

“Education for Knowledge, Science and Culture”

-Shikshanmahashri Dr. Bapuji Salunkhe

Shri Swami Vivekanand Shikashan Sanstha's

Vivekanand College, Kolhapur (Autonomous)

Department of Zoology

Academic Year: 2018-2019

B. Sc. III Project

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Vivekanand College, Kolhapur
Department of Zoology
Autonomous
Kolhapur - 413001

Date: 10/10/2018

Student Project (B.Sc.III)

NOTICE

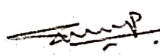
All students of B. Sc. III here by informed that, as per part of practical, all have to complete their projects and it is compulsory to all. List of students and guide is given below, follow the list and complete your project up to 28th February 2019.

(Dr. K. P. Shinde)
Head,
Department of Zoology
Vivekanand College,
Kolhapur (Autonomous)

Shri Swami Vivekanand Shikshan Sanstha's
Vivekanand College, Kolhapur (Autonomous)
 Department of Zoology
 Academic Year-2018-2019
 Class: BSc III

Sr. No.	Name of the Students	Name of the Guide	Title of the Project
1	Supriya Dipak Amate	Miss. K. L.Kamble	Study the diversity of butterflies in the Mouje Vadange Village
2	Aruna Dhondiba Chougule	Dr. T. C. Gaupale	To study histological structure and periodic acid – Schiff staining pattern in brain of black molly fish
3	Rafel Rujay Desa	Dr. T. C. Gaupale	Embryonic development and regeneration ability in zebra fish
4	Pooja Suresh Ekal	Miss. N. A. Jadhav	Assessment of physico-chemical parameters of water from Kalamba, Kotitirth, Rankala, Laxtirth, Tahsil-Karvir , Dist.-Kolhapur
5	Monica Anton Godad	Miss. N. A. Patel	Analysis of antimicrobial activities of photoactivated urine against common human pathogens.
6	Paravej Altaf Golandaj	Miss. N. A. Patel	Isolation of chitin from crab shell.
7	Nilam Chandrakant Kamble	Miss. K. L.Kamble	Study of zooplanktons in some water reservoir at Kolhapur city
8	Nisha Dinkar Kamble	Miss. K. L.Kamble	Study of zooplanktons in some water reservoir at Kolhapur city
9	Suraj Vijay Kapase	Dr. T. C. Gaupale	Histology and histochemical study in earthworm <i>Eisenia fetida</i>
10	Shivani Kiran Mane	Miss. N. A. Jadhav	Assessment of physico-chemical parameters of water from Kalamba, Kotitirth, Rankala, Laxtirth, Tahsil-Karvir , Dist.-Kolhapur
11	Manjula Bhimrao Naik	Miss. N. A. Jadhav	Histology of intestinal segments of <i>Eisenia fetida</i> by H.E. and Masson's Trichrome staining
12	Pooja Ravindra Patil	Ms. A K.Bhilugade	Study of insect pest of fruit plants.

13	Rutuja Rajendra Patil	Miss. N. A. Jadhav	Histology of intestinal segments of <i>Eisenia fetida</i> by H.E. and Masson's Trichrome staining
14	Snehal Sarjerao Patil	Miss. N. A. Patel	Analysis of antimicrobial activities of photoactivated urine against common human pathogens
15	Trupti Tanaji Patil	Dr. K. P. Shinde	To study histological structure and periodic acid – Schiff staining pattern in brain of black molly fish
16	Nilesh Mansing Rajput	Dr. K. P. Shinde	To study the honey bee behaviour and types of honey bee in the Devthane Village area
17	Abhishek Chandrakant Shirke	Dr. T. C. Gaupale	Embryonic development and regeneration ability in zebra fish
18	Varsha Rajesh Singh	Miss. N. A. Patel	Isolation and characterisation of papain enzyme from fresh papaya latex
19	Akshata Parsharam Sutar	Miss. N. A. Patel	Isolation and characterisation of papain enzyme from fresh papaya latex
20	Nivedita Balasaheb Gaikwad	Dr. K. P. Shinde	The study of life cycle stages of <i>Bombyx mori</i> .
21	Pooja Rajendra Sanap	Ms. A K. Bhilugade	Study of insect pest of fruit plants.


(Dr. K. P. Shinde)
 Head,
 Department of Zoology,
 Vivekanand College,
 Kolhapur (Autonomous)

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A PROJECT REPORT ON

Isolation and characterization of papain enzyme from
fresh papaya latex

SUBMITTED TO:

**DEPARTMENT OF ZOOLOGY,
VIVEKANAND COLLEGE (AUTONOMOUS), KOLHAPUR.**



**IN THE PARTIAL FULFILLMENT OF BACHELOR OF SCIENCE
IN ZOOLOGY
IN THE YEAR: 2018-2019**

UNDER THE GUIDANCE OF:

**PROJECT GUIDE: ASST.PROF. NAJNIN A. PATEL
HOD, ZOOLOGY: PROF.DR.KIRAN P. SHINDE**

BY:

Akshata P. Sutar - 8780

DECLARATION

I undersigned, declare that the project entitled "Isolation and characterization of papain enzyme from fresh papaya latex" is submitted by me under the guidance of Asst. Prof. Najnin A. Patel and Prof. Dr. K. P. Shinde (Head of the Department, Department of Zoology).

The empirical findings in this project are based on the data collected by us and it is authentic to the best of our knowledge. The work carried out during the project period is original and not copied from any other source.

Name : Akshata Parsharam Sutar

Roll No : 8780

Sign : 

Date : 17:03:2019


Place : Kolhapur

ACKNOWLEDGEMENT

I express my profound gratitude and deep regards to my guide Asst. Prof. Miss. Najnin A. Patel for her exemplary guidance throughout the project work. I should also like to express my special thanks to Prof. Dr. Kiran. P. Shinde (HOD, Department of Zoology) and Prin. Dr. S. Y. Hongekar (Vivekanand College, Kolhapur) and for providing me the opportunity to conduct the project on the topic "Isolation and characterisation of papain enzyme from fresh papaya latex" I am also thankful to all the teaching and non-teaching staff of Department of Zoology of Vivekanand College, Kolhapur for their co-operation throughout my project work. I would also like to thank my parents and friends who helped me in finalizing the project within the limited time frame.

Place: Kolhapur

Date: 17-03-2019


Miss. Akshata P. Sutar

(Project student)

" ज्ञान, विज्ञान आणि सुसंस्कार यांसाठी शिक्षण प्रसार "
 - शिक्षणमहर्षी डॉ. बापुजी साळुंखे

Shri Swami Vivekanand Shikshan Sanstha's

VIVEKANAND COLLEGE (Autonomous), KOLHAPUR



DEPARTMENT OF ZOOLOGY

CERTIFICATE

This is to certify that, **Miss. Akshata Parsharam Sutar (Roll No. 8780)** have satisfactorily completed the project entitled **"Isolation and characterization of papain enzyme from fresh papaya latex "** as per the Shivaji University, Kolhapur syllabus for B.Sc. III course in Zoology and this is the bonafide work of the student in the academic year 2018-19.

To the best of my knowledge and belief the matter presented in this project is original and is based on their own work. Such kind of work has not been submitted anywhere.

Place : Kolhapur

Date : 17-03-2019

Akshata
18/03/2019
Teacher in Charge

[Signature]
Examiner
27/3/2019

[Signature]
18/3/2019
Head of Department
Department of Zoology
Vivekanand College,
Kolhapur

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ENZYMES

Enzymes are substances that biological systems use to speed up chemical reactions. The molecules upon which enzymes act are called substrates and the molecules which the enzymes form from the substrate are called products. Most of the processes of life depend on the phenomenon called catalysis.

The living cell is the site of numerous biochemical reactions called metabolism. This is the sum of all chemical and physical change which goes on continually in the living organism. The rate of these reactions is affected by many factors, such as temperature, pH, concentration of reactants, presence of catalysts, etc. In this chapter, we shall study the factors which affect the rate of these reactions.

This building up and tearing down takes place in the form of an open pathway. The ordered sequence of these biochemical reactions do not take place simultaneously. The phenomenon of catalysis makes possible biochemical reactions necessary for all the processes of life. It is defined as the acceleration of a chemical reaction by some substance which itself is neither a product, nor a reactant. The catalysts of biochemical reactions are called enzymes. They are responsible for the acceleration of most of the chemical reactions in living organisms. Without enzymes, life would be impossible.

CHAPTER : 1

INTRODUCTION



1) ENZYMES

Enzymes are macromolecular biological catalysts. Enzymes accelerate chemical reactions. The molecules upon which enzymes may act are called substrates and the enzyme converts the substrates into different molecules known as products. Recently, this enzyme is being used for pharmaceutical and medical purposes.

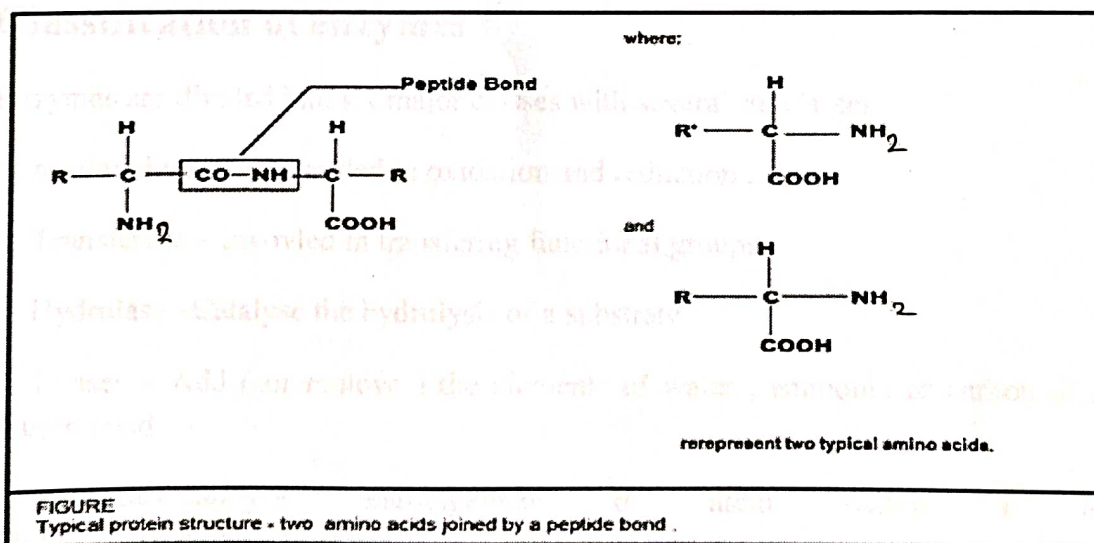
The living cell is the site of tremendous biochemical activity called metabolism. This is the process of chemical and physical change which goes on continually in the living organism. Build-up of new tissue, replacement of old tissue, conversion of food to energy, disposal of waste materials, reproduction - all the activities that we characterize as "life."

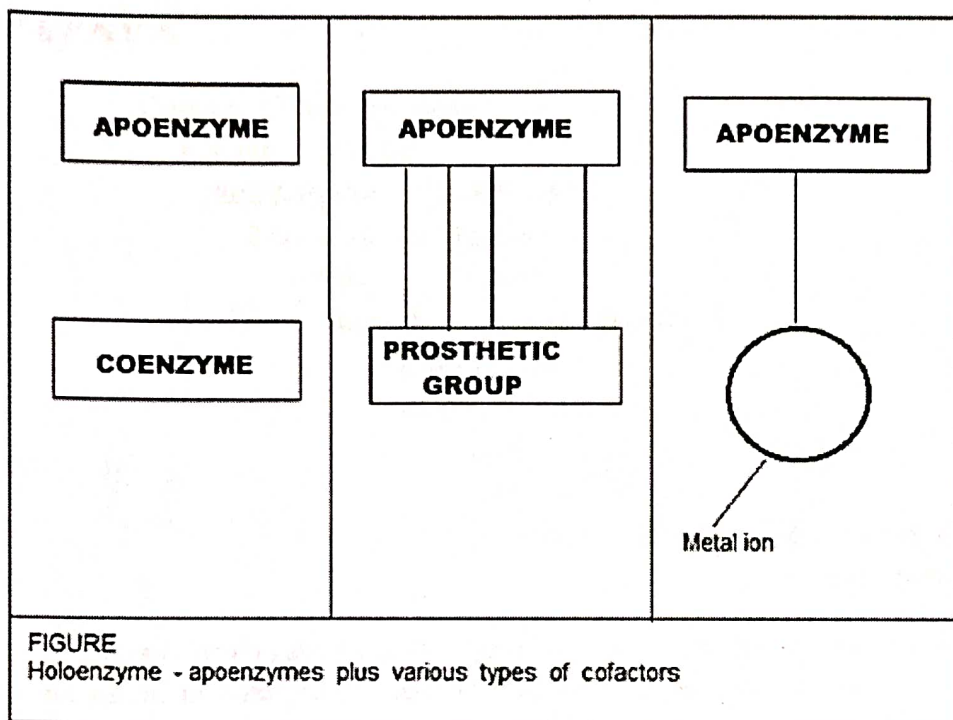
This building up and tearing down takes place in the face of an apparent paradox. The greatest majority of these biochemical reactions do not take place spontaneously. The phenomenon of catalysis makes possible biochemical reactions necessary for all life processes. Catalysis is defined as the acceleration of a chemical reaction by some substance which itself undergoes no permanent chemical change. The catalysts of biochemical reactions are enzymes and are responsible for bringing about almost all of the chemical reactions in living organisms. Without enzymes, these reactions take place at a rate far too slow for the pace of metabolism.

Chemical Nature of Enzymes

All known enzymes are proteins. They are high molecular weight compounds made up principally of chains of amino acids linked together by peptide bonds. Enzymes can be denatured and precipitated with salts, solvents and other reagents. They have molecular weights ranging from 10,000 to 2,000,000.

Many enzymes require the presence of other compounds - cofactors - before their catalytic activity can be exerted. This entire active complex is referred to as the holoenzyme; i.e., apoenzyme (protein portion) plus the cofactor (coenzyme, prosthetic group or metal-ion activator) is called the holoenzyme.





Apoenzyme + Cofactor = Holoenzyme

According to Holum, the cofactor may be:

1. A coenzyme - a non-protein organic substance which is dialyzable, thermostable and loosely attached to the protein part.
2. A prosthetic group - an organic substance which is dialyzable and thermostable which is firmly attached to the protein or apoenzyme portion.
3. A metal-ion-activator - these include K^+ , Fe^{++} , Fe^{+++} , Cu^{++} , Co^{++} , Zn^{++} , Mn^{++} , Mg^{++} , Ca^{++} , and Mo^{+++} (1).

Classification of enzymes :

Enzymes are divided into six major classes with several subclasses.

- A. oxidoreductase – Involved in oxidation and reduction .
- B. Transferase – Involved in transferring functional groups .
- C. Hydrolase –Catalyse the hydrolysis of a substrate .
- D. Lyases – Add (or remove) the elements of water , ammonia or carbon di oxide to form double bond
- E. Isomerases –catalyze rearrangement of atom within a molecule .
- F. Ligases – Join two molecules .

A PROJECT REPORT ON
 “ANALYSIS OF ANTIMICROBIAL ACTIVITIES OF
 PHOTOACTIVATED COW URINE AGAINST COMMON
 HUMAN PATHOGENS”

SUBMITTED TO:

**DEPARTMENT OF ZOOLOGY,
 VIVEKANAND COLLEGE (AUTONOMOUS), KOLHAPUR.**



**IN THE PARTIAL FULFILLMENT OF BACHELOR OF SCIENCE
 IN ZOOLOGY
 IN THE YEAR: 2018-2019**

UNDER THE GUIDANCE OF:

**PROJECT GUIDE: ASST.PROF. NAJNIN A. PATEL
HOD, ZOOLOGY: PROF.DR.KIRAN P. SHINDE**

BY:


SR.NO.	NAME	CLASS	ROLL NO.
1.	PATIL SNEHAL SARJERAO	B.Sc. III	8775

DECLARATION

I the undersigned students, declare that the project entitled "ANALYSIS OF ANTIMICROBIAL ACTIVITIES OF PHOTOACTIVATED COW URINE AGAINST COMMON HUMAN PATHOGENS" is submitted by us under the guidance of Asst. Prof. Najnin A. Patel and Prof. Dr. Kiran P. Shinde (HOD, Department of zoology). It is my original work. The empirical findings in this project are based on the data collected by us and it is authentically to the best of our knowledge. The presented matter is not copied from any other source.

Date:

Place: Kolhapur

SR.NO.	NAME	CLASS	ROLL NO.	SIGN
1.	Patil snehal sarjerao	B.ScIII	8775	

ACKNOWLEDGEMENT

I express am profound gratitude and deep regards to my project guide Asst. Prof. Najnin A. Patel for her exemplary guidance throughout the project work. I would also like to express my special thanks of gratitude to Prof. Dr. Kiran P. Shinde (Professor & HOD, Department of zoology) and Dr. S. Y. Hongekar (Principle, Vivekanand College(Autonomous), Kolhapur) for providing us the opportunity to conduct the project on the topic "ANALYSIS OF ANTIMICROBIAL ACTIVITIES OF PHOTOACTIVATED COW URINE AGAINST COMMON HUMAN PATHOGENS"

I am also thankful to all teaching and non-teaching staff of Department of Zoology, Vivekanand College, Kolhapur for their co-operation and help throughout my project work.

I would also like to thank our parents and friends who helped us in finishing the project within the limited time frame.

" ज्ञान, विज्ञान आणि सुसंस्कार यांसाठी शिक्षण प्रसार "
- शिक्षणमहर्षी डॉ. बापुजी साळुंखे

Shri Swami Vivekanand Shikshan Sanstha's

VIVEKANAND COLLEGE (Autonomous), KOLHAPUR



DEPARTMENT OF ZOOLOGY

CERTIFICATE

This is to certify that MISS. SNEHAL SARJERAO PATIL (ROLL NO. 8775) have satisfactory completed the project entitled "ANALYSIS OF ANTIMICROBIAL ACTIVITIES OF PHOTOACTIVATED COW URINE AGAINST COMMON HUMAN PATHOGENS" As per the Shivaji University, Kolhapur, syllabus for B. Sc. III course in Zoology and this is their bonafide work in the academic year 2018-019.

To the best of my knowledge and belief the matter presented in this project is original and is based on their own work. Such kind of work has not been submitted anywhere.

Date: 15/3/2019

Place: Kolhapur .

Ash
15/03/2019
PROJECT GUIDE

Ash
EXAMINER
15/3/2019

Ash
15/3/2019
HOD ZOOLOGY
Head
Department of Zoology
Vivekanand College,
Kolhapur

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CHAPTER 1 :

INTRODUCTION

I. MICROORGANISMS:

A microorganism or microbe is a microscopic organism, which may be single-celled or multicellular. (Brock Biology of Microorganisms- Madigan M.) The study of microorganisms is called microbiology, a subject that began with the discovery of microorganisms in 1674 by Antonie van Leeuwenhoek, using simple microscope of his own design.

Microorganisms are very diverse and include all bacteria, archaea, and most protozoa. This group also contains some fungi, algae, and some micro animals such as rotifers. Many macroscopic animals and plants have microscopic juvenile stages. Some microbiologists classify viruses and viroids microorganisms, but others consider these as nonliving. (Lwoff A.- Concept of virus)

Microorganism live every in every part of the biosphere, including soil hot springs, the deepest parts of the ocean, high in the atmosphere, and inside rocks. Microorganisms, under certain test conditions, have been observed to thrive in the vacuum of outer space. (Wade, Nicholas)

Microorganisms are found in almost every habitat present in nature, They also include all the marine microorganisms of the oceans and deep sea. Some types of microorganisms have adapted to extreme environments and sustained colonies; these organisms are known as extremophiles. Extremophiles have been isolated from rocks as much as 7 kilometers below the Earth's surface, and it has been suggested that the amount of organisms living below the Earth's surface is comparable with the amount of life on or above the surface. Extremophiles have been known to survive for a prolonged time in a vacuum, and can be highly resistant to radiation, which may even allow them to survive in space.; some of which are mutually beneficial (mutualism), while others can be damaging to the host organism (parasitism). If microorganisms can cause disease in a host they are known as pathogens and then they are sometimes referred to as *microbes*. Microorganisms play critical roles in Earth's biogeochemical cycles as they are responsible for decomposition and nitrogen fixation.

Microorganisms are useful in producing foods, treating waste water, creating bio fuels and a wide range of chemicals and enzymes. They are invaluable in research as model organisms. They have been weaponised and sometimes used in warfare and bioterrorism. They are vital to agriculture through their roles in maintaining soil fertility and in decomposing organic matter

Microorganisms are used in a fermentation process to make yoghurt, cheese, curd, ayran, xynogala, and other types of food. Fermentation cultures provide flavor and aroma, and inhibit undesirable organisms. They are used to leaven bread, and to convert sugars to alcohol in wine and beer. Microorganisms are used in brewing, wine making, baking, pickling and other food-making processes.

Microorganisms are used in fermentation to produce ethanol, and in biogas reactors to produce methane. Scientists are researching the use of algae to produce liquid fuels and bacteria to convert various forms of agricultural and urban waste into usable fuels. Microorganisms are essential tools in biotechnology, biochemistry, genetics, and molecular biology. Microorganisms

can be harnessed for uses such as creating steroids and treating skin diseases. Scientists are also considering using microorganisms for living fuel cells and as a solution for pollution

II. INTERACTION OF MICRO-ORGANISM WITH HUMAN:

The presence of microbes in all walks of human life, there is a constant interaction of the microbes on human life. The vast majority of the bacteria in the body are rendered harmless by the protective effects of the immune system, and a few are beneficial. In fact, the relationship between microbes and humans is delicate and complex.

- The microbes that normally live in association with humans on the various surfaces of the body (called the normal flora), such as *Lactobacillus* and *Bifid* bacterium, are known to protect their hosts from infections and otherwise promote nutrition and health
- Micro-organisms, especially molds, can trigger respiratory infections and allergies if they grow in our workplaces or homes.
- Microscopic growth can also lead to fungal staining of carpets and algal growth on paint, which can be difficult and costly to remove. Bacteria and fungi are common causes of malodour in home textiles, clothing, and footwear. Bacteria and other microbes are frequent contaminants of food and water, which can lead to food poisoning and serious illness. Microbes are the agents of food spoilage and decomposition of clothing and sheltering materials

a. Positive interaction :

Positive interaction of micro-organism:

A. Food production :

1. Controlled fermentation with microbes in brewing, wine making, baking, pickling and cultured dairy products such as yogurt and cheese, is used to modify ingredients to make foods with desirable properties. The principal microbes involved are yeasts, in the case of beer, wine, and ordinary bread; and bacteria, in the case of anaerobically fermented vegetables, dairy products, and sourdough bread. (*"Dairy Microbiology". University of Guelph. Retrieved 9 October 2006 Steinkraus, K. H., ed. (1995). Handbook of Indigenous Fermented Foods. Marcel Dekker.*)

B. Water treatment:

1. Oxidative sewage treatment processes rely on microorganisms to oxidise organic constituents.
2. Anaerobic microorganisms reduce sludge solids producing methane gas and a

A PROJECT REPORT ON:

**To Study the Honey bee behaviour and types of honey bee
in the Devthane village area**

SUBMITTED TO:

**DEPARTMENT OF ZOOLOGY,
VIVEKANAND COLLEGE, KOLHAPUR.**



IN THE PARTIAL FULFILLMENT OF BACHELOR OF SCIENCE IN

ZOOLOGY

IN THE YEAR: 2018-19

BY,

NILESH MANSING RAJPUT

Roll no.8777

UNDER THE GUIDANCE OF:

PROJECT GUIDE: PROF. DR. KIRAN P. SHINDE

DECLARATION

I undersigned students , declare that project entitled **To Study the Honey bee behaviour and types of honey bee in the Devthane village area** is written and submitted by us under the guidance of PROF. DR. KIRAN P. SHINDE [HOD, Department of Zoology]

We declare that this project work is original and the project is based on information collected by us personally and is not a reproduction of any source.

We understand that such copying is liable to be punished in any way the university authorities deem fit.

Thank You.

Place: Kolhapur

Date:

Mr. Nilesh Mansing Rajput


(Project Student)

ACKNOWLEDGMENT

We express our profound gratitude and deep regards to our guide

Prof. Dr. Kiran P. Shinde (HOD, Department of Zoology)

Vivekanand college, Kolhapur for his exemplary guidance throughout the project work. We should also like to express our special thanks to Dr. Prin. S. Y. Hongekar (Vivekanand College, Kolhapur) and for providing us the opportunity to conduct the project on the topic **To Study the Honey bee behaviour and types of honey bee in the Devthane village area.**

We are also thankful to all the teaching and non-teaching staff of Department of Zoology of Vivekanand College, Kolhapur and Mr. Shridhar Randive for their co-operation throughout our project work. We would also like to thank our parents and friends who helped us in finalizing the project within the limited time frame.

Shri Swami Vivekanand shikshan sanstha's
Vivekanand College, Kolhapur(Autonomous)

Shivaji University, Kolhapur.

DEPARTMENT OF ZOOLOGY

CERTIFICATE

This is to certify that **Mr. Nilesh Mansing Rajput (Roll No. 8777)** have satisfactorily completed the project entitled "**To Study the Honey bee behaviour and types of honey bee in the Devthane village area**" as per the Shivaji University, Kolhapur syllabus for **B.SC.III** course in **Zoology**, and this is their confide work in the academic year **2018-19**. To the best of my knowledge and belief the matter presented in this project is original and is based on their own work. Such kind of work has not been submitted anywhere

Place: Kolhapur


Date:


2013/2019

Teacher in charge


2013/2019

Examiner


2013/2019

Head of the Department
Department of Zoology
Vivekanand College,
Kolhapur

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CHAPTER 1: INTRODUCTION

Applied zoology

The science of life and living organisms including their structure, functions, growth, origin, evolution, and distribution comes under applied zoology.

Types / Branches of applied zoology :

- »Apiculture
- »Poultry farm
- »Sericulture
- »Lac culture
- »Dairy farm
- »Fishery
- »Animal husbandry
- »Entomology
- »Pearl culture
- »Parasitology

Apiculture:

‘Apis’ means bee. The scientific names of different species of honeybees begin with .The generic name *Apis*. Apiculture or bee-keeping is the art of caring for, and manipulating colonies of honeybee in large quantity, over and above their own requirement.

The first evidence of this association came to light from the rock painting made by primitive human. Thousands of years ago, Egyptian were well acquainted with bee keeping before the Christian Era. In Rigveda, there are many references to bee and honey. Bee-keeping became a commercial proposition during the 19th century as a result of scientific research. Apiculture is a flourishing industry in many advanced countries like USA, Canada, Germany and Australia.

Species of honey bee

There are four common species of honey bee under a single genus *Apis* (*apis* = bee):

1. *Apis dorsata* (The rock- bee):

Kingdom :Animalia

Phylum :Euarthropoda

Class :Insecta

Order:Hymenoptera

Family:Apidae

Genus :*Apis*

Species: *dorsata*

Apis dorsata is the gaint honey bee of south and southeast Asia ,found mainly in forested areas such as terai of nepal. Produces large quantity of honey, but this bee is difficult to domesticate.

They are typically around 17-20mm long .The social bees are known for agresive defence when thier colony is distrubed..The comb size is 1×1meter Builds single large open comb on high branches of trees and rocks. This bee is ferocious, stings severely causing fever and sometimes even death.



pic:1 *Apis dorsata*
(<https://goo.gl/images/XhrGPn>)

A PROJECT REPORT ON
“STUDY OF INSECT PESTS OF FRUIT PLANTS”

SUBMITTED TO:

DEPARTMENT OF ZOOLOGY
 VIVEKANAND COLLEGE, KOLHAPUR



IN THE PARTIAL FULFILLMENT OF
 BACHELOR OF SCIENCE IN ZOOLOGY
 IN THE YEAR 2018-19

BY

<u>SR.NO</u>	<u>NAME</u>	<u>CLASS</u>	<u>ROLL NO.</u>
1	MISS. POOJA .R. PATIL	B.SC III	8773

UNDER THE GUIDANCE OF

PROJECT GUIDE : ASST. PROF. ARATI K. BHILUGADE

HOD, ZOOLOGY : PROF.DR. KIRAN .P SHINDE

DECLARATION

We, the undersigned students, declare that project on “**STUDY OF INSECT PESTS OF FRUIT PLANTS**” is written and submitted by us under the guidance of Asst. Prof. Miss. Aarti Bhilugade and Prof. Dr. K. P. Shinde (HOD, Department of Zoology)

We declare that this project work is original and the project is based on information collected by us personally and is no a reproduction of any source.

We understand that such copying is liable to be punished in any way the university authorities deem fit.

Thank You,

Place : Kolhapur

Date :

P.R. Patil
Miss. Pooja R. Patil

ज्ञान, विज्ञान आणि सुसंस्कार या यासाठी शिक्षण प्रसार — शिक्षणमहर्षी डॉ. बापूजी साळुंखे

Shri Swami Vivekanand Shikshan Sanstha's

Vivekanand College, (Autonomous), Kolhapur

Shivaji University, Kolhapur

DEPARTMENT OF ZOOLOGY

CERTIFICATE

This is to certify that **Miss. Pooja Ravindra Patil (Roll No. 8773)**, have satisfactorily completed the project entitled “**STUDY OF INSECT PESTS OF FRUIT PLANTS**” as per the Shivaji University, Kolhapur syllabus for B.SC.III course in Zoology, and this is their confide work in the academic year 2018-19.

To the best of my knowledge and belief the matter presented in this project is original and is based on their own work. Such kind of work has not been submitted anywhere.

Place : Kolhapur

Date :

At Bhatiyade
23/03/2019
Project Guide

Examiner
23/3/2019

Head of the Department
Department of Zoology
Vivekanand College,
Kolhapur
23/3/2019

ACKNOWLEDGEMENT

We express our profound gratitude and deep regards to our guide Asst. Prof. Miss. Aarti Bhilugade for her exemplary guidance throughout the project work. We should also like to express our special thanks to Prof. Dr. Kiran P. Shinde (HOD, Department of Zoology) and Prin. Dr. S.Y. Hongekar (Vivekanand College, Kolhapur) for providing us the opportunity to conduct the project on the topic “**STUDY OF INSECT PESTS OF FRUIT PLANTS**”

We are also thankful to all the teaching and non-teaching staff of Department of Zoology of Vivekanand College, Kolhapur for their co-operation throughout our project work. We would also like to thank our parents and friends who helped us in finalizing the project within the limited time frame.

Place : Kolhapur

Date :

P. R. Patil

Miss. Pooja Ravindra Patil

(Project Student)

CHAPTER - 1
INTRODUCTION

INTRODUCTION :

Pest is a destructive insect or other animal that attacks crops, food, livestock etc. In the plant world pests refers to harmful organisms that latch on to plants rendering them unsuitable for harvest which most of organisms end to be insect some fungi or plants can also be classified as pests. These insect pest can damage the buds, leaves and fruits of the plant. Some birds, mammals frephiles can also damage to the fruit plant.

There are common insect pests like aphids, whitefly, moth fly, grasshopper, mealy bug, mango hopper. These pests attack on banana, mango, papaya, citrus, grapes etc. which can damage fruit plant and causes various diseases. Larvae, nymph and adult of insect pest can damage the various parts of fruit plants. Damage or destruction of parts of plants decreases the quality and production of fruits. various methods are used to control the pest to grow any type of fruit successfully, must grow healthy plants. Insecticides, pesticides are used to control the pest. Instead of any chemical, biological control measure is better. Insecticides and pesticide reduce destribution and contamination of growing and harmsterd insects and there eggs. To maintain quality of fruits for proper control of pest and for the increase the yield of crop.

Objectives of the study:

1. To study the insect pests of fruit plant.
2. To study the damage on fruit plant caused by the insect pests.

CHAPTER - 2
MATERIAL AND METHODS