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Title of paper	Name of the author/s	Department of the teacher	Name of journal	Year of publication	ISSN number
Water quality status of Hinglajwadi lake dist. Osmanabad, [M.S.]	Dr.S.E.Shinde	Zoology	<i>Bioinfolet</i>	2020	633-634
Synthesis And Charecterristion of thio-dihydropyramidone and its derivatives	Mr. A.V. Shinde	Chemistry	International Journal of Applied Research	2021	2394-7500
Day Removal from Aqueous Solution into Alternative low cost Adsorbent – A Review	Mr. A.V. Shinde	Chemistry	International Journal of JETIR	2021	2349-5162
Effect of Diazepam on the development of <i>lucilia Cuprina</i> (Diptera:Calliphoridae)	Dr.H.M.P aware	Zoology	International journal of Emerging Technologies and Innovate Research	2021	2349-5162
Effect of Alprazolam on morphometric parameters of life cycle stages of <i>Lucilia sericata</i> (Diptera:Calliphoridae	Dr.H.M.P aware	Zoology	International journal for Innovate Research in multidisciplinary field.	2021	2455-0620
Synthesis & characerization of thio-dihydropyridone and its derivaties	Dr.H.M.P aware	Zoology	International Journal of Applied Research	2021	2394-7500



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Germplasm Collection and Evaluation of Hyacinth bean (Lablab purpureus (L.) Sweet.syn. Dolichus Lablab L. from Akrani Tahsil, District Nandurbar	Dr. H.M.Patil	Botany	International Journal of Creative Research Thoughts (IJCRT)	2021	2320- 2882



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WATER QUALITY STATUS OF HINGLAJWADI LAKE DIST. OSMANABAD, [M.S.]

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ABSTRACT

Present study deals with assessment of the water quality of Hinglajwadi Lake (Dist. Osmanabad, M.S) during January - December 2018. Seasonal variations were observed with respect to various parameters.

Key words: water quality, seasonal variations Hinglajwadi Lake

Introduction

Present investigation has been undertaken to assess water quality of Hinglajwadi Lake Dist. Osmanabad (M.S), which is a Perennial water body. The water from this lake is often used for domestic, agricultural and recreational purposes by the local people.

Material and Methods

The water samples were collected early in the morning in the first week of every month during January to December, 2018. The samples were collected in acid washed plastic containers from the depth of 5-10 cm below water surface. The samples were analyzed immediately into the laboratory (APHA, 1998; Trivedi and Goel, 1987).

Results and Discussion

The data have been presented in Table. 1. The transparency of water ranged from 4.63 to 20 cm. The water was less transparent during monsoon. Maximum transparency (13.75 ± 3.41 cm) was recorded during summer, while minimum (6.25 ± 2.83 cm) during Monsoon (Table 1).

The turbidity ranged from 107 to 500 NTU, which was maximum during monsoon

while minimum during winter. Similar findings have been reported by Adarshkumar *et. al.*, (2006)

Electrical conductivity (E.C.) ranged from 897.6 to 2493.9 μ mhos/cm. which was maximum during monsoon, and minimum during winter. Due to high E.C., the water was not found suitable for drinking purpose. The pH ranged from 6.9 to 9.7. Maximum pH was recorded in summer. Similar results were reported by Subbamma and Rama, (1992) from a minor reservoir at Nadergul.

Dissolved oxygen ranged from 2.7 to 5.8 mg/l, while biological oxygen demand (B.O.D.) from 23.3 to 168 mg/l. The B.O.D. was higher in monsoon. Chemical Oxygen Demand(COD) ranged from 56 to 408.8 mg/l, with highest values in monsoon. The values of B.O.D. and C.O.D. are considered as indicators of water pollution.

It was concluded that the water was useful for irrigation as well as fish culture, but, not for drinking purpose

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Biobeds: An Effective and Eco-Friendly Method for Disposal of Pesticide Waste

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Abstract: *The pesticides are one of the tools for achieving the goal of the green revolution and play an important role in improving yield of various crops. Though the pesticides play a vital role in controlling crop pests, it results in to pollution of environment especially land and water bodies. Pollution occurred mainly due to large number of pesticides and chemicals used in the farm, and now a day the use of pesticides and chemicals in farm is very common. Generally, soil gets polluted by improper disposal of pesticides and chemicals. Therefore, there is need to degrade the pesticide by using a bio bed technique. This technique is most effective method to degrade the pesticide.*

Key Words: *Bio bed, Pesticide, Chemicals, Pollution*

Introduction:

Biobeds began in Sweden as a reaction to the requirement for straightforward and viable techniques to limit ecological pollution from pesticide use, particularly when filling splashing hardware, a regular point wellspring of defilement. Biobed is a basic and modest development on homesteads planned to gather and debase spills of pesticides (1,2). It comprises of three parts in a 60 cm profound pit in the ground (Fig. 1): a) a mud layer at the last (10 cm), b) a biomixture or biomix of straw, peat and soil (50:25:25 vol-%) filling the leftover 50 cm profundity, and c) a grass layer that covers the surface. The biobed is additionally outfitted with an incline for driving and situating the sprayer over the grassed surface. The thought is that all treatment of pesticides when filling showering hardware ought to be done over the biobed so when spills happen, they are held and debased in the biobed. The creation of the biomixture is planned to advance microbial debasement exercises. India is rural country the vast majority of the individuals rely upon agrarian. Presently a day's Indian rancher confronting enormous issue of soil contamination, water contamination declines in harvest yield and changes in sea-going environment this is simply because of abundance utilization of compound manures and pesticide in agribusiness. The remainders of pesticides or washing the sprayer of pesticide was contaminated the specific zone. To supported this condition, there is need of corrupts remainders of pesticides appropriately. In this investigation, biobed ought to be utilized for securing of climate against point source pesticide contamination, during filling, blending, and cleaning of sprayers.

Materials and Methods:

The necessary surface territory for bio-bed was 4 x 4 ft and 2 ft profundity in type of rectangular pit region and according to utilization of pesticides. It is essentially made up by utilizing a combination of straw (Wheat or Rice), top soil, and peat. The biomixtures was set up by blending soil (25%) initially, and afterward similarly spread the bio-combination of cleaved straw (half) similarly on the dirt lastly the peat soil (25%) covers the straw and on the top the grass layer is developed.



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Synthesis & characterization of thio-dihydropyrimidone and its derivatives

Anil V Shinde and HM Pawar

Abstract

Dihydropyrimidinones and their corresponding derivatives were synthesized by the union of ethyl aceto acetat, benzaldehyde and thiourea under bronsted acid catalysis condition was pioneered by pietro biginelli in 1893. This review wraps recent mechanistic advances, new pharmacological revelation and new building block of dihydropyrimidinones. On the other hand it also swathe the most recently developed asymmetric synthetic methodologies to offer the enantio enrich dihydropyrimidinones derivatives.

Keywords: benzaldehyde, aceto acetate, thiouera & ethanol

Introduction

A multi component reaction (MCR) is a process in which three or more reactants combined together in one pot to form a product that introduces structural features of each reagent ^[1]. MCRs have played a central role in the development of modern synthetic methodology due to its selectivity, synthetic convergency and atom-economy for pharmaceutical and drug discovery research ^[2]. MCRs are cornerstones of both combinatorial chemistry and diversity-oriented synthesis ^[3].

Combinatorial chemistry is helpful to introduce structural variations in targeted compounds of interest whereas Diversity oriented synthesis is helpful to explore chemical structure space in search of new bioactive small molecules. Both approaches are benefit from the complexity-generating characteristics of MCRs. Another important feature of these reactions implies that the diminution of waste production because of reducing synthetic or isolation steps along with saving time ^[4]. Significant advantages were offered by the multi component strategies over conventional linear-type syntheses ^[5].

One-pot multicomponent synthesis offers simple and valuable synthetic tool to prepare drugs within a minimum number of synthetic steps ^[6]. Therefore, MCRs have gained tremendous importance in the synthesis of drug moieties. One of the widely used classical multicomponent strategies for the synthesis of N-heterocyclic compounds is the Biginelli reaction which was pioneered by Pietro Biginelli in 1893 ^[7].

Biginelli synthesized dihydropyrimidin-2(1H)- (thi) one (4) (DHPM) derivatives by the three-component condensation of an aldehyde, a β -keto ester and urea or thiourea under Bronsted acid catalysis condition ^[8].

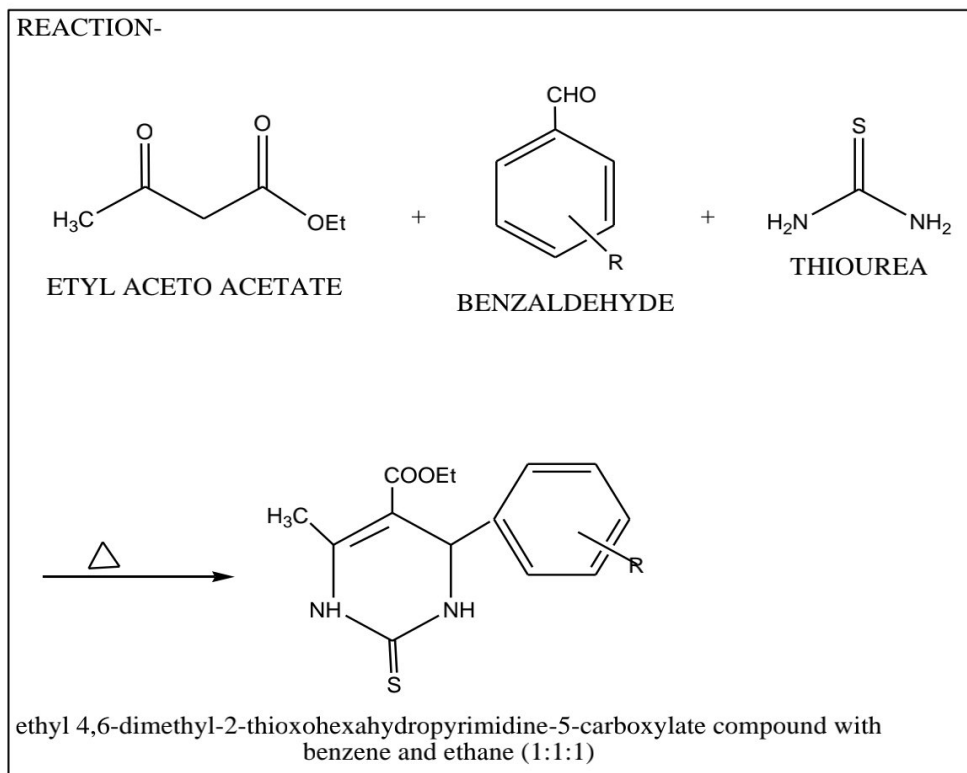
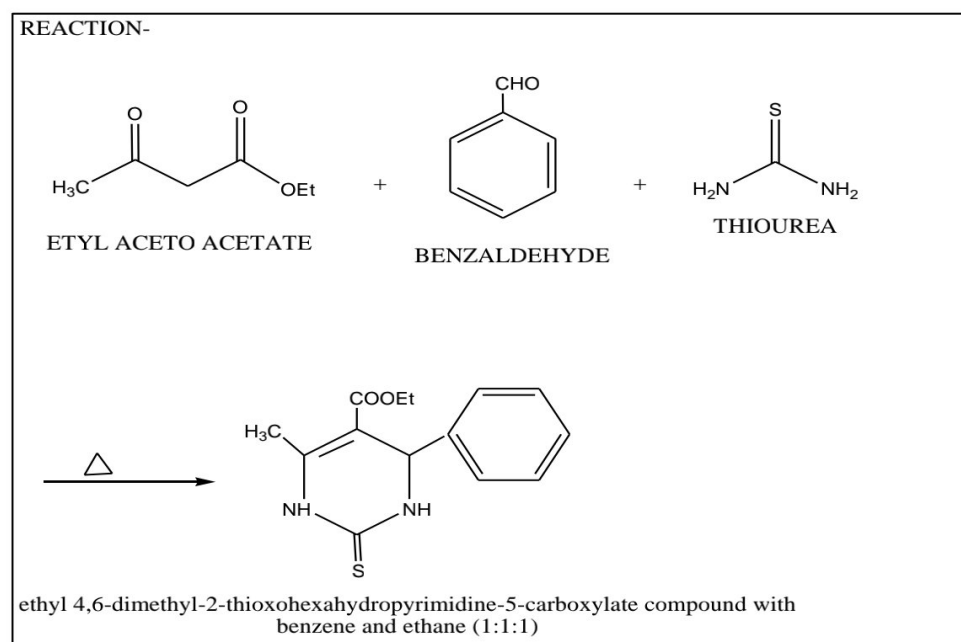
Exprimental Method

A mixture of benzaldehyde (2 gm), ethyl acetoacetate (2.6 gm) and thiourea (2 gm), taken in a round bottom flask was shaken by hand for 2 minutes. The reaction mixture was then heated in a water bath 90^oC for one hour. With progress of the reaction a solid started to deposit and after one hour the flask is full of solid. The solid was washed with cold water (1 ml) and then recrystallized from rectified ethanol.

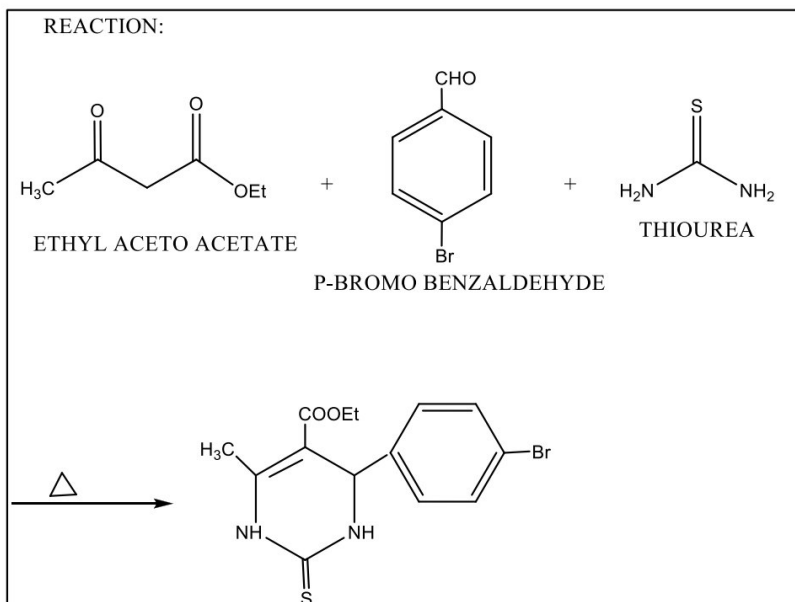
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**Reaction A.****Reaction Time:** -90 Min.**Melting point:** - 120 °C**% Practical Yield:** -78%**Recrystallized solvent:** -Ethanol**Reaction B**

Standard Frequency	Actual Frequency
Ar-CH 2900C0-3000 cm ⁻¹	Ar-CH 3173 cm ⁻¹
Ar-C=C 1500-1600 cm ⁻¹	Ar-C=C 1577 cm ⁻¹
C=O ester 1700-1740 cm ⁻¹	C=O ester 1666 cm ⁻¹
N-H 3300-3500 cm ⁻¹	N-H 3328 cm ⁻¹
C-S 570-610 cm ⁻¹	C-S 596 cm ⁻¹



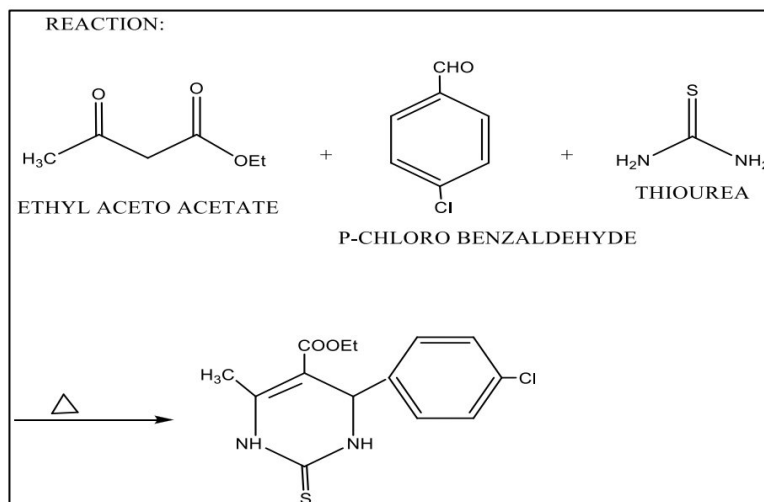
Reaction Time:- 110 Min
% Practical Yield:-75%

Melting point:- 130 °C
Recrystallized solvent:-Ethanol

Reaction C

Standard Frequency	Actual Frequency
Ar-CH 2900C0-3000 cm ⁻¹	Ar-CH 3173 cm ⁻¹
Ar-C=C 1500-1600 cm ⁻¹	Ar-C=C 1577 cm ⁻¹
C=O ester 1700-1740 cm ⁻¹	C=O ester 1666 cm ⁻¹
N-H 3300-3500 cm ⁻¹	N-H 3328 cm ⁻¹
C-S 570-610 cm ⁻¹	C-S 596 cm ⁻¹
C-Br 750-850 cm ⁻¹	C-Br 730 cm ⁻¹

Reaction D.



Reaction Time: 115Min.
% Practical yield:-70%

Melting Point:-65 °C
Recrystallized Solvent:-Ethanol

Standard Frequency	Actual Frequency
Ar-CH 2900C0-3000 cm ⁻¹	Ar-CH 3173 cm ⁻¹
Ar-C=C 1500-1600 cm ⁻¹	Ar-C=C 1577 cm ⁻¹
C=O ester 1700-1740 cm ⁻¹	C=O ester 1666 cm ⁻¹
N-H 3300-3500 cm ⁻¹	N-H 3328 cm ⁻¹
C-S 570-610 cm ⁻¹	C-S 596 cm ⁻¹
C-Cl 650-750 cm ⁻¹	C-Cl 730 cm ⁻¹

Result Table

Sr. No.	Compound	M.P. of product	% yield of product
1	A	120-122	78%
2	B	130-132	75%
3	C	65-67	70%
4	D	100-112	79%

Conclusion

The Thiodihydropyrimidone is a three component coupling reaction product occurs in a single step. The reaction is environmentally and economically free. The purity of the product is very nice and product obtained without any toxic solvent without any reagent and no use of any catalyst the reaction simply taking in presence of heat only. The great achievement of thiodihydropyrimidone obtained by Green methodology. Using green method such product have various biological activities, such as Antibacterial, Antifungal, Antipyretic, Antioxidant, Analgesic, Anti inflammatory activities.

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Dye Removal from Aqueous Solution into Alternative Low Cost Adsorbent: -A Review

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Abstract

This review article provides extensive literature information about dyes, its classification, sources, toxicity, various treatment methods, dye adsorption and characteristics by various adsorbents. The one of the objective of this review article is to organize the scattered available information on various aspects on a wide range of potentially effective adsorbents in the removal of dyes. Therefore, an extensive list of various adsorbents such as natural materials, waste materials from industry, agricultural by-products, and biomass based activated carbon in the removal of various dyes has been compiled here. Dye bearing waste treatment by adsorption using low cost alternative adsorbent is a demanding are double benefits i.e. water treatment and waste management. Further, activated carbon from biomass has the advantage of offering an effected low cost replacement form on-renewable coal based granular activated carbon provided that they have similar or better adsorption on efficiency. The effectiveness of various adsorbents under different physio-chemical process parameters and their comparative adsorption capacity towards dye adsorption has also been presented. This review paper also includes the factors affective adsorption of dye such as solution pH, initial dye concentration, adsorbent dosage, and temperature.

Keywords: - Adsorption, Biodegradable solid waste, Dye, waste water treatment.

Introduction

Water is very essential to our life, animal life, processing industry, plantation and aquatic system. If the dye effluent wastewater discharges in hydrosphere, because of that water quality degrade and their adverse effect to environment. The greatest environmental concern problem deals with dyes absorption and reflection of sunlight that entered to water which interferes on the growth of bacteria level cannot biologically degradable in the water body. Because color is very high wavelength (200 to 800 nm) in the water so directly effect on absorption of sun light in water body and there also side effect on photosynthesis reaction, when lake of photosynthesis reaction its adverse effect of plankton growth and their adverse effect to fisheries production.[1]. If fish production is low so naturally water purification system effect and there directly impact too environmentally and economically loss due to discharge of effluent dye wastewater in fresh water. This problem can be solved by different engineering method such as physical method, chemical method and biological method.

The Some dye manufacturing institute showed that the basic dyes are generally more toxic than acid or direct dyes. And some commercial dye are harmful to some microorganisms. Many dyes may cause allergic derma tics, dysfunction of kidney, skin irritation, central nervous system, liver, and brain. Organic dyes are harmful to human beings. The need to remove dye from waste water effluents become environmentally significance

The main factor which on the adsorption process are surface area, pore size, chemical composition and dyes properties such as molecular size, molecular polarity. Activated carbon is the most widely used adsorbent for dye removal because of its micro -pore structures, high adsorption capacity, extended surface area and high degree of surface reactivity. However, commercially available activated carbon is very expensive and has high regeneration cost.

Dyeing is a process of coloring the fabric using dyes which are organic compounds. They are widely used for imparting colour to textiles industry and other many industry. They are produced either synthetic or naturally. Dyeing properties depended on two reasons. First, the sizes of the dye molecules are smaller than the size of the pores in the fiber. The second reason is the affinity of the dye to the fiber due to forces of attraction. The dye which has diffused or penetrated into the fiber is held there by the forces of attraction between the dye and the fiber. Dyes could be either obtained from natural and synthetic sources. Dye is naturally occurring in the nature such as wood, leaf of tree, soil, bark of tree, seed, root, minerals, fungi, and insect, clay and microorganism. Sources of dye are two type, naturally and synthetic. Naturally dye source is from clay, bark of tree. Leaf, root .seed, fungi, Minerals and microorganism [2]. Synthetic dyes are obtained from many different industry such as cosmetics industry, printing industry, rubber industry, plastic industry, textiles industry and dye and pigment industry. All the above industry effluent discharge in fresh water source so water quality degradable.

Method of dye removal.

Basically there are three methods Such as Physical Methods, chemical Methods & Biological Methods

Physical method

Physical method includes as membrane filtration process, reverse osmosis, electrolysis, sedimentation, and adsorption. Adsorption treatment method is an effective alternative method used to remove dye from waste water. The adsorption treatment has many advantages such as low cost; easily change, less susceptibility to toxic chemicals, greater flexibility in design and operation. Generally two type adsorbent uses **a**). Natural adsorbents **b**) Prepared activated carbon.



Natural adsorbents used for dye removal such as clay, siliceous materials, zeolites etc.

Prepared agricultural waste materials used as low cost adsorbent such as orange peel, banana peel, rice husk, almond shell, soybeans husk and coconut shell. Their adsorption capacity varies with various factors affecting are adsorbent dosage, contact time, pH value, agitation speed, ionic strength, temperature and initial dye concentration etc.

Chemical method

Chemical method includes coagulation/flocculants, oxidation, ion-exchange, and neutralization. It involves the addition of substances such as aluminium, calcium and ferric ions in to the effluent, as such flocculation. [3]. Generally, a chemical treatment has feasibility, economic and efficiency, but major drawback is that, the costs of chemical are expensive.

Biological method

Biological method includes such as activated sludge, anaerobic digestion and aerobic digestion adsorption by (living order) microbial biomass, fungal decolonization, and microbial degradation. Microorganism such as fungi, yeast, bacteria and algae are able to accumulate dye and degrade different pollution [4]. Biological treatment may be aerobic and anaerobic. But the major drawback is that required large land area and high construction cost. Table 1 gives advantage and disadvantage of dye removal methods

Table 1: Advantages and Disadvantage of Dye Removal Methods [1].

No.	Methods	Advantages	Disadvantages
1.	Adsorption by activated carbon (physical treatments)	Good removal capacity of different variety of dyes	Very costly
2.	Membrane filtration	Removal all types dye	Concentrated sludge production, blocking problems, maintenance cost very high.
3.	Ozonation (chemical treatments)	Ozone can be applied in its gaseous state and does not increase the sludge and volume of waste water.	Very costly and short half-life(20)min
4.	Electro chemical destruction	No sludge formation and does not use chemical component	Relatively high power at electrode use a direct decrease in dye removal
5.	Microbial cultures (mixed bacterial) biological treatments	Decolorized in 24-30hr	Under the aerobic condition azo dyes are not readily metabolized
6.	Adsorption by living/dead microbial biomass	Certain dyes have a particular affinity for binding with microbial species	Not effective for all dyes
7.	Prepared activated carbon sample (bark of vachellianilotica)	Good removal capacity of different dyes	Low cost

Classification of Dye

Mainly dyes are two types

1. Natural Dye
2. Synthetic Dye.

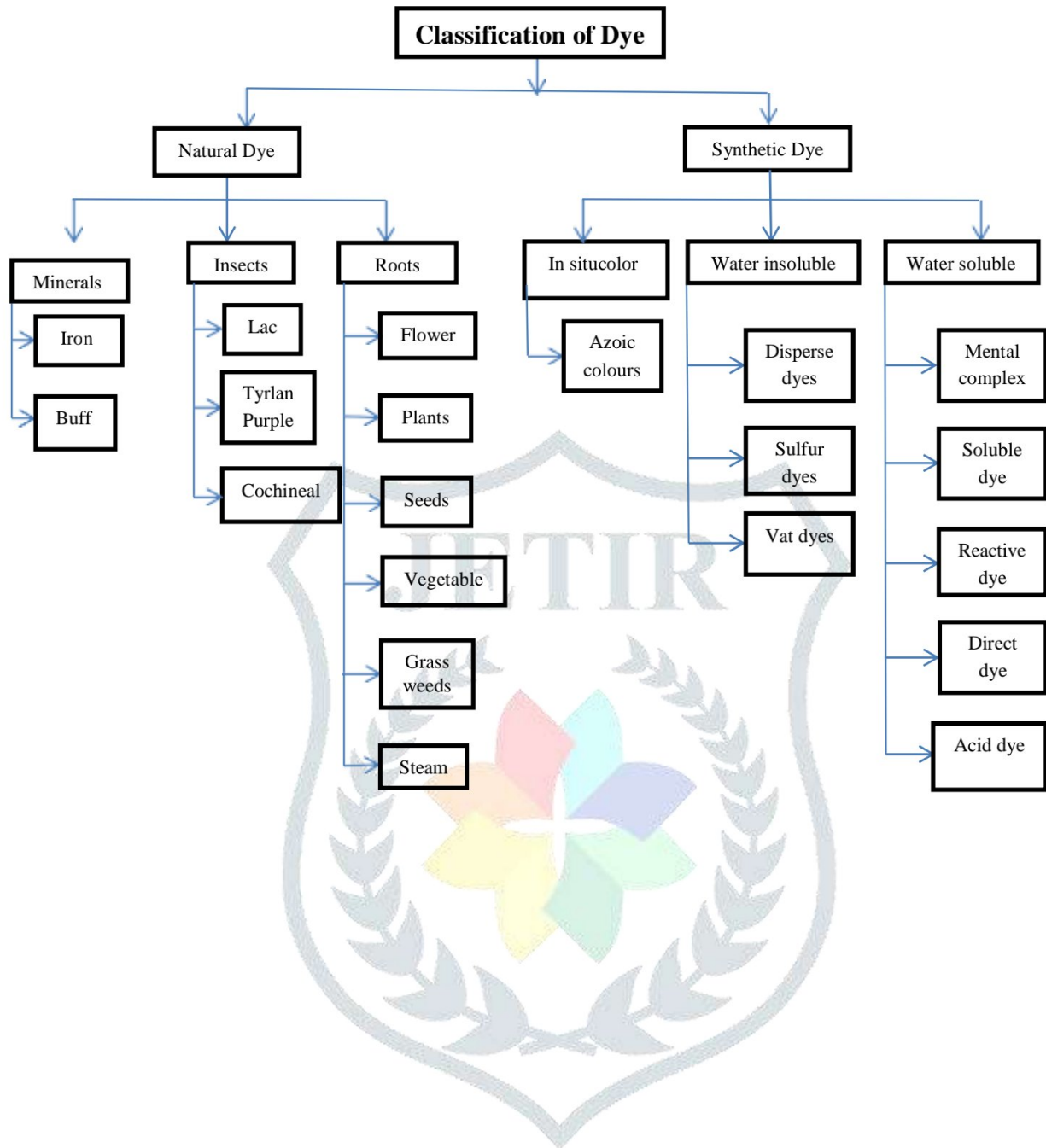
Natural Dye

Natural dyes are organic compounds used to colour various products. In Prior to the year of 1856, natural dyes are extracted from plants, animals, insects and minerals sources. Natural dyes are such as Turmeric, Weld, Onion, Jackfruit, henna, eucalyptus are used in the early textile industry. Due to the increase in population and industrial activities, natural dyes do not meet the industrial demand and their applications have

Synthetic Dye

The first synthesis dye was discovered by William Henry Perkin in 1856. Dye effluents are produced because dyes do not have a complete degree of fixation to fiber during dyeing and finishing processes [5]. Dye based effluents can cause a serious hazard to the water stream and environment due to their synthetic origin and complex molecular structures which decrease their ability to biodegrade. There are various types of dyes used in various industries such as acid dyes, reactive dyes, basic dyes, azo dyes, direct dyes, vat dyes and disperse dyes [6]. All dyes are water soluble except disperse dyes and vat dyes. All dyes contain traces of metals such as copper, zinc, lead, chromium and cobalt in their aqueous solution except vat and disperse dyes. Dye bearing effluents from these industries are characterized by its high colour, organic content and hazardous as well. It is estimated that more than 100,000 commercial dyes are known with an annual production of more than 7×10^5 tonnes per year [2]. Dyes are broadly classified into cationic, anionic and non-ionic dyes.

Anionic dyes include various dyes groups such as acid dyes, reactive dyes, azo dyes Figure -1 shows the classification of dyes.



Desiccation & Result

Factors Affecting Adsorption of Dye

There are many factors affecting dye adsorption such as solution pH, temperature, initial dye concentration, etc. Thus, the effects of these parameters are to be taken into account. Optimization of such conditions will greatly help in the development of industrial-scale dye removal treatment process. In this section, some of the factors affecting adsorption of dyes are discussed below:

Effect of solution pH

One of the most important factors affecting the capacity of adsorbent in wastewater treatment is solution pH. The efficiency of adsorptions dependent on the solution pH, since variation in pH leads to the variation in the degree of ionization of the adsorptive molecule and the surface properties of adsorbent [7]. [8] studied the effect of solution pH on the adsorption of Basic Green 4 dye by Ananscomosus leaf powder and they noticed that at a pH range from 2 to 10, the dye removal ratio was maximum at a pH 10. [9] studied the effect of solution pH on the adsorption of Congo red by pine cone and they noticed that the adsorption was maximum at pH of 3.5. [10] studied the adsorption of RB4 dye by modified barley straw and they found that RB4 gives a complete removal of 100% at pH of 3 and decreased value below 50% as the pH was increased. [11] reported that adsorption of cationic dye MB onto raw pine leaves biomass was increased with increase in solution pH (Figure 1). Table 4 reported the compilation of different studies on the effect of solution pH on dye adsorption.

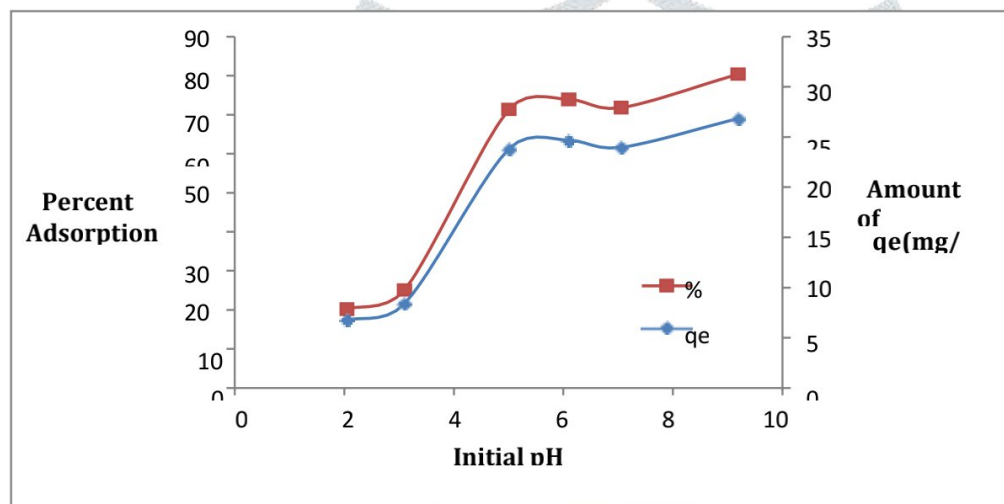


Fig.1 Effect of initial solution pH on the adsorption of Methylene Blue (MB) on pine leaves [11]

The adsorption ability of the surface and the type of surface active centers are indicated by the significant factor that is the point of zero charge (pH_{pzc}) [12]. The pH at which the surface charge is zero is called the point of zero charge (pzc) and is typically used to quantify or define the electro kinetic properties of a surface. The value of pH is used to describe pzc only for systems in which H^+/OH^- are the potential determining ions. Many researchers studied the point of zero charge (pH_{pzc}) of various adsorbents prepared from agricultural solid wastes; in order to understand and the adsorption mechanism. Due to presence of functional group such as OH^- group, cationic dye adsorption is favoured at $pH > pH_{pzc}$, whereas, anionic dye adsorption is favoured at $pH < pH_{pzc}$ where the surface becomes positively charged [12].

Effect of initial dye concentration

The amount of adsorption for dye removals highly dependent on the initial dye concentration. The effect of initial dye concentration depends on the immediate relation between the concentration of the dye and the available sites on an adsorbent surface. In General, the percentage of dye removal decreases with an increase in the initial dye concentration, which may be due to the saturation of adsorption sites on the adsorbent surface. On the other hand the increase in initial dye concentration will cause an increase in the capacity of the adsorbent and this may be due to the high driving force for mass transfer at a high initial dye concentration [13-14] studied the adsorption of Methyl Orange by Chitosan/Alumina interface and it was found that when the Methyl Orange concentration increased from 20 mg/L to 400mg/L, the percentage of dye removal decreased from 99.53% to 83.55% with the same MB concentration range. [11] studied the effect of initial dye concentration on the adsorption of methylene blue (MB) by pine leaves and they noticed that as the initial dye concentration increase from 10 to 90 mg/L, the percentage removal of dye decreased from 96.5 to 40.9% on increasing the initial dye concentration from 10 to 90 mg/L after 240 minutes. Fig 2 showed that the amount of CR dye adsorption increased with increase initial dye concentration.

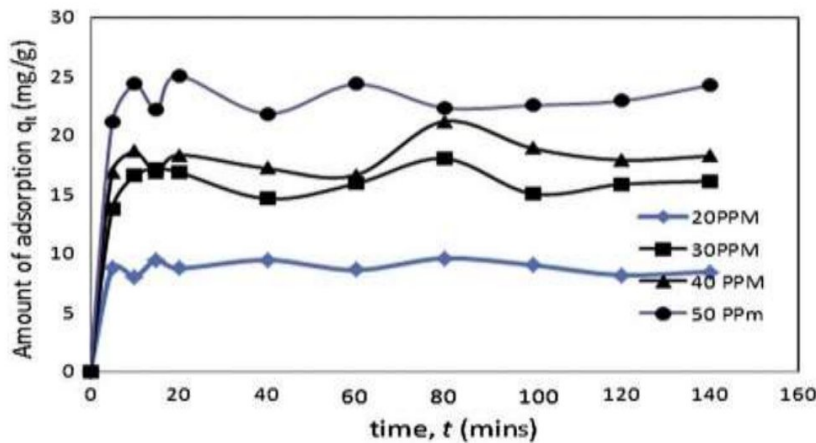


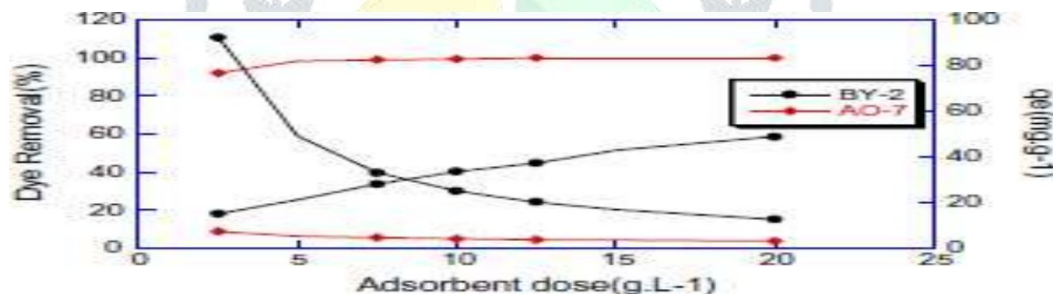
Fig.1 Effect of Initial Dye concentration (amount of CR dye adsorption increased with increase initial dye concentration.)

Effect of Temperature

Effect of temperature is another significant physio-chemical process parameter because temperature will change the adsorption capacity of the adsorbent [15]. If the amount of adsorption increases with increasing temperature then the adsorption is an endothermic process. This may be due to increasing mobility of the dye molecules and an increase in the number of active sites for the adsorption with increasing temperature. Whereas the decrease of adsorption capacity with increasing temperature indicates that the adsorption is an exothermic process. This may be due to increasing temperature decrease the adsorptive forces between the dye species and the active sites on the adsorbent surface as a result of decreasing the amount of adsorption [1].

Effect of Amount of Adsorbent

Adsorbent dosage is an important process parameter to determine the capacity of an adsorbent for a given amount of the adsorbent at the operating conditions. Generally the percentage of dye removal increases with increasing adsorbent dosage, where the quantity of sorption sites at the surface of adsorbent will increase by increasing the amount of the adsorbent. The effect of adsorbent dosage gives an idea for ability of a dye adsorption to be adsorbed with a smallest amount of adsorbent, so as to recognize the capability of a dye from an economical point of view [1] Fig 3 presented the effect of doses on the removal of acidic and basic dye by tea waste [16].



. Fig 3 presented the effect of doses on the removal of acidic and basic dye by tea waste.

Various Adsorbents in the removal of Dyes from aqueous Solution

Activated carbon

Activated carbon is the most popular for the removal of pollutants from wastewater among all the sorbent materials proposed [17, 18]. In particular, the effectiveness of adsorption on activated carbons for removal of a large variety of dyes from waste water such as made it an ideal alternative to the expensive treatment options [17]. However, activated carbon possess several disadvantages, it is quite expensive, problem in regeneration, non-selective and ineffective against disperse and vat dyes [18]. The use of carbons based on relatively expensive starting materials is also unjustified for most pollution control applications [19]. This has led many researcher to search for alternative low cost adsorbents.

Low Cost Adsorbents for Dyes Removal

Selection of the precursor for the development of low cost adsorbents depends on many factors. The precursor should be freely available, in-expensive and non-hazardous in nature. In recent times, attention has been focused on different natural solid, which are able to remove pollutants from contaminated water at low cost. Cost is an important parameter for comparing the sorbent materials. In general, a sorbent can be assumed to be "low cost" if it requires little

processing and is abundant in nature, or waste material from another industry, which has lost its economic or is a by-product or further processing values. There are many low cost adsorbents that have been used for the removal of dyes. Also certain waste products from industrial and agricultural operations, natural materials and biosorbents represent potentially economical alternative sorbents. Many of them have been tested and proposed for dye removal. Waste treatment by adsorption using low cost adsorbent is a demanding area as it has double benefits i.e. water treatment and waste management. Given below table shows example of adsorption for removal of dye The use of agricultural waste helps to reduce the waste and produce a better waste minimization plan. Various cost effective adsorbents have been successfully used in the removal of textile dyes from.

Adsorbents	Dyes	Adsorption capacity (mg/g)	Reference
Raw coffee residue	Basic blue3G	251	[21]
Coffee waste	Toluidine Blue	142.5	[22]
Raw coffee residue	Remazol Blue	232	[21]
Pinecone	Congo red	19.18	[24]
Acid treated pinecone	Congo red	40.19	[24]
Palm shell	Reactive red 141	14	[29]
Palm shell	Reactive blue 21	24.7	[29]
Pinecone	Methylene blue	109.9	[28]
Pine tree leaf	Methylene Blue	126.6	[27]
Pinecone	Acid Black 26	62.9	[25]
Pinecone	Acid Green 25	43.3	[25]
Pinecone	Acid Blue 7	37.4	[25]
Pine tree leaves	Basic red 46	71.9	[23]
Organ attapulgite	Congo red	189.4	[31]
Rice husk	Indigo Carmine	65.9	[30]
Rice husk	Methylene blue	40.6	[26]
Pine saw dust	Acid yellow 132	398.8	[30]
Pine saw dust	Acid blue 256	280.3	[30]
Coffee residues	Basic Blue 3G	179	[32]
Poplar leaf	Methylene Blue	135.35	[61]
Swede rape straw	Methylene Blue	246.4	[33]
Grape fruit peel	Crystal violet	254.16	[34]
Wheat bran	Crystal violet	80.37	[35]
Japonica	Crystal violet	82.83	[35]
Coniferous pinus bark	Crystal violet	32.78	[36]
Citrus sinensis Bagasse	Methylene Blue	96.4	[37]
Peanut hull	Methylene Blue	68.06	[38]
Banana peel	Methylene Blue	20.8	[39]
Pine apple stem	Methylene Blue	119.05	[40]
Pine sawdust	Acid yellow 132	398.8	[30]
Garlic peel	Methylene Blue	82.64	[41]
Coconut bunch waste	Methylene Blue	70.92	[42]
Coffee husk	Methylene Blue	90.1	[43]
Rubber seed shell	Methylene Blue	82.64	[44]
Ground hazel nutshells	Methylene Blue	76.9	[60]
Walnut sawdust	Methylene Blue	59.17	[60]
Yellow passion fruit waste	Methylene Blue	44.7	[46]
Rice husk	Methylene Blue	40.59	[47]
Cherry sawdust	Methylene Blue	39.84	[60]
Coconut coir	Methylene Blue	15.59	[48]
Neem leaf powder	Methylene Blue	3.67	[49]
Pine apple leaf powder	Crystal violet	78.22	[50]
Sawdust	Crystal violet	37.83	[51]
Rice husk	Crystal violet	44.87	[52]
Orange Peel	Methylene Blue	18.6	[39]
Mango seed kernel	Methylene Blue	142.86	[53]

Pine Tree Leaves	Basic Red 46	71.94	[62]
Pinecone	Basic Red 46	73.53	[54]
Canola hull	Basic Red 46	49.00	[55]
Princess tree leaf	Basic Red 46	43.1	[56]
Rice husk	Direct Red 23	4.35	[57]
Rhizophoraapiculata bark	Direct Red 23	21.55	[58]
Pea nut hull	Reactive Black 5	55.55	[59]

Conclusion:-

A review of various type of activated carbon as adsorbent has been presented. The use of these activated carbon as adsorbent is recommended since they show a good potential in eliminating dyes from industrial wastewater, easily available, low cost and renewable. This paper presented the potential of adsorption process using activated carbon from agricultural waste to remove dye from textile wastewater. The factors effecting dye adsorption such as contact time, adsorbent dosage, pH and initial dye concentration has been discussed. Solution of pH turn to be the most important condition in adsorption process as for anionic dye, a low pH value are preferable in contrast for cationic dye where the suitable pH value is high. For the adsorbent dose, that the adsorption capacity increase along with the increment of adsorbent dosage due to the increase of available amount of sorption site. It was also highlighted that the contact time between adsorbent and dye affecting the efficiency of dye removal where strong attraction force will shorten the time. As for the effect of dye initial concentration, increasing the initial concentration, enhance the increment of adsorbent surface area to adsorb dyes. Extensive studies in literature show that industrial waste and biosorbent activated carbon are among the less selective compound in removing dye. Furthermore, agricultural waste activated carbon showed effectiveness in removing dye such as basic dye and direct dye yet often being test for other pollutant such as copper II, fluoride and phenol. However, the raw material of activated carbon to be used are depends on the local sources available at low cost. According to the literature reviewed, these adsorption method using agricultural waste activated carbon have potential to be applied at full-scale wastewater treatment. These low cost adsorbent can used to replace the expensive adsorbents in the market nowadays.

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Synthesis & characterization of thio-dihydropyrimidone and its derivatives

Anil V Shinde and HM Pawar

Abstract

Dihydropyrimidinones and their corresponding derivatives were synthesized by the union of ethyl aceto acetat, benzaldehyde and thiourea under bronsted acid catalysis condition was pioneered by pietro biginelli in 1893. This review wraps recent mechanistic advances, new pharmacological revelation and new building block of dihydropyrimidinones. On the other hand it also swathe the most recently developed asymmetric synthetic methodologies to offer the enantio enrich dihydropyrimidinones derivatives.

Keywords: benzaldehyde, aceto acetate, thiouera & ethanol

Introduction

A multi component reaction (MCR) is a process in which three or more reactants combined together in one pot to form a product that introduces structural features of each reagent ^[1]. MCRs have played a central role in the development of modern synthetic methodology due to its selectivity, synthetic convergency and atom-economy for pharmaceutical and drug discovery research ^[2]. MCRs are cornerstones of both combinatorial chemistry and diversity-oriented synthesis ^[3].

Combinatorial chemistry is helpful to introduce structural variations in targeted compounds of interest whereas Diversity oriented synthesis is helpful to explore chemical structure space in search of new bioactive small molecules. Both approaches are benefit from the complexity-generating characteristics of MCRs. Another important feature of these reactions implies that the diminution of waste production because of reducing synthetic or isolation steps along with saving time ^[4]. Significant advantages were offered by the multi component strategies over conventional linear-type syntheses ^[5].

One-pot multicomponent synthesis offers simple and valuable synthetic tool to prepare drugs within a minimum number of synthetic steps ^[6]. Therefore, MCRs have gained tremendous importance in the synthesis of drug moieties. One of the widely used classical multicomponent strategies for the synthesis of N-heterocyclic compounds is the Biginelli reaction which was pioneered by Pietro Biginelli in 1893 ^[7].

Biginelli synthesized dihydropyrimidin-2(1H)- (thi) one (4) (DHPM) derivatives by the three-component condensation of an aldehyde, a β -keto ester and urea or thiourea under Bronsted acid catalysis condition ^[8].

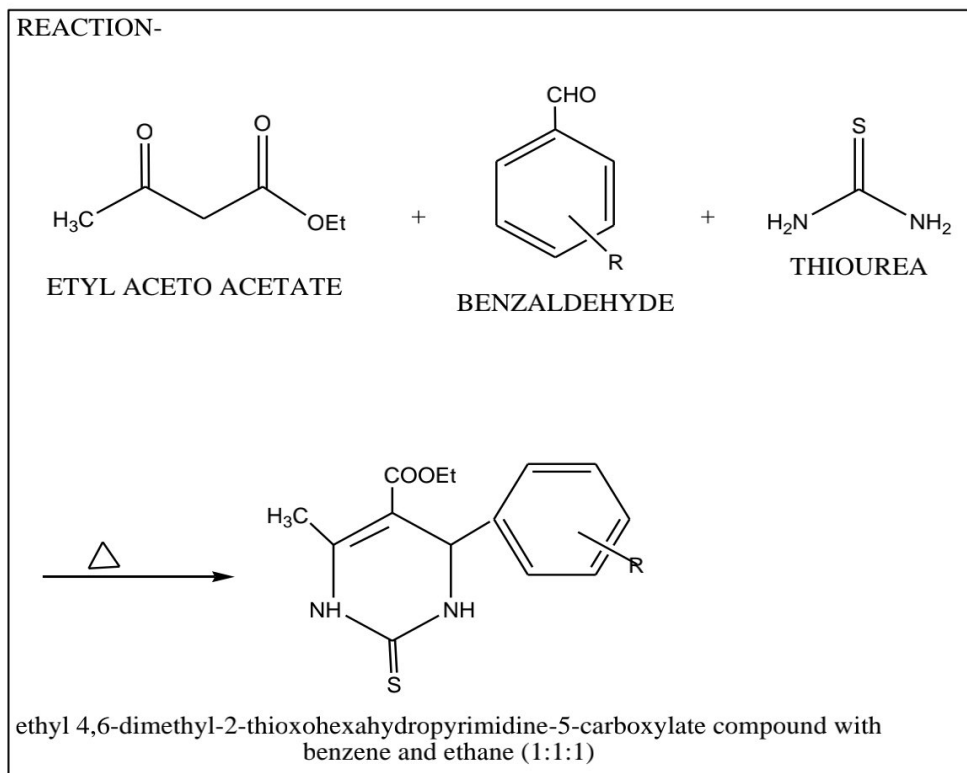
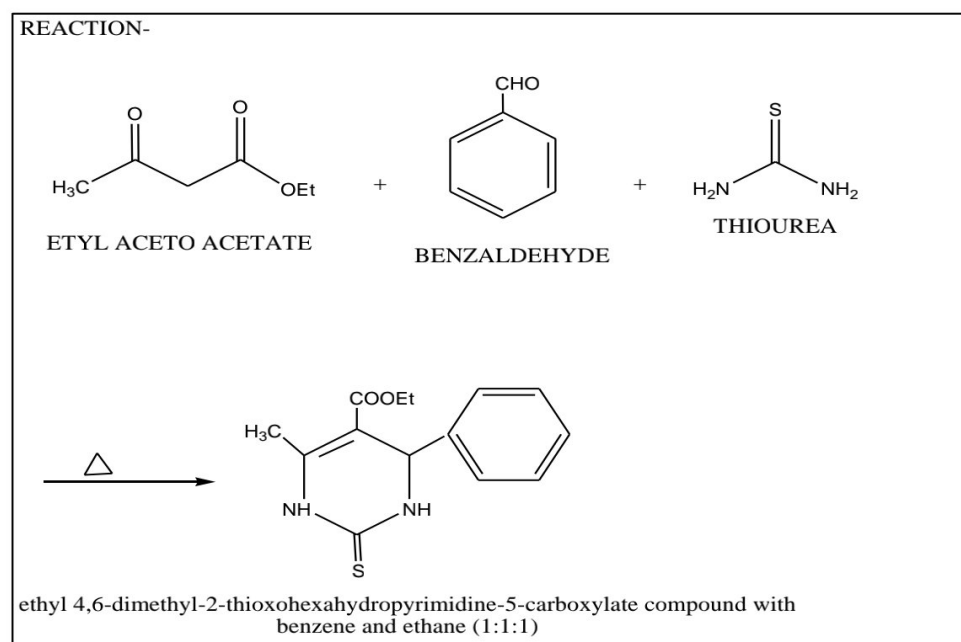
Exprimental Method

A mixture of benzaldehyde (2 gm), ethyl acetoacetate (2.6 gm) and thiourea (2 gm), taken in a round bottom flask was shaken by hand for 2 minutes. The reaction mixture was then heated in a water bath 90^oC for one hour. With progress of the reaction a solid started to deposit and after one hour the flask is full of solid. The solid was washed with cold water (1 ml) and then recrystallized from rectified ethanol.

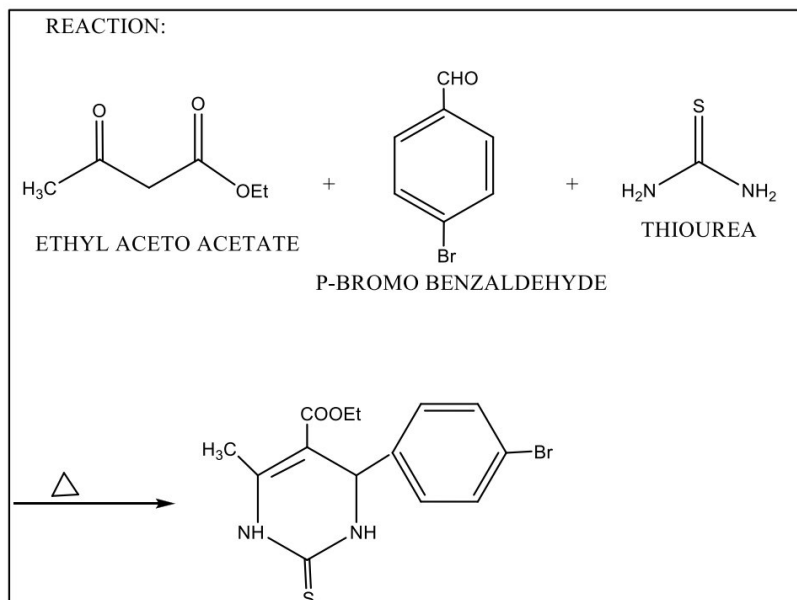
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**Reaction A.****Reaction Time:** -90 Min.**Melting point:** - 120 °C**% Practical Yield:**-78%**Recrystallized solvent:**-Ethanol**Reaction B**

Standard Frequency	Actual Frequency
Ar-CH 2900C0-3000 cm^{-1}	Ar-CH 3173 cm^{-1}
Ar-C=C 1500-1600 cm^{-1}	Ar-C=C 1577 cm^{-1}
C=O ester 1700-1740 cm^{-1}	C=O ester 1666 cm^{-1}
N-H 3300-3500 cm^{-1}	N-H 3328 cm^{-1}
C-S 570-610 cm^{-1}	C-S 596 cm^{-1}



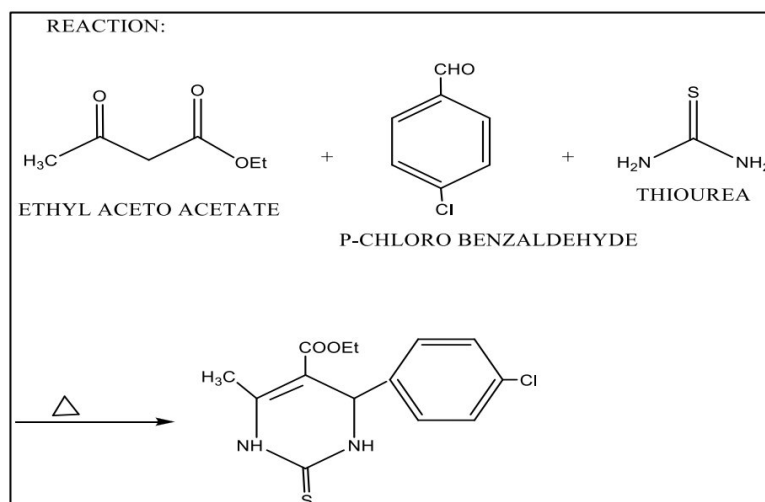
Reaction Time:- 110 Min
% Practical Yield:-75%

Melting point:- 130 °C
Recrystallized solvent:-Ethanol

Reaction C

Standard Frequency	Actual Frequency
Ar-CH 2900C0-3000 cm ⁻¹	Ar-CH 3173 cm ⁻¹
Ar-C=C 1500-1600 cm ⁻¹	Ar-C=C 1577 cm ⁻¹
C=O ester 1700-1740 cm ⁻¹	C=O ester 1666 cm ⁻¹
N-H 3300-3500 cm ⁻¹	N-H 3328 cm ⁻¹
C-S 570-610 cm ⁻¹	C-S 596 cm ⁻¹
C-Br 750-850 cm ⁻¹	C-Br 730 cm ⁻¹

Reaction D.



Reaction Time: 115Min.
% Practical yield:-70%

Melting Point:-65 °C
Recrystallized Solvent:-Ethanol

Standard Frequency	Actual Frequency
Ar-CH 2900C0-3000 cm ⁻¹	Ar-CH 3173 cm ⁻¹
Ar-C=C 1500-1600 cm ⁻¹	Ar-C=C 1577 cm ⁻¹
C=O ester 1700-1740 cm ⁻¹	C=O ester 1666 cm ⁻¹
N-H 3300-3500 cm ⁻¹	N-H 3328 cm ⁻¹
C-S 570-610 cm ⁻¹	C-S 596 cm ⁻¹
C-Cl 650-750 cm ⁻¹	C-Cl 730 cm ⁻¹

Result Table

Sr. No.	Compound	M.P. of product	% yield of product
1	A	120-122	78%
2	B	130-132	75%
3	C	65-67	70%
4	D	100-112	79%

Conclusion

The Thiodihydropyrimidone is a three component coupling reaction product occurs in a single step. The reaction is environmentally and economically free. The purity of the product is very nice and product obtained without any toxic solvent without any reagent and no use of any catalyst the reaction simply taking in presence of heat only. The great achievement of thiodihydropyrimidone obtained by Green methodology. Using green method such product have various biological activities, such as Antibacterial, Antifungal, Antipyretic, Antioxidant, Analgesic, Anti inflammatory activities.

Reference

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Effect of Alprazolam On Morphometric Parameters of Life Cycle Stages of
***Lucilia Sericata* (Diptera: Calliphoridae)**

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Abstract: *Lucilia sericata* (Diptera: Calliphoridae) species were collected on the decaying meat in the Aurangabad region. The development is holometabolous and the life cycle includes egg, three instars, pre-pupa, pupa and adult stages. Changes in the life cycle of *Lucilia sericata* species was studied after exposure to alprazolam. The alprazolam treated food cause the effect on growth of the larvae. As the concentration of alprazolam increases in the food the larval development slows down and the pupal development was also delayed. The flies emerged first from control then from 0.4 ppm, while in higher concentrations of alprazolam, the pupation was delayed.

Key words: Calliphoridae, *Lucilia sericata*, alprazolam, life cycle.

1. INTRODUCTION:

Forensic science is the application of a broad spectrum of sciences to answer questions in relation to a crime or a civil action. The main areas used in forensic science are biology, chemistry and medicine, although it also includes the use of computer science, physics, geology and psychology. Forensic scientists study objects, substances, chemicals, tissue traces and impressions left at the crime scene. It fulfills the growing demand for expertise in investigatory, enforcement and monitoring work, including incident scene investigation, physical evidence collection and laboratory analysis of evidence and defense of testimony (Lincoln, 2010).

Forensic entomology is mainly associated with death investigations however it may also be used to detect poisons and drugs, determine the location of an incident and the presence and time of the infliction of wounds. Forensic entomology is the broad field where arthropod science and the judicial system interact. It has been subdivided into three principal areas focused on those issues are most often litigated (Lord and Stevenson, 1986).

Blowflies are usually the first organisms to arrive at a corpse, sometimes within minutes of death and they are also the species of greatest forensic importance (Goff, 2000; Byrd and Castner, 2001; Arnaldos et al., 2005). A blow fly belongs to the family Calliphoridae and are commonly called greenbottles or bluebottles. *Lucilia sericata* is the most well-known green bottle fly species found in most areas of the world and *Lucilia sericata* begin their life cycle by laying a mass of eggs in a wounded area, corpse or in necrotic or decaying tissue.

Sedatives at higher doses may result in slurred speech, staggering gait, poor judgment and slow, uncertain reflexes. All sedatives when taken regularly over a period of time can cause physiological and psychological dependence, even at therapeutic doses (Yi et al., 2007; Ebert et al., 2006 and Sarreccchia et al., 1998). Dependent users may shows symptoms ranging from restlessness and insomnia to convulsions and death. When users become psychologically dependent, they feel as if they need the drug to function.

Alprazolam has a relatively high potential for recreational use and is the most commonly misused benzodiazepine. It is primarily used to treat moderate to severe anxiety disorders, panic attacks, moderate depression. Overdoses of alprazolam can be mild to severe depending on how much of the drug is taken. Alprazolam is significantly more toxic in overdose having higher rates of fatalities compared to other benzodiazepines. Combined overdose with tricyclic antidepressants, opiates or alcohol or overdoses of alprazolam in the elderly significantly increases the possibility for severe toxicity and fatality.

Forensic entomology is a recognized method of estimation postmortem interval, but comparatively little research has carried out in the use of larvae in forensic entomology in India. Forensic entomology-toxicology includes the study of effects of toxins and drugs on development rate of carrion-feeding insects. Analysis of living material, such as larvae offers a number of technical advantages for detection of drug in putrefied human remains. The presence of the sedative drugs in the dead tissue can also affect on the longevity of the life cycle stages of the insects of forensic

importance and hence it is essential to study the effect of the sedative drug alprazolam on the periods of the developmental stages of blow flies.

2. MATERIALS AND METHODS:

The *Lucilia sericata* (Calliphoridae) flies were used as the biomaterials. The flies do not need the flesh of specific animal and hence those which occurs on the dead human body, also occurs on the flesh of any animal and hence for the study goat or other available flesh in the market was used. After one day of putrification, the liver and other meat was placed in open air for collection of flies. After sometime the flies gathered on the rotten liver. The flies of calliphoridae family were collected by means of insect collecting net after identification they were released in insect rearing cages.

TREATMENT OF ALPRAZOLAM:

The flesh was finely chopped in the mixer and was mixed with the alprazolam so as to make the concentration as 0.4 ppm, 0.8 ppm, 1.2 ppm and 1.6 ppm. The concentrations were decided as per the doses given to the human with respect to the effective doses. The first instar maggots were released on the 50 gms each of the diazepam mixed flesh in separate culture chambers, one with only flesh was maintained as control. Fresh chopped meat was provided twice a day as food. Honey soaked in cotton was also provided as the source of sugar and glucose. Wet cloth piece was maintained on one side of the cage to maintain the humidity. The feed was changed on each day and the mortality was recorded.

The developing stages were collected on each day, were narcotized in menthol water and were stored in vials containing AGA solution (alcohol, glycerol and acetic acid). Narcotization inactivates the maggots at relaxed condition and thus after preservation there is no contraction of the maggots. The vial was labeled as the stage collected, date and time. The stages were photographed and weighed on the electronic balance. Measurements of these stages were made by means of the microscope whose least count is 0.001. At the same time the temperature and humidity were recorded. Measurements of five maggots were done at each time and their average with the standard deviation. Difference among the mean values of control and treated were analyzed by Student’s t-test. Difference were considered statistically significant when, $p < 0.05$. The data obtained is tabulated in the tables for different groups.

3. RESULTS AND DISCUSSION:

The flies belonging to the family calliphoridae of the order diptera found on the decaying flesh in Aurangabad region were *Lucilia sericata*. For the treatment of alprazolam eggs of *Lucilia sericata* were collected on first day. Then thirty eggs were placed separately on 0.0 ppm (Control), 0.4 ppm, 0.8 ppm, 1.2 ppm, 1.6 ppm alprazolam containing chopped flesh. The observations were made each day with respect to the dose of concentrations and are given in the table 1.

The results showed that alprazolam treated food cause the effect on growth of the larvae. As the quantity of alprazolam increases in the food the larval development slows down and the pupal development was also delayed. The flies emerged first from control then from 0.4 ppm, while in higher concentrations, the pupation was delayed as per the dose of alprazolam as given in table 1. The temperature variations and the humidity variations in the room conditions at the time of experiment are also mentioned in the table.

TABLE 1. Effect of alprazolam on the Morphometric parameters of life cycle stages of *Lucilia sericata*.

PMI Days	Stages	Conc of Alprazolam	Length (mm)	Width (mm)	Weight (mg)	Temperature °C			Humidity %		
						Max	Min.	Recorded	Max	Min.	Recorded
1	I st Instar	Control	3.5±0.018	0.8±0.001	04±0.18	38.2	30	34.3	38	15	27
	I st Instar	0.4 ppm	3.5 ^{NS} ±0.019	0.8 ^{NS} ±0.01	04 ^{NS} ±0.19						
	I st Instar	0.8 ppm	3.4 ^{NS} ±0.017	0.7 ^{NS} ±0.009	03 ^{NS} ±0.14						
	I st Instar	1.2 ppm	3.3 ^{NS} ±0.017	0.6 ^{NS} ±0.008	02*±0.10						
	I st Instar	1.6 ppm	3.2*±0.016	0.5*±0.009	02*±0.11						
2	II nd Instar	Control	7.1±0.034	1.5±0.04	14±0.76	36.4	29	33.3	40	16	29
	II nd Instar	0.4 ppm	7.1 ^{NS} ±0.031	1.4 ^{NS} ±0.04	14 ^{NS} ±0.78						
	II nd Instar	0.8 ppm	7.0 ^{NS} ±0.034	1.4 ^{NS} ±0.03	13 ^{NS} ±0.74						
	II nd Instar	1.2 ppm	6.9 ^{NS} ±0.032	1.3 ^{NS} ±0.03	12*±0.71						
	II nd Instar	1.6 ppm	6.7*±0.030	1.2*±0.021	11*±0.70						
3	III rd Instar	Control	9.1±0.63	2.3±0.035	29±1.15	35.2	28	31.8	42	17	31
	III rd Instar	0.4 ppm	9.0 ^{NS} ±0.61	2.3 ^{NS} ±0.034	29 ^{NS} ±1.18						
	III rd Instar	0.8 ppm	8.9 ^{NS} ±0.58	2.2 ^{NS} ±0.028	28 ^{NS} ±1.13						
	III rd Instar	1.2 ppm	8.7*±0.55	2.1 ^{NS} ±0.027	27*±1.11						
	III rd Instar	1.6 ppm	8.6*±0.54	2.0*±0.025	26*±1.08						
4	Pre-pupa	Control	8.8±0.61	2.5±0.038	40±1.75	35.4	29	31.2		17	32
	Pre-pupa	0.4 ppm	8.7 ^{NS} ±0.62	2.4 ^{NS} ±0.034	39 ^{NS} ±1.69						

	III rd Instar	0.8 ppm	9.0 ^{NS} ±0.67	2.4 ^{NS} ±0.033	37*±1.62				43		
	III rd Instar	1.2 ppm	8.8 ^{NS} ±0.65	2.3 ^{NS} ±0.031	35*±1.54						
	III rd Instar	1.6 ppm	8.7 ^{NS} ±0.63	2.2*±0.030	34*±1.51						
5	Pre-pupa	Control	8.7±0.59	2.5±0.038	41±1.83	37.3	29	32.6	39	16	28
	Pre-pupa	0.4 ppm	8.6 ^{NS} ±0.51	2.5 ^{NS} ±0.037	40 ^{NS} ±1.65						
	Pre-pupa	0.8 ppm	8.6 ^{NS} ±0.52	2.4 ^{NS} ±0.035	39*±1.58						
	Pre-pupa	1.2 ppm	8.5 ^{NS} ±0.53	2.3 ^{NS} ±0.034	38*±1.47						
	Pre-pupa	1.6 ppm	8.4*±0.50	2.2*±0.032	37*±1.37						
6	Pupa	Control	8.4±0.55	2.8±0.041	40±1.57	35.4	28	31.6	41	17	30
	Pupa	0.4 ppm	8.3 ^{NS} ±0.48	2.7 ^{NS} ±0.040	39 ^{NS} ±1.42						
	Pre-pupa	0.8 ppm	8.5 ^{NS} ±0.58	2.6 ^{NS} ±0.39	39 ^{NS} ±1.41						
	Pre-pupa	1.2 ppm	8.4 ^{NS} ±0.53	2.5*±0.037	39 ^{NS} ±1.47						
	Pre-pupa	1.6 ppm	8.3 ^{NS} ±0.49	2.4*±0.033	38*±1.38						
7	Pupa	Control	8.0±0.51	3.0±0.04	39±1.87	38.2	29.3	34.7	40	15	26
	Pupa	0.4 ppm	7.8 ^{NS} ±0.45	3.0 ^{NS} ±0.038	38 ^{NS} ±1.85						
	Pupa	0.8 ppm	8.0 ^{NS} ±0.53	2.9 ^{NS} ±0.034	38 ^{NS} ±1.83						
	Pupa	1.2 ppm	7.8 ^{NS} ±0.50	2.8 ^{NS} ±0.035	37*±1.68						
	Pupa	1.6 ppm	7.7*±0.49	2.6*±0.038	37*±1.61						
8	Adult	Control	8.1±0.55	4.0±0.048	46±1.93	36.6	28.5	32.9	38	14	27
	Adult	0.4 ppm	8.0 ^{NS} ±0.53	4.0 ^{NS} ±0.051	45 ^{NS} ±1.89						
	Pupa	0.8 ppm	7.9 ^{NS} ±0.51	3.0 ^{NS} ±0.044	37*±1.64						
	Pupa	1.2 ppm	7.7*±0.45	3.0 ^{NS} ±0.041	36*±1.53						
	Pupa	1.6 ppm	7.7*±0.47	2.9*±0.038	36*±1.54						
9	Adult	0.8 ppm	7.9±0.48	4.0±0.048	44±1.93	33.7	28.1	31.8	43	19	32
	Pupa	1.2 ppm	7.8 ^{NS} ±0.41	3.0 ^{NS} ±0.041	36*±1.61						
	Pupa	1.6 ppm	7.6* ±0.43	2.8*±0.037	34*±1.23						
10	Adult	1.2 ppm	7.9±0.44	4.0±0.042	43±1.91	33.5	27.5	31.3	44	19	33
	No Adult	1.6 ppm	Dead pupa	-	-						

Where, * $p < 0.05$ (Significant t test), NS- Not significant

Identifying species found in association with a corpse is one of the first steps a forensic entomologist performs to estimate the post-mortem interval (PMI) (Watanabe et al., 2002). Blowflies feed on decaying organic matter and may show how much time has passed between a death and the time of discovery of the corpse (Merrit et al., 2000). The blowfly eggs of many genera are of forensic importance and have been studied in many parts of the world (Kitching, 1976; Greenberg and Szyska, 1984; Erzinclioglu, 1989; Liu and Greenberg, 1989; Greenberg and Singh, 1995; Greenberg and Kunich, 2002).

The most valuable use for entomological data is the estimation of the postmortem interval (PMI), or the time elapsed since death (Hall, 2001). Developmental data for primary blow flies provide the most accurate means of estimating the PMI using arthropod information (Greenberg, 1991). It is presumed that the first individuals that arrives at corpse and lay eggs a within hours after death (Catts and Goff, 1992).

Important area of entomotoxicology is the investigation of the effects of drugs and toxins on arthropod development (Goff and Lord, 1994). The use of drugs prior to death can result in an inaccurate estimation of PMI based on insect development (Goff et. al., 1991). For example, Bourel et. al., (1999) found that morphine can cause an underestimation of the PMI in *Lucilia sericata* by 24 hours. Tabor 2004 observed effects of ethanol on development rates of 3rd instar *P. regina* maggots feeding on meat from treated pigs were significantly different from development rates of maggots feeding on meat from untreated pigs.

Studies show that use of various drugs and toxins can affect maggot development rates, resulting in inaccurate estimations of postmortem intervals (PMI) based on insect development (Goff et al., 1992, Bourel et al., 1999). Goff et al., (1989) studied the effects of cocaine on development of the sarcophagid fly, *Boettcherisca peregrine*.

Several times the victims suicide or murdered by giving the sedative drugs and under such conditions the body tissue has large amount of the sedative drug. This drug can affect the duration of the life cycle stages and hence in such condition it is important to find the correct Post Mortem Interval (PMI). The standard data related to effect of some sedative drugs on the duration of the life cycle stages and the impact on their morphometric measurement is essential. The commonly used sedative drug, alprazolam were used in the present study and their effect on different stages of life cycle of the *Lucilia sericata* and their morphometric parameter helps in crime investigations.

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Effect of Diazepam on the development of *Lucilia cuprina* (Diptera: Calliphoridae)

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Abstract: *Lucilia cuprina* species were collected from the decaying meat in the Aurangabad region. The life cycle of *Lucilia cuprina* species includes egg, three instars, pre-pupa, pupa and adult stages. Changes in the life cycle of *Lucilia cuprina* species was studied after exposure to diazepam. Diazepam lowered the rate of growth at higher concentrations. The prepupation period of *Lucilia cuprina* was delayed in larvae fed on diazepam containing diet. The adults of *Lucilia cuprina* emerged out after 8 days in control while at 8 ppm, 12 ppm and 16 ppm diazepam containing food, the adults emerged out after 8, 9 and 10 days respectively.

Key words: Calliphorid, *Lucilia cuprina*, diazepam, life cycle.

Introduction

Forensic Science can be defined as scientific studies or investigation of crime. Along with the development of science and technology the criminal also often uses different techniques for commission of various crimes within our society. So it has become a problem for the investigative agencies to check the potentiality of crimes. For such checking the need of forensic science becomes an important prerequisite on the part of the investigative agencies. Forensic science is a multidisciplinary subject used for investigation crime scenes and collecting evidence to be used in prosecution of offenders in a court of law. It fulfills the growing demand for expertise in investigatory, enforcement and monitoring work, including incident scene investigation, laboratory analysis of evidence, physical evidence collection and defense of testimony (Lincoln, 2010).

Forensic entomology is legal application of the science of entomology. Forensic entomology is primarily associated with death investigations however it may also be used to detect drugs and poisons, determine the location of an incident and the presence and time of the infliction of wounds. Forensic entomology is the broad field where arthropod science and the judicial system interact. Insects and other arthropods are found in almost every possible type of habitat. The ubiquitous nature of insects, especially with regards to the flies and beetles shall facilitate the search, recognition and collection of insect specimens for evidence (Byrd and Castner, 2001).

The blow flies (Calliphorids) are especially valuable for establishing postmortem interval (PMI) because of their profound association with a corpse soon after death. In addition to estimating the minimum postmortem interval at crime scenes, the larvae of these blow flies are able to reveal other important

information about crimes such as place of death, manner of death and the presence of drugs or toxins in a corpse (Carvalho et al., 2004; Catt's and Goff 1992; Goff 1991; Introna et al., 1998; Lord 1990). Blowflies are usually the first organisms to arrive at a corpse, sometimes within minutes of death, and they are also the species of greatest forensic importance (Goff 2000; Byrd and Castner, 2001; Arnaldos et al., 2005).

Lucilia cuprina is a species of blow fly characterized by a metallic outer appearance and reddish eyes, usually they have a shiny green or greenish/blue abdomen with bronze/coppery reflections. Because of this, *Lucilia* species are recognized as the bronze bottle flies (Drees and Jackman, 1998). Their body shape is round to oval and length varies from 4.5–10 millimeters. They have two pairs of wings, the first pair being membranous wings and second pair being reduced wings known as halteres which are used for flight stabilization (Durden, 1999).

A sedative is a substance that induces sedation by reducing irritability (Johns Hopkins Colon) or excitement (Dorland's). At higher doses it may result in slurred speech, poor judgment, staggering gait and slow, uncertain reflexes. At high doses many of these drugs can cause unconsciousness and even death. All sedatives can cause physiological and psychological dependence when taken regularly over a long period of time, even at therapeutic doses (Yi et al., 2007; Ebert et al., 2006 and Sarrecchia et al., 1998). Dependent users may show symptoms ranging from restlessness and insomnia to convulsions and death. When users become psychologically dependent, they feel as if they need the drug to function.

Diazepam is one of the most frequently prescribed drugs of the benzodiazepine group, used in treatment of anxiety and anxiety related muscle relaxant, anti-epileptic and pro-operative sedative. Regular long-term use of this drug can lead to the psychological and physical dependence. Diazepam and its metabolites are commonly detected in post-mortem sample and often in conjugation with other illicit drug.

Forensic entomology-toxicology includes the study of effects of toxins and drugs on development rate of carrion-feeding insects, but comparatively little research has carried out in the use of larvae in India. The presence of the sedative drugs in the dead tissue can also affect on the longevity of the life cycle stages of blow flies and hence it is essential to study the effect of the sedative drug diazepam on the periods of the developmental stages of *Lucilia cuprina*.

Material and Methods:

The *Lucilia cuprina* (Calliphoridae) flies were used as the biomaterials. The flies does not need the flesh of specific animal and hence those which occurs on the dead human body, also occurs on the flesh of any animal and hence for the study goat or other available flesh in the market was used. After one day of putrification, the liver and other meat was placed in open air for collection of flies. After some time the flies gathered on the rotten liver. The flies of calliphoridae family were collected by means of insect collecting net after identification they were released in insect rearing cages.

Treatment of Diazepam:

The flesh was finely chopped in the mixer and was mixed with the diazepam so as to make the concentration as 4 ppm, 8 ppm, 12 ppm and 16 ppm. The first instar maggots were released on the 50 gms each of the diazepam mixed flesh in separate culture chambers, one with only flesh was maintained as control. Fresh chopped meat was provided twice a day as food. Honey soaked in cotton was also provided as the source of sugar and glucose. Wet cloth piece was maintained on one side of the cage to maintain the humidity. The feed was changed on each day and the mortality was recorded.

The developing stages were collected on each day, were narcotized in menthol water and were stored in vials containing AGA solution (alcohol, glycerol and acetic acid). Narcotization inactivates the maggots at relaxed condition, and thus after preservation there is no contraction of the maggots. The vial was labeled as the stage collected, date and time. The stages were photographed and weighed on the electronic balance. Measurements of these stages were made by means of the microscope whose least count is 0.001. At the same time the temperature and humidity were recorded. Measurements of five maggots were done at each time and their average with the standard deviation. Difference among the mean values of control and treated were analyzed by Student's t-test. Difference were considered statistically significant when, $p < 0.05$. The data obtained is tabulated in the tables for different groups.

Results and Discussion

The flies belonging to the family calliphoridae of the order diptera found on the decaying flesh in Aurangabad region were *Lucilia cuprina*. *Lucilia cuprina* is considered one of the most important species of blow flies in forensic science. *Lucilia cuprina* can fly up to ten miles searching for food and can be found on anything ranging from carrion to decaying fruit. *Lucilia cuprina* is often used as a very helpful tool to aid medical and forensic professionals because it first occupies a corpse upon its death. Once it lands on a corpse it lays its eggs and continues its next generation. The eggs are followed by its larva, pupa and finally the adult. Forensic professionals may form a postmortem interval (PMI) by the life stage found on the corpse.

Medical doctors use maggots of *L. cuprina* for debridement therapy of patients who suffer from wounds that are healing slowly (Marsi and Nazni, 2005). The maggots cleanse the wound by eating the dead and infectious skin and preventing further infection and gangrene. Medico-legal entomology is the science of using insect life cycle data combined with other evidence of domestic crimes, such as homicide, suicide, movement of bodies, drugging, and torture (Starkeby, 2004). *Lucilia cuprina* (Wiedemann) and *Hemipyrellia ligurriens* (Wiedemann) are blow flies of forensic importance and their immature stages are found in human corpses, as previously reported in Thailand (Sukontason et al., 2007).

For the treatment of diazepam eggs of *Lucilia cuprina* were collected on first day. Then thirty eggs were placed separately on 0.0 ppm (Control), 4 ppm, 8 ppm, 12 ppm, 16 ppm diazepam containing chopped flesh. The observations were made each day with respect to the dose of concentrations and are given in the table 1.

The results showed that diazepam treated food cause the effect on growth of the larvae. As the quantity of diazepam increases in the food the larval development slows down and the pupal development was also delayed. The flies emerged first from control then from 4 ppm, while in higher concentrations, the pupation was delayed as per the dose of diazepam as given in table 1. The temperature variations and the humidity variations in the room conditions at the time of experiment are also mentioned in the table.

Table 1. Effect of diazepam on the Morphometric parameters of life cycle stages of *Lucilia cuprina*.

PMI Days	Stages	Conc of Diazepam	Length (mm)	Width (mm)	Weight (mg)	Temperature °C			Humidity %		
						Max	Min.	Recorded	Max	Min.	Recorded
1	I st Instar	Control	4.0±0.039	1.0±0.02	04±0.21	34.7	30	31.9	37	14	28
	I st Instar	4 ppm	3.9 ^{NS} ±0.037	1.0 ^{NS} ±0.01	04 ^{NS} ±0.23						
	I st Instar	8 ppm	3.8 ^{NS} ±0.038	0.9 ^{NS} ±0.008	03 ^{NS} ±0.18						
	I st Instar	12 ppm	3.6*±0.035	0.7*±0.008	02*±0.15						
2	I st Instar	16 ppm	3.4*±0.031	0.6*±0.008	02*±0.14	36.6	30.1	33.6	35	13	25
	II nd Instar	Control	7.6±0.28	1.7±0.014	15±0.71						
	II nd Instar	4 ppm	7.5 ^{NS} ±0.27	1.6 ^{NS} ±0.012	14 ^{NS} ±0.52						
	II nd Instar	8 ppm	7.4 ^{NS} ±0.24	1.5 ^{NS} ±0.013	13*±0.41						
	II nd Instar	12 ppm	7.2*±0.22	1.2*±0.012	12*±0.38						
3	II nd Instar	16 ppm	7.1*±0.21	1.1*±0.011	12*±0.36	33	28	30.5	41	17	32
	III rd Instar	Control	10±0.33	2.4±0.33	40±1.8						
	III rd Instar	4 ppm	9.9 ^{NS} ±0.31	2.3 ^{NS} ±0.32	39 ^{NS} ±1.7						
	III rd Instar	8 ppm	9.7*±0.30	2.2 ^{NS} ±0.31	38*±1.6						
	III rd Instar	12 ppm	9.5*±0.26	2.0*±0.28	38*±1.7						
4	III rd Instar	16 ppm	9.2*±0.24	1.8*±0.24	37*±1.5	33.3	27	30.8	40	16	31
	Pre-pupa	Control	9.0±0.19	2.8±0.37	42±1.9						
	Pre-pupa	4 ppm	8.7*±0.22	2.7 ^{NS} ±0.39	41 ^{NS} ±1.8						
	III rd Instar	8 ppm	9.7*±0.31	2.6 ^{NS} ±0.37	43 ^{NS} ±2.1						
	III rd Instar	12 ppm	9.6*±0.32	2.5*±0.35	42 ^{NS} ±2.0						
5	III rd Instar	16 ppm	9.3*±0.32	2.4*±0.32	40 ^{NS} ±1.8	35.3	28	31.6	39	15	29
	Pre-pupa	Control	8.7±0.34	2.6±0.032	38±1.8						
	Pre-pupa	4 ppm	8.6 ^{NS} ±0.32	2.5 ^{NS} ±0.031	37 ^{NS} ±1.7						
	Pre-pupa	8 ppm	8.5 ^{NS} ±0.31	2.6 ^{NS} ±0.032	36*±1.6						
	III rd Instar	12 ppm	9.8*±0.39	2.6 ^{NS} ±0.031	43*±2.2						
6	III rd Instar	16 ppm	9.5*±0.35	2.5 ^{NS} ±0.030	41*±2.0	36	29	32.3	38	14	29
	Pupa	Control	8.0±0.3	2.9±0.036	39±1.8						
	Pre-pupa	4 ppm	8.5*±0.31	2.8 ^{NS} ±0.033	38 ^{NS} ±1.7						
	Pre-pupa	8 ppm	8.4*±0.32	2.7 ^{NS} ±0.035	37*±1.6						
	Pre-pupa	12 ppm	8.3*±0.31	2.7 ^{NS} ±0.034	36*±1.5						
7	Pre-pupa	16 ppm	8.2 ^{NS} ±0.30	2.5*±0.032	36*±1.6	36.5	29.3	32.6	36	14	27
	Pupa	Control	7.5±0.23	3.0±0.35	36±1.8						
	Pupa	4 ppm	7.1*±0.20	2.9 ^{NS} ±0.32	35 ^{NS} ±1.6						
	Pupa	8 ppm	7.0*±0.21	2.8 ^{NS} ±0.32	34*±1.5						
	Pupa	12 ppm	8.2*±0.34	2.8 ^{NS} ±0.31	38*±1.9						
8	Pre-pupa	16 ppm	8.1*±0.30	2.6*±0.31	37 ^{NS} ±1.7	37.3	30	33.2	35	13	26
	Adult	Control	8.2±0.33	4.2±0.38	46±2.3						
	Adult	4 ppm	8.1 ^{NS} ±0.31	4.0 ^{NS} ±0.37	44*±2.1						
	Pupa	8 ppm	7.6*±0.28	3.0*±0.34	33*±1.2						
	Pupa	12 ppm	7.4*±0.24	3.0*±0.32	37*±1.6						
9	Pupa	16 ppm	7.2*±0.22	2.8*±0.30	36*±1.6	36	28	30.7	42	18	30
	Adult	8 ppm	7.6*±0.28	4.0 ^{NS} ±0.038	42*±2.1						
	Pupa	12 ppm	7.4*±0.25	3.0*±0.034	36*±1.7						
10	Pupa	16 ppm	7.2*±0.23	2.7*±0.030	35*±1.5	37	28	30.9	41	17	30
	Adult	12 ppm	7.2*±0.21	3.5*±0.032	41 ^{NS} ±1.8						
	NoAdult	16 ppm	Dead pupa	-	-						

Where, * $p < 0.05$ (Significant t test), NS- Not significant

The blowfly eggs of many genera has forensic importance and have been studied in many parts of the world (Kitching, 1976; Greenberg and Szyska, 1984; Erzinclioglu, 1989; Liu and Greenberg, 1989; Greenberg and Singh, 1995; Greenberg and Kunich, 2002). Watanabe et al., (2002) reported identifying species found in association with a corpse is one of the first steps a forensic entomologist performs in seeking to estimate the post-mortem interval (PMI). Liu and Greenberg (1989) have been developed keys and diagnostic descriptions for egg, larval and pupal stages for several flies of forensic importance.

The most important use for entomological data is the estimation of the postmortem interval (PMI) (Hall, 2001). The Postmortem Interval (PMI) provides an important information in homicide investigations and untimely deaths (Byrd and Castner, 2001). Developmental data for blow flies provide the most accurate information for estimating the PMI (Greenberg, 1991).

Important work of entomotoxicology is the investigation of the effects of toxins and drugs on arthropod development (Goff and Lord, 1994). Goff et al., (1991) observed that use of drugs prior to death can result in an inaccurate estimation of PMI based on insect development. Bourel et al., (1999) reported that morphine can cause an underestimation of the PMI in *Lucilia sericata* by 24 hours. Ethanol caused significant variations in maggot length for third instars feeding on treated meat compared to an untreated control in field conditions (Tabor et al., 2005). Monthei (2009) observed effects of different concentrations of ethanol on maggot development of the black blowfly, *Phormia regina* in which he reported that in ethanol treated tissue, development of maggot take more time than its control.

Studies show that use of different drugs and toxins can affect maggot development rates, resulting in inaccurate estimations of postmortem intervals (PMI) based on insect development (Goff et al., 1992, Bourel et al., 1999). Goff et al., (1993) showed the effects of amitriptyline on larvae of *P. ruficornis* (Fabricius) reared on tissues of rabbits that were administered by different doses of the drug. Arnaldos et al., (2005) also observed in laboratory experiments investigating the effects of heroin on time taken to complete individual larval stages in *Sarcophaga tibialis* was considerably longer, in contrast to those larvae which were not fed heroin.

Entomology-toxicology is a recognized method of estimation of postmortem interval, but relatively little research has carried out in the use of larvae in forensic entomology-toxicology in India. The most commonly used sedative drug, diazepam were used in the present study and their impact on different stages of life cycle of the *Lucilia cuprina* and morphometric parameter helps in crime investigations. This drug can affect the duration of the life cycle stages and hence in such condition, it is essential to have the standard data related to such fact. Hence effect of dizepam on the duration of the life cycle stages and the impact on their morphometric measurement was done.

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INTERNATIONAL JOURNAL OF CREATIVE RESEARCH THOUGHTS (IJCRT)

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Germplasm Collection and Evaluation of Hyacinth bean (*Lablab purpureus* (L.) Sweet.syn. *Dolichus lablab* L.from Akrani Tahsil, District Nandurbar

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ABSTRACT

The tribals of Nandurbar district have their own Traditional landraces of Lablab beans. Lablab beans landraces are discussed here with their morphological and ethnobotanical characters.

Keywords: Tribals, Lablab beans, ethnobotany, Akrani, Nandurbar, etc.

Introduction & Review of literature :

India is the centre of origin of wild forms of *Lablab* (Deka and Sarkar, 1990) they were introduced into Africa through South East Asia during eighth century. It is now known to be grown in many countries in the tropics. Notable among them are Australia, India, Bangladesh, Kenya, Zimbabwe, Cameron, Tanzania and other African countries, China, South and Central America and West Indies. The seeds and immature pods are used for human consumption and the herbage is used as green manure in China, Asia, India and some African countries. On the other hand, it is grown mainly as fodder crop in Australia and Central America (Cameron, 1998) the species *Dolichus lablab* was classified into two subspecies *D. lablab* var. *lignosus* and var. *dolichus*. The former is a field type with a bushy habit and is grown for seeds, while the latter is a pendal type twining in habit and is grown for its tender soft pods as vegetable. The collection has shown large genetic variation in pod

characteristics. They opined that genetic improvement in this crop was negligible on the other hand, wild collections of species *Lablab purpureus* was divided into three sub-species by Cameron (1998). They are ssp. *purpureus*, ssp. *benghalensis* and ssp. *uncinatus* among these *benghalensis* is the pulse crop of Asiatic origin. Its pods are linear-oblong in shape. It is used in Africa as forage crop. The ssp. *purpureus* shows similar shaped pods. It is used both as pulse crop as well as commercial or green manure. The third ssp. *uncinatus* is the wild form of tropical Africa. Its pods and seeds are similar but smaller than those of ssp. *purpureus*. Shivashankar *et al.* (1981) showed that *typicus* and *lignosus* varieties of hyacinth bean are easily intercrossable. Hence, they are no more considered as sub-species but only as two varieties of species *Lablab*. *Lablab* bean has also been reported to be having certain pharmaceutical and industrial uses. Carbohydrate and myo-inositol contents of the seed are useful for panic disorders and genistein found in the hypocotyl, it is possibly useful for menopause hot flashes (Morris, 2003). Other chemicals like lectins, alpha amylase inhibitors, vicilins are present in sufficient quantities to affect resistance to insect pests, such as *Callosobruchus maculatus*, Fabricius (Ignacimuthu *et al.*, 2000). The green pods as well as seeds are reported to show higher levels of tyrosine and leucine like amino acids than those of common bean. Its high fibre content is known to prevent cancer (Morris, 2003). Such a highly nutritive pulse crop has come as a natural food to tribals, living in an extreme tropical environment.

Methodology :

Ethno-botanical principles were followed for the collection of different landraces of crops grown by tribal people of the study area.. The criteria for the selection of these crop plants were simple, such as: (a) they are being grown from ancient times, (b) they are grown in large areas and relished and consumed by most of the tribals and (c) they are the subsistence crops of the tribals i.e. the produce is generally not sold to others. The legumes crops studied were hyacinth bean and cowpea. They were given accession numbers and field notes were recorded on farm itself. The seed samples were stored in polyethylene bags, herbarium of inflorescence twigs were prepared in cases where morpho-genetic differences were found among the landraces. The crop species collected were identified with the help of standard work of Cook (1967).

Biochemical analysis:

The content of insoluble proteins, total amino acids, free amino acids and total hydrolysable carbohydrates in the grains and seeds of the landraces of every crop were analyzed on percent of dry weight basis.

The seed material was powdered and known amount of the powder was extracted in 80 % ethyl alcohol. The supernatant fraction was used as the source of free amino acids. The residue was further extracted with Chloroform: Ether: alcohol (1:2:3) to remove lipids. The residue was then extracted with 15 % Trichloro Acetic Acid (TCA) to obtain acid soluble protein fractions. For total amino acids and total carbohydrates, the extraction procedure of Hedge and Hofreiter (1962) was followed. The powdered sample was extracted in 3.5 N HCL for 12 hours at 70°C and centrifuged. The supernatant acid fraction was neutralized with Na₂CO₃ and used for analysis.

Spectrophotometric methods were followed for estimation of all the phytochemicals analysed. The methods of Lowry et al. (1951) for proteins, Harding and Maclean (1916) for amino acids and McCready et al. (1950) for carbohydrates were followed. The contents were estimated using BSA, methionine and glucose as standards for proteins, amino acids and carbohydrates respectively and expressed as g /100 g dry weight or percent dry weight.

Morpho-genetic characters:

For crop plants in which considerable morpho-genetic variation was observed, the landraces were grown on separate plots adjacent to the field. Characters like height, number of fruits, number of seeds / pod, 100-seed weight, pigmentation, flower colour, etc., were recorded frequently and at appropriate time during the growth and development. Besides agronomic characters like response to drought, incidence of diseases and pest etc., was also recorded.

RESULTS :-**Morpho-genetic characteristics:**

A total of 9 landraces and 21 accessions were collected from different parts of Akrani tahsi of Nandurbar district Table-01 shows accession number, local name, locality, and flower colour and pod and seed characters of landraces collected. All 09 accessions are climbers. VCW-124 is more branched. The variety VCW-111 with green coloured pods is called *niyawal*. VCW-112 is called *bokadkani* due to its pod shape similar to the

ear of goat (Bokad = goat ;kani = ear in Marathi). VCW-113 is profusely branched and high yielding. VCW-114 is called *giramti*, which is more susceptible to pest. VCW-114, VCW-115 and VCW-116 are called *lalwal* due to their purple coloured pods. But they differ in the shades of colour. VCW-117 is called *hirvawal-I* due to green coloured pods. VCW-118 is also called *hirvawal-II*, but it's pods are faint green in colour and are flat and short as compared to VCW-117. The variety VCW-123 is called *mothi safed fapda*. The name *fapda* indicates the flat and broad shape of the pod.

Yield characteristics:

Table- 2 shows yield characteristics of the 9-wal landraces. The range of number of pods per inflorescence was from 1.66 to 11.3. At least five landraces showed six or more than six pods per inflorescence. The range for pod length was 6.00 to 13.8 cm and for breadth was 0.93 to 4.26 cm. Both length and breadth were maximum in VCW-112, but the characters, pods per inflorescence and seeds per pod were less in this accession. Number of seeds per pod showed a range of 2.66-6.66. Three accessions viz., VCW-113, VCW-114, VCW-123 showed six or more than six seeds per pod. The range for seed size was also narrow. The pod length was more than 10 cms in accessions VCW-114 (12 cm), VCW-113 (11.3 cm), VCW-123 (10.33 cm), VCW-111 (10.2 cm) and VCW-115 (10 cm). But pods per inflorescence were highest in VCW-114 (6.8). Seeds per pod were highest in VCW-123 (6.66) and lowest for VCW-114(4.66). The 100-seed weight showed a maximum of 71 g. in VCW-112 and a minimum of 34 g. in VCW-117. The accession VCW-114 is also a high yielding landrace with 70 g. of 100-seed weight, 6-seeds per pod and seed size of 1.47 cm. The number of pods per inflorescence for VCW-114 was however moderate at 7.66.

Seed proteins and total amino acids:

Table-3 shows the percentage of insoluble proteins and total amino acids in the dry seeds of hyacinth bean landraces. The protein content was 21.6% to 48%. The protein content of more than 40% was recorded in five cultivars viz. VCW-112, VCW-113, VCW-114, VCW-115 and VCW-116. All these five cultivars showed total amino acids in the range of 32.50 -38.50%. These five collections were from Akrani tahsil. Low protein content of 21-30% was recorded in cultivars VCW-117, and VCW-118. The highest amino acid content of 38.50% was observed in lal wal-III (VCW-116) collected from Toranmal in Akrani tahsil.

Seed morphology:

The seed morphology also shows a good variation among the 15 landraces of *hyacinth bean* as shown in Table-01.

The seed shape is mostly oblong and about eight accessions showed this type of seed. While, seed shape is round in VCW-112, VCW-113 and VCW-117. The shape of VCW-114, VCW-115 and VCW-116 is flat and oblong.

Seed colour is black in VCW-111, VCW-113, VCW-116 and VCW-117. The landraces VCW-112 and VCW-123 have brown coloured seeds. VCW-114 shows faint brown seed with black dots. VCW-115 shows faint brown seed with dark brown spots and VCW-118 shows blackish brown seed colour.

Discussion:

Extremely high variability was observed among the nine Wal landraces. There are pole type and bush type varieties, disease resistant and susceptible varieties, high protein and high total amino acid containing varieties and also vegetable and grain legume varieties. Variation was also observed in several morphological characters of pod and seed (Table 1 & 2). Such high degree of variation among the landraces of field bean crop plants indicates their adaptation to the local climatic conditions. It also suggests the methods developed by the local ethnic groups in utilizing the vast biodiversity of this legume crops to fulfil their food and nutritive requirements in a sustainable way. The tribals of this district do not grow these legume crops in field for large-scale production. There are two reasons for this - a) this legumes form only side dish in their food and b) allocation of land to legume crop will reduce the production of cereal and millet crops whose produce must be stored for the entire year. Dikshit and Aghora (2004) observed that mostly the tribal communities are the custodians of the valuable diversity of the cowpea existing in Orissa. They opined that the indigenous method of identification and maintenance of strains helped the tribals in conservation of vast biodiversity of Wal. The present study also clearly indicates that the tribals of Nandurbar have their own methods of identification and maintenance of hyacinth bean and cowpea landraces as evidenced by their local names, topographical features of area grown and limited cultivation.

The protein contents of seeds of hyacinth bean obtained in the present study are on higher side as compared to the standard amount of 25-30 %. One of the reasons for this may be the presence of large quantity of free tyrosine amino acids in the protein sample. The aim of the present study is to establish the quality of the available landraces on the basis of comparison but not to find the precise contents of the metabolites. The results show that there is enormous variation in the protein content among the landraces of hyacinth bean. Landraces with high protein content coupled with high total amino acids levels are valuable strains for improving the nutrition quality of our HYVs in future crop improvement programme. Wal is recognized as vital for food security by the International Treaty on Plant Genetic Resources for Food and Agriculture. Thus, the collections of Wal diversity are eligible for funding by Global Crop Diversity Trust (Kapila, 2004).

The tribal farmers of Nandurbar district do not have the idea that Wal can grow very well in their soils due to its ability to utilize nitrogen in soil atmosphere. Secondly cowpea has extremely high capacity of drought tolerance and provides green cover during severe drought conditions also. The tribals should exploit these characters by using cowpea as a mixed crop along with other drought resistant crops like millets. There must be bodies either GO or NGO to educate these marginal farmers who are rendering valuable service to our biodiversity by in situ conservation of our crop plants. Such GOs and NGOs can support traditional farming systems. They may also provide a feed back to Government to determine National Agricultural Policies particularly for scarcity areas.

Growing of grain legume crop plants for a very limited extent (restricted to kitchen garden) without bringing them into cultivation is another important finding of this work. The germplasm of these grain legumes lablab bean show a great deal of diversity in several morphogenetic agro botanical and yield characteristics. The correlation between flower colour and susceptibility to disease pest is established for hyacinth bean germplasm.

Concluding these remarks with a quote of the great botanist, internationally renowned agricultural scientist, Dr. M. S. Swaminathan will be a befitting finale to this work.

Lab-to -lab: This will involve organizing a consortium of scientific institutions and data providers.

Lab-to-land: This will involve symbiotic linkages between the providers of information and the users, so that the information disseminated is relevant to the life and work of rural families.

Land-to-lab: There is considerable traditional knowledge and wisdom among rural and tribal families concerning the sustainable management of natural resources, particularly water and biodiversity. Therefore, the technical experts should not only learn from traditional knowledge and experience, but also take steps to conserve for posterity, dying wisdom and dying crops.

Land-to-land: There is much scope for lateral learning among rural families; such learning has high credibility because the knowledge coming from a fellow farm-woman or man would have been subjected to an impact analysis from the point of view of its economic and social relevance to the population.

“Progress in achieving a productivity revolution need not wait until new technologies become available. Integrated steps in the areas of soil health and fertility enhancement, water conservation and management, conservation and sustainable and equitable use of agro-biodiversity and greater emphasis on post-harvest technology and agro processing will help us leapfrog in agricultural progress and agrarian prosperity. Unity of goals but diversity of approaches based on local socio-cultural, socio-economic and agro ecological conditions will be needed so as to the desired goals.

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मुदतीच्या कर्जाच्या स्वरूपात देण्यात येते. महाराष्ट्र राज्य सहकारी आदिवासी विकास महामंडळाचे मुख्य कार्यालय नाशिक येथे आहे.

महाराष्ट्र राज्य सहकारी विकास महामंडळाच्या विविध योजना

अ. केंद्रीय-योजना

१. भारतीय संविधानाच्या अनुच्छेद २७५ (१) याखाली सहाय्यक अनुदान केंद्रीय सहाय्य योजना :

भारतीय संविधानाच्या अनुच्छेद २७५ (१) याखाली सहाय्यक अनुदान आणि विशेष केंद्रीय सहाय्य योजना या दोन्ही योजना केंद्र शासनाकडून राबविण्यात येत असून याकरीता १००% केंद्र सहाय्य उपलब्ध होते. या दोन्ही योजनांकरीता केंद्र शासनाने माहे जूलै, २०१६ मध्ये सुधारीत मार्गदर्शक सुचना जाहीर केल्या आहेत. सदर सुधारीत मार्गदर्शक सुचनांनुसार पुढील प्रमाणे प्रस्ताव सादर करण्याचे केंद्र शासनाने जाहीर केले आहे.

अ.क्र.	क्षेत्र	निधी उपलब्धता (%)
१	शिक्षण	४०-५०%
२	आरोग्य	१०-१५%
३	कृषी, फलोत्पादन, पशुसंघटन, मत्स्य, दुग्धविकास	२०-३०%
४	रोजगार वन्यजीव योजना	१०-१५%
५	प्रशासकीय बाबी/ संशोधन	५-१०%

सुधारीत मार्गदर्शक सुचनांनुसार रस्ते, विद्युत्पुरिठा, पाणीपुरवठा योजना, मोठे जलससचन प्रकल्प, घरबांधणी यासारखे प्रस्ताव या योजनांतर्गत प्रस्तावित करता येणार नाहीत. भारतीय संविधानाच्या अनुच्छेद २७५ (१) या योजनेअंतर्गत राज्यामध्ये चालविण्यात येणा-या १४ एकलव्य इंग्रजी माध्यमाच्या आश्रमशाळा (EMRS) तसेच नव्याने मंजूर करण्यात आलेल्या २ एकलव्य आश्रमशाळांकरीता निधी प्राप्त होत असतो. EMRS करीता प्रती विद्यार्थी प्रती वर्षांकरीता रु. ४२,०००/- इतके अनुदान प्राप्त होत असते. तर नवीन EMRS च्या बांधकामाकरीता रु. १२.०० कोटी प्रमाणे टप्प्या टप्प्याने अनुदान उपलब्ध करून दिले जाते.

केंद्र शासनाकडून या योजनेकरीता प्राप्त निधी पुढीलप्रमाणे (प्रती वर्ष)

Sr. No	Scheme Name	Year	Grant Released from GOI
1	Special Central Assistance Scheme	2013-14	7728.00
		2014-15	11726.18
		2015-16	12514.91
		2016-17	9717.00
2	Central Assistance under -Article 275 (1) of the Constitution of India	2013-14	12489.00
		2014-15	11701.30
		2015-16	13374.00
		2016-17	11680.73

२. आदिम जमाती (PVTGs) संरक्षण तथा विकास कार्यक्रम

केंद्र शासनाने राज्यातील कातकरी, कोलाम आणि माडीया रॉड या तीन जमातींना आदिम जमाती म्हणून घोषित केले आहे.

अ. क्र.	जमात	जिल्हे
१	कातकरी	ठाणे, पालघर, रायगड, पुणे, व नाशिक
२	कोलाम	श्वेतमाळ, नांदेड व चंद्रपूर
३	माडीया रॉड	गडचिरोली

या जमातींच्या सर्वांगीण विकासासाठी संरक्षण तथा विकास कार्यक्रमाखाली (CCD Plan) विविध व्यक्तीस तसेच समूह विकासाकरीता योजना राबविण्यात येत असतात. त्याअनुषंगाने केंद्र शासनाकडे प्रस्ताव सादर करून केंद्र शासनाने मान्यता प्रदान केलेल्या योजनांची अंमलबजाणी करण्यात येत असते. आदिम जमातींकरीता राज्य योजनेतून देखील निधी उपलब्ध करून देण्यात येत असतो. सदर निधीचा वापर आवकदम जमातींकरीता घरकुल बांधून देण्याकरीता वापरण्यात येत असतो. या योजनेची अंमलबजावणी घरकुल बांधकामासाठी ग्रामविकास विभागामार्फत तयार करण्यात आलेल्या व्यवस्थापन कक्षामार्फत करण्यात येत असते. केंद्र शासनाकडून या योजनेकरीता काही वर्षांकरीता प्राप्त निधी पुढील प्रमाणे.

Scheme Name	Year	Grant Released from GOI
Scheme for Development of Primitive Tribes	2013-14	2610.00
	2014-15	1900.00
	2015-16	0.00
	2016-17	2017.00

३. स्वयंसेवी संस्थांना सहाय्यक अनुदाने

केंद्र शासनाच्या Scheme of Grant in -id to voluntary organizations working for the welfare of Scheduled Tribe या योजनेखाली आदिवासी भागात शिक्षण, आरोग्य, पिण्याचे पाणी, शेती उत्पादकता वाढविणे, सामाजिक सुरक्षा इत्यादी बाबी आदिवासी जनतेच्या आर्थिक उन्नतीसाठी कार्यरत असणा-या तसेच अनुसूचित क्षेत्रातील स्वयंसेवी संस्थांना १००% व या क्षेत्राबाहेरील संस्थांना ९०% अनुदान दिले जाते. केंद्र शासनाने त्यांच्या दिनांक १ एप्रिल, २००८ आदेशान्वये निकष निर्धारित केले आहेत. उपरोक्त क्षेत्रात कार्यरत असणा-या संस्थांचे प्रस्तावाच्या खरेपणा/ कमतरतेसंबंधीत जिल्हाधिका-याच्या तपासणी अहवाल आवृक्त आदिवासी विकास यांना प्राप्त झाल्यानंतर आदिवासी विकास यांचे अध्यक्षतेखाली असलेल्या राज्यस्तरीय समितीच्या शिफारशीने केंद्र शासनास अनुदानासाठी पाठविण्यात येतात. सन २०१६-१७ करीता या आर्थिक वर्षापर्यंत शैक्षणिक, आरोग्य इत्यादी क्षेत्रात कार्यरत असलेल्या

महाराष्ट्र राज्य सहकारी विकास महामंडळ आणि महामंडळाच्या विविध योजनांचा अभ्यास

प्रा. राजू गिरधर पवार
(संशोधक)महाराज ज. पो. बळवी कला, चाणिन्य व
विज्ञान महाविद्यालय धडगाव जि. नंदुरबारप्रा. डॉ. अनिल गणिसराव सोनवणे
(मार्गदर्शक)कला, चाणिन्य व विज्ञान महाविद्यालय,
शिरपुर जि. पुळे

प्रस्तावना :

आदिवासींच्या कल्याणाच्या योजनांची परिणामकारक अंमलबजावणी करण्यासाठी सन १९७२ मध्ये समाजकल्याण विभागांतर्गत आदिवासी विकास संचलनालयाची स्थापना करण्यात आली होती. त्यानंतर १९७६ साली आदिवासी विकास आयुक्तालय सुरु करण्यात आले. दि. २२ एप्रिल १९८३ रोजी स्वतंत्र आदिवासी विकास विभागाची स्थापना करण्यात आली आणि १९८४ पासून आदिवासी विकास विभाग स्वतंत्रपणे कार्यरत आहे. आदिवासी विकास विभागाच्या बळकटीकरणकारिता सन १९९२ मध्ये आदिवासी विकास संचलनालय हे आदिवासी विकास आयुक्तालयात विलीन करण्यात आले.

आदिवासी विकास विभागांतर्गत ठाणे, नाशिक, अमरावती व नागपूर येथे चार अपर आयुक्त व २९ एकात्मिक आदिवासी विकास प्रकल्प कार्यालये असून त्यांच्या मार्फत मागासवर्गीय कल्याणाच्या राज्य व केंद्र शासनाच्या योजनांची अंमलबजावणी केली जाते. या योजनांतर्गत सामाजिक कल्याण, आर्थिक कल्याण, शिक्षणामध्ये प्रगती, सामाजिक न्याय, महिला व बाल विकास, आरोग्य, पोषण, रोजगार इ. बाबतच्या योजना राबविण्यात येतात. सन २०१५-१६ च्या अर्थसंकल्पामध्ये आदिवासी विकास विभागाकरिता रु. ५१७० कोटी इतका नियतव्यय मंजूर आहे.

राज्यातील आदिवासींची ओळख :

महाराष्ट्र राज्याचे भौगोलिक क्षेत्र ३,०७,७१३ चौ.कि.मी. एवढे असून त्यापैकी ५०,७५७ चौ.कि.मी क्षेत्र आदिवासी उपयोजनेखाली येते. याचे प्रमाण १६.५ टक्के एवढे होते. गेल्या पाच दशकातील राज्याची लोकसंख्या व आदिवासी लोकसंख्या यांची तुलनात्मक आकडेवारी खालीलप्रमाणे आहे :

जनगणना वर्ष	राज्याची एकूण लोकसंख्या	आदिवासी लोकसंख्या	टक्केवारी
१९७१	५०४.१२	३८.४१	७.६२%
१९८१	६२७.८४	५७.७२	९.१९%
१९९१	७८९.३७	७३.१८	९.२७%
२००१	९६८.७९	८५.७७	८.८५%
२०११	११२३.७४	१०५.१०	९.३५%

महाराष्ट्र राज्यात एकूण ४५ अनुसूचित जमाती असून त्यात प्रामुख्याने भिन्न, गोंड, महादेव काळी, पावरा, ठाकुर, वारली यांचा समावेश आहे. यवतमाळ जिल्हयातील कोलाम, रायगड, ठाणे व पालघर जिल्हयातील कातकरी आणि गडचिरोली जिल्हयातील माडिया गोंड अशा तीन जमाती केंद्र शासनाने अदिम जमाती म्हणून अधिसूचित केलेल्या आहेत. राज्यातील एकूण ३६ जिल्हे असून त्यापैकी धुळे, नंदुरबार, जळगांव, नाशिक, पालघर व ठाणे (सह्याद्री प्रदेश) तसेच चंद्रपूर, गडचिरोली, भंडारा, गोंदिया, नागपूर, अमरावती व यवतमाळ (गोंडवन प्रदेश) या पूर्वेकडील वनाच्छादित जिल्हयांमध्ये आदिवासींची संख्या मोठ्या प्रमाणात आहे. राज्यात एकूण २९ एकात्मिक आदिवासी विकास प्रकल्प कार्यालये असून त्यापैकी ११ एकात्मिक आदिवासी विकास प्रकल्प कार्यालये अतिसंवेदनशील म्हणून घोषित करण्यात आले आहेत. त्यामध्ये

नाशिक, कळवण, तळोदा, जव्हार, डहाणू, धारणी, किनवट, पांढरकवडा, गडचिरोली, अहेरी व भामरागड यांचा समावेश आहे.

महामंडळाची उद्दिष्टे :

महाराष्ट्र राज्य सहकारी आदिवासी विकास महामंडळ हे महाराष्ट्र राज्य सहकारी संस्था, अधिनिबमान्वये १९७२ मध्ये स्थापन करण्यात आले आहे. या महामंडळाची उद्दिष्टे पुढीलप्रमाणे आहेत.

- १) एकाधिकार खरेदी योजनेंतर्गत आदिवासी भागात कृषी माल व गीण वानोत्पादनाची खरेदी व विक्री करणे.
- २) शासन, सार्वजनिक संस्था आणि महामंडळे यांच्या वतीने आदिवासी भागात एजन्सी तत्वावर विकास कार्यक्रमाचे व्यवस्थापन करणे.
- ३) आदिवासी कुटुंबांना खावटी कर्जांचे वाटप करणे.
- ४) आर्थिक उत्पादनाच्या योजनांना कर्ज देणे.
- ५) आदिवासींच्या सर्वसामान्य विकासासाठी शासनाने सोपवलेले कोणतेही कार्यक्रम राबवणे.
- ६) आदिवासी क्षेत्रात रोजगाराचे कार्यक्रम विकसित करणे.

महाराष्ट्र राज्य सहकारी आदिवासी विकास महामंडळास अर्थसहाय्य म्हणून रु.७५० लाख इतका नियतव्यय २०१३-१४ च्या आदिवासी उपयोजनेत निश्चित करण्यात आला आहे. महाराष्ट्र राज्य सहकारी आदिवासी विकास महामंडळातर्फे खावटी कर्ज योजना राबवली जाते. राज्यात खावटी कर्ज योजना १९७८ पासून आदिवासी क्षेत्रात सुरु करण्यात आली. ही योजना या महामंडळाकडून आदिवासी सहकारी संस्थांच्या सहाय्याने राबवण्यात येते. पावसाळ्यामुळे रोजगार नसलेल्या दिवसांमध्ये गरजू आदिवासी कुटुंबांना या योजनेंतर्गत धान्य पुरवठा करण्यात येतो. या योजनेंतर्गत देण्यात येणारी मदत अल्प



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एकूण २५ स्वयंसेवी संस्थांचे प्रस्ताव केंद्र शासनाकडे अनुदानासाठी पाठविण्यात आलेले आहेत.

आ. राज्य योजना

क्र.	योजनेचे नाव	योजनेचे विवरण
१.	शासकीय आश्रमशाळा	१. शासकीय आश्रम शाळा समूह योजना उद्देश व स्वरूप
		२. स्नेच्छा संस्थाना आश्रमशाळा चालविण्यास अर्थसहाय्य
		३. आदर्श आश्रमशाळा
		४. एकलव्य इंग्रजी माध्यमाच्या निवासी शाळा
२.	आर्थिक उपव्राच्या योजना	१. आदिवासी शेतक-यांना विजय / तेलपंग पुरवठा करणे
		२. केंद्रकर्ती अर्थसंकल्प (न्युक्लिअस बजेट)
		३. क्वचसाय प्रशिक्षण केंद्र योजना (केंद्र पुरस्कृत योजना)
		४. आदिम जमातीसाठी विकासाच्या योजना - केंद्रीय सहाय्य
३.	इतर योजना	१. अनुसूचित जमातींच्या उमेदवारांसाठी मेवायोजन नोंदणी
		२. आदिवासी हस्तकला प्रदर्शन
		३. आदिवासी पारंपारिक नवस्यर्था
		४. चारली चित्रकला स्पर्धा योजना
४.	इतर विभागाकडून राबविण्यात येणा-या योजना	१. तुषार टिक्क सिन्धु योजना
		२. शेळ्या मंद्यांचा गट पुरवठा करणे
		३. अन्नकूट पाण्यात मत्स्य संघर्ष करणे
		४. सहकार विभाग - वैयक्तिक लाभान्वय योजना च्या अनुदान

निष्कर्ष :

राज्यातील आदिवासींचे जीवनमान उंचावण्यासह त्यांना रोजगार उपलब्ध करून देण्यासाठी आदिवासी विभागाने १९७२ मध्ये स्वतंत्रपणे महाराष्ट्र राज्य सहकारी आदिवासी विकास महामंडळाची स्थापना केली. या महामंडळाची राज्यभरात ३५

उपप्रादेशिक कार्यालये, ९ प्रादेशिक कार्यालये आणि एक विभागीय कार्यालये अशी तब्बल ४५ कार्यालये आहेत. साडेसहाशे कोटींची वार्षिक उलाढाल आहे. विशेषतः १२ आदिवासीबहुल जिल्हांमध्ये कार्यालयांची संख्या सर्वाधिक असून, आदिवासींनी पिकवलेला माल खरेदी करणे, आदिवासींचे जीवनमान उंचावण्यासाठी विविध योजनांची अंमलबजावणी करण्याची जबाबदारी महामंडळावर आहे. नाशिक आयुक्तालयात या महामंडळाचे मुख्यालय ठेवून राज्यभर नियंत्रण ठेवले जाते. परंतु, या विभागात भ्रष्टाचाराचा शिरकाव झाल्याने या महामंडळालाही आता शब्दी वित्त व विकास महामंडळाप्रमाणेच घरघर लागली आहे. सद्यस्थितीत महामंडळ कागदोपरी नसून दिसत असले तरी सर्व योजनांना टाळे लावण्यात आल्याने कारभार ठप झाला आहे. एकाधिकार गौणउपज खरेदी आणि एकाधिकार खरेदी या दोनच योजना सुरू असून, जवळपास ७ योजना भ्रष्टाचारामुळे बंद केल्या आहेत. आदिवासी विकासमंत्री अध्यक्ष, तर राज्यमंत्री हे महामंडळाचे उपाध्यक्ष असतात. महामंडळात ३४ संचालक असून, व्यवस्थापकीय संचालक हे सद्यस्थितीत म्हणून काम करतात. परंतु, असे दिसून येत आहे की या विभागाच्या अधिका-यांना अजिबात रस नसल्याने त्यांनी महामंडळाच्या कारभाराकडे दुर्लक्ष केल्याचा आरोप केला जात आहे.

संदर्भ :

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