir comprises forest-covered hills.The reservoir has two small canals through which water supply goes to agricultural lands of the villages like Nagapur, Pangri, Deshmukhtakli, Talegaon, Limbota, Kowthali,Sangam, Gopalpur, Mandekhel, Bhilegaon, Tandoli,Selu, Parchondi, Sirsala, Kanadi and Pimpalgaon. The salient features of the reservoir are depicted in Table 1.

Table 1: Salient features of Wan reservoir, Maharashtra

River	Wan
Year of construction	1963
Nearest city	Parli (Vaijyanath)
Water spread area (ha)	347
Height of dam (m)	19.81
Length of dam (m)	2188
Gross storage capacity (mcm)	25.181
Catchment area (km^2)	379.92
Full tank level	454.87
High flood level (m)	456.40
Irrigation potential (ha)	7567
Length of canal • Right canal (m) • Left canal (m)	 12.03 9.65
Rainfall at catchment area (mm)	535

MATERIALS AND METHODS

Fishes for the purpose of study were collected with the help of local fishermen in spite of buying from the market. Three different sampling sites were selected for study; the outlet, the inlet and an approximate intermediate of the water body. The collected fishes were brought to the laboratory after noting their original colour and capturing photographs. The collected fishes were preserved in 5% formalin solution in to the laboratory for further study. The identification of fishes was done with the help of standard keys (Talwar and Jhingran, 1991 and Day, 1875-1878).

A personal contact and interview method was used to gather data on fish seed stocking, fish catch, catch composition and environmental impact of exotic fishes on indigenous fish species.

RESULTS AND DISCUSSION

Fish fauna: In the present study 26 fish species have been identified (Table 2). They include carps, feather backs, catfishes and other. Out of 26 species *Labeorohita, Channa spp., Cyprinuscarpio and Oreochromismossambicus*were noted to be predominant and occurred throught the year. The fishery of *Catlacatla*was badly affected by the accidental entry of *O. mossambicus.* The exotics such as *Cyprinuscarpio*and *O. mossambicus*together contribute to about 14.79% of the total fish catch.

The details of the fish production in Wan reservoir are depicted in Table 3.The study of the data revealed that the maximum fish production was recorded at 82.88 kg/ha/yr in year 2013-14.The minimum fish production was during 2012-13at 66.92 kg/ha/yr.During the present investigation the catch of local fishes showed the higher catches than those of carps (Table 3).

During first year of investigation (2011-12), Indian major carps,common carp,tilapia and local fishes contributed to 28.36%,11.67%,12.05% and 47.92% of the total catch respectively.

During second year of investigation (2012-13),local fishes formed 46.42% of the total catch,while Indian major carps,common carp and tilapia contributed to about 19.80%,13.04% and 20.74% of the total fish catch.Exotic species (common carp and tilapia) together contributed to about 33.78% of the total fish catch.

During third year (2013-14) of the investigation,local fishes dominated over the carps and contributed to about 39.57% of the total catch.Indian major carps,common carp and tilapia contributed to 29.21%,18.08 % and 13.14% of the total catch.The contribution from two exotics (common carp and tilapia) was more than 31% of the total catch.

In Wan reservoir tilapia (*Oreochromismossambicus*) affected the phenomenal growth of *Catlacatla.* The growth of *Catlacatla*never exceeded 850 gms after entry of tilapia. From the interview with fishermen it is learned that tilapia accidentally entered in reservoir in last five years. It may be due to other predatory fishes present in the reservoir, tilapia population could not proliferate much. Tilapia is a non-predatory fish, comes to maturity early and starts breeding, almost continuously, from the age of three months. The new recruits also multiply, compete for food and space, not only among themselves, but also with fish fauna present in the water body, which results in an over population of small sized fishes of very low/no market value. Hence, many regard tilapias as a pest and it affect adversely indigenous fish population, mainly *Catlacatla.*Though this fish became a favorite of fish culturists through the world it has certain undesirable traits such as early maturity, prolific breeding and stunted growth. Being a prolific breeder, it over-populates, and very small sized tilapia are obtained due to its precocious breeding. It is therefore difficult to culture all the progeny to a marketable size and hence there is market decline, in its culture operations and is now called as a ‘trash fish’. It is not suitable for stocking with carps as it is competed with carps for space, food and oxygen besides predating on the carp fry. The accidental entry of tilapia in wan reservoir caused a great challenge for its effective control.

Table 2: Fish Diversity in Wan Reservoir of Beed district

Order:Clupeiformes **Suborder:Notopteroidei** **Family:Notopteridae** *1.Notopterus notopterus (Pallas)*
2. Notopteruschitala (Ham.)
Order: Cypriniformes **Suborder:Cyprinoidei** **Family:Cyprinidae** *3.Chelaphulo (Ham.)*
4.Catlacatla (Ham.)
5.Labeorohita (Ham.)
6.Labeo fimbriatus (Bloch)
7.Cirrhinusmrigala (Ham.)
8.Cyprinus carpio(Linn)
9.Amblypharyngodonmola (Ham.)
10.Osteobramacotio (Ham.)
11. Puntiussaranasarana (Ham.)
12. Puntiustictoticto (Ham.)
13. Puntiuschola (Ham.)
14. Rasboradaniconius (Ham.)
Order:Siluriformes **Family:Bagridae** *15.Mystuscavasius (Ham.)*
16.Mystus seenghala (Sykes)
17.Mystus vittatus (Bloch)
Family: Claridae *18.Clariasbatrachus (Linn.)*
Family:Siluridae *19.Wallago attu (Bloch and Schneider)*
Order:Mugiliformes **Family:Mugilidae** *20.Mugilcephalus (Linn.)*
Order:Channiformes **Family:Channidae**
21.Channa striatus (Bloch)
22.Channamarulius (Ham.)
Order:Perciformes **Family:Anabantidae** *23.Anabas testudineus (Bloch)*
Family:Cichlidae *24.Oreochromis mossambicus (Peters)*
Family:Gobiidae

25.Glassogobiusgiuris (Ham.)
Family:Ambassidae *26.Chandaranga (Ham.)*

Table 3: Year wise fish catch in Wan Reservoir (kg)

Year	Indian major carps	Common carp	Tilapia	Local fishes	Total	Fish yield (kg/ha/yr)
2011-12	7895	3250	3355	13340	27840	80.23
%	28.36%	11.67%	12.05%	47.92%		
2012-13	4600	3027	4815	10780	23222	66.92
%	19.80%	13.04%	20.74%	46.42%		
2013-14	8400	5200	3780	11380	28760	82.88
%	29.21%	18.08%	13.14%	39.57%		

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SYNTHESIS AND CHARACTERIZATION OF SILVER NANO PARTICLES BY USING ALOE BARBENDENSIS

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ABSTRACT :

An experiment was conducted entitled "Synthesis and characterization of silver nano particles by using Aloe barbendensis" with the objectives to standardize the protocol and to study the antimicrobial activity of nano particles prepared by using Aloe Vera gel. Fresh Aloe Vera gel was collected from the botanical garden of CABT, Hatta, Dist. Hingoli and all the Aloe Vera plant were 6 months old. Gel was extracted from the leaves of Aloe Vera and filtered by using traditional hand filtering procedure and treated with silver nitrate ($AgNO_{3)}$ and incubated at 37^0 C for 24hrs. Two bacterial and two fugal species were used to determine the antimicrobial activity of silver nanoparticles Different Conc. Of silver nanoparticles were used to study the antimicrobial activity The maximum activity was found against fungus at 100 µg/ml .The silver nano particles activity were determined on the basis of zone of inhibition. The maximum zone of inhibition were recorded was 29 mm in fungus and 22 mm in bacteria. The entire bacterial and fungal samples were isolated from pure culture brought from VNMKV, Parbhani.

KEYWORDS : *Aloe Vera, $AgNO_{3,}$ Nutrient Agar media and PDA media.*

INTRODUCTION

The field of Nanotechnology is one of the most active areas of research in modern material science. The world "*nano*" is used to indicate one billionth of meter. The term nanotechnology was coined by Taniguchi a researcher at the University of Tokyo, Japan. Nanoparticles exhibit completely new or improved properties based on specific characteristics such as size, distribution and morphology. New application of Nanoparticles and nonmaterial's are emerging rapidly.

Infectious diseases are the leading cause of death world-wide. So, antibiotics resistance has become a global concern but the clinical efficacy of many existing antibiotics is being threatened by the emergence of multidrug - resistance pathogens. Even though pharmacology industries have produced a number of new antibiotics in the last three decades, resistance to these drugs by microorganisms has increased. In general, bacteria have the genetic ability to transmit and acquire resistance to drugs, which are utilized as therapeutic agents.

Nanotechnology is now creating a growing Sense of excitement in the life sciences especially biomedical device and Biotechnology. Nanoparticles exhibit completely new or improved properties based on specific characteristics such as size, distribution and morphology. The Silver Nanoparticles have various and important application. Historically silver has been known to have a disinfecting effect and has been found in application ranging from traditional medicine to culinary items. It has been reported that silver Nanoparticles (SNPs) are non- toxic to humans and most effective against bacteria, viruses and other eukaryotic micro-organisms at low concentrations and without any side effects. Moreover, several salts of silver and their derivatives are commercially manufactured as antimicrobial agents. In small concentrations, silver is safe for human cells, but lethal for micro-organisms.

Nanoparticle is a microscopic particle with at least one dimension less than 100 nm. Nanoparticles investigation is currently an area of passionate scientific research due to a wide variety of potential

applications in biomedical, optical and electronic fields. Nanoparticles are of immense scientific interest as they are effectively bridge between bulk material and atomic molecular structure. To date metallic Nanoparticles are mostly prepared from Nobel metals. The use of metallic Nanoparticles in the field of catalysis optoelectronic, pinpointing biomedical troubles and exhibit device uncovered many significant findings. Among the Nobel metals, silver (Ag) is the metal of preference in the field of biological systems, living organisms and medicine.

OBJECTIVES

- To synthesized plant based nanoparticles using Aloe vera gel.
- To study antimicrobial activity of nanoparticles prepared by using Aloe Vera gel.
- To standardize protocol for synthesis of nanoparticles

MATERIALS AND METHODS

Materials:

The investigation described under this chapter was done at college of Agriculture Biotechnology Hatta, Tq. Basmat Dist. Hingoli various materials used during the present investigation described under following sub-headings.

Plant material: Fresh leaves of *Aloe barbadenesis*.

Instruments and Glassware:

mortar and pastel, stand, electronic balance, measuring cylinder, petriplate, glass spreader, filter paper discs, What's Mann filter paper, Aluminium foil, Funnel, cotton, conical flask, Glass rod, UV-Visible spectrophotometer, water bath, incubator, Cork Borer etc.

Chemical and Media:

Silver nitrate (AgNo3) was used to check the microbial activity with Aloe vere extract, Potato dextrose agar media, and Nutrient Agar Media for the growth of micro-organisms. All the chemical and media used during this project work were produced from Hi media Pvt.India and nice chemical Pvt.Ltd India.

Table: Compositionof Potato Dextrose Agar media:

S. N.	Component	Weight in Gram
01	PDA Powder	39
02	Agar agar Powder	15
03	D/W	1000

Table: Composition of Nutrient Agar Media:

S.N	Component	Weight in Gram
01	Peptone	10.0
02	Beef Extract	10.0
03	Agar powder	15.0
04	pH	7.0
05	D/W	1000ml

Microbial Culture: We have used two bacterial Bacillus subtillis, Escherichia Coli, and two fungal speciesAspergillusniger, Aspergillusflavus.

Table: Morphological Characterization:

Organisms	Size (µm)	Shape	Colour	Gram Nature
Bacillus subtilis	4-10	Rod-Shaped	White	+ve
Escherichia coli.	0.5-4	Rod-Shaped	Cream	-ve
Aspergillus niger	45-55	Sub-globes	Black	+ve
Aspergillusflavus	50-55	Radiate	Yellow Green	-ve

Methods:

Collection and preparations of plant material:

Leaves of Aloe *barbadenesis* were collected from the botanical garden of college of Agriculture Biotechnology, Hatta.

Collection of pathogens:

Microorganisms were isolate in the laboratory of CABT Hatta from soil and sewage water by growing on selective and then pure cultures were obtained from the isolate plate.

Preparations of plant extracts:

Fresh Aloe Vera were collected. The gel was extract from the levels using traditional Hand filleting procedure. 25 g of gel was chopped into pieces and grinded using morter and pestle. The gel was mixed with equal volume of distilled water and heated at 85^{o}C for 10 minutes. The mixture was filtered by using whattman filter paper no.1. The extract was stored 4^{o}C and used for further experiment.

Preparations of silver nitrate (AgNo3) solutions:

1m M silver nitrate solution was prepared by adding 0.0169gm AgNo3 in 100ml of distilled water.

Synthesis of silver Nanoparticles:

0.1M silver nitrate solutions was prepared in distilled water.20ml of the AgNo3 solutions was taken in a glass beaker and kept in magnetic stirrer for 15min at 65^{o}C 1ml of plant extract was added drop wise in different volume of AgNo3 solution with continuous stirring. The mixture was kept on magnetic stirrer for 15 minutes and Silver nitrate solutions keeping at incubation in dark for 24 hrs. To observe color change to reddish brown, change in color indicates synthesis of silver nanoparticles

The bioreduction of silver ions in aqueous solutions was monitored by periodic sampling of aliquots (3ml) and subsequently measuring UV-visble spectra of the solutions by using UV visible spectrophotometer.

Antimicrobial activity of Aloe *barbadenesis* and Silver Nanoparticles:

Antimicrobial activity of the silver nanoparticles either extract of Aloe barbadenesis. Leaves wasteasted by well diffusion method. Potato dextrose agar and Nutrient agar was prepared and poured 20ml each in petriplate of 9 cm diameter and allowed to solidify. A quantity of 0.1 ml from above over night grown micro-organisms containing approximately 10^{6}- 10^{8} CFU/Plate was used in Inoculums, spread over plate by spread plate method - one well of 6 mM size made in the Nutrient agar and PDA Plate with the help of sterile cork borer, the were located within 25, 50, and 100 micro liter of SNPs either extract of Aloe Vera leaves. Plates were incubated at 37^{o}C of 24 hrs. After incubation, the plate observed for the formation of clear zone of growth inhibition around the well presence of zone of inhibition indicates. Antimicrobial activity of the zone of inhibition was calculated by measuring the millimeter of zone around the well.

RESULTS

The results of this investigation are described below.

Yellowish- brown colour in the reaction vessels suggests the formation of silver nanoparticles (SNPs). The synthesis of SNPs had been confirmed by measuring the UV-Vis spectrum of the reaction media. The UV-

Vis spectrum of colloidal solutions of SNPs synthesized from Aloe *barbadenesis* have absorbance peaks at 360nm, 450 nm respectively and the broadening of peak. Indicate that practical's are poly-dispersed. Nanoparticles produced by Aloe Vera (Aloe *barbadenesis*).

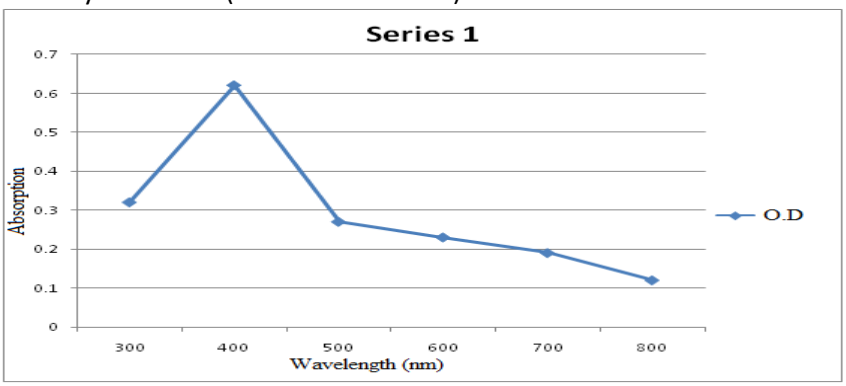

Fig: 3.1.1 Absorbance peak of silver nanoparticles synthesized by using *Aloe barbadenesis.*

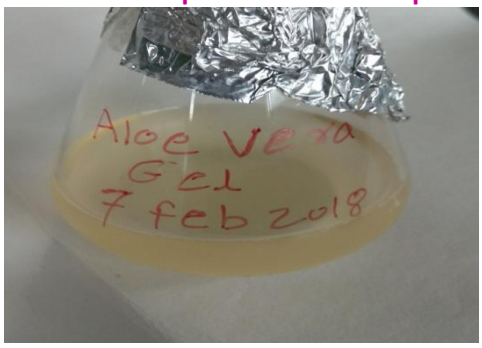

Fig: Aloe vera extract.

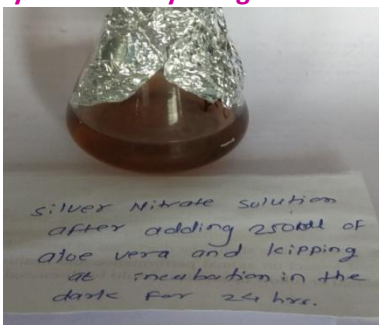

Fig: Silver nanoparticles.

Fig.3.3 Antimicrobial activity of silver nanoparticles on Aloe *Barbadenesis*

Fig: Zone of inhibition in *Bacillus subtilis.*

Fig: Zone of inhibition in *Escherichia coli.*

Fig: Zone of inhibition in *Aspergillusnigar*

Fig: Zone of inhibition in *Aspergillusflavus*

Table: Antibacterial and Antifungal activity of SNPs.

Sr.no	**Conc. Of AgNo3 nanoparticles from *Aloe barbadenesis***	**Zone of inhibition (mm)**			
	(µg/ml)	***B. subtillis***	***E.coli***	***A.niger***	***A.flavus***
1	25	12	11	19	15
2	50	16	16	20	19.1
3	100	22	20	29.1	26.2
4	Control	Nil	Nil	Nil	Nil

The synthesized silver nanoparticles were found effective against fungal species minimum effective conc. Was 100 µm/ml and maximum zone of inhibition was recorded in A. niger species which is 29.01mm where as in control no. zone of inhibition was observed.

OUTCOMES OF THE PROJECT

Development of antibiotic resistant or multi drug resistant pathogens is the serious problem in medical field at present investigation of new drugs is somewhat tedious and long terms job there for researchers for us in their research over synthesis of new drugs which are safe effective and reasonable. Aloe Vera plant is natures gift to humans which have strong antimicrobial properties.In present study Silvarnanoparticle were synthesized by using aloe Vera gel and there antimicrobial activities work observed. Such type of studies provides based for further research and prove helpful in the search of effective and reasonable drugs with no side effect. The production of nanoparticle was successful and activity shows in various research paper.

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INSECT PEST CONTROL WITH THE HELP OF SPIDERS IN THE ORANGE FIELDS OF WARUDTAHSIL, DISTRICT AMRAVATI, MAHARASHTRA STATE

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ABSTRACT :

Spiders are one of the most diverse animal groups in the World. Order Araneae is a large group of animals, which is commonly called as Spiders. Spiders are the creature which present in everywhere. Spiders are among the most abundant insectivorous predators of Terrestrial ecosystem.Spiders play a major role as bio-control agents of insect pests in all habitats. Spiders are carnivorous creature.Spider plays an important role in regulating insect pests in the Orange Fields.Considerably insect populations increases when release from predations by spiders. They are widespread and found in all types of habitats. They mostly feed on small insects, even though they may also feed on various large insects. Pesticides use is harmful and costly in Orange fields so now a day's spiders are use as natural and safe pest control agent in Orange fields.Spider's predatory capacity can have an effect in decreasing densities of insect pests, when they are used to balance the effect of insecticides and Pesticides.

If pesticides are avoided, spiders can consistently take shelter in the fields, feed on the pests and increase the productivity. The constant use of a wide range of pesticides has caused many side effects, like the problem of secondary pests, loss of biodiversityand Environmental Pollution.Spiders eat a large number of small creatures. During the survey in 2018-19, I have reported 131 Species belonging to 18 Families and 63 Genera of Spiders in Orange fields of WarudTahsil, District Amravati, Maharashtra State. Spiders of Families Araneidae, Clubionidae, Corinnidae, Eresidae, Gnaphosidae, Hersilidae, Linyphiidae, Lycosidae, Miturgidae, Oxyopidae, Philodromidae, Salticidae, Scytodidae, Sparassidae, Tetragnathidae, Theridiidae, Thomisidae and Uloboridae were recorded during the investigation.

Some spiders are the most effective Pests control agents. Spiders are importantPredatory group of biological control agents.Spiders are friends of farmer.

KEYWORDS : *Insect Pest, Orange fields, Spiders.*

INTRODUCTION

Spiders are one of the most diverse animal groups in the World. Spiders are the creature which present in everywhere. Spiders are among the most abundant insectivorous predators of Terrestrial ecosystem. Spiders play a major role as bio-control agents of insect pests in all habitats. Spiders are one of the most diverse animal groups in the World. Spiders are carnivorous creature. Spider plays an important role in regulating insect pests in the Agricultural Ecosystem. There are 42,339 spiders species are found all over the world in almost every kind of habitat.

Spiders mostly feed on insects, even though they may also feed on various other kinds of creatures. Considerably insect populations increases when release from predations by spiders. They are widespread

and found in all types of habitats. They are beneficial to human beings in the sense that they feed mostly on the pests of orange fields. A particular spiders as the giant crab spider has been known as an effective in controlling large insects and other insect pests found in the orange fields. Predatory arachnids such as spiders are an important group of biological control agents. The population densities and species abundance of spider communities in Orange fields can be as high as in natural ecosystems. Many uses of parasitic and predatory natural enemies to control Orange pests have been reported.They have usually been treated as an important biological control agent, because there isecological role of spiders in pest control. Use of chemical pesticides has killed natural predators in the Orange fields and also disturbing the natural fauna. Several toxic insecticides and pesticides are recommended to control pests in Orange fields. These chemicals insecticides and pesticides are destroying the vegetation.

MATERIAL AND METHOD:

A survey of Spiders was carried out in Orange Fields of Warud Tahsil, District Amravati during 2018-19. Spiders were collected from different areas of Orange Fields. For collection of spiders, Pit fall trapping, Direct searching,Collected Spiders by Insect nets, Beatingof steak and Umbrella method were used. The Spiders Specimens were identified according to Kaston spider book. The photographs were taken in different views, to get the clear eye position, shades of cephalothorax and abdomen, spines and hairs pattern.
The constant use of a wide range of pesticides has caused many side effects, the problem of secondary pests, the recovery of insect pests and Environmental Pollution. Spiders consume a large number of small creatures and do not injure vegetation.Spiders can not disturb natural vegetation.

Observation and Result:

During the survey in 2018-19, I have reported131Species belonging to18 Families and 63 Genera of Spiders in Orangefields of Warud Tahsil, District Amravati, Maharashtra State. Spiders of Families Araneidae, Clubionidae, Corinnidae, Eresidae, Gnaphosidae, Hersilidae, Linyphiidae, Lycosidae, Miturgidae,Oxyopidae, Philodromidae, Salticidae, Scytodidae, Sparassidae, Tetragnathidae, Theridiidae, Thomisidaeand Uloboridae were recorded during the investigation. For details I have arranging the data in a Table Format of systematic way.

Sr. No.	Family	Genera	Species
01	Araneidae	10	21
02	Clubionidae	01	02
03	Corinnidae	01	02
04	Eresidae	01	03
05	Gnaphosidae	06	13
06	Hersilidae	02	05
07	Linyphiidae	07	16
08	Lycosidae	08	17
09	Miturgidae	02	04
10	Oxyopidae	05	09
11	Philodromidae	02	03
12	Saltisidae	09	17
13	Scytodidae	01	02
14	Sparassidae	01	02
15	Tetragnathidae	01	02
16	Theridiidae	02	03
17	Thomisidae	03	08
18	Uloboridae	01	02
Total		**63**	**131**

CONCLUSION:

Spiders are used to balance the effect of insecticides and Pesticides. Spider's predatory capacity can have an effect in decreasing densities of insect pests. Some spiders are among the most effective predators of caterpillars and other pests. Some Spiders and Spider lings are main control agents of aphids. Due to destroying the pest or insects, spiders are friends of farmer. Most spiders feedon insects, productivity of Oranges gets increased. Spiders are important Predatory group of biological control agents. Spiders are important insect pests control in Orange Fields.

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BIOSYSTEMIC STUDIES ON MONIEZIA (B.) SUBHAPRADHAE N. SP. *PARASITIC IN CAPRA HIRCUS L. FROM PARBHANI DISTRICT JINTUR (M.S.) INDIA.*

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ABSTRACT :

Moniezia (B.) subhapradhae n.sp.is described morphologically, taxonomically and anatomically from the intestine of Caprahircus L. is differs from all known species of the genus in shape and size of scolex, shape of mature segments, in number, position and shape of testes, shape, size and position of ovary in shape and size, number, positionof interproglottidalglands in shape, size position of vitelline gland, in shape, size position of cirrus pouch and reported from the host.

KEYWORDS : *Moniezia (B.) subhapradhaen.sp, Capra hircus, Intestine, Jintur.*

INTRODUCTION

The genus *Moniezia* is erected by Blanchard (1891), as a type species *Monieziaexpansa* from *Ovisaries*. Skrjabin and Schulz (1937) divided this genus into three sub-genera:

1. Interproglottid glands grouped in rosette- *Moniezia*
II. Interproglottid glands arranged lineally-*Blanchariezia*
III. Interproglottid glands absent- *Baeriezia*

The present tapeworm, is similar in all characters, with sub genus *Blanchariezia* (Skrjabin and Schulz, 1937) having two species as *Moniezia*(Blancharizia) benedeni (Moniez 1979 and Skrjabin and Schulz, 1937) and *Moniezia*(*Blancharizia*) *pallida*(Monning, 1926).

Later on twenty six Species are added to this genus. The present communication, deals with description of new species *Moniezia(B.)subhapradhae*n.sp.

MATERIAL AND METHOD:

Fourteen cestodes were collected from the intestine of goat, *Caprahircus*.All were flattened fixed, preserved in 4% formaline, washed well with tap water, stained in Harri'shaematoxylene,dehydrated through various alcoholic grades and mounted in D.P.X., whole mount slides were prepared for further anatomical studies. Sketches were drawn with the help of camera lucida. All measurements are given in millimeters.

Descriptions:

All the cestodes were long, with thick musculature, scolex dome shaped, measures 1.70 - 0.72 mm in length and 0.136 - 0.049 mm in breadth; suckers 4 ,oval, muscular, in two pairs, overlapping to each to other, 0.053 - 0.029 in length and 0.048 in breadth; neck thick, Longer than breadth, musculature, 0.087 -

0.096in length and 0.063 - 0.038 in breadth; mature segment broader than long, squares in shape with double set of reproductive organs, 0.215 to 0.159 in length and 0.613 to 0.590 in breadth; testes 180 - 185 in number, oval in shape ,medium to small in size, scattered antero-posteriorly, distributed 2/3rd region of segments, situated in between longitudinal excretory canals, 0.102 in length, 0.045 in breadth; Cirrus pouch medium, elongated marginal, situated anteriorly from the middle of segment, reaches up to longitudinal excretory canal, 0.071 to 0.125 in length and 0.045 in breadth, cirrus thin, coiled tube, enclosed in cirrus pouch, 0.034 in length, 0.022 to 0.090 in breadth; vas deference thin, coiled, interiorly directed, 0.022 in length, 0.034 in breadth; ovary bilobed, flower shape, with irregular margin, obliquely placed, lateral side &mid region of the segment, 0.068 length, 0.213 breadth; vagina thick tube, coiled, situated posterior to cirrus pouch, opens into ootype, 0.124 - 0.122 length, 0.034 - 0.022 breadth, Ootype oval, 0.102 -0.0795 in length, 0.079 breadth; genital pore small, oval, situated 2/3rd anterior region of the segment; 0.079 - 0.056 length, 0.034 -0.035 breadth; Vitelline gland oval, post-ovarian, 0.068 - 0.045 in length &0.02 - 0.03 in breadth;interproglotid glands15-17 number, posterior,anterior margin of the segment,situated in each segment, lateral to excretory canal&0.102 in length, 0.045 breadth.

RESULT AND DISCUSSION

The genus *Moniezia*was erected by Blanchard 1891. The worm under discussion is having the scolex large, globular, mature segment broader, stout with blunt projection, testes medium, 180 - 185 in number, scattered anterior-posterior to segment, cirrus pouch medium, oval, interproglottidal glands, 15 - 17 in number, situated in central region, Vitelline gland medium, oval, with irregular margin.The present worm differs from*Monieziabenedeni* , which is having the mature segments broader than long, posterior segment fleshy, testes 500 in number, arranged in the form of triangles, ovary compact with acini, interproglittidal glands varying, narrow, short, in transverse row, cirrus pouch wide, short, oval,& reported fromthe host, *Equuscaballus*.The present cestode differs from *Moniezia* (B) *pallida,* which is having the mature segment squares, uterus external, dorsal, ventrally over excretory canal, interproglottidal glands varying in size and reported from the host, *Equuscaballus*.The tapeworm under discussion, differs from *Moniezia* (B) *aurangabadensis*which is having the scolex broader, testes, 1100 –1200in number, ovary bilobed, with acini, interproglottidal glands 12 - 15 in numbers, seminal vesicle oval and large, cirrus pouch small, cylindrical, Vitelline gland small, round, vagina posterior to cirrus pouch, reported from the host, *Ovisbharal*.The present worm differs from *Moniezia* (B) *bharalae*, which is having mature segment broader than long, testes, 190 - 220 in number, ovary compact, bilobed, interproglottidal glands in two rows, 38 - 44 in number, seminal vesicle elongated, fusiform, cirrus pouch small, oval,& reported from host*Ovisbharal.*The present cestode differs from *Moniezia* (B) *waranangarensis*which is having scolex large, globular, mature segments broader; testes 300-320 in number, distributed throughout the segment, in single field; ovary indistinctly bilobed, 13-15, with blunt acini, transversely elongated; cirrus pouch medium, oval, transversely elongated, slightly obliquely placed, extend beyond longitudinal excretory canal; interproglottidal glands 56 in number, medium, oval, & reported from the host,*capra hircus*.The present cestode differs from *Moniezia* (B) *kalawati*which is having squares scolex, mature proglottids broader, medium; testes172 in number small, oval, distributed throughout the segment;ovary medium, oval, short, irregularly arranged in the central width of segments and leaving space on each lateral side,& reported from the host,*Capra hircus.*The present worm differs from *Moniezia* (B) *murhari*which is having scolex squares, mature segment broader; testes 405-415 in number; cirrus pouch elongated anteriorly, ovary inverted, horse shoe shaped, indistinctly bilobed, each with numerous short, blunt, round acini; and 63 interproglottidalglands, reported fromthe host, *Capra hircus.*The Present worm differs from *Moniezia (B.) caprai* which is having the scolex is medium squarish with large 4 suckers, without rostellum; testes 255-260 in number ,oval, cirrus pouch is medium in size; ovary medium in size& kidney shaped.The present worm differs from *Moniezia (B) shindei* which is having scolex large, mature segment craspedote; testes 190-200 (195) in number, scattered all over segmentand ovary a single mass,large,oval; cirrus pouch oval, elongated in centre of the segment and vitelline gland large, oval, and internal to ovary.

The present cestode differs from *Moniezia (B.) hircusae*, which is having scolex large, mature segment big craspedote; testes 168 in number, medium, small, scattered in a single field; ovary large, oval , asingle mass, in anterior half of the segment ;and cirrus pouch in anterior 1/3rd region of the segment,interproglottidal glands 14-15 in number, large &oval.The present worm differs from earlier described *Moniezia (B.) rajalaensis*, in having scolex large, globular; mature proglottids,squarish,broader than long; testes 250-260 in number, medium scattered throughout proglottid cirrus pouch oval ; ovary large, horse shoe shaped interproglottidal glands 31-32 in number , large & oval. The present worm differs from *Moniezia (B.)aishvaryae* which is having testes small and 255-265 in number; ovary large mass cirrus pouch spindle shaped vitelline glandsquandrangular in shape interproglottidal gland 42-44 in numbers, and reported from the host *ovaries.*The present worm differs from *Moniezia(B.) maharashtrae*which is having scolex oval ,neck broader than long; mature proglottid four and half times broader than long ; testes 116 in numbers and interproglottidal glands 38 in numbers.The present worm differs from *Moniezia (B.) madhukarae* in having the scolex simple, elongated, necklong, mature segments, five to six times broader than long ; testes medium in size , oval, scattered posterior to segment , 210-240 in numbers, cirrus pouch oval ; vagina posterior to cirrus pouch , ovary butterfly shaped; and vitelline gland post ovarian.The present worm differs from *Moniezia (B.)mansureae* in having the scolex is small , globular with musculature , suckers 4 slightly overlapping to each other ; mature proglottids are broader than long; testes small, rounded and 160-170 in numbers; the cirrus pouch is large elongated and broader at opening; ovary compact somewhat oval ; vitelline gland oval, compact, and genital pore large in size , elongated coarse like and belly shaped and marginal; vas deferense is thin& straight tube.The present cestode differs from earlier described Moniezia *(B.) govindae* in having scolex large , globular; mature proglottids big, crospedote; testes 100-140 in numbers, medium scattered throughout proglottids; ovary large compact shaped,cirrus pouch elongatedinterproglottidal glands 40-42 in number , large &oval .

The present cestode differs from *Moniezia (B.)babai* in having scolex globular , elongated; testes 190 -220 in numbers; cirrus pouch oval, ovary compact & rounded.The present tapeworm differs from *Moniezia (B.)ovisae*in having testes 155-165 in numbers; cirrus pouch and ovary compact.The present worm differs from *Moniezia (B.) interproglottina* in having the scolex rectangular, suckers are oval to rounded, arranged in two groups; mature proglottids square, testes small, rounded and 40-45 in numbers; cirrus pouch is cylindrical asdifference is thin coiled tube; ovarybilobed , inverted 'U' shaped; vitelline gland is oval , compact genital pore marginal; and the interproglottidal glands are arranged in two rows &25 in each row.The present worm differs from*Moniezia (B.) orientalis* in having scolex simple, oval , muscular, suckers 4, oval to rounded, arranged in two groups; mature proglottids4-5 times broader than long; testes small, rounded and 35-40 in numbers; cirrus pouch cylindrical; ovary bean shaped, vitelline gland is oval, compact and genital pore marginal; vas difference is thin straight tube; the interproglottidal glands are arranged in two rows, 16-18 in numbers (8-9in each row.

The present worm differs from *Moniezia (B.)marathwadensi,* in having scolex simple, almost quadrangular, with rounded suckers, neck long, slightly narrow than scolex;mature proglottid broader than long; testes small, oval, 125-130 in numbers; cirrus pouch large, elongated, thin tube, straight; vas deferense slightly curved, thin; ovary compact, with numerous blunt acini; vagina thin tube, posterior to cirrus pouch ,receptacle seminal broad, opens in ootype rounded, medium; vitelline gland post ovarian, medium, rounded; excretory canal paired, interproglottidal glands 50-52 in numbers &situated in double rows.

The present worm differs from *Moniezia (B.)punensi,* in the number of testes 110-120; and in the number of interproglottidal gland 18-22.

The present worm differs from *Moniezia (B.)warudensis*in the number of testes 241-256; in the shape of ovary compact; and in the number of interproglottidal gland 30-35.

The present worm differs from *Moniezia (B.)parbhaniensis*which is having scolex squares; in the number of testes 240-246; ovary bilobed interproglottidal gland 27-30.

The present worm differs from *Moniezia (B.)nagaonensis,* testes 185, ovary horse shoe , and in the number of interproglottidal gland 33-37.

The present worm differs from *Moniezia (B.)bhalchandrai n. sp.* Which is having scolex medium, quadrangular, broad anteriorly & narrow posteriorly, sucker 4, without rostellum, neck medium; mature segment broader than long, with double set of reproductive organs; testes 196-200 in number; ovary medium, inverted cup shaped; vagina thin tube, posterior to the cirrus pouch,receptacular seminal large, spindle shaped, ootype small, rounded, genital pore bilateral, medium ,oval,longitudinal excretory canal wide; vitelline gland large, oval & gravid proglottid large, rectangular with numerous round eggs & interproglottidal glands 13-14 in number.

From the above discussion it is clear that, the species under discussion is new to science and differ from the known valid species of the genus *Moniezia* in respect to taxonomic characters. Hence the species is named as *Moniezia (B.) subhapradhae*n.sp.is proposed in honourof Dr. Subhapradhae C.K. Who is Eminent Helminthologist?

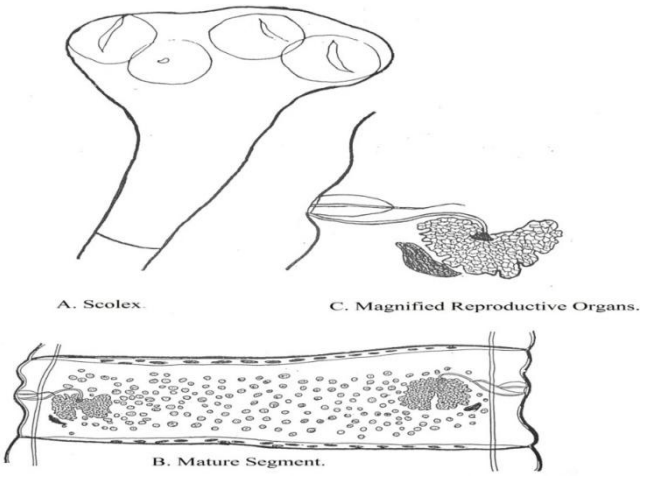

Fig 1: A. Scolax, B. Mature Segment, C. Magnified reproductive organs

Taxonomic summary

Genus:*Moniezia (B.)subhapradhae sp.Nov.*
Host:*Capra hircus*.
Habitat: small intestine.(Goat)
Locality: Jintur Dist.Parbhani, M. S. India.
Type of specimen: Holotype ,Paratypesare Deposited in Helminthology Laboratory Department of Zoology.S. M. D. M. College, Kallam, Dist. Osmanabad,M.S.India.

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SUSTAINABLE DEVELOPMENT AND CLIMATE CHANG: IN THE CONTEXT OF FISHERY INDUSTRY

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ABSTRACT :

Fish is a particularly important resource for people living in developing countries. First, fish is an important food for combating undernourishment and malnutrition as it contains unique nutrients. Second, artisanal fishery provides employment and a livelihood for millions of families. However, overfishing and unsustainable management practices have meant that nearly 90 per cent of fish stocks used worldwide are considered to be overfished or exploited up to sustainability limits. Some 59.9 percent of the major commercial fish species that FAO monitors are now being fished at biologically sustainable levels. By 2050 humans will face the challenge of having to provide food and livelihoods to a population likely to exceed nine billion people. This challenge is well reflected in the United Nations Agenda 2030 for Sustainable Development, a global commitment to end poverty and hunger and to ensure that economic, social and technological progress occurs in harmony with nature, through the sustainable management of natural resources. Climate change affects communities and livelihoods in fisheries and aquaculture, and efforts to adapt to and mitigate climate change must therefore be human centred. Climate adaptation strategies must emphasize the need for poverty eradication and food security, in accordance with the Paris Agreement, the United Nations 2030 Agenda for Sustainable Development and other international instruments, such as the Voluntary guidelines for securing sustainable small- Scale fisheries in the context of food security and poverty eradication. Predictions of the future impact of climate change on the poverty and vulnerability of fisheries and aquaculture arise out of climate change models, which indicate, for example, increased fish productivity at high latitudes and decreased productivity at low- and mid-latitudes, with considerable regional variations. By 2050, total maximum catch potential globally has been projected to decrease under climate change by 2.8 percent to 5.3 percent under representative concentration pathway (RCP) 2.6 and by 7.0 percent to 12.1 percent under RCP8.5 from present yields, but with substantial variability across national exclusive economic zones. This papers aimed is explore the effects of climate change on fishery industry in the context of Indian economy, also how much important for sustainable development of natural water resources.

KEYWORDS : *Sustainable Development, Climate change, Scenario.*

INTRODUCTION

Fisheries and aquaculture play a key role in provision of food security and livelihoods of millions of people for their social, economic and nutritional benefits. The sector is crucial in numerous coastal, riverine, insular and inland regions, with fishing- and aquaculture-dependent people often located in places that are at particularly high risk of extreme events. There has been a major expansion in fish production, trade and consumption over the last decades, but more recently, while still expanding, a slowdown in growth rates is being experienced. The sector is globalized through trade, but production (especially in the case of inland

fisheries and aquaculture) is concentrated in certain countries/regions. Developing countries, in particular in Asia, have a growing share of production and trade, with a high percentage of small-scale/artisanal fishers and fish farmers playing a part.

Fish is a particularly important resource for people living in developing countries. First, fish is an important food for combating undernourishment and malnutrition as it contains unique nutrients. Second, artisanal fishery provides employment and a livelihood for millions of families. However, overfishing and unsustainable management practices have meant that nearly 90 per cent of fish stocks used worldwide are considered to be overfished or exploited up to sustainability limits. Some 59.9 percent of the major commercial fish species that FAO monitors are now being fished at biologically sustainable levels, while 33.1 percent are being fished at biologically unsustainable levels-a situation that SOFIA 2018 describes as "worrying." (The other 7 percent are under fished). Just 40 years ago, 90 percent of FAO-monitored fisheries were being utilized at biologically sustainable levels, and just 10 percent were being fished unsustainably. These trends do not necessarily mean that no progress has been made toward achieving Sustainable Development Goal 14, which calls on the international community to effectively regulate fish harvesting end overfishing, illegal fishing, and destructive fishing practices, and to implement science-based management plans aimed at restoring stocks. India on Monday assured the ongoing climate change conference at Katowice in Poland that the country is committed to meeting its climate goals. In 2015, the country, as part of the requirement ahead of the finalisation of the Paris Agreement, listed a series of specific actions it would take to fight climate change. One of the important promises that India made was that it would create 2.5 to 3 billion tonnes of additional carbon sinks through extensive afforestation. This papers aimed is explore the effects of climate change on fishery industry in the context of Indian economy, also how much important for sustainable development of natural water resources.

Present Scenario and Policy Framework Regarding Climate Change:

Parliamentary Union (IPU) and participated in all meetings, he said. We cherish our relationship and engagements with the IPU family, Climate change is disturbing the natural ecosystems and is expected to have substantial adverse effects in India, mainly on agriculture (on which 58 per cent of the population still depends for livelihood), water storage in the Himalayan glaciers which are the source of major rivers and groundwater recharge, sea-level rise, and threats to a long coastline and habitations, floods, and droughts. These in turn will impact India’s food security problems and water security. As per the Second National Communication submitted by India to the UNFCCC, it is projected that the annual mean surface air temperature rise by the end of the century ranges from 3.5°C to 4.3°C, whereas the sea level along the Indian coast has been rising at the rate of about 1.3 mm/year on an average. These climate change projections are likely to impact human health, agriculture, water resources, natural ecosystems and biodiversity. Concerned of the threats imposed by climate change and pressures on centre stage in the Indian policy domain. India has been part of 94 multilateral environmental agreements. India has also voluntarily agreed to reduce its emission intensity of its GDP by 20-25 per cent over 2005 levels by 2020, and emissions from the agriculture sector would not form part of the assessment of its emissions intensity. Indian economy is already moving along a lower carbon and sustainable path in terms of declining carbon intensity of its GDP which is expected to fall further through lower carbon strategies. It is estimated that India’s per capita emission in 2031 will still be lower than the global per capita emission in 2005 (in 2031, India’s per capita GHG emissions will be under 4 tonnes of carbon dioxide equivalent (CO 2 eq.) which is lower than the global per capita emissions of 4.22 tonnes of CO2 eq. in 2005). Together with the national efforts in different sectors, India also recognises that rural areas are equally prone to stress and pressures from natural resource exploitation. In this context, schemes for rural development and livelihood programmes are very relevant. A vast majority of the works under the Mahatma Gandhi National Rural Employment Guarantee Scheme (MGNREGS) are linked to land, soil, and water. There are also programmes for non- timber forest produce-based livelihood, promotion of organic and low-chemical agriculture, and increased soil health and fertility to sustain agriculture-based livelihoods. These schemes help mobilise and

develop capacities of community institutions to utilise natural resources in a sustainable manner and their potential can be further developed. Along with efforts to incorporate sustainability in the rural development process, India is increasingly making efforts to integrate the three pillars of sustainable development into its national policy space. In fact, environment protection is enshrined in our Constitution (Articles 48 A and 51A]). Various policy measures are being implemented across the domains of forestry, pollution control, water management, clean energy, and marine and coastal environment. Some of these are policies like Joint Forest Management, Green Rating for Integrated Habitat Assessment, Coastal Zone Regulation Zone, Eco Labelling and Energy Efficiency Labelling, Fuel Efficiency Standards etc. Over a period of time, a stable organisational structure has been developed for environment protection.

India and Climate Change:

India's concerns and actions towards climate change appear in its policies by early 1997 itself when it officially accepted the idea of sustainable development. Since then, several sectoral initiatives have been taken by the country. By 2008, India had launched its eight national missions on climate change. Over the time, India has not only played a very dynamic role at the international fora but it has also taken appreciable domestic efforts in this direction**.**

NAPCC: A major component of India's domestic actions against climate change is the National Action Plan on Climate Change (NAPCC). In March 2016, the PM's Council on Climate Change (PMCCC) directed the missions under the NAPCC to enhance their ambition in respect of adaptation, mitigation and capacity building and reprioritize them, besides recommending the setting up of some *new missions* in addition to the existing eight:

1. Considering the adverse impacts that climate change could have on health, a new 'Mission on Climate Change and Health' is currently under formulation and a National Expert Group on Climate Change and Health has been constituted.
2. The proposed 'Waste-to-Energy Mission' will incentivize efforts towards harnessing energy from waste and is aimed at lowering India's dependence on coal, oil and gas for power production.
3. The 'National Mission on Coastal Areas' (NMCA) will prepare an integrated coastal resource management plan and map vulnerabilities along the entire (nearly 7000-km-long) shoreline.
4. The 'Wind Mission' seeks to increase the share of wind energy in the renewable energy mix of India. It is likely to be given an initial target of producing about 50,000–60,000 MW of power by the year 2022.

India's Effort to Counter Climate Change:

1. India is the world's third largest economy and fifth largest greenhouse gas (GHG) emitter, accounting for about 5% of global emissions. India's emissions increased 65% between 1990 and 2005 and are projected to grow another 70% by 2020.
2. By other measures, India's emissions are low compared to those of other major economies. India accounts for only 2% of cumulative energy-related emissions since 1850. On a per capita basis, India's emissions are 70% below the world average and 93% below those of the United States.
3. India is also at the frontlines of facing the impacts of climate change. Shifting rainfall patterns, recurring floods, stronger cyclones and droughts or soil erosion are exacerbating the challenge of poverty eradication and necessitate the allocation of scarce national resources for preventing loss of human life.
4. Despite resource constraints, India is undertaking ambitious actions to undertake adaptation and mitigation actions, including thorough lowering of the energy intensity of our economic growth, increasing energy efficiency across sectors and making greater use of renewable.
5. India has doubled the Clean Energy Cess on coal, which very few countries have, and the Clean Energy Fund already has over 3 billion US dollars to be used for promoting clean technologies.

6. India's National Solar Mission is being scaled up five-fold from 20,000 megawatts to 100,000 megawatts. This will mean an additional investment of 100 billion dollars and savings of about 165 million tonnes of CO2 emissions per year.
7. India is releasing 6 billion US dollars in one go for intensive afforestation which will result in more carbon sinks.

Outlook for the Future:

The year 2015 has been commendable regarding world's actions towards environmental protection and climate change. We see the world agree to a common framework on climate change and a set of SDGs in a single year was indeed a monumental achievement. In this regard, there will two important challenges in front of the India:

1. Mobilization of the funds for realizing the bold targets envisaged under both; and
2. Need of a clear action plan for implementation.

Budgetary sources of the countries (especially, in case of the developing countries) will not be sufficient enough for the successful implementation of the Paris Agreement, the SDGs and the ambitious targets set out in the INDCs. Looking at the size of funds which will be needed to realise these goals, the experts have advised to mobilise all channels in this regard; private finance, public finance-both national and international.

CONCLUSION:

Fisheries are a major source of food for the majority of poor and vulnerable communities in developing countries. The sector also provides jobs to many men and women and is one of the most traded food commodities in the region. Fish trade supports economic growth processes in developing countries in general, by providing an important source of cash revenue to service international debt, funding the operations of national governments, and importing food for domestic consumption, thus contributing to national food security and diversification of diets. However, climate change poses a significant threat to fisheries in the region. The potential impacts of climate change on fisheries are categorized as physical and biological changes: physical changes include water surface temperature rise, sea level rise, increasing water salinity and ocean acidification; biological changes include changes in primary production and changes in fish stock distribution. Such changes could lead to disruptions in the food chains of aquatic flora and fauna, habitat destruction, depletion in food stock and prey-predator composition, destruction of coastal fish landing, and risk to processing and marketing sites.

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ON THE OCCURRENCE OF *BOLBITIS PRESLINA* (FEE) CHING. IN HIRANYKESHI HILLS, AMBOLI, SAHYADRI HILLS, WESTERN GHATS, MAHARSHTRA STATE, INDIA

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ABSTRACT :

The auther are engaged in the study of fern of the Sahyadri hills in weastern ghats of Maharshtra state, India.During studies on ferns of the weastern ghats Maharashtra. A Bolbitis species with dimorphic fronds was recorded as a new record for Maharashtra. It was collected from origin of Hiranykeshi hills, Amboli and identified as Bolbitis preslina (Fee) Ching.

KEYWORDS : *Bolbitis, dimorphic fern, Sahyadri hills, Weastern ghats, India*

INTRODUCTION

The fern genus *Bolbitis* is characterized by dimorphic fronds, forked, free or anastomosing venation and compressed fertile fronds. Various species of *Bolbitis* are common in the Western Ghats of South India (Anamalais and Kerala Ghats, Ponmudi hills, Munnar hills, Sabarimalai, rare on the Tirunelveli Hills) (Beddome 1863, Manickam& Irudayaraj 1992, Nayar & Geevarghese 1993, Chandra 2000, (Neel et al, 2018). Fern flora of Maharashtra have not been botanically explored at all or very cursorily explored as can be judged from the works of Dalzell and Gibson (1861), Blatter and Almeida (1922), Mahabale and Kamble (1981), Manickam and Irudayaraj (1992) Rathod et al.(2009) Pardeshi (2009), Rathod and Pardeshi (2010), Neel et al, (2018)etc.

The present authors are engaged in studies of the fern diversity of the Sahyadri Hills of the Western Ghats further north in Maharashtra State. During the course of botanical exploration in the Sahyadri Hills, Kolhapur District, a few specimens of Bolbitis were collected.

Checking the morphology and taxonomy of the specimens revealed that they belong to the species in *Bolbitis preslina* (Fee) Ching. the present communication is intended to place on alrady recorded in the occurrence of *Bolbitis preslina*(Fee) Ching.By (Sachin Patil et.al. 2012 &Neel et al, 2018)in the Hiranyakeshi river, Sahyadri Hills of Western Ghats in Maharashtra state.

Hiranyakeshi is situated in Amboli hills in Sahyadri ranges. The HiranyakeshiRiver is a originating in the Amboli,Western Ghats in the Sindhudurg district of Maharashtra.

Sindhudurg district is situated between latitudes 15.37 and 16.40 North and longitudes 73.19 and 74.18 East. It is bordered by the Arabian Sea on the west and Sahyadri hill ranges to the east with a total area of 5,207 sq.km. Sindhudurg is part of the Konkan region of Maharashtra located on the west coast of Indian Peninsula. The district has been endowed with great natural beauty with its long beautiful seashore, picturesque mountains and lush green forests. The minimum and maximum temperature ranges from 16.3-33.8^{0}c. On an average it receives an annual rainfall of 3287mm.

Amboli lies in the Sahyadri Hills of Western India, one of the world's "Eco Hot-Spots" and it abounds in unusual flora and fauna. However, as in the other parts of the Sahyadri Hills, denudation of the forest cover and unregulated government-assisted development are gradually ruining a once-pristine environment The highest fern species collected from Amboli area. The major localities in Amboli area that shows high diversity of ferns are Hiranyakeshi, Mahadev point, Kawle sad, Amboli ghats. Major fern species in *Osmunda, Bolbitis,Lygodium,Pityrogramma, Pteris,Cheilanthes, Adiantum, Adiantum, Pteridium, Lindsaea, Athyrium, Athyrium, Tectaria, Asplenium, Asplenium, Blechnum, Stengogramma, Pyrrosia, Microsorium* etc. are present in Amboli. Comparatively many fern species are collected from Amboli area It is observed during exploration that- diversity of fern species goes on decreeing as we go from lower side of hills to the top or at high altitudes.

TAXONOMICAL ACCOUNT

Bolbitis perslina(Fee.) Ching in C.Chr.,Index Fil.Supple.III:49,1934;Nayar & Kaur, Bull. Nat., Bot. Gdn. Lucknow 88:53,1964 *pro-parte*; Dixit Census 162, 1984; Irudaya- raj & Bir, Indian Fern. J.14:114, 1997; Chandra S., FI 235, 2000. *Heteronevron preslianum* Fee, Hist. Acrost. 92 t.39f-1 1845. *Paecilopteris preslina* (Fee) Bedd.,FBI t. 269, 1868.*Gymnopteris preslina* (Fee) J.Sm.in Bedd.,Handb.439, 1883 *pro-parte*.
Plant creeping, ca 20-47 cm tall. Rhizome creeping, scaly, scales dark brown, ovate -lanceolate, 4 x1 mm, entire, acute. Fronds bipinnatly compound, tufted; stipes sterile stramineous to grey, rounded abaxially, adaxially grooved, ca 14 –24 cm, sparsely scaly, 3x1 mm long; rachis sterile dark grey, narrowly winged, ca 10-25 cm, less scaly than the stipe; sterile leaflet opposite, shortly stalked, 9-10 pairs, oblong-lanceolate, acuminate both sides, 2-6.2 x 0.2-0.8 cm, glabrous on both the surfaces, apex acute, base cuneate, margin entire, venation anastromosing at the right angles, two pairs of opposite veinlets which meet at an acute angles from which proceed a veinlets which is either free or joined to the veins above marginal veins free terminating in a dot within the margin. Fertile frond ca26-48 cm; stipe stramineous to grey, adaxially grooved, ca 18-28 cm, pinnae opposite, sessile, 8-9 pairs, 2.5 x 0.5 cm, apex rounded, margin entire, lower surface is distributed sori, upper surface is glabrous. Sori naked; sporangia 103.4 x 51.7 µ.

DISTRIBUTION AND OUR SPACIAL COLLECTIONS NOTE:

Very rare, deepforest River shore or bank, small house flies like insectsare alwaysassociated with this plant. Strictly lithophytic, Hiranyakeshi is situatedat16°11'N latitude and 74°40'E longitude, Amboli, Sindhudurg district ofMaharashtra state, India.

Exsiccata-V.N.Rathod-Hiranyakeshi, 320.

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SOCIO-ECONOMIC STATUS OF FISHERMEN OF KALAMNURI RESERVOIR, HINGOLI DISTRICT MAHARASHTRA

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ABSTRACT :

The Kalamnurireservoir is small sized reservoir of about 134 ha area, constructed near Puyana village Tq. Kalamnuri Dist. Hingoli in 1963. The Kalamnuri reservoir lies in between 19°-18' N latitude and 77°-17'E longitude. The present work was mainly undertaken to investigate Socio-economic Status of Fisher communities, Caste and tribe and their population, Involvement of fisherwomen in fishing, Housing, Educational status, Modern facilities, Wages and Income. The present work was mainly undertaken to investigate Socio-economic status of Kalamnuri reservoir for a period of 2 years during June 2010 to May 2012 and it is first effort in this direction from this reservoir.

KEYWORDS : *Reservoir fishery, Socio-economic status, Kalamnuri reservoir.*

INTRODUCTION

India's inland resources are important source of food and provides employment to sizeable sections of the society in rural area. The kalamnuri reservoir is small sized reservoir of about 134 ha area, constructed near Puyana village Tq. Kalamnuri Dist. Hingoli in 1963. The Kalamnuri reservoir lies in between 19°-18' N latitude and 77°-17'E longitude. The present work was mainly undertaken to investigate various aspects of Kalamnuri reservoir like Fisher communities, Caste and tribe and their population, Involvement of fisherwomen in fishing, Housing, Educational status, Modern facilities, Wages and Income.The present work was mainly undertaken to investigate Socio-economic Status of Kalamnuri reservoir for a period of 2 years during Jun 2010 to May 2012. On Kalamnuri Reservoir, Dongargoanpool Fish Co-operative society, DongargoanpoolTq. Kalamnuri Dist. Hingoli was working on this reservoir having 55 members belongs to Caste Andh, Bhoi, and Muslim. The Bhoi caste members were 38, Muslim caste members were 14 and Andh Caste members were 03. It was firstly reported that during study period only 10-14 active fishermen of the fish co-operative society belonging to village Dongargaonpool and town Kalamnuri were involved in fish catch.

MATERIAL AND METHODS

For the study ofSocio-economic Status of Fisher communities ofKalamnuri reservoir, the data was collected by the survey to visit the, fisher communities on the reservoir. The data on Fisher communities, Caste and tribe and their population, Involvement of fisherwomen in fishing, Housing, Educational status, Modern facilities, Wages and Income. was collected by questionnaires and photography from active fisherman during Jun 2010 to May 2012 and the data was analyzed.

RESULT AND DISCUSSION

Dongergaonpool fish co-operative society was working on Kalamnuri reservoir since 1974. During the period (1974-2010), the Fish Co-operative Society members were increased up to 55.The Fish Co-

operative Society belongs to Caste Andh 3 members, CasteBhoi 38 members, and Caste Muslim 14 members. The fish catch obtained from Kalamnuri reservoir was marketed by the fishermen of Dongargaonpool fish co-operative society into the Kalamnuri fish market and the huge catch of dried weed fishes and small sized fishes to the Wholesaler on the reservoir itself.

It was observed in Kalamnuri reservoir fish market system that, 04 to 05 groups of fishermen having 2-3 member fishermen of the fish co-operative society in each group had made tie-up or agreement with 04 different fish retailers for fish sale. i.e. whatever the fish catch harvested in a day by a particular group of fishermen was marketed to the fixed fish retailer on the site of reservoir on credit basis. These retailers collect the harvested fish catch between 10.30 am to 11.30.am. During the study period, it was observed that out of 04 fish retailers 03 were the members of the working fish co-operative society ofKalamnuri reservoir and was involved only in fish marketing process and not in fish harvesting.

a. Fishermen caste and tribe and their population:

The members of the Dongergaonpool fish co-operative society working on Kalamnuri reservoir belongs to village Dongergaonpool and Kalamnuri. 25 Bhoi caste fishermen belongs to village Dongergaonpool and 03 Andh caste fishermen, 13 Bhoi caste fishermen and 14 Muslim caste fishermen belongs to town Kalamnuri. During study period only 10-14 active fishermen of the fish co-operative society belonging to village Dongargaonpool and town Kalamnuri were involved in fish catch.

Table 1 Distribution of active fishermen according to age group of Kalamnuri

Sr. No	Age group	Fishermen number	Percentage
1	21-30	02	14.28%
2	31-40	08	57.14%
3	41-50	02	14.28%
4	51-60	02	14.28%

Table 2 Caste wise details of active fishermen of kalamnuri reservoir

Sr.No	Caste	Total	Percentage
1	Andh	01	07.20 %
2	Bhoi	06	42.80 %
3	Muslim	07	50.00 %

b. Involvement of fisherwomen in fishing:

As on Kalamnuri reservoir all fishermen involved in fishing and there was no remarkable involvement of fisherwomen found in fishing and fish marketing in kalamnuri reservoir fishery.

c. Housing:

The active fishermen involved in fishing belong to village Dongergaonpool and Kalamnuri. The house of fishermen present in Dongergaonpool and Kalamnuri are small sized and made up of stone bricks and clay where as few fishermen houses were hut like structure. The fishermen belongs to village Dongergaonpool daily comes to reservoir by bus where as fishermen of Kalamnuri comes on bicycle or by walking to kalamnuri reservoir. There was no any permanent house or hut is constructed by the fishermen around the reservoir. However, in the peak fishing period (December to March) a temporary shade was constructed to take rest at afternoon.

d. Educational status and educational facilities:

During the study period it was observed that most of members of the society were moved away from fishing process and involved in other works like labor work, brick construction, farm working as an of

the main reason to provide educational facilities to their children. The educational facilities for education are present at village Dongergaonpool as well as at town Kalamnuri.

It was found that out of 14 Active fishermen 13 fishermen were literate, able to read and write where as only one fishermen was illiterate. In the literate 13 fishermen 10 fishermen have taken the education up to 6th class, 2 fishermen were educated up to 10th class and only one fishermen was educated up to 12th class.

The educational status of fishermen of caste Bhoi, Andh and Muslim is very worst. All the fishermen were illiterate. The male Childs of fisher community were going to school but the fisher community of Kalamnuri reservoir has no any positive attitude towards the female child education.

e. Fishing license:

The main objectives of the fishermen's fish co-operative society was collect the tender cost amount and fish seed purchase amount and transport amount. The Dongergaonpool fish co-operative society charges Rs 1000/year as license fees for fishing in Kalamnuri reservoir to the society member or non member fishermen. This policy was launched due to financial problem of the co-operative society since from many years.

Only those members who were able to pay Rs 1000/year as fishing license fees towards the secretary of the society were allowed for fishing in the Kalamnuri reservoir..

f. Fishing wages and Income:

It was observed that the fulltime fishing activates were started after Dipwali festival i.e. from November up to may ending and 1 to ½ months in monsoon season. The active fishermen were allowed to sale their fish catch to the local fish merchant or middlemen. The fishermen of Kalamnuri reservoir sale their fish catch to 4 to 5 middle men or fish merchants on the site of reservoir at morning 10:30 am to 11:30 pm. There is a fix contract for fish purchase between a particular fishermen and a particular middlemen i.e. one middlemen purchase the catch of one or two particular fishermen and not of others Due to such type of contract there is assurance of fish sale on reservoir site to fishermen and there was very less fluctuation in fish price of purchase. The price fluctuation in observed according to the season i.e. in winter season fish sale and fish purchase price was high as compare to summer season and monsoon season.

The fish co-operative society collects fishing commission as Rs 5/kg from fishermen.

Table .3 Fish Sale price at the site of Kalamnuri reservoir.

Sr. No.	Fish catch	Fish Sale rate in Monsoon season	Fish Sale rate in Winter season	Fish Sale rate in Summer season
1	Fishes larger than 1kg	Rs 35-40/kg	Rs 45-45 /kg	Rs 35-40/kg
2	Fishes smaller than 1kg	Rs 30-35/kg	Rs 35-40/kg	Rs 30-35/kg

Source; Data collected in Interviews with fishermen of Kalamnuri reservoir

Table 4 Wages to active fishermen of Kalamnuri reservoir

Sr. No	Fish catch	Wages/income in Monsoon season	Wages/income in winter season	Wages/income in Summer season
1	Fishes larger than 1kg	Rs 30-35/kg	Rs 35-40 /kg	Rs 30-35/kg
2	Fishes smaller than 1kg	Rs 25-30/kg	Rs 30-35/kg	Rs 25-30/kg

Source; Data collected in Interviews with fishermen of Kalamnuri reservoir

g. income to Fishermen:

As every active fisherman are engaged in fishing for duration July to August and November to May of every year. The catch obtained in the month of July, August is abundant, and the fishes are of large size

ranges from 1 kg to 5 Kg Generally every fisherman gets a catch of 250 to 300 kg in monsoon season (July and August) where as 650 to 900 kg in winter season (November to May).

Table 5 Average Income of each fisherman of Kalamnuri reservoir.

Sr. No	Year	No of Fisher population	Total fish catch in Kg by fishermen	Average fish Sale amount in Rs	Weed fish sale in Rs	Average wages/income to per fishermen in Rs
1	2010-2011	10	11862	385515	12000	39751
2	2011-2012	14	12400	403000	13000	29714

Source; Data collected in Interviews with Secretary of the fish Co-operative society of Kalamnuri

h. Modern facilities

It was observed that only a single temporary open shade was present near the embankment of Kalamnuri reservoir to take rest during harvesting season. 1 to 2 fishermen having bicycle, used to transport the fish from reservoir to Kalamnuri fish market. 2 to 3 fisher were having mobile phone sets.

DISCUSSION: As productivity is concerned, Kalamnuri reservoir has good productivity , therefore there is wide scope for the development of the fishery sector in this reservoir and also be the best option for application of Pen-culture, Cage Culture methods. Kalamnuri reservoir was characteristically loaded with variety of weeds, located in all corners of the a numerous quantity of the filamentous algae on the bottom and the coastal rocks and stone reservoir. Naturally the Kalamnuri reservoir support the weed fish occurrence and establishment, hence, in the existing situation of flood water loss from the reservoir, along with the weed fishes, the new trend of catfish development, Murrel culture could be established through cage culture and pen culture practice as compared to current practice of IMC stocking which will definitely helpful in socio-economic upliftment of fisher community.

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Photo No. 1
Sun drying of Harvested Fish Catch contian weed fish in major at Kalamnuri Reservoir (Photo no. 1- 3)

Photo No. 2

Photo No. 3

Fishermen taking rest at afternoon in temporary shade durig peak fishing at Kalamnuri Reservoir

Air filled rubber tubes Used as Crafts in Fish Harvesting in Kalamnuri Reservoir.

PLATE - 14

REVIEW OF RESEARCH
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COMPARATIVE STUDIES ON ANTIBIOTIC RESISTIVITY 0F ISOLATED *ESCHERICHIA COLI* FROMCLINICAL & NON-CLINICAL SEWAGE WATER SOURCES OFGUHAGAR REGION, RATNAGIRI DISTRICT

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ABSTRACT :

Scientific studies on clinical and non-clinical Sewage waste water for the purpose of isolation of antibiotics resistance bacterial species especially E.coli strain. We have used important antibiotics like Tetracycline, streptomycin,ampicillin, Penicillin, Nitrofurantoin etc as per NCCLS criteria. During our lab work and we have analyzed that the sample from clinical sewage source shows resistance to most of the antibiotics whilesample from non-clinical sewage sources shows susceptibility to most of the antibiotics. By this study we can easily highlighted the current scenario of an ***antibiotic resistivity****because Antibiotic resistivity of E.coli is one of the today's major problem.*

KEYWORDS : *Clinical and Non clinical Sewage Samples, Antibiotics,E.coli.*

INTRODUCTION

Antibiotic resistance in bacteria is a growing problem among humans and wildlife in terrestrial or aquatic environments. In this respect, the spread and contamination of the environment, especially through "hot spots" such as hospital wastewater and untreated urban waste water is a growing and serious public health problem. Antibiotics have been polluting the environment since their introduction through human waste(medication, farming), animals and the pharmaceutical industry.Due to exposure of bacteria to the antibiotic waste, in many bacteria there is introduction of antibiotic-resistance. *Escherichia coli* is a member of the family enterobacteriaceae. It is abbreviated as *Escherichia coli* is named after its discovery, Theodor Escherich, a German pediatrician and bacteriologist. *Escherichia coli* is residual microorganism present in colon region of intestine and has an important role in the proper digestion of food as well as in immunity system. *Escherichia coli* is a gram negative short bacillus 1-3 um long and 0.42-0.7 um broad, motile and spore forming.

As bacteria replicate quickly, the resistant bacteria that enter the environment replicate their resistance genes as they continue to divide. In addition, bacteria carrying resistance genes have the ability to spread those genes to other species via horizontal gene transfer. Therefore, even if the specific antibiotic is no longer introduced into the environment, antibiotic-resistance genes will persist through the bacteria that have since replicated without continuous exposure. The present work is oriented with the Comparative studies on antibiotic resistivity 0f *Escherichia coli* from Clinical & Non-clinical Sewage water sources of Guhagar region, Ratnagiri district.

MATERIALS AND METHODS:

- **Antibiotics:**
  1) Tetracycline 2) Streptomycin 3) Ampicillin 4) Penicillin 5) Nitrofurantoin 6) Carbenicillin 7) Amoxicillin 8) Amikacin 9) Vankomycin 10) Ciprofloxacin 11) Cefpodoxime
  (Concentrations of antibiotics are as per NCCLS for disc diffusion methods)
- **Sewage water sample –**
  1) Clinical (Rural hospital Guhagar,Dist-Ratnagiri, Maharashtra)
  2) Non-clinical (Shivaji Chowk,Guhagar, Dist-Ratnagiri, Maharashtra)
- **Media: Selective and Differential Media-**
  1) Mac.Conkeys Agar 2) Endo agar 3) Nutrient agar
- IMViC test Kit
- Urease test Kit
- Catalase test Kit
- Amylase test Kit.
- Sugar Utilization Test Kit.
- Lysine Decarboxylase Test kit.

In Methodology following steps are taken:

1) Sample collection
2) Processing of Sample
3) Isolation of Microorganisms
4) Identification of isolates
5) Antimicrobial susceptibility and resistivity

Isolation of organisms:

Sample (clinical, Non-clinical)
↓
0.1 ml of each sample was spread on Mac Conkeys agar plate
↓
Kept for incubation at 37^0C for 24hrs
↓
Pink colour colonies were observed
↓
Grams staining of suspected colonies were performed
↓
Pink coloured short rods were observed
(Gram Negative)

Screening of Organism / Sub culturing :

Suspected colonies from Mac Conkeys agar plate were streaked on endo agar plate
↓
Kept for incubation at 37^0C for 24hrs
↓
Pink coloured colonies showing metallic sheen were observed
↓
Gram staining was performed
↓
Pink coloured short rods were observed

↓

This colony showing above result was again streaked on Endo agar plate

↓

Kept for incubation at 37^0C for 24hrs

↓

The plate showed the pink coloured colonies having metallic sheen

↓

Gram staining was performed.(Gram Negative)

Morphological Properties:

Gram Reaction	: Negative
Arrangement	: Single
Shape	: Short Rod
Motility	: Positive
MacConkey Agar	: Pink colour Clonies
Endo Agar	: Pink Coloured Metallic Sheen

Confirmatory test/Biochemical Properties

1. **IMViC Test**
   - **Indole**- Cherry red coloured ring- positive
   - **Methyl Red** – dark red colour – positive
   - **Citrate**- No turbidity – Negative
   - **Voges- Proskauer**- Negative
2. **Urease test**
   Loopful of *E.coli* culture – Urease Broth – No pink colour – Negative
3. **Catalase test**-Loopful of *E.coli* culture - 3% H_2O_2 – No formation of air bubble – Negative
4. **Amylase test** – Loopful of *E.coli* culture – Iodine – No zone of clearance - Negative
5. **Sugar utilization test-** Glucose-lactose-Mannose-Maltose-Xylose-Sucrose-Acid & Gas Production.
6. **Lysine Decarboxylase Test** - Positive

To check antibiotic resistance of the organism of different water sample (Clinical, Non-clinical)-

0.1ml of isolated culture of *E.coli* spread on nutrient agar plate

↓

Aseptically place the disc of appropriate concentrations of antibiotics on Nutrient agar plates

↓

Kept the plates for incubation at 37^0 C for 24 hrs

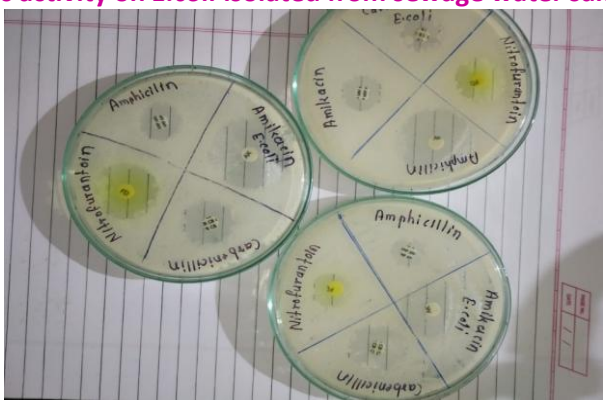
↓

Observe the zone of inhibition/clearance of both antibiotics

↓

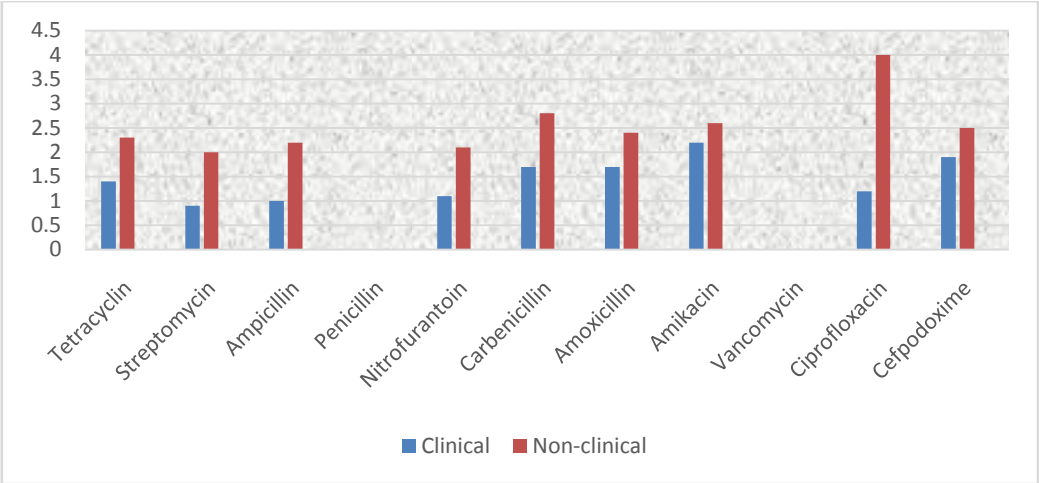
Clear zone indicates susceptibility while no zone indicates resistance

Results- Antibiotic activity on *E.coli* isolated from sewage water sample Non clinical:



Resistivity and Susceptibility of *E.coli* to various antibiotics: (Diameter measured in cm)

Sr. No.	Antibiotics	Sample & Zone of Clearance	
		Clinical (cm)	Non-Clinical (cm)
1.	Tetracycline	1.4	2.3
2.	Streptomycin	0.9	2.0
3.	Ampicillin	1.0	2.2
4.	Penicillin	0.0	0.0
5.	Nitrofurantoin	1.1	2.1
6.	Carbenicillin	1.7	2.8
7.	Amoxicillin	1.7	2.4
8.	Amikacin	2.2 (S)	2.6
9.	Vankomycin	0.0	0.0
10	Ciprofloxacin	1.2	4.0
11	Cefpodoxime	1.9 (S)	2.5



Graphical Representation: Effect of antibiotic on *E.coli* isolated from different sewage water sample (Clinical, Non-clinical)

CONCLUSION:

*E.coli*isolated from clinical waste water sample showed resistance to most of the antibioticsexcept Amicacin and cefpodoxime while compared to the *E.coli* isolated from the sewage waste of Non-clinical sample which shows susceptibility to all used antibiotics . This resistance to the antibiotics may be due to the repeated exposure of *E.coli* from clinical waste water to different antibiotics.

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A STUDY ON ICTHYOFAUNAL DIVERSITY OF SUKHANA DAM, GARKHRDA, DIST. AURANGBAD, MAHARASTRA, INDIA.

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ABSTRACT :

The present study deals with fish biodiversity undertaken during period July2011 to June 2012 to survey and commercially important fishes in the Sukhana dam.The Fresh water body of Sukhana dam used for irrigation purposes at Garkheda in Aurangabad district. The present study deals with the variety and abundance of fresh water fishes in Sukhana dam of Garkheda in Aurangabad district (M.S.) India. The results of present study reveal the occurrence of fish biodiversity belong to 4 orders 7 families and 16 species. The members of Order Cypriniformes were dominated by 9 species followed by Perciformes 4 species,Siluriformes 2 species and Synbranciformes with one species.

KEYWORDS : *Icthyofaunal diversity, Sukhna dam Garkheda, Economicvalue*

INTRODUCTION

Fishes are one of the most important groups of vertebrate, influencing his life in various ways. Millions of human beings suffer from hunger and malnutrition and fishes form a rich source of food and provide a meal to tide over the nutritional difficulties of man. In addition to serving as an important item of food, fishes provide several by-products to us. Fishes have formed an important item of human diet from time immemorial and are generally caught for this purpose. Fish diet provides proteins, fat and vitamin A and D. A large amount of phosphorous and other elements are also present in it. They have a good taste and are easily digestible. As there is economic importance and scope of fish and fisheries especially in Maharashtra, it is essential to study distribution and the availability of fish from freshwater reservoirs and tanks (More*et al.,* 2018). Biodiversity is essential for stabilization of ecosystem, protection of overall environmental quality for understanding intrinsic worth of all species on the earth (Ehrlich, P.R. and Wilson, E.O. (1991).

Fish constitutes half of the total number of vertebrates in the world. They live in almost conceivable aquatic habitats; 21,723 living species of fish have been recorded out of 39,900 species of vertebrates out of these 8,411 are freshwater species and 11,650 marine. India is one of the mega biodiversity countries in the world and occupies the ninth position in terms of freshwater mega biodiversity (Mittermeier, R.A. and C.G. Mitemeir, 1997).In India there are 2,500 species of fishes of which 930 live in freshwater and 1,570 are marine (Kar, D. A. Kumar, C. Bohra and L.K. Sigh, (Eds) 2003).

The Sukhana dam is an earthfill dam on Sukhana river at village Garkheda in the state of Maharashtra, India near Aurangabad. The dam was constructed in 1968 for irrigation purpose. The height and length of dam is 16.92 meter and 446 meter respectively and thesurface area of dam is 6.782 km^2. Present work was undertaken to study the icthyofaunal diversity of Sukhana dam at Garkheda in

Aurangabad district. Various indigenous and commercial fishes of economic importance have been noticed and recorded from the said dam.

In the field of ichthyology there is valuable contribution by many workers(Ashashree *et al.,* 2008; Shinde *et al.,* 2009 and Brinda *et al.,* 2010 Ubharhande *et. al.,*2012; Jayabhaye and Lahane 2013, Humbe *et.al.*, 2014; sonawane and Barve 2015, More *et. al.* 2018).

Biodiversity is essential for stabilization of ecosystem, protection of overall quality environment for understanding intrinsic worth of all species on the earth Ehrlich *et. al.,*(1991). Present work was undertaken to study the icthyofaunal diversity of Sukhana dam in Aurangabad district. Various indigenous and commercial fishes of economically importance have been noticed and recorded from the said dam.

MATERIALS AND METHODS

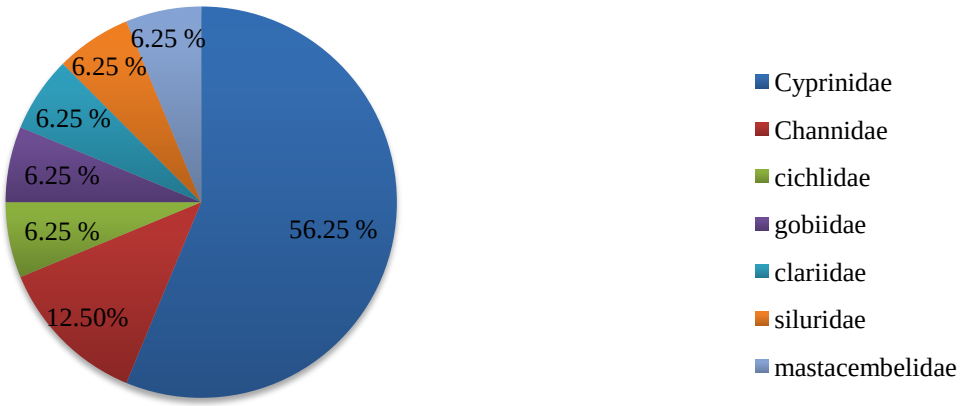
The present study was carried outon sukhana, situated at Garkheda in Aurangabad District (M.S) India, from July2011 to June 2012.Fishes were collectedmonthly, with the help of local fishermen using different type of nets namely gill nets, cast nets, dragnets, wadap net and Bhor jal. Immediately photographs were taken with help of digital camera.

The collected fishes were brought to laboratory then cleaned with rectified sprit and preserved in 6-10% formalin solution in separate specimen jars according to the size of species. Small fishes were directly placed in the formalin solution. While large fishes were giving an incision in their abdomen and preserved.Fishes were identified up to the species levelby using standard keys and books (Day,1978; Jayaram**,** 1999 and Talwar and Jhingran, 1991).

RESULTS AND DISCUSSION

During the present ichthyofaunal study, total 16 species of fresh water fishes belonging to7 families and 3 orders were recorded from the Sukhana Dam duringJuly2011to June 2012. The species found in the Sukhana dam, their taxonomic distribution, scientific name, common name, group of fish, economic value and abundance is given in the table no1.Order Cypriniformes and family cyprinidae were dominated by 9 species followed by Perciformes 4 species Siluriformes 2 species and Synbranchiformes with one species.

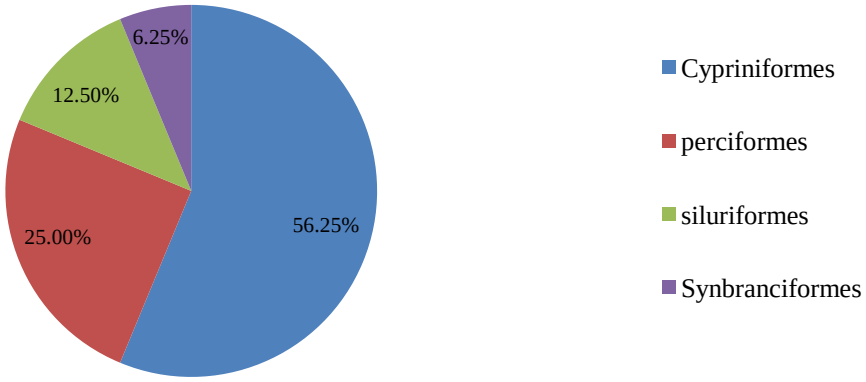
Fig. 1. Familiwise fish species %composition of Sukhana dam at Garkheda



The total 16 species representing by 4 orders, cypriniformes was dominant with 9 species and dominant group in the assemblage composition in which the member of family cyprinidae viz. *Catla-catla, Labeorohita, cirrhinus mrigala*and *Rasbora daniconius* were found most abundant. *Puntius ticto* were found in abundant form. *Puntius stigma, Chela bacaila*, *Garra lamta* and *Thynnichthys sandkhol* were found less abundant. Followed by perciformes in which *Channa striatus*, and *Tilapia mossambica*was found abundant form *Channa punctatus* and Glossogobiusis gluris were found less abundant form Followed by siluriformes in

which one species reported that is *Clarias batrachus* found less abundant and Synbranchiformes reported *Mastacembelus armatus* one species**(Table No. 1).**

Fig. 2. Orderwise fish species %composition of Sukhana dam at Garkheda



Similarresults have been reported by More *et al.,* (2018); Shinde *et al.,* (2011); Kharat *et al.,* (2012); recorded dominance during summer season followed by winter season.In the present study, fishes have been studied under seven family viz., Cyprinidae, Channidae, Cichlidae Gobiidae, Clariidae, Siluridae. Cyprinidae showed its dominance in Sukhana Dam followed by Channidae, Cichlidae and Clariidae.

The sequence of dominance of encountered order is as follows:

Cypriniformes (57.89%) > Persiformes (25.00%) > Siluriformes (12.50%) >Synbranchiformes (6.25%)

The sequence of dominance of encountered families is as follows:

Cyprinidaee (56.25%) > Channidae (12.50%) > Cichlidae (6.25) = Gobiidae (6.25%) = Clarridae (6.25%) = Siluridae (6.25%) = Mastacembelidae (6.25%)

Similar survey of fish fauna has been done by More et al., (2018) reported 19 species of 12 different genera 7 families and 5 orders were recorded at Harsool Dam, Aurangabad during the period January – December 2012. Among the collected species Cypriniformes Order was dominated by 11 species followed by Perciformes 3 species, Siluriformes 2 species, Saccobranchidae and Angulidae with one species.

Shinde *et al.,* (2009) reported the fish diversity of Pravara River, Pravara Sangam Dist. Ahmednagar (M.S) India. The results of investigation reveal the occurrence of 41 fish species belonging to 7 orders, 14 families and 26 genera. Among the collected species order Cypriniformeswas most dominant constituting 50 % followed by order Siluriformes constituting 19 % order Perciformes constituting 14.28 % orders Osteoglossiformes andSynbranchiformes constituting 4.76 % and orders Mugiliformesand Beloniformes constituting 2.38 % of the total fish species.

Nikam *et al.,* (2014) has been done fish surve of Ashti lake Dist. Solapur and reported 23 species belonging to 21 genera,12 familiesand 5 ordrs. Among the collected species order Cypriniformeswas dominant.

The Sukhana dam exhibit a good icthyofaunal diversity represented by 16 species of fishes belonging to 7 families and 4 orders.The fish diversity of Sukhana dam indicates that the pond under taken for study has a well balanced fish community. The maximum population densities of fish were recorded in summer and minimum in winter.

Table 1: - Ichthyofaunal diversity of Sukhana dam Garkheda Dist. Aurangabad (July 2011to June 2012).

Taxonomical rank	Scientific name	Common name	Group of fish	Economic value	Abundance
I. Order: Cypriniformes					
1. Family: Cyprinidae	1.*Catla-catla* (Hamilton)	Catla	Carps	FD	***
	2. *Labeo-rohita* (Hamilton)	Rohu	Carps	LV	***
	3. *Rasbora daniconius* (Ham - Buch)	Black line Rasbora	Food fish	BT, LV,WF	***
	4. *Puntius ticto* (Hamilton)	Ticto	Miscellaneous fishes	BT, LV,WF	**
	5. *Puntius stigma* (Hamilton)	Stigma	Miscellaneous fishes	LV	*
	6. *Chela bacaila* (Ham - Buch)	Chela	Food fish	FD	*
	7. *Cirrhinus mrigala* (Hamilton)	Mrigala	Carps	FD	***
	8. *Garra lamta* (Hamilton)	Garra	Food fish	FD	*
	9.*Thynnichthys sandkhol* (sykes)	Sandkhol carp	Food fish	LV, PF	*
II. Order: Perciformes					
1. Family: Channidae	10. *Channa striatus* (Bloch)		Live fish	FD	**
	11. *Channa punctatus* (Bloch)		Food fish		*
2. Family: Cichlidae	12. *Tilapia mossambica* (Hamilton)			LV	**
3.Family: Gobiidae	**13. Glossogobius giuris** (Hamilton)		Live fish	FD	*
III. Order: Siluriformes					
1. Family: Clariidae	14. *Clarias batrachus* (Linneaus		Carps	LV	*
2. Family: Siluridae	15.*wallago attu*	Wallago / helicaptor cat fish	Food fish	BT, LV,WF	*
IV. Order: Synbranciformes					
1. Family: Mastacembelidae	16.*Mastacembelus armatus*	Zig zag eel	Miscellaneous fishes	BT, LV,WF	*

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GENETIC EVOLUTION OF BT. COTTON HYBRIDS

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ABSTRACT :

Cotton is one of the major fibre crops of global significance. It is cultivated in tropical and subtropical regions of more than eighty countries of world occupying nearly 33 m ha with an annual production of 19 to 20 million tones of bales. China, U.S.A., India, Pakistan, Uzbekistan, Australia, Brazil, Greece, Argentina and Egypt are major cotton producing countries. These countries contribute nearly 85% of the global cotton production.

KEYWORDS : *Cotton, Genetic Evolution.*

INTRODUCTION

In India, cotton is being cultivated in 9.0 m ha and stands first in acreage. The crop is grown in varied agro-climatic situation across nine major states viz. Maharashtra, Gujarat, Madhya Pradesh, Punjab, Haryana, Rajasthan, Andhra Pradesh, Karnataka and Tamil Nadu. The crop is also grown on small area in Orissia, Assam, U.P and West Bengal. Nearly 60 million people are engaged in cotton production, marketing and processing. The textile industry which utilizes the cotton provides employment to about 16% of the total workforce. Cotton in its various forms also serves as raw material for more than 25 industries.

OBJECTIVES

1. To study morphological characteristics of cotton hybrids.
2. To measure the infection percentage on Bt-cotton hybrids.

In India, 162 species of insect pests attack different stages of cotton. Of these, about a dozenaremajor and half of them are key production constraints necessitating management Interventions in the crop ecosystem. The sucking pest complex comprising of aphids, jassids, thrips and whitefly are widespread and fairly serious. However, their damage can be efficientlycontained by the existing practices of cultural, chemical, biological and host resistance means.

The bollworms are most important tissue feeders and highly damaging. Three types of bollworms viz. American bollworm (Helicoverpa armiger), Pink bollworm (Pectionphoragossypiella) and Spotted bollworm (Eariasvitella), normally referred as bollworm complex are by far the most damaging and loss inducing pests of cotton. Amongst them, Helicoverpa emerged as a key pest all over the country causing as high as 80% losses in cotton.

MATERIALS AND METHODOLOGY

Materials:-

Investigate on described under the chapter was done at two talukas in hingoli district. During the investigation we have used various material which has been described under following.

Selected hybrid genotypes

Ankursuwarna, Ankur 3028,Malika, Bunny,Jaddo,Ajit-155,Rashi magna, Bramha, Firstclass

Survey:-To study the following investigation.

1. Selected nine hybrid genotype varities of cotton from the field area of Hingoli district.
2. Selected two talukas of cotton of cotton growing fields in Hingoli district.
3. The field area from different villages of two talukas are as follows.
4. Yeulegaonsolanke 2. Suregaon 3. Aundha 4. Nageshwadi 5. Gunda 6. Aajarsonda 7. Aadgaon 8. Karanjala 9. Borisawant.

2.2. Method :

***3.* Morphological character observation:**

1) To study the morphological characteristics of the plant in the grouth stage the following observations are given by this method.
2) Plant height measured by using meter scale.
3) No of branches are measured manually and Data recorded.
4) No. of bolls per plant were measured manually and recorded.

***4.* Infection percentage calculation are meal nod& observed**

1. Tone infected bolls are manually
2. Then total the total bolls are measured observed
3. Then infected bolls are measured
4. Then on basis of characters the bolls infected with pink bollworm spotted bollworm & American bollworm has been separated
5. Then observation were recorded& arranged in a table

RESULTS

The Result of present study entitled that the lowest infection percentage is observed in Ankur 3028, Ankursuwarna ,malika and Bunny shows good resistance to Bolloworm complex.

3.1 Morphological study of Bt – cotton hybrids.

The morphological Characters of Bt-cotton Hybrid were observed the lowest infection percentage is observed in case of ankursuwarna it is 11% in Malika Hybrid Infection % in Ankur 3028 it is 25% In Jaddo cotton Hybrid infection perentage is 57 % which is very high in Ajit -155 in 65 % of Infection percentage seen.

Table No. 3.1.1. Morphological study of Bt – cotton hybrids.

Sr.No.	Genotpye	Location	Plant Hight	No. of Branches	Total No. of Bolls	Infected	Infection
1.	Ankursuwarna	Nageshwadi	212	29	62	7	11%
2.	Malika	Suregaon	198	30	67	8	12%
3.	Bunny	Suregaon	188	27	53	13	25%
4.	Ankur 3028	Suregaon	204	32	69	7	10%
5.	Jaddo	Gunda	182	30	63	20	57%
6.	Ajit-155	Jawla	152	16	23	15	65%
7.	Rashi magna	Adgaon	106	12	16	10	63%
8.	First class	Aajarsonda	186	36	40	25	62%
9.	Bramha	Borisawant	167	25	40	17	43%

In rashiMegana 63% of Infection of boll warm Observed in first class in Bramha Hybrid the infection percentage is 43 % Calculated .

3.2. Infection of bollworm complex

Table no. 3.2.2. Infection of bollworm complex				
Hybrid	**Genotype**	**Spott Boll**	**Am Boll**	**Pink Boll**
Ankursuwarna	8	1	1	6
Malika	9	2	1	6
Bunny	7	1	1	5
3028	13	2	1	10
Jady	21	2	3	16
Ajit 155	15	1	2	12
Rashi Magna	10	1	3	6
First class	25	3	4	18
Bramha	17	2	3	12

The infection of bollworm in case of Ankursuwarna is observed on 8 bolls from that spotted bolloworm and American bollwarm infected each on 1 boll while 6 are infected with pink bollworm. In malika 9 bolls were infected from that SB 2 bolls infected with spotted bollworm 1 infected with American bollworm and 6 with pink bollworm incase of Ankur 3028 from B 2 bolls are infected with spotted bollworm 1 with American bollworm while 5 with pink bollworm. In Jaddubybrid 21 infected bolls seen from that 2 infected with spotted bollworm 3 with American bollworm and 16 with pink bollworm in Ajit-155 hybrid 15 infected bolls seen American bollworm on 2 and pink bollworm on 12 observed. In Rashi magna 10 bolls seen from that 1 infected with spotted bollworm 3 infected with American bollworm and 6 with pink bollworm.

CONCLUSION:

The morphological parameters was observed from different type of Bt-cotton geuotypes the analysis shows that the resistance to bollworm complex has been declined in various varities of cotton and that results in infection of Bolloworm complex and decline in the yield of Bt-Cotton.

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EFFECTOF MEDICINAL ELEMENTS OF GOAT MILK TO IMPROVE THE QUALITY OF GOAT MILK PRODUCTS

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ABSTRACT :

Growing understanding of the relationship between diet, specific food elements and health is leading to new visions into the effect of food components on physiological function and health. This awareness has moved consumers to become more health-conscious, driving a trend towards healthy and nutritious foods with additional health promoting functions, such as functional foods. Goats are important component of livestock industry having adaptability to harsh climates which make them suitable for landless and marginal farmers. The importance of goats as providers around the world of essential food in meat and dairy products has been conversed and documented. The milk is affordable, available and nutritious hence a wide variation of knowledge on the nutrition and to cause of allergic reaction characteristics of goat milk could promote the direct use of the milk in the nutrition of babies and weak children.

INTRODUCTION

The sociological, economic and nutritional values have significantly impact on the food industries and consumers for the manufacture of functional food products with health-related required properties. A functional food may provide stretched utility beyond its nutritional benefit. Functional foods are those foods which provide health benefits beyond the normal nutritional requirements [1]. These foods contain physiologically-active food components. These benefits can be both physical and mental and are commonly attributed to the active components of the food. Today's animal originated functional foods are typically marketed to large groups of the total population. Goats are known as "Wet nurse of infant" in the United Kingdom and "Poor man`s cow" in India. Accurate statistics are required to determine the future outlook of the goat populations and their productivity. Goats are present in all of the continents and the world total numbers of goats are 861.9 million [2]. The livestock population in India includes 135.17 million goats standing at first and second place in milk and meat production overall the world respectively [3]. Research in 20thcentury has led to a substantial increase in our knowledge of the basic and unique features of the composition of goat milk. Goat is a good source of meat (Chevon), milk, yoghurt, cheese and other by-products such as hide and skin. Goat milk production is a dynamic and growing industry that is fundamental to the wellbeing of hundreds of millions of people worldwide and is an important part of the economy in many countries. Goat milk shows great changeability in biochemical composition, technological properties and bacteriological quality depending on genetic factors, environmental conditions, and goat farming practices [4]. These factors are- pure breeding, crossing, age, birth season, birth type, duration of lactation and dry period, milking type, frequency and duration of milking, mating season, first pregnancy age, survival rate of kids, nutrition and diseases [5].

Average composition of basic nutrients in goat, sheepand cow

Composition	Goat	Sheep	Cow
Fat (%)	3.8	7.9	3.6
Solid-not-fat (%)	8.9	12.0	9.0
Lactose (%)	4.1	4.9	4.7
Protein (%)	3.4	6.2	3.2
Casein (%)	2.4	4.2	2.6
Albumin, Globulin (%)	0.6	1.0	0.6
Non Protein N (%)	0.4	0.8	0.2
Ash (%)	0.8	0.9	0.7
Calories/100 ml	70	105	69

The popularity of dairy products from goats' milk has shown a gradual increase all over the world due to those properties which differentiate it from other milks and beneficial effects on human health.[6] In comparison with cow's milk, goats' milk has a higher concentration of short and medium chain fatty acids and lipoprotein lipase associated with the fat phase [5]. Fat is one of the most important components in the technological and nutritional quality of goat milk [6]. The percentage of total fat in goat and cow milk is quite similar, and the fatty acid composition depends to a large extent on the diet composition in both species. Two characteristics of goat milk fat have important consequences for manufacturing. One is the smaller size of the fat globules in goat milk in comparison to those in cow milk [7-8]. In both species the fat globules range from 1 to 10 ìm, but the number of fat globules less than 5 ìm is ~60% in cow milk whereas it is ~80% in goat milk which results in a softer texture of goat milk products. The second feature, is the fatty acid composition of goat milk with a higher proportion of medium chain fatty acids, i.e., caproic (C6:0), caprylic (C8:0) and 5 capric (C10:0), which are partly responsible for the characteristic "goaty" odour of goat milk [9]

Average fatty acid composition (g/100 g milk) in lipids of goat and cow milk

Fatty Acid	Got Milk
C4:0 butyric	0.13
C6:0 caproic	0.09
C8:0 caprylic	0.10
C10:0 capric	0.26
C12:0 lauric	0.12
C14:0 myristic	0.32
C16:0 palmitic	0.34
C18:0 stearic	0.44
C6-14 total MCT	0.91
C4-18 total SAFA	2.67
C16:1 palmitoleic	0.08
C18:1 oleic	0.98
C16:1-22:1 total MUFA	1.11
C18:2 linoleic	0.11
C18:3 linolenic	0.04
C18:2-18:3 total PUFA	0.15

The mineral content of goat milk varies from 0.70 to 0.85%, of goat milk contains more calcium, phosphorous and potassium. Goat milk reportedly has higher fat and ash contents in the tropics than cow counterparts although Holstein cow milk fat is similar to that in milk of Swiss goats. Mineral contents of goat milk from French-Alpine and Anglo-Nubian breeds showed higher Ca, P, K, Mg, and Cl, and lower Na and S

levels than bovine milk. Mineral contents of commercial indian goat milk yogurt have been shown to have significant differences in the levels of Ca, Mg, P, Fe, Zn, and Al between different yogurt varieties. Mineral concentrations of 30 varieties of Indian goat milk cheeses produced in the US revealed that there were wide variations in concentrations of P, K, Ca, Na, Cl, Fe, Al and Zn among and within varieties of the cheeses [10].

Composition of minerals and vitamins in goat milk

Composition	Goat	Composition	Goat
Ca, mg/L	1304	Cu	0.23
P	1080	Vitamin A	548
Mg	136	Vitamin D microg/L	0.6
Na	488	Vitamin K	12
K	1996	Thiamin	0.5
Cl	1566	Riboflavin	1.4
Fe	0.5	Niacin	2.7
Ascorbic acid	12.6	Panthothenic acid	3.0
Vitamin B6	0.5	Vitamin B12	.064

Medicinal Properties of Elements in Goat Milk

The differences in genetic types are due to amino acid changes in the protein chains, which in turn are responsible for the transformations in digestibility, cheese making properties and flavors of goat milk products, but the amino acid changes also enable the detection of even small amounts of adulteration with cow milk. The production of cheese from goats' milk has a very long history and is an important source of protein for people in several countries. In the last decade, there has been an increased interest substitute to cow milk for those who suffer from cow milk allergy or goat milk production and its conversion to value added products as well as a renewed interest in goat milk as an alternative milk source for people with cow milk intolerance [11].

Medicinal Dairy Products with Goat Milk

The use of milk with particular nutritional properties (e.g., goats', mares' and donkeys' milk), alone or in combination with bacterial strains having probiotic properties and/or producing physiologically active metabolites, represents one of the technology options for manufacturing new dairy functional beverages. The functional value of goats' milk may be further exploited through fermentation by selected microorganisms possessing specific features. Sheep and goat cheeses are very well recognized by connoisseurs as gastronomic and festive products. Goats' milk products, especially cheeses and yogurt are very popular in the Mediterranean peninsula, the Middle East, southern Russia and the Indian subcontinent. The milk was probably made into soft cheese, and then hard, ripened goat cheeses were later developed in the Mediterranean basin countries. There are goat cheeses made from raw and pasteurized milk. In many countries the manufacture of goat cheese from raw milk is prohibited due to food safety issues. The type of milk used significantly influences the finished cheese. It is mainly produced by Bedouins during the spring season when milk is produced in excess amount [12].

Goat Milk: Development of medicinal Foods

Traditionally, goat and cow milk has been considered as a fundamental food in the diets of many cultures. Milk provides an easily accessible matrix, rich in a large variety of essential nutrients like minerals, vitamins and easy digestible proteins with balanced amino acid profiles, important in supporting most body functions. Together with grains, meats, vegetables and fruits, dairy products are categorized as nutrient-dense foods, i.e., foods that deliver many nutrients with relatively low energy content, and are relevant to health throughout the life cycle [13].

Conclusion

The production of quality goat milk through professional breeding programs can be rewarding, profitable, pleasant and successful. Human had to give more importance to their health and nutritional situation with increasing environmental pollution and stress in their life. So, recently it is watched that there has been increasing demand to foods that has Medicinal foods. Medicinal foods can be defined as foods that have positive effects on the health. The nutritional value of goat meat and milk is becoming recognized because of the medicinal values for treating many human diseases. The research is still required to exploit the use of liquid goat milk as well as its application licensing in manufacture of several milk products especially various types of fermentedproducts through India.

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DEVELOPMENT OF ECOFRIENDLY MOSQUITO REPELLENT COIL FROM COW DUNG

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ABSTRACT :

The chemical based mosquito repellents available in the market contain some harmful to cause threat to human health. An attempt has been made or prepares a 100 % herbal repellent product. This herbal product is effective and cheaper than presently chemical based mosquito repellent. There is no side effect on inhalation or even on digestion. This paper deals with selection and optimization of ingredients, their characteristics, medicinal properties and studies conducted about the comparison with the existing mosquito repellent. The all the ingredient's easily available. The main aim of this products development is to provide employment to the rural youth and economic gain to farmers.

Key words: *Cow dung, Tulsi, Neem, Phytochemistry.*

INTRODUCTION

With the onset of modern civilization we are for getting several useful natural resources and one of that is cattle dung. The cow dung utility as fertilizer, cheap fuel and cheap housing material and as insect repellent. Scientist proved that pyrethroids used in repellent lead to hyper excitation of nervous system and prolong uses result in corneal damage liver and asthma. About 10-12 % of users are seriously affected by use of repellents. The common problems are caused by inhalation of its smoke. In the present study an attempt has been made to develop a cow dung based herbal mosquito repellent. Ever since an established fact and practice is than the natural mosquito repellent is more effective, cheap and keep environmental pleasant and healthy friendly and ecofriendly. +

MATERIAL AND METHODS

Raw material has been selected based on experience traditional knowledge and practice by ancestors. Traditionally used repelling agents have been blended with some new ingredients. The most popular and traditional ways of repelling mosquitoes is by using Neem leaves along with cow dung. It is and excellent antiviral agent when burn. Raal is also used along with cow dung because its smell that keeps environment fresh and free from bacteria. Tulsi is the most scared and most generally used medicinal plant in Indian homes. It is good antiviral and insecticidal property. Lemon grass oil is an aromatic and medicinal herb. It is has been used because of its disinfectant property and good smell. Clover oil is also utilized. It is also aromatic and medicinal herb. Ajowan is also show the enhancing mosquito repellent property and for its antiseptic and antifungal properties.

Material Optimization

For preparing the mosquito repellent cow dung as well as coal powder has been selected as base. Cow dung is better because it has some additional exceptional properties. Some unpublished data says that the cow dung smoke is a potential antioxidant. A detailed study on cow dung based dhoop/ coil is being done at Banaras Hindu University, Varanasi. Gum/ Maida and guggulu have been tried as binders. Gum is found to be more convenient for use and gives excellent binding to all the ingredient's and holds it together strongly. Through guggulu has exceptionally good smell and binding property. Still it is not easy to be used on large scale. The suitable binder is the one which gives show and prolong burning along with uniform binding ability. Saw dust is also utilized.

RESULT

The natural mosquito repellent is more effective, cheap and keeps environment pleasant and health friendly.

Phytochemistry of Neem leaves

Tests	Methanol	Ethanol	Aqueous	Petroleum ether
Alkaloid	+	+	+	+
Tannin	+	+	-	-
Flavonoid	+	-	+	+
Steroids	+	-	-	+
phytoerthrin	+	+	-	-
Anthroqunin	+	+	-	-

Phytochemistry of Cow dung

Tests	Methanol	Ethanol	Aqueous	Petroleum ether
Alkaloid	+	+	+	+
Tannin	+	+	+	+
Flavonoid	+	+	+	+
Steroids	+	+	+	+
phytoerthrin	-	-	-	-
Anthroqunin	-	-	-	-

Liquid vaporizer (Mosquito) Neem leaves powder + cow dung + Cow urine + Clove oil + fermentation *for 5 days. (1:1)*

CONCLUSION

The mosquito repellent prepared with above mentioned formulas was given for use by inhabitants of different localities in Sengaon. A survey conducted in a group of maximum people of different social section and different localities in Sengaon. The cow dung based mosquito product is not only mosquito repellent but also hygienic, aesthetic and medicinal. The present product is a source of employment generation rural India.

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MARKETING SYSTEM AND STATEOF FISH MARKET SINHINGOLI DISTRICT, MAHARASHTRA

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ABSTRACT :

Indian fisheries is important sector contributing around 1.1% of total GDP and 5.15% of agriculture GDP of country as well as involvement of 15 million people in different fishery activities for their livelihood and revenue generations.Most of the fish produced and captured in India are sold in local domestic markets. Most of the Indian fish markets are under developing stage with unsatisfactory infrastructure and physical facilities. Substantial fish catches from Hingoli are generally sold in local and domestic markets at Hingoli, Sengaon, Kalamnuri, Basmat and Aundha. The present work was undertaken to study the condition of Fish markets in Hingoli district with respect to market facilities, appliances, cold chain, market building, hygiene, sanitation, major species sold, price structure, women involvement and marketing system. The study revealed that the none of the fish market in the Hingoli had proper Freezing and cold storage facility as well as market building. Most of the market were set on roadside in open in unhygienic conditions. Carps species constituted part with 68 % to 73% share in total species sold. Price structure in the fish markets varied with different factors such as species, size, quality, season etc. Study also showed meager involvement of women in fish marketing activities in hingoli fish market. The study revealed urgent need for provision of facilities in fish markets of Hingoli district for development and upliftment of fishermen and fishery sector of district.

Key words: *Market, Inland, Fish, Hingoli, Price, Market facilities, Hygiene*

INTRODUCTION

Fisheries is an important sector in India contributing to about 6.3% to global fish production. Indian fisheries sector contributes around 1.1% of total GDP and 5.15% of agriculture GDP of country (Ayyappan, 2006). With third place among fish producing countries in the world, India recorder total fish production of 0.76 million metric tonne 2016 through involvement of 15 million people in different fishery activities for their livelihood and revenue generations.

Most of the fish produced and captured in India are sold in local domestic markets. The condition of market vary from place to place. Most of the fish markets are still under developing stage having very few facilities. Infrastructure as well as physical facilities in Indian fish market are very unsatisfactory. Very little importance is given to hygiene and sanitation in most of the fish markets. Major hindrance in fish marketing includes perishability and large quantities, storage, transportation, quality and quantity of commodity, low demand elasticity and high price spread (Ravindranath, 2008).

Hingoli district is endowed with substantial resources such as rivers, reservoirs, lakes, village lakes, etc. These resources produces substantial amount of fish catches which are mostly sold in local and domestic markets. Hingoli district has five blocks (namely Hingoli, Sengaon, Kalamnuri, Basmat and Aundha) each having fish market place. Fishermen in and around each block gather their catches and brought it to the market places.

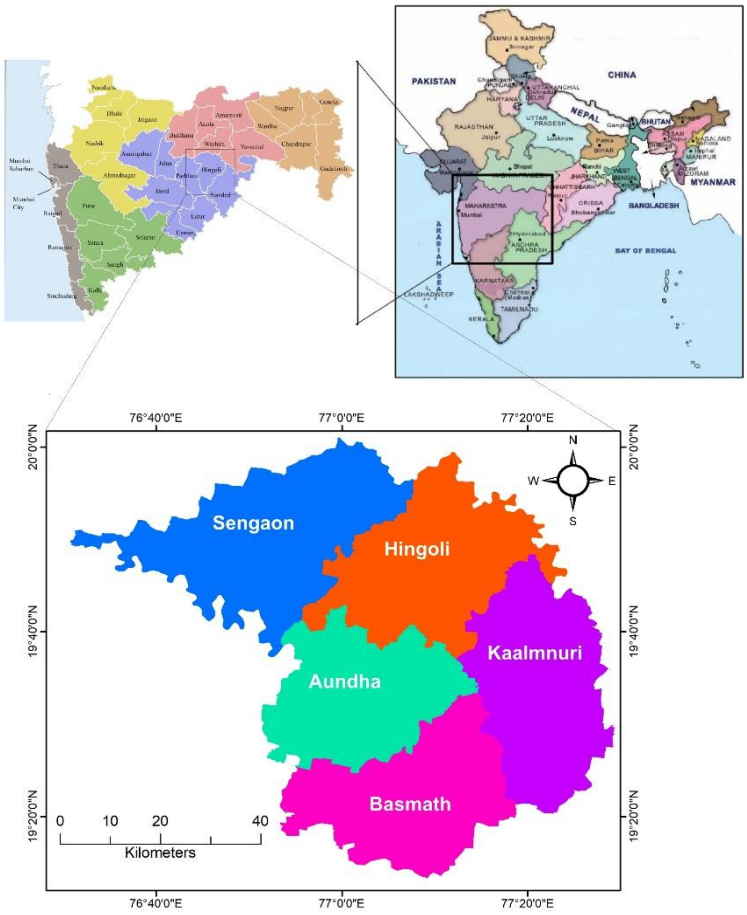
The present study was carried out to analyse the condition of these markets with respect to market facilities, appliances, cold chain, market building, hygiene, sanitation, major species sold, price structure, women involvement and marketing system.

MATERIAL AND METHODS

The study was carried out to analyze the condition of fish markets with respect to market facilities, appliances, cold chain, market building, hygiene, sanitation, major species sold, price structure, women involvement and marketing system. The data was collected through field visits, observations and personal interviews in major fish markets at block level of Hingoli district. The field visit were carried out in fish markets on weekly bazars day during year 2017-18. The consumers purchasing fish were also interviewed for the quality, preferences and utilization after informing of the purposes of study.

Study area:

Fish markets located at block level and district level of the Hingoli district were areas of study in the present work. During the present work, fish markets of Hingoli, Sengaon, Basmat, Kalmnuri and Aundha were studied and analysed for prevailing conditions. The collected data was organised and calculations were made using computer system. The results were tabulated and represented in graphical formats for better presentation and understanding.



RESULTS & DISCUSSION:

Present study was carried out to analyse the situation of major fish markets located at five block of ofHingoli districts. The fish markets of Hingoli district were studied with respect to market facilities, appliances, cold chain, market building, hygiene, sanitation, majorspecies sold, price structure, women involvement and marketing system.The outcome of the present study are elaborated below with these aspects.

1. Market building:

None of the fish market in the Hingoli district has special building facility. The fish markets are set in open spaces, mostly along roadside. Fisherman and fish seller bring fishes in crates, *Ghamelas,* bags and other such containers. These fishes are set on sheets or even on open rocks for sell. Permanent roofs were not seen any of the fish market of Hingoli district under study. Fisherman and fish seller set temporary roofs and covers using plastic and gunny bag sheets for protection.

2. Appliances and equipment used by seller:

Fish sellers used knives for cutting along with special scrappers to remove scales and wooden platform for cutting and filleting. Cut fishes were generally given in plastic bags. Crates, *Ghamelas* and bags

were used for storage of fishes. None of the seller in the fish markets of Hingoli district was found using refrigerator at market place.Padghane*et al.,* 2016 also reported use of nylon bags for crab transportation and marketing.

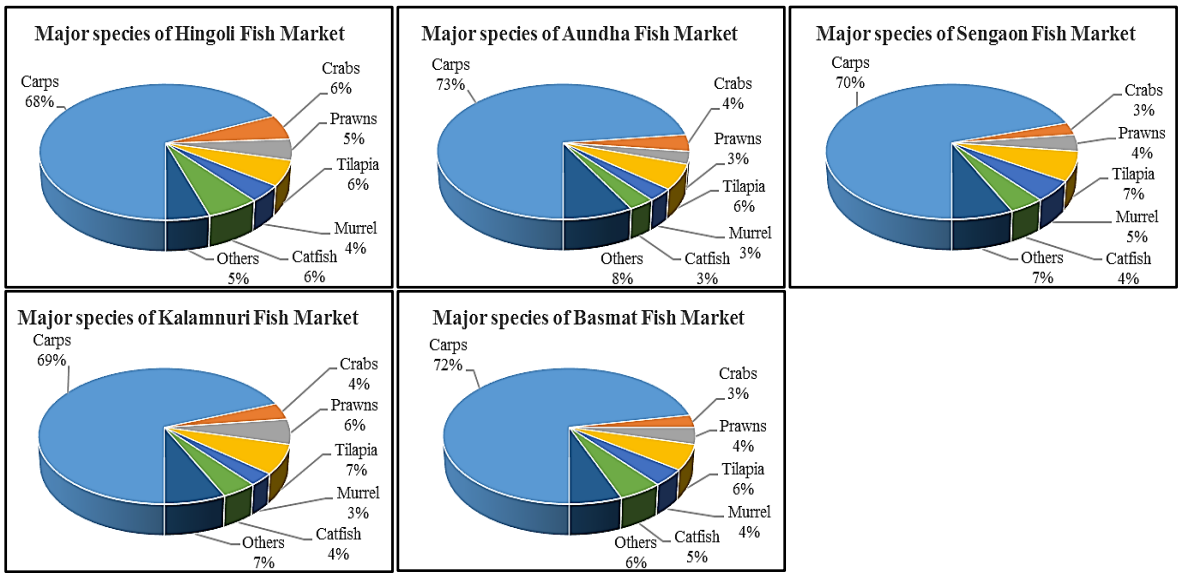
3. Cold chain:

Being highly perishable commodity, cold chain forms integral part of fish marketing. The cold chain facilities in fish markets of Hingoli district were very poor. None of the fish market under study had appropriate freezing and cold storage facilities. The cold chain of the fish markets in Hingoli district was mostly dependent on ice. Fisherman and fish seller brings fishes in crates with fishes mixed with ice. The ice preservation in these markets was done without any regard to maintenance of fish to ice ratio. The fishers use ice as per their instinct and experience for maintaining cold chain for fish storage, transport and marketing.

4. Species composition:

Fishers in all the fish markets mostly sold freshwater fishes available and caught in nearby reservoirs. The fishes were preserved in ice and brought to the market. Hingoli fish market receives fishes from nearby reservoirs such as Shiddheswar reservoir, etc. Major species sold are Catla, Rohu, Mrigal, Common carp, Silver carp, Grass carp, Murrel, Tilapia, crabs, freshwater prawn, etc. Some sun dried aquatic species sold in the fish markets of Hingoli district are of limited variety such as dries Bombay duck (*Bombil*), Acetus (*Jawla*), small freshwater weed fishes etc.

The finfish and shellfish species sold in the fish markets of Hingoli district were carps (Catla, Rohu, Mrigal, Common carp, Silver carp, Grass carp), Murrels (*Channa sp.*), Tilapia, catfishes, prawns (*Macrobrachium sp.*), crabs, air breathing fishes (Magur) and eels. Carps were major species in all the fish markets of the Hingoli district with market share ranging from 68 % to 73%. During the study of Deharadun fish market carps were found to be major species (60%) (Abdurrahman, et al. 2017).Carp species including Catla, Rohu, Common carp, Mrigal and other carps were sold in large quantities. Other finfish species like Murrels (*Channasp*), Catfishes and Tilapia having individual share in fish market less than 10%. Major shellfish species included freshwater prawns (*Machrobrachium sp*.) and crabs. No freshwater bivalve and gastropods were found to be sold in any of the fish markets in Hingoli district during present work.



5. Price structure of different species:

The Price of species vary considerable depending upon the availability, freshness, and condition of the specimen being sold. Alam *et al.* (2010) also reported influence of market structure, species quality, size and weight in price of fish. Sathiadhas and Narayanakumar (1994) also report effect of veroius factor on sell and price of fishes. Generally, larger specimen fetch more price compared to smaller ones.Deshmukh and Jawale (2014) also found that larger fishes fetched better price that smaller during study of Paithan fish market. The selling price structure of different species sold in fish markets of Hingoli district is mostly depend on freshness condition and size of fishes (Table 1).

Table 1. Price structure of various fish species in Hingoli fish markets

Sr. No.	Local Name	Scientific Name	Price (Rs/Kg)
01	Catla	*Catlacatla*	120-200
02	Rahu	*Labeorohita*	120-160
03	Mrigal	*Cirrhinamrigala*	120-150
04	Suparnas	*Cyprinuscarpio*	140-200
05	Tilapi	*Tilapia mossambica*	90-120
06	Balu	*Wallagoattu*	80-110
07	Pankaj/ Chopda	*Pangasiuspangasius*	90-110
08	Maral	*Channamarulius*	250-350
09	Dhok	*Channagachua*	180-350
10	Borali	*Cirrhinareba*	80-100
11	Shingada	*Mystusseenghala*	100-110
12	Tepali	*Puntius spp.*	60-80
13	Murhi	*Nemacheilus spp.*	180-250
14	Palai	*Salmophasianovacula*	60-80
15	Rasbora	*Rasboradaniconius*	80-100
16	Mishalu	*Mystus spp.*	80-100
17	Wam	*Macrognathuspancalus*	200-300
18	Japaniwam	*Mastacembelusarmatus*	150-200
19	Kanch	*Chandaspp*	60-80
20	Tambu	*Anguilla benghalensis*	400-500
21	Crab	Crab	700-800
22	Zinga	*M. rosenbergii*	400-500

6. Hygiene and sanitation:

The hygiene and sanitation conditions at the fish markets of Hingoli district under study were found to be poor. Fishes were sold along roadsides in open with plenty of mud and dust.Deshmukh and Jawale (2014) also report selling of fishes in open along roadside during study of Paithan fish market. The fishes were set and displayed on simple gunny sheets, polythene sheets, tree leaves or even on open ground. Cutting knives and platform were not found stored in proper condition and many times seen lying on open grounds full of dirt, mud and dust. The cut fishes were not properly washed before handing over to buyers.

7. Women involvement :

Many women are actively involved in many fisheries activities such as culture, capture, processing, wholesaling, retailing etc in mostly in maritime states. Although their degree and type of involvement is mostly variable and depends on local cultural conditions and caste (Shanthi et al, 2012**).**Involvement of women in fish markets and fish marketing system was meager in Hingoli district. Mostly male fisherman and

fish sellers were observed selling finfishes and sell fishes in all the fish markets of Hingoli district under study signifying their major part.

8. Marketing system and Traders involved:

The marketing system of fish markets in Hingoli district was found to be simple one. Most of the fisherman bring their fish catches and sell. Some retailers bring fishes from nearby reservoirs for selling. Mostly the fishes were caught in morning hours and were brought to the fish markets by afternoon. Most of the fisherman try to sell their whole catches on the same day due to unavailability of proper cold storage facilities. In other words, fisherman and seller would bring the amount of fishes in the marketing that can be sold within same day. The fish markets of Hingoli district mainly involved retailers. Fish venders were not seen in any of the markets during the study. Role of whole seller in Hingoli fish marketing system was found to be limited and it was confined to larger reservoirs. Most of the fisherman were found working in groups for fishing as well as selling.

CONCLUSION:

Condition of Hingoli fish market is very poor with very few modern facilities. It is need of time to have some assistance for development of fish markets of the district. Local governing bodies may take initiative to develop some of basic facilities in fish market. Fisherman should be made aware and trained in hygienic fish handling and processing. Also there is a great need to make people aware about fishes and their nutrition so as to enhance fish consumption.

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