

**Effects of  $\text{Ca}^{++}$  ions on the melanophore response in the  
fish, *Rasbora daniconius***



**A Project dissertation submitted  
in partial fulfillment for degree of  
M.Sc. Zoology IV Semester**

**By**

**Abharani Tandi**

**Under Supervision of  
Dr. Naresh Chandra Agrawal  
(Assistant Professor)**



**DEPARTMENT OF ZOOLOGY  
GURU GHASIDAS VISHWAVIDYALAYA, BILASPUR**

**2024**



## Department of Zoology

### Guru Ghasidas Vishwavidyalaya

(A central university established by act of parliament 2009 no.25 2009)

#### CERTIFICATE

This is to certify that **Abharani Tandi** has on postgraduate dissertation project entitled "**Effects of  $Ca^{++}$  ions on the melanophore response in the fish, *Rasbora daniconius***" under my supervision for 3 months and this work has not been formed the basis for the award of any other similar title.

It represents entirely an independent work on the part of candidate.

Date: 03-09-2024

Place: Bilaspur (C.G.)

  
Signature of Supervisor

Date: 03-09-2024

Place: Bilaspur (C.G.)

  
Head of the Department

विभागाध्यक्ष  
HEAD

जन्तु विज्ञान विभाग

Department of Zoology

गुरु घासीदास वि.वि., बिलासपुर

Ghasidas Vishwavidyalaya Bilaspur

  
3.9.24

# **Contents**

<b>Introduction</b>	<b>01-04</b>
<b>Review of Literature</b>	<b>05-08</b>
<b>Materials and Methods</b>	<b>09-12</b>
<b>Results</b>	<b>13-15</b>
<b>Discussion</b>	<b>16-19</b>
<b>Conclusion</b>	<b>20</b>
<b>References</b>	<b>21-34</b>

# **Clomiphene Citrate in reversal of male infertility: A Meta-analysis**

A Project dissertation submitted  
in partial fulfillment for degree of  
M.Sc. Zoology

By

**Ajay Kumar**

Roll no. - 22062102

Enrollment no. - GGV/22/03402

Under supervision of

**Prof. Seema Rai**

Department of Zoology



**GURU GHASIDAS VISHWAVIDYALAYA**

Department of Zoology

Guru Ghasidas Vishwavidyalaya, Bilaspur (C.G.)

2022-2024





**Department of Zoology**  
**Guru Ghasidas Vishwavidyalaya, Bilaspur (C.G.)**  
(A Central University established by Central University Act 2009 no.25 of 2009)

**CERTIFICATE**

This is to certify that **Mr Ajay Kumar**, Roll no. **22062102**, Enrollment no. **GGV/22/03402** has worked on postgraduate dissertation project entitled "**Clomiphene Citrate in reversal of male infertility: A Meta-analysis**" under my supervision for months and this work has not been formed the basis for the award of any other similar title.

It represents entirely an independent work on the part of candidate.

Date: **03/09/2024**

  
**Signature of Supervisor**

Place: Bilaspur

Date: **03/09/2024**

  
**Head of Department**

Place: Bilaspur

**विभागाध्यक्ष**  
**HEAD**  
**जन्तु विज्ञान विभाग**  
**Department of Zoology**  
**गुरु घासीदास वि.वि., बिलासपुर**  
**Gur Ghasidas Vishwavidyalaya, Bilaspur**

## CONTENTS

ABSTRACT	1
INTRODUCTION	2-4
REVIEW OF LITERATURE	5-11
MATERIALS AND METHODS	12-13
RESULTS	14-29
DISCUSSION	30-31
CONCLUSION	32
REFERENCES	33-41

**Effect of Agricultural Insecticide Profenofos on Protein profile of  
Fresh water Teleost *Labeo rohita* (Hamilton)**



**A Dissertation Report**

**Submitted in partial fulfillment of the requirements for degree of  
Master of Science in Zoology**

**By**

**Archana Kundu**

**Under the supervision of**

**Dr. Sushant Kumar Verma  
(Assistant Professor)**



**DEPARTMENT OF ZOOLOGY**

**GURUGHASIDAS VISHWAVIDYALAYA, BILASPUR (C.G.)495006**

**A central university established by act of parliament 2009 no.25 of 2009)**

**2024**



**DEPARTMENT OF ZOOLOGY**  
**GURU GHASIDAS VISHWAVIDYALAYA**

(A Central university established by central university Act 2009 No. 25 of 2009)

**CERTIFICATE**

This is to certify that **Ms. Archana Kundu**, has worked on dissertation entitled "**Effect of Agricultural Insecticide Profenofos on Protein profile of Fresh water Teleost *Labeo rohita* (Hamilton)**" for the completion of M.Sc. (Zoology) degree under my supervision and this dissertation report has not formed the basis for the award of any other degree.

It represents entirely independent work on the part of the candidate.

Signature of Supervisor

Head of the Department

DATE: 03.09.24

PLACE: Bilaspur

विभागाध्यक्ष  
HEAD  
जन्तु विज्ञान विभाग  
Department of Zoology  
गुरु घासीदास वि.वि., बिलासपुर  
Ghasidas Vishwavidyalaya Bilaspur

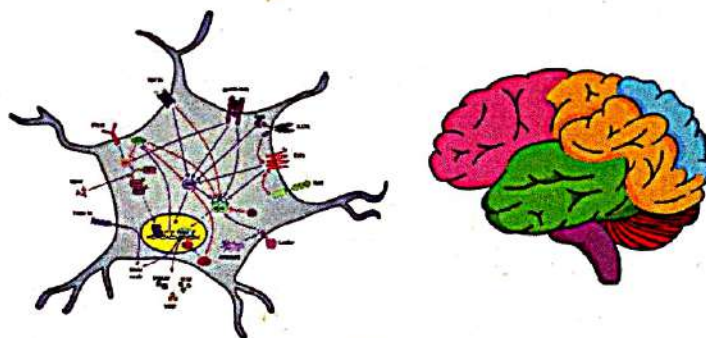


## CONTENTS

S.NO.	CONTENTS	PAGE NO.
1.	INTRODUCTION	1-3
2.	REVIEW OF LITRETURE	4-6
3.	AIM AND OBJECTIVE	7
4.	MATERIALS AND METHODS	8-12
5.	RESULT	13-14
6.	DISCUSSION	15-17
7.	REFERENCES	18-25



**IMPACT OF LIPOCALIN(LCN)-2 ON THE HIPPOCAMPAL  
NEURODEGENERATION DURING DIABETES MELITUS**



Dissertation submitted for

Partial fulfillment for the degree of

***Master of Science in Zoology***

By

**Miss. Baivhabee Panigrahy**

Under the supervision of

**Dr. Santosh Singh**

*Assistant Professor*



**Department of Zoology**

**Guru Ghasidas Vishwavidyalaya, Bilaspur (CG)**

**2024**



# Department of Zoology Guru Ghasidas Vishwavidyalaya

(A Central University established by Central University Act 2009 No. 25 of 2009)

## CERTIFICATE

This is to certify that **Miss. Baivhabee Panigrahy**, a student of the M.Sc. IV semester has worked on a dissertation project entitled **"Impact of Lipocalin 2 on the Hippocampal Neurodegeneration During Diabetes Mellitus"** under the supervision of **Dr. Santosh Singh** for three months and this work has not been formed on the basis for the award of any other degree.

It represents entirely independent work on the part of the candidate.

*Santosh Singh*  
8/7/24

Signature of the Supervisor

Date: 3/09/2024

Place: Bilaspur

*[Signature]*

Head of the Department

विभागाध्यक्ष  
HEAD

जन्तु विज्ञान विभाग

Department of Zoology

गुरु घासीदास वि.वि., बिलासपुर

Guru Ghasidas Vishwavidyalaya, Bilaspur

# INDEX

## Contents:

## Page:

1. Abstract	01
2. Introduction	02-03
3. LCN-2	03-09
4. Different physiological roles of LCN2 in the Central Nervous System	09
5. Lipocalin 2 and diabetic encephalopathy	10-16
6. Targeting Lipocalin-2 for therapeutic interventions	16-19
7. Conclusion	19
8. References	20-35



**EVALUATION OF TOXIC EFFECT OF GRAPHENE  
OXIDE ON ZEBRAFISH (*Danio rerio*) BRAIN**

Project dissertation submitted

In Partial fulfillment for degree of  
**MASTER OF SCIENCE IN ZOOLOGY**

by

**Bharti Dewangan**

Under supervision of

**DR. GITA MISHRA**  
**(ASSISTANT PROFESSOR)**



**DEPARTMENT OF ZOOLOGY**  
**GURU GHASIDAS VISHWAVIDYALAYA**  
**KONI, BILASPUR (C.G) - 495009**



# Department of Zoology Guru Ghasidas Vishwavidyalaya

(A Central University established by Central University Act 2009 No. 25 of 2009)

## CERTIFICATE

This is to certify that **Ms. Bharti Dewangan** has worked for dissertation for M.Sc. (Zoology) degree entitled “**EVALUATION OF TOXIC EFFECT OF GRAPHENE OXIDE ON ZEBRAFISH (*Danio rerio*) BRAIN**” under my supervision for 3 months and this work has not been formed the basis for the award of any other degree.

It represents entirely an independent work on the part of candidate.

Date: 03/09/2024

Place:

Signature of Supervisor

Dr. Gita Mishra

Signature of Co-supervisor

Dr. Nisha Sahu

Head of the Department

Dr. Seema Raj

विभागाध्यक्ष  
HEAD

जन्तु विज्ञान विभाग

Department of Zoology

गुरु घासीदास वि.वि., बिलासपुर

Guru Ghasidas Vishwavidyalaya Bilaspur



# **CONTENTS**

## **Page no.**

• Introduction	01-04
• Review of literature	04-05
• Material and methods	05-07
• Results	08-13
• Discussion	14-15
• References	16-19

**Evaluation of phytochemical and antioxidant potential of a  
commercialized standard pelleted feed for rats**



**Dissertation submitted  
in partial fulfilment for degree of  
M. Sc. in Zoology**

**By**

**Ms. Bipasha Biswas**

**Under the supervision of**

**Prof. Monika Bhadauria**

**Department of Zoology  
Guru Ghasidas Vishwavidyalaya  
Koni- Bilaspur 495009 (C.G.)**

**2024**



**Department of Zoology  
Guru Ghasidas Vishwavidyalaya  
Koni, Bilaspur 495009 (C.G.)**

(A Central University Established under Central University Act 2009, No. 25 of 2009)

**CERTIFICATE**

This is to certify that **Ms. Bipasha Biswas** has worked for M.Sc. (Zoology) dissertation entitled **“Evaluation of phytochemicals and antioxidant potential of a commercialized standard pelleted feed for rats”** under my supervision for about 3 months and this work has not been formed the basis for the award of any other similar title.

It represents entirely an independent work on the part of candidate.

**Date: 03/ 09/ 2024**

**Place: Bilaspur**

*Mouli*

**Signature of Supervisor**

**Date: .... / 09/ 2024**

**Place: Bilaspur**

*[Signature]*

**Head of the Department**

**विभागाध्यक्ष  
HEAD**

**जन्तु विज्ञान विभाग**

**Department of Zoology**

**गुरु घासीदास वि.वि., बिलासपुर**

**Guru Ghasidas Vishwavidyalaya Bilaspur**

**Date: .... / 09/ 2024**

**Place: Bilaspur**

*[Signature]*  
**External Expert**

## **CONTENT**

<b>[1] Introduction</b>	<b>01 - 03</b>
<b>[2] Review of literature</b>	<b>04 - 25</b>
<b>[3] Materials and methods</b>	<b>26 - 29</b>
<b>[4] Result and discussion</b>	<b>30 - 34</b>
<b>[5] Conclusion</b>	<b>35</b>
<b>[6] References</b>	<b>36 - 43</b>
<b>[7] Research paper communicated</b>	<b>44</b>

**Activin A: a new avenue for enhancing cancer therapy**

**A Project Dissertation Submitted**

**In Partial Fulfilment for Degree of**

**M.Sc Zoology**

**By**

**Mr. Chandrasekhar Mishra**

**Under Supervision of**

**Prof. LVKS Bhaskar**

**(Professor of Zoology)**



**DEPARTMENT OF ZOOLOGY**

**GURU GHASIDAS VISHWAVIDYALAYA, KONI, BILASPUR**

**(C.G.).**

**(A Central University Established By Act of Parliament 2009, No. 25 of 2009)**

**2024**



**Activin A: a new avenue for enhancing cancer therapy**

A Project Dissertation Submitted  
In Partial Fulfilment for Degree of  
**M.Sc Zoology**

By

**Mr. Chandrasekhar Mishra**

Under Supervision of  
**Prof. LVKS Bhaskar**  
(Professor of Zoology)



**DEPARTMENT OF ZOOLOGY**

**GURU GHASIDAS VISHWAVIDYALAYA, KONI, BILASPUR**  
(C.G.).

(A Central University Established By Act of Parliament 2009, No. 25 of 2009)

**2024**



Department of Zoology  
Guru Ghasidas Vishwavidyalaya

(A Central University Established By Act of Parliament 2009, No. 25 of 2009)

CERTIFICATE

This is to certify that Mr. Chandrasekhar Mishra worked on a postgraduate dissertation project entitled "Activin A: a new avenue for enhancing cancer therapy" under my supervision for 3 months and this work has not been formed the basis for the award of any other similar title. It represents entirely independent work on the part of the candidate.

Date: 03/09/2024

Place: Bilaspur

*LVKS Bhaskar 3/9/2024*  
Signature of supervisor

Prof. LVKS Bhaskar

Head of the Department

Prof. *सुखदेव शर्मा*

HEAD

जन्तु विज्ञान विभाग

Department of Zoology

गुरु गसाीदास वि. वि., बिलासपुर

Guru Ghasidas Vishwavidyalaya Bilaspur



**Department of Zoology**  
**Guru Ghasidas Vishwavidyalaya**

(A Central University Established By Act of Parliament 2009, No. 25 of 2009)

**DECLARATION**

I **Mr. Chandrasekhar Mishra** hereby declare that the work presented in the dissertation entitled "**Activin A: a new avenue for enhancing cancer therapy**" submitted for partial fulfilment of M.Sc. Zoology was carried out at Department of Zoology, Guru Ghasidas Vishwavidyalaya, Koni, Bilaspur (C.G).

The work was carried out by me under the supervision of **Dr. LVKS Bhaskar**, Department of Zoology, Guru Ghasidas Vishwavidyalaya. The work presented in this dissertation is original and it has not previously formed the basis for the award of any degree.

*Chandrasekhar Mishra*

**Mr. Chandrasekhar Mishra**

Signature of Candidate

*L.V.K.S. Bhaskar 3/9/2024*  
Signature of the supervisor

Date: 03/09/2024

Place: Bilaspur

## ACKNOWLEDGEMENT

First & foremost, I express my special thanks and gratitude to my supervisor **Dr. LVKS Bhaskar**, whose constant encouragement, supervision & support from the preliminary to the concluding level enabled me to develop an understanding of the subject.

I am also thankful to **Dr. Seema Rai, Dr. Monika Bhadauria, Dr. Rohit Seth, Dr. Sushant Kumar Verma, Dr. Santosh Singh, Dr. Manish Kumar Tripathi, Dr. Neha Jain, Dr. Gita Mishra, Dr. Naresh Chandra Agrawal, Dr. Nisha Sahu** for their valuable co-operation, suggestions and guidance during the dissertation work.

I am also thankful PhD scholar **Mr. Manas Ranjan purohit, Mr. Falguni Saraf, Mr. Sagar Jangde, Ms. Shubhasmita Sahoo, Ms. Varsha Ahire** for supporting my work related to the dissertation work. I thank my classmates specially **Mr. Tapindra Rana, Mr. Laxminarayan Sahoo, Mr. Nikesh Bhoy**, and all my classmates for their constant support and encouragement.

I take this opportunity to express my gratitude & love to my parents and family members especially to my father **Mr. Srikanta Mishra** and my Mother **Mrs. Sashirekha Mishra** for their understanding, inspiration, kind support and encouragement during the crucial time of the completion of the project. Finally, all honour's & glories to almighty God for spiritual support & strength.

*Chandrasekhar mishra*

**Chandrasekhar Mishra**

Date: 03/09/2024

Place: Bilaspur

## **Contents**

## **page no.**

<b>1. Introduction</b>	<b>1</b>
<b>2. Activin A signalling</b>	<b>1-2</b>
<b>3. Regulation of Activin a activity</b>	<b>2-3</b>
<b>4. Activin A expression in normal and malignant cell</b>	<b>3</b>
<b>5. Activin A in cell growth and death</b>	<b>3-4</b>
<b>6. Activin A in migration, invasion and metastasis</b>	<b>4-5</b>
<b>7. Activin A in angiogenesis</b>	<b>5-6</b>
<b>8. Activin A in anti-tumor immune response</b>	<b>6-7</b>
<b>9. Activin A in stemness and drug resistance</b>	<b>7-8</b>
<b>10. Activin A as cancer bio-marker</b>	<b>8</b>
<b>11. Targetting approach for activin A</b>	<b>9-10</b>
<b>12. Conclusion</b>	<b>11</b>
<b>13. References</b>	<b>11-16</b>



**Hepatic Encephalopathy: The Role of Glutamate-Glutamine  
cycle in Ammonia Detoxification Vs Neurotoxicity**

A Project Dissertation Submitted  
In Partial Fulfilment for Degree of

**M.Sc. Zoology**

By

**Ms. Elizabeth Ekka**

Under Supervision of

**Dr. Santosh Singh**

**(Professor of Zoology)**



**DEPARTMENT OF ZOOLOGY**  
**GURU GHASIDAS VISHWAVIDYALAYA, KONI,**  
**BILASPUR (C.G.).**

(A Central University Established By Act of Parliament 2009, No. 25 of 2009)

**2024**



**Department of Zoology**  
**Guru Ghasidas Vishwavidyalaya**


(A Central University Established By Act of Parliament 2009, No. 25 of 2009)

**CERTIFICATE**

This is to certify that Ms. Elizabeth Ekka worked on a postgraduate dissertation project entitled "**Hepatic Encephalopathy: The Role of Glutamate-Glutamine cycle in Ammonia Detoxification Vs Neurotoxicity**" under my supervision for 3 months and this work has not been formed the basis for the award of any other similar title. It represents entirely independent work on the part of the candidate.


Date: 03/09/24

Place: Bilaspur

  
3/9/24

Signature of supervisor

Dr. Santosh Singh

  
3/9/24

Head of the Department

Dr. Seema Rani  
HEAD

जन्तु विज्ञान विभाग  
Department of Zoology  
गुरु घासीदास वि.वि., बिलासपुर  
Guru Ghasidas Vishwavidyalaya Bilaspur

## **Table of Contents**

1. Abstract
2. Introduction
3. Role of glutamine and Glutamate in Hepatic Encephalopathy
  - I. Enzymes involved in the Glutamine-Glutamate Cycle
4. Neurotransmitter system in Hepatic encephalopathy
  - I. GABA and Glutamate
5. Oxidative stress and mitochondrial dysfunction
6. Inflammation and Immune Response
7. Transporters and Receptors
  - I. Glutamate Receptor
  - II. Glutamine Receptor
8. Mechanism of Neurotoxicity
9. Detoxification pathways
10. Therapeutic implications
11. Discussion
12. Conclusion
13. References

**EVALUATION OF SERUM BIOCHEMICAL AND HISTOLOGICAL  
ALTERATION INDUCED BY GRAPHENE OXIDE IN  
ZEBRA FISH, *Danio rerio***

A Project Dissertation Submitted  
In Partial Fulfilment for Degree of

**M.Sc. Zoology**

By

**Ms. Hema Katle**

Under Supervision of

**Dr. Gita Mishra**

And

**Dr. Nisha Sahu (Co-supervisor)**

**(Asst. Professor of Zoology)**



**DEPARTMENT OF ZOOLOGY  
GURU GHASIDAS VISHWAVIDYALAYA, KONI,  
BILASPUR (C.G.).**

(A Central University Established By Act of Parliament 2009 No.25 of 2009)

**2024**





**Department of Zoology**

**Guru Ghasidas Vishwavidyalaya**

(A Central University Established By Act of Parliament 2009 No.25 of 2009)

## **CERTIFICATE**

This is to certify that **Ms. Hema Katle** worked on a postgraduate dissertation project entitled **“EVALUATION OF SERUM BIOCHEMICAL AND HISTOLOGICAL ALTERATION INDUCED BY GRAPHENE OXIDE IN ZEBRA FISH, *Danio rerio*”** under my supervision for 3 months and this work has not been formed the basis for the award of any other similar title. It represents entirely independent work on the part of the candidate.

**Date:** 03/09/24

**Place:** Bilaspur

**Signature of supervisor**

**Dr. Gita Mishra**

**Signature of Co-supervisor**

**Dr. Nisha Sahu**

**Head of the Department**

**Prof. Seema Rai**

**विभागाध्यक्ष  
HEAD**

**जन्तु विज्ञान विभाग**

**Department of Zoology**

**गुरु घासीदास वि.वि. बिलासपुर**

**Guru Ghasidas Vishwavidyalaya Bilaspur**

## **CONTENTS**

	<b>Page no.</b>
• Introduction	01-04
• Review of literature	04-07
• Aim and objectives	08
• Material and methods	08-15
• Results	15-22
• Discussion	23-24
• References	24-27

**Qualitative and quantitative evaluation of phytochemicals  
and antioxidant potential of standard rat feed:**

**A laboratory study**



**Dissertation submitted  
in partial fulfilment for degree of  
M. Sc. in Zoology**

By

**Mr. Hemant Rathore**

Under the supervision of

**Prof. Monika Bhadauria**

**Department of Zoology  
Guru Ghasidas Vishwavidyalaya,  
Koni- Bilaspur 495009 (C.G.)**

**2024**



**Department of Zoology  
Guru Ghasidas Vishwavidyalaya  
Koni, Bilaspur 495009 (C.G.)**

(A Central University Established under Central University Act 2009, No. 25 of 2009)

**CERTIFICATE**

This is to certify that **Mr. Hemant Rathore** has worked for M.Sc. (Zoology) dissertation entitled "**Qualitative and quantitative evaluation of phytochemicals and antioxidant potential of standard rat feed: A laboratory study**" under my supervision for about 3 months and this work has not been formed the basis for the award of any other similar title.

It represents entirely an independent work on the part of candidate.

**Date: 03/09/2024**

**Place: Bilaspur**

  
**Signature of Supervisor**

**Date: .../09/2024**

**Place: Bilaspur**

  
**Head of the Department**

विभागाध्यक्ष

HEAD

जन्तु विज्ञान विभाग

Department of Zoology

गुरु घासीदास वि.वि., बिलासपुर

Guru Ghasidas Vishwavidyalaya, Bilaspur

**Date: ....09/2024**

**Place: Bilaspur**

  
**External Expert**



## **CONTENTS**

<b>[1] Introduction</b>	<b>01-03</b>
<b>[2] Review of literature</b>	<b>04-22</b>
<b>[3] Materials and methods</b>	<b>23-26</b>
<b>[4] Results and Discussion</b>	<b>27-30</b>
<b>[5] Conclusion</b>	<b>31</b>
<b>[6] References</b>	<b>32-39</b>
<b>[7] Research paper communicated</b>	<b>40</b>

**Protective effect of *Cordia dichotoma* against stress  
induced damage in brain of adult zebrafish (*Danio rerio*)**

**A Project Dissertation Submitted  
In Partial Fulfilment for Degree of**

**M.Sc. Zoology**

**By**

**Ms. D. Indra Swain**

**Under Supervision of**

**Dr. Gita Mishra**

**(Asst. Professor of Zoology)**



**DEPARTMENT OF ZOOLOGY**

**GURU GHASIDAS VISHWAVIDYALAYA, KONI,  
BILASPUR (C.G.).**

**(A Central University Established By Act of Parliament 2009 No.25 of 2009)**

**2024**



**Department of Zoology**  
**Guru Ghasidas Vishwavidyalaya**

(A Central University Established By Act of Parliament 2009 No.25 of 2009)

**CERTIFICATE**

This is to certify that **Ms. D. Indra Swain** worked on a postgraduate dissertation project entitled "**Protective effect of *Cordia dichotoma* against stress induced damage in brain of adult zebrafish (*Danio rerio*)**" under my supervision for 3 months and this work has not been formed the basis for the award of any other similar title. It represents entirely independent work on the part of the candidate.

**Date:** 03/09/2024

**Place:** Bilaspur

**Signature of supervisor**

**Dr. Gita Mishra**

**Head of the Department**

**Prof. Seema Bai**

विभागाध्यक्ष  
जन्तु विज्ञान विभाग  
Department of Zoology  
गुरु घासीदास वि.वि., बिलासपुर  
Ghasidas Vishwavidyalaya Bilaspur

## **CONTENTS**

	<b>Page no.</b>
• Introduction	01-05
• Review of literature	05-06
• Aim and objectives	06
• Material and methods	07-10
• Results	10-15
• Discussion	16-18
• References	18-22



**A gender based autorhythmometric physiological  
assessment among research scholars of Guru  
Ghasidas Vishwavidyalaya**

A Project dissertation submitted  
in partial fulfillment for degree of  
M.Sc. Zoology

By

**Jaya Sharma**

Roll no. 22062116

Enrollment no. GGV/22/03415

Under supervision of

**Prof. Seema Rai**

Department of Zoology

Dean, School of Studies of Life Science



**GURU GHASIDAS VISHWAVIDYALAYA**

Department of Zoology

Guru Ghasidas Vishwavidyalaya, Bilaspur (C.G.)

2022-2024



**Department of Zoology**  
**Guru Ghasidas Vishwavidyalaya, Bilaspur (C.G.)**  
(A Central University established by Central University Act 2009 no.25 of 2009)

**CERTIFICATE**

This is to certify that Miss Jaya Sharma Roll no. 22062116 Enrollment no. GGV/22/03415 has worked on postgraduate dissertation project entitled "A gender based autorhythmometric physiological assessment of research scholars at GGV campus" under my supervision for months and this work has not been formed the basis for the award of any other similar title.

It represents entirely an independent work on the part of candidate.

Date: 03/01/2024

Place: Bilaspur

Date: 03/01/2024

Place: Bilaspur

Signature of Supervisor

Head of Department

विभागाध्यक्ष  
HEAD  
जन्तु विज्ञान विभाग  
Department of Zoology,  
गुरु घासीदास वि.वि., बिलासपुर  
Gur Ghasidas Vishwavidyalaya Bilaspur

## **CONTENTS**

ABSTRACT	1
INTRODUCTION	2-4
REVIEW OF LITERATURE	5-6
METHODOLOGY	7-12
RESULTS	13-42
DISCUSSION	43-44
CONCLUSION	45
REFERENCES	46-49

**Phytochemicals and antioxidant profiling of standard  
rat feed: Qualitative and quantitative analysis**



**Dissertation submitted  
in partial fulfilment for degree of**

**M. Sc. in Zoology**

**By**

**Ms. Jyoti Karna**

**Under the supervision of**

**Prof. Monika Bhadauria**

**Department of Zoology  
Guru Ghasidas Vishwavidyalaya,  
Koni- Bilaspur 495009 (C.G.)**

**2024**





**Department of Zoology  
Guru Ghasidas Vishwavidyalaya  
Koni, Bilaspur 495009 (C.G.)**

(A Central University Established under Central University Act 2009, No. 25 of 2009)

**CERTIFICATE**

This is to certify that **Miss. Jyoti Karna** has worked for M.Sc. (Zoology) dissertation entitled "**Phytochemicals and antioxidant profiling of standard rat feed: Qualitative and quantitative analysis**" under my supervision for about 3 months and this work has not been formed the basis for the award of anyother similar title.

It represents entirely an independent work on the part of candidate.

**Date: 03/09/2024**

**Place: Bilaspur**

  
**Signature of Supervisor**

**Date: ....09/2024**

**Place: Bilaspur**

  
**Head of the Department**

विभागाध्यक्ष  
HEAD

जन्तु विज्ञान विभाग

Department of Zoology

गुरु घासीदास वि.वि., बिलासपुर

Guru Ghasidas Vishwavidyalaya

**Date: ....09/2024**

**Place: Bilaspur**

  
**External Expert**

## **CONTENTS**

<b>[1] Introduction</b>	<b>01-05</b>
<b>[2] Review of literature</b>	<b>06-19</b>
<b>[3] Materials and methods</b>	<b>20-23</b>
<b>[4] Results</b>	<b>24-27</b>
<b>[5] Discussion</b>	<b>28-29</b>
<b>[5] Conclusion</b>	<b>30</b>
<b>[6] References</b>	<b>31-38</b>
<b>[7] Research paper communicated</b>	<b>39</b>

**Study of the alteration in hematological parameters of fresh water  
teleost, *Labeo rohita* exposed to insecticide profenofos**



**A Dissertation Report**

**Submitted in partial fulfillment of the requirements for degree of  
Master of Science in Zoology**

**By**

**Jyotsna Rani Parida**

**Under the supervision of**

**Dr. Sushant Kumar Verma  
(Assistant Professor)**



**DEPARTMENT OF ZOOLOGY  
GURUGHASIDAS VISHWAVIDYALAYA, BILASPUR (C.G.) 495006  
A central university established by act of parliament 2009 no.25 of 2009)**

**2024**





DEPARTMENT OF ZOOLOGY  
GURU GHASIDAS VISHWAVIDYALAYA

(A Central University Established by Central University Act 2009 No. 25 of 2009)

CERTIFICATE

This is to certify that that **Ms. Jyotsna Rani Parida**, has worked on dissertation entitled "**Study of the alteration in hematological parameters of fresh water teleost, *Labeo rohita* exposed to insecticide profenofos**" for the completion of M.Sc. (Zoology) degree under my supervision and this dissertation report has not formed the basis for the award of any other degree.

It represents entirely independent work on the part of the candidate.

Signature of Supervisor

Head of the Department

विभागाध्यक्ष  
HEAD

जन्तु विज्ञान विभाग

Department of Zoology

गुरु गhasidas वि.वि., बिलासपुर

Guru Ghasidas Vishwavidyalaya, Bilaspur

DATE: 03.09.2024

PLACE: Bilaspur

3.9.24

## CONTENTS

S.NO.	CONTENTS	PAGE NO.
1.	INTRODUCTION	1-3
2.	REVIEW OF LITERATURE	4-6
3.	AIM AND OBJECTIVE	7
4.	MATERIALS AND METHODS	8-13
5.	RESULTS	14-16
6.	DISCUSSION	17-19
7.	CONCLUSION	20
8.	REFERENCES	21-26



# **Evaluation of the Role of Melatonin Treatment in Breast Cancer: A Meta Analysis**

A dissertation work submitted in partial fulfilment for the degree of M. Sc. Zoology

**Submitted By**

**Kiran Kumari**

Roll. No- 22062120

Enrollment no.- GGV/22/03419

**Under supervision of**

**Prof. Seema Rai**



**Department of Zoology**

**GURU GHASIDAS VISHWAVIDYALAYA**

**Koni-Bilaspur, 495009 (C.G.)**

**2022 - 2024**



**Department of Zoology**

**Guru Ghasidas Vishwavidyalaya, Bilaspur (C.G)**

(A Central University established by Central University Act 2009 no.25 of 2009)

**CERTIFICATE**

This is to certify that **Miss Kiran Kumari** Roll no. 22062120 Enrollment no. GGV/22/03419 has worked on postgraduate dissertation project entitled “**Evaluation of the role of Melatonin Treatment in Breast Cancer: A Meta Analysis**” under my supervision for months and this work has not been formed the basis for the award of any other similar title.

It represents entirely an independent work on the part of candidate.

Date: 03 / 09 / 2024

Place: Bilaspur

**Signature of Supervisor**

Date: 03 / 09 / 2024

Place: Bilaspur

**Head of Department**

विभागाध्यक्ष  
HEAD  
जन्तु विज्ञान विभाग  
Department of Zoology  
गुरु घासीदास वि.वि., बिलासपुर  
Guru Ghasidas Vishwavidyalaya Bilaspur

## CONTENTS

ABSTRACT	1
INTRODUCTION	2-5
REVIEW OF LITERATURE	5-9
MATERIALS AND METHODOLOGY	10-12
RESULTS	13-28
DISCUSSION	29-31
CONCLUSION	32-33
REFERENCES	34-37

# **Ebstein's Anomaly: A Review of Recent Advances and Modern Management Approaches**

A Project Dissertation Submitted  
In Partial Fulfilment for Degree of

**M.Sc. Zoology**

By

**Mr. Laxminarayan Sahoo**

Under Supervision of  
**Prof. LVKS Bhaskar**  
(Professor of Zoology)



**DEPARTMENT OF ZOOLOGY**

**GURU GHASIDAS VISHWAVIDYALAYA, KONI,  
BILASPUR (C.G.).**

(A Central University Established by Act of Parliament 2009, No. 25 of 2009)

**2024**



**Department of Zoology**  
**Guru Ghasidas Vishwavidyalaya**

**(A Central University Established by Act of Parliament 2009, No. 25 of 2009)**

**CERTIFICATE**

This is to certify that **Mr. Laxminarayan Sahoo** worked on a postgraduate dissertation project entitled "**Ebstein's Anomaly: A Review of Recent Advances and Modern Management Approaches**" under my supervision for 3 months and this work has not been formed the basis for the award of any other similar title. It represents entirely independent work on the part of the candidate.

Date: 03/09/24

Place: Bilaspur

*L.V.K.S. Bhaskar*  
Signature of supervisor 3/9/2024

**Prof. LVKS Bhaskar**

*[Signature]*  
Head of the Department 3/9/24

**Prof. Seema Rai**

विभागाध्यक्ष  
HEAD  
जन्तु विज्ञान विभाग  
Department of Zoology  
गुरु घासीदास वि.वि., बिलासपुर  
Ghasidas Vishwavidyalaya Bilaspur



# CONTENTS

## 1. Introduction and Background

## 2. Review

### i. Genetics Update

### ii. Underlying Physiopathology of Ebstein's Disease

### iii. Anatomoechocardiography of Ebstein's Anomaly [EA]

### iv. Manifestations of Ebstein's Anomaly [EA]

*a) Ebstein's Anomaly [EA] in Association with Pregnancy*

*b) Ebstein's Anomaly [EA] in Prenatal Condition*

*c) Ebstein's Anomaly [EA] in Neonates*

*d) Ebstein's Anomaly [EA] in Adolescents and Infants*

*e) Ebstein's Anomaly [EA] in Adults*

### v. Diagnostic Procedures

### vi. Modern Management and Its Treatment

*a) Administration of Ebstein's Anomaly [EA] in Neonates*

*b) Administration of Ebstein's Anomaly [EA] in Children and Adults*

*c) Surgical Interventions*

### vii. Prognosis

## 3. Outcome of The Review

## 4. References

**Protective effect of *Cordia dichotoma* against stress  
induced liver damage in adult zebrafish (*Danio rerio*)**

**A Project Dissertation Submitted  
In Partial Fulfilment for Degree of**

**M.Sc. Zoology**

**By**

**Ms. Mamta Patel**

**Under Supervision of**

**Dr. Gita Mishra**

**(Asst. Professor of Zoology)**



**DEPARTMENT OF ZOOLOGY**

**GURU GHASIDAS VISHWAVIDYALAYA, KONI,  
BILASPUR (C.G.).**

**(A Central University Established by Act of Parliament 2009, No.25 of 2009)**

**2024**



**Department of Zoology**  
**Guru Ghasidas Vishwavidyalaya**

(A Central University Established by Act of Parliament 2009, No.25 of 2009)

**CERTIFICATE**

This is to certify that **Ms. Mamta Patel** worked on a postgraduate dissertation project entitled "**Protective effect of *Cordia dichotoma* against stress induced liver damage in adult zebrafish (*Danio rerio*)**" under my supervision for 3 months and this work has not been formed the basis for the award of any other similar title. It represents entirely independent work on the part of the candidate.

**Date:** 03/09/2024

**Place:** Bilaspur

*Gita Mishra*

**Signature of supervisor**

**Dr. Gita Mishra**

*S. Sahalkar*  
3.9.24

*S. Sahalkar*

**Head of the Department**

**Prof. Seema Rai**

विभागाध्यक्ष  
HEAD  
जन्तु विज्ञान विभाग  
Department of Zoology  
गुरु घासीदास वि.वि., बिलासपुर  
Ghasidas Vishwavidyalaya Bilaspur

## **CONTENTS**

	<b>Page no.</b>
• <b>Introduction</b>	<b>01-05</b>
• <b>Aim and objectives</b>	<b>06</b>
• <b>Literature review</b>	<b>07-10</b>
• <b>Material and methods</b>	<b>10-11</b>
• <b>Results</b>	<b>11-18</b>
• <b>Discussion</b>	<b>19-21</b>
• <b>References</b>	<b>22-26</b>



**Genotoxic impact of insecticide profenofos on fresh water teleost  
*Labeo rohita***



**Experiment Paper**

**Submitted in partial fulfillment of the requirements for degree of  
Master of Science In Zoology**

**By**

**Nousheen Khan**

**Under the supervision of**

**Dr. Sushant Kumar Verma  
(Assistant Professor)**



**DEPARTMENT OF ZOOLOGY**

**GURUGHASIDAS VISHWAVIDYALAYA, BILASPUR (C.G.) 495006**

**A central university established by act of parliament 2009 no.25 of 2009)**

**2024**





DEPARTMENT OF ZOOLOGY  
GURU GHASIDAS VISHWAVIDYALAYA

(A Central university established by central university Act 2009 No. 25 of 2009)

CERTIFICATE

This is to certify that Ms. Nousheen Khan, has worked on an experiment entitled "Genotoxic impact of insecticide profenofos on fresh water teleost *Labeo rohita*" for the completion of M.Sc. (Zoology) degree under my supervision and this experiment has not formed the basis for the award of any other degree.

It represents entirely independent work on the part of the candidate.

Signature of Supervisor

Head of the Department

विभागाध्यक्ष  
HEAD

जन्तु विज्ञान विभाग

Department of Zoology

गुरु घासीदास वि. वि., बिलासपुर

Gur Ghasidas Vishwa Vidyalaya Bilaspur

DATE: 3-9-24

PLACE: Bilaspur

3-9-24

## Contents

S.No.	Content	Page No.
1.	Introduction	1 – 4
2.	Review of literature	5 – 7
3.	Material and Methods	8 – 11
4.	Results and Observations	12 – 14
5.	Discussion	15 – 17
6.	Conclusion	18
7.	References	19 – 26

# **G6PD: A Review of Mutations and Management Approaches**

A Project Dissertation Submitted  
In Partial Fulfilment for Degree of

**M.Sc. Zoology**

By

**Mr. Nikesh Bhoy**

Under Supervision of  
**Prof. LVKS Bhaskar**  
(Professor of Zoology)



**DEPARTMENT OF ZOOLOGY**  
**GURU GHASIDAS VISHWAVIDYALAYA, KONI,**  
**BILASPUR (C.G.).**

(A Central University Established by Act of Parliament 2009, No. 25 of 2009)

**2024**



**Department of Zoology**  
**Guru Ghasidas Vishwavidyalaya**

(A Central University Established by Act of Parliament 2009, No. 25 of 2009)

**CERTIFICATE**

This is to certify that **Mr. Nikesh Bhoy** worked on a postgraduate dissertation project entitled "**G6PD: A Review of Mutations and Management Approaches**" under my supervision for 3 months and this work has not been formed the basis for the award of any other similar title. It represents entirely independent work on the part of the candidate.

Date: 3/9/2024

Place: Bilaspur

*LVKS Bhaskar*

Signature of supervisor

**Prof. LVKS Bhaskar**

Head of the Department

**Prof. Seema Rai**

विभागाध्यक्ष

HEAD

जन्तु विज्ञान विभाग

Department of Zoology

गुरु गहसीदास वि.वि., बिलासपुर

Guru Ghasidas Vishwavidyalaya Bilaspur



## **Contents**

### **Page No.**

<b>1. Introduction and background.....</b>	<b>1</b>
<b>1.1 Malaria and G6PD.....</b>	<b>2</b>
<b>1.2 Classification of G6PD .....</b>	<b>2</b>
<b>2. Epidemiology.....</b>	<b>2</b>
<b>2.1 Prevalence by reason.....</b>	<b>2</b>
<b>2.2 Gender difference.....</b>	<b>3</b>
<b>2.3 Distribution.....</b>	<b>3</b>
<b>3. Review of G6PD.....</b>	<b>4</b>
<b>3.1 Gene Structure of G6PD.....</b>	<b>4</b>
<b>3.2 Biochemistry of G6PD .....</b>	<b>5</b>
<b>3.3 Molecular characterization of G6PD variants..</b>	<b>7</b>
<b>4. Clinical Manifestations of G6PD.....</b>	<b>10</b>
<b>4.1 Actual hemolytic anemia .....</b>	<b>11</b>
<b>4.2 Chronic non spherocytic hemolytic anemia...</b>	<b>13</b>
<b>4.3 Neonatal jaundice.....</b>	<b>14</b>
<b>5. Diagnosis .....</b>	<b>14</b>
<b>6. Treatment .....</b>	<b>15</b>
<b>7. Discussion.....</b>	<b>16</b>
<b>8. References.....</b>	<b>17</b>



**Therapeutic effect of lignin on zebrafish (*Danio rerio*)  
liver against acute immobilization and crowding induced  
oxidative stress**

**A Project Dissertation Submitted  
In Partial Fulfilment for Degree of**

**M.Sc. Zoology**

**By**

**Ms. Nikita Patel**

**Under Supervision of**

**Dr. Gita Mishra**

**(Asst. Professor of Zoology)**



**DEPARTMENT OF ZOOLOGY  
GURU GHASIDAS VISHWAVIDYALAYA, KONI,  
BILASPUR (C.G.).**

**(A Central University Established By Act of Parliament 2009 No.25 of 2009)**

**2024**



**Department of Zoology**  
**Guru Ghasidas Vishwavidyalaya**

(A Central University Established By Act of Parliament 2009 No.25 of 2009)

**CERTIFICATE**

This is to certify that **Ms. Nikita Patel** worked on a postgraduate dissertation project entitled "**Therapeutic effect of lignin on zebrafish (*Danio rerio*) liver against acute immobilization and crowding induced oxidative stress**" under my supervision for 3 months and this work has not been formed the basis for the award of any other similar title. It represents entirely independent work on the part of the candidate.

**Date:** 03/03/2024

**Place:** Bilaspur

**Signature of supervisor**

**Dr. Gita Mishra**

**Head of the Department**

**Prof. Seema Rai**

**विभागाध्यक्ष  
HEAD**

**जन्तु विज्ञान विभाग**

**Department of Zoology**

**गुरु घासीदास वि.वि., बिलासपुर**

**Ghasidas Vishwavidyalaya Bilaspur**

*Seema Rai*  
3-9-24

## **CONTENTS**

	<b>Page no.</b>
• Introduction	01-04
• Aim and objectives	05
• Review of literature	06-08
• Material and methods	9-10
• Results	10-17
• Discussion	18-19
• References	20-24

# **Therapeutic Role of Acetyl L Carnitine in Hepatic Encephalopathy**

A Project dissertation submitted

In partial fulfillment for the degree of

**M.Sc. Zoology**

By

**Mr. Nilu aryan Meher**

Under Supervision of

**Dr. Santosh Singh**

*Assistant Professor*



**DEPARTMENT OF ZOOLOGY,  
GURU GHASIDAS VISHWAVIDYALAYA, KONI,  
BILASPUR (C.G.)**

**2024**



**Department of Zoology**  
**Guru Ghasidas Vishwavidyalaya**

(A central university established by act of parliament 2009 no.25 of 2009)

**CERTIFICATE**

This is to certify that **Mr. Nilu aryan Meher** worked on a postgraduate dissertation project entitled '**Therapeutic role of Acetyl L carnitine in Hepatic Encephalopathy**' under my supervision for 3 months and this work has not been formed the basis for the award of any other similar title. It represents entirely independent work on the part of the candidate.

**Date:** 03/09/24

**Place:** Bilaspur

**Signature of Supervisor**

**Dr. Santosh Singh**

**Head of the Department**

**Prof. Seema Rai**

विभागाध्यक्ष  
HEAD

जन्तु विज्ञान विभाग

Department of Zoology

गुरु घासीदास वि.वि., बिलासपुर

Guru Ghasidas Vishwavidyalaya Bilaspur



# INDEX

<b>Contents</b>	<b>Page No.</b>
1. Abstract	1
2. Introduction	2-3
3. Ammonia and its neurotoxic effect	4-13
4. Acetyl L Carnitine: metabolism and function	13-24
5. Clinical evidence	25
6. Conclusion	26
7. Reference	27-34

**Effect of Na<sup>+</sup> ions on the xanthophore response in fish,  
*Labeo rohita***



**A Project Dissertation submitted  
in partial fulfillment for degree of  
M.Sc. Zoology IV Semester**

**By**

**Pooja Meher**

**Under Supervision of  
Dr. Naresh Chandra Agrawal  
(Assistant Professor)**



**DEPARTMENT OF ZOOLOGY  
GURU GHASIDAS VISHWAVIDYALAYA, BILASPUR (CG)**

**2024**



**Department of Zoology**  
**Guru Ghasidas Vishwavidyalaya**

(A central university established by act of parliament 2009 no.25 of 2009)

**CERTIFICATE**

This is to certify that **Pooja Meher** has on postgraduate dissertation project entitled **Effect of Na<sup>+</sup> ions on the xanthophore response in fish, *Labeo rohita*** under my supervision for 3 months and this work has not been formed the basis for the award of any other similar title.

It represents entirely an independent work on the part of candidate.

Date: **03-09-2024**

Place: Bilaspur (C.G.)

  
Signature of Supervisor

Date: **03-09-2024**

Place: Bilaspur (C.G.)

  
Head of the Department


विभागाध्यक्ष  
HEAD

जन्तु विज्ञान विभाग

Department of Zoology

गुरु घासीदास वि.वि., बिलासपुर

Guru Ghasidas Vishwavidyalaya Bilaspur

  
3.9.24

# **CONTENTS**

<b>INTRODUCTION</b>	<b>01-03</b>
<b>REVIEW OF LITERATURE</b>	<b>04-06</b>
<b>MATERIALS AND METHODS</b>	<b>07-11</b>
<b>RESULTS</b>	<b>12-14</b>
<b>DISCUSSION</b>	<b>15-19</b>
<b>CONCLUSION</b>	<b>20-21</b>
<b>REFERENCES</b>	<b>22-34</b>

# **Role of Advanced Glycation End Products in Diabetic Encephalopathy**

A Project Dissertation Submitted  
In Partial Fulfilment for Degree of

**M.Sc. Zoology**

By

**Mr. Pradeep Kumar Rout**

Under Supervision of

**Dr. Santosh Singh**

**(Professor of Zoology)**



**DEPARTMENT OF ZOOLOGY**

**GURU GHASIDAS VISHWAVIDYALAYA, KONI,  
BILASPUR (C.G.).**

(A Central University Established by Act of Parliament 2009, No. 25 of 2009)

**2024**





**Department of Zoology**

**Guru Ghasidas Vishwavidyalaya**

(A Central University Established by Act of Parliament 2009, No. 25 of 2009)

## **CERTIFICATE**

This is to certify that Mr. Pradeep Kumar Rout worked on a postgraduate dissertation project entitled **"Role of Advanced Glycation End Products in Diabetic Encephalopathy"** under my supervision for 3 months and this work has not been formed the basis for the award of any other similar title. It represents entirely independent work on the part of the candidate.

**Date:** 03.09.24

**Place:** Bilaspur

**Signature of supervisor**

**Dr. Santosh Singh**

**Head of the Department**

**Prof. Seema Rai**

विभागाध्यक्ष  
HEAD  
जन्तु विज्ञान विभाग  
Department of Zoology  
गुरु घासीदास वि.वि., बिलासपुर  
Guru Ghasidas Vishwavidyalaya, Bilaspur

*Seema Rai*  
3.9.24

## **Table of Contents**

1. Abstract
2. Introduction
3. Mechanism of AGE Formation
4. AGEs and Hyperglycemia
5. Pathophysiology of Diabetic Encephalopathy
6. Interaction of AGEs with Neuronal Cells
7. Clinical Evidence Linking AGEs to Diabetic Encephalopathy
8. Bio-Markers of AGE Accumulation
9. Potential Therapeutic Approaches
10. Current Challenges and Future Directions
11. Discussion
12. Conclusion
13. References

**Mg<sup>++</sup> ions induced effect of Na<sup>+</sup> ions on the melanophore  
response in the fish, *Rasbora daniconius***



**A Project dissertation submitted  
in partial fulfillment for degree of  
M.Sc. Zoology IV Semester**

**By**

**Pranjal Patel**

**Under Supervision of**

**Dr. Naresh Chandra Agrawal**

**(Assistant Professor)**



**DEPARTMENT OF ZOOLOGY**

**GURU GHASIDAS VISHWAVIDYALAYA, BILASPUR**

**2024**



Department of Zoology  
Guru Ghasidas Vishwavidyalaya

(A central university established by act of parliament 2009 no.25,2009)

CERTIFICATE

This is to certify that Pranjali Patel has on postgraduate dissertation project entitled "**Mg<sup>++</sup> ions induced effect of Na<sup>+</sup> ions on the melanophore response in the fish, *Rasbora daniconius***" under my supervision for 3 months and this work has not been formed the basis for the award of any other similar title.

It represents entirely an independent work on the part of candidate.

Date: **03**-09-2024

Place: Bilaspur (C.G.)

Signature of Supervisor

Head of the Department

HEAD

जनक विज्ञान विभाग

Department of Zoology

गुरु घासीदास वि.वि., बिलासपुर

शिव

Guru Ghasidas Vishwavidyalaya

3.9.24

# Contents

<b>Introduction</b>	<b>01-03</b>
<b>Review of Literature</b>	<b>04-06</b>
<b>Materials and Methods</b>	<b>07-10</b>
<b>Results</b>	<b>11-13</b>
<b>Discussion</b>	<b>14-17</b>
<b>Conclusion</b>	<b>18</b>
<b>References</b>	<b>19-28</b>



# **Meta-analysis study on oxidative stress-induced male infertility**

A Project dissertation submitted  
in partial fulfillment for degree of  
M.Sc. Zoology

By

**Priyadarshni Sahu**

Roll no. - 22062129

Enrollment no. – GGV/22/03428

Under supervision of

**Prof. Seema Rai**



**GURU GHASIDAS VISHWAVIDYALAYA**

Department of Zoology

Guru Ghasidas Vishwavidyalaya, Bilaspur (C.G.)

2022-2024



**Department of Zoology**  
**Guru Ghasidas Vishwavidyalaya, Bilaspur (C.G.)**  
(A Central University established by Central University Act 2009 no.25 of 2009)

**CERTIFICATE**

This is to certify that Miss Priyadarshni Sahu Roll No. 22062129 Enrollment No. GGV/22/03428 has worked on postgraduate dissertation project entitled "Meta-analysis study on oxidative stress induced male infertility in human" under my supervision for months and this work has not been formed the basis for the award of any other similar title.

It represents entirely an independent work on the part of candidate.

Date: 03/09/2024

Place: Bilaspur

  
Signature of Supervisor

Date: 03/09/2024

Place: Bilaspur

  
Head of Department

विभागाध्यक्ष  
HEAD  
जन्तु विज्ञान विभाग  
Department of Zoology  
गुरु घासीदास वि.वि., बिलासपुर  
Guru Ghasidas Vishwavidyalaya Bilaspur

## CONTENTS

ABSTRACT	1
INTRODUCTION	2-3
REVIEW OF LITERATURE	4-8
MATERIALS AND METHODS	9-10
RESULTS	11-23
DISCUSSION	24-26
CONCLUSION	27
REFERENCES	28-34

**Impact of physical stress and therapeutic effect of lignin  
on zebrafish (*Danio rerio*) brain**

A Project Dissertation Submitted  
In Partial Fulfilment for Degree of

**M.Sc. Zoology**

By

**Ms. Priyanka Yadav**

Under Supervision of

**Dr. Gita Mishra**

**(Asst. Professor of Zoology)**



**DEPARTMENT OF ZOOLOGY**

**GURU GHASIDAS VISHWAVIDYALAYA, KONI,  
BILASPUR (C.G.).**

(A Central University Established By Act of Parliament 2009 No.25 of 2009)

**2024**



**Department of Zoology**

**Guru Ghasidas Vishwavidyalaya**

(A Central University Established By Act of Parliament 2009 No.25 of 2009)

## **CERTIFICATE**

This is to certify that **Ms. Priyanka Yadav** worked on a postgraduate dissertation project entitled “**Impact of physical stress and therapeutic effect of lignin on zebrafish (*Danio rerio*) brain**” under my supervision for 3 months and this work has not been formed the basis for the award of any other similar title. It represents entirely independent work on the part of the candidate.

**Date:** 03/09/2024

**Place:** Bilaspur

**Signature of supervisor**

**Dr. Gita Mishra**

**Head of the Department**

**Prof. Seema Rai**

विभागाध्यक्ष  
HEAD  
जन्तु विज्ञान विभाग  
Department of Zoology  
गुरु घासीदास वि.वि., बिलासपुर  
Ghasidas Vishwavidyalaya Bilaspur



## **CONTENTS**

	<b>Page no.</b>
● <b>Introduction</b>	<b>01-06</b>
● <b>Review of literature</b>	<b>07-08</b>
● <b>Aim and objectives</b>	<b>08</b>
● <b>Material and methods</b>	<b>10-13</b>
● <b>Results</b>	<b>14-19</b>
● <b>Discussion</b>	<b>20-22</b>
● <b>References</b>	<b>23-26</b>

**Evaluation of phytochemicals and antioxidant activities  
present in commercialized standard pelleted feed for horses**



**Dissertation submitted  
in partial fulfilment for degree of  
M. Sc. in Zoology**

**By**

**Mr. Rakesh Kumar Sahoo**

**Under the supervision of**

**Prof. Monika Bhadauria**

**Department of Zoology  
Guru Ghasidas Vishwavidyalaya,  
Koni- Bilaspur 495009 (C.G.)**

**2024**



**Department of Zoology  
Guru Ghasidas Vishwavidyalaya  
Koni, Bilaspur 495009 (C.G.)**

(A Central University Established under Central University Act 2009, No. 25 of 2009)

**CERTIFICATE**

This is to certify that **Mr. Rakesh Kumar Sahoo** has worked for M.Sc. (Zoology) dissertation entitled "**Evaluation of phytochemicals and antioxidant activities present in commercialized standard pelleted feed for horses**" under my supervision for about 3 months and this work has not been formed the basis for the award of any other similar title.

It represents entirely an independent work on the part of candidate.

**Date: 03/09/2024**

**Place: Bilaspur**

*Mouic*  
**Signature of Supervisor**

**Date: .../09/2024**

**Place: Bilaspur**

*[Signature]*  
**Head of the Department**

**HEAD**  
जन्तु विज्ञान विभाग  
Department of Zoology  
गुरु घासीदास वि.वि., बिलासपुर  
Guru Ghasidas Vishwavidyalaya, Bilaspur

**Date: .../09/2024**

**Place: Bilaspur**

*[Signature]*  
**External Expert** 3-9-24

## **CONTENTS**

<b>[1] Introduction</b>	<b>01-04</b>
<b>[2] Review of literature</b>	<b>05-24</b>
<b>[3] Materials and methods</b>	<b>25-28</b>
<b>[4] Results and discussion</b>	<b>29-33</b>
<b>[5] Conclusion</b>	<b>34</b>
<b>[6] References</b>	<b>35-44</b>
<b>[7] Research paper published</b>	<b>45-</b>



# **“A REVIEW ON THE ROLE OF VITAMIN D IN MODULATING MULTIPLE SCLEROSIS SEVERITY AND RELAPSE RATES”**

**A Project Dissertation Submitted  
In Partial Fulfilment for Degree of  
M.Sc. Zoology**

**By**

**SHRISTI SAHU**

**Roll No.-22062134**

**Enrolment No.-GGV/22/03432**

**Under Supervision of  
Prof. LVKS BHASKAR  
(Professor of Zoology)**



**DEPARTMENT OF ZOOLOGY**

**GURU GHASIDAS VISHWAVIDYALAYA, KONI, BILASPUR (C.G.).**

**(A Central University Established By Act of Parliament 2009, No. 25 of 2009)**

**2024**



# **“A REVIEW ON THE ROLE OF VITAMIN D IN MODULATING MULTIPLE SCLEROSIS SEVERITY AND RELAPSE RATES”**

A Project Dissertation Submitted  
In Partial Fulfilment for Degree of  
M.Sc. Zoology

By

**SHRISTI SAHU**

Roll No.-22062134

Enrolment No.-GGV/22/03432

Under Supervision of  
Prof. LVKS BHASKAR  
(Professor of Zoology)



DEPARTMENT OF ZOOLOGY

GURU GHASIDAS VISHWAVIDYALAYA, KONI, BILASPUR (C.G.).

(A Central University Established By Act of Parliament 2009, No. 25 of 2009)

2024



Department of Zoology

Guru Ghasidas Vishwavidyalaya

(A Central University Established By Act of Parliament 2009, No. 25 of 2009)

## CERTIFICATE

This is to certify that Ms. SHRISTI SAHU worked on a postgraduate dissertation project entitled "A Review on The Role of Vitamin D in Modulating Multiple Sclerosis Severity and Relapse Rates" under my supervision for 3 months and this work has not been formed the basis for the award of any other similar title. It represents entirely independent work on the part of the candidate.

Signature of the supervisor

Prof. LVKS Bhaskar

Head of the Department

Prof. Seema Rai

विभागाध्यक्ष  
HEAD

जन्तु विज्ञान विभाग

Department of Zoology

गुरु घासीदास वि.वि., बिलासपुर

Guru Ghasidas Vishwavidyalaya, Bilaspur

Date: 3/9/2024

Place: Bilaspur



Department of Zoology

Guru Ghasidas Vishwavidyalaya

(A Central University Established By Act of Parliament 2009, No. 25 of 2009)

## DECLARATION

I **Shristi Sahu** hereby declare that the work presented in the dissertation entitled "**A Review on The Role of Vitamin D in Modulating Multiple Sclerosis Severity and Relapse Rates**" submitted for partial fulfillment of M.Sc. Zoology was carried out at the Department of Zoology, Guru Ghasidas Vishwavidyalaya, Koni, Bilaspur (C.G).

The work was carried out by me under the supervision of **Dr. LVKS Bhaskar**, Department of Zoology, Guru Ghasidas Vishwavidyalaya. The work presented in this dissertation is original and it has not previously formed the basis for the award of any degree.

Signature of the supervisor

Prof. LVKS. Bhaskar

Signature of the candidate

Shristi Sahu

Date: 3/9/2024

Place: Bilaspur



## ACKNOWLEDGEMENT

First & foremost, I express my special thanks and gratitude to my supervisor **Prof. LVKS Bhaskar**, whose constant encouragement, supervision & support from the preliminary to the concluding level enabled me to develop an understanding of the subject.

I am also thankful to **Prof. Seema Rai, Dr. Monika Bhadauria, Dr. Rohit Seth, Dr. Sushant Kumar Verma, Dr. Santosh Singh, Dr. Manish Kumar Tripathi, Dr. Neha Jain, Dr. Gita Mishra, Dr. Naresh Chandra Agrawal, Dr. Nisha Sahu** for their valuable co-operation, suggestions, and guidance during the dissertation work.

I am also thankful to **PhD scholars Mr. Manas Ranjan Purohit, Mr. Falguni Saraf, Mr. Sagar Jangde, Ms. Shubhasmita Sahoo, and Ms. Varsha Ahire** for supporting my work related to the dissertation work. I thank my classmates, especially **Mr. Laxminarayan Sahoo, Mr. Nilu Aryan Meher, Tejaswini Sahu, Yogita Gupta, Swati Agrawal, and all my classmates** for their constant support and encouragement.

I take this opportunity to express my gratitude & love to my parents and family members especially to my father **Mr. Girish Kumar Sahu** and my Mother **Mrs. Sima Sahu** for their understanding, inspiration, kind support, and encouragement during the crucial time of the completion of the project. Finally, all honors & glories to almighty God for spiritual support & strength.

*Shristi Sahu*  
**Shristi Sahu**

Date: 03/09/24

Place: Bilaspur

## CONTENTS

1. ABSTRACT	01-01
2. INTRODUCTION	02-03
3. REVIEW	
3(a) Endogenous and exogenous origin of vitamin D	04-05
3(b) Biotransformation of vitamin D	05-07
3(c) Genetic predisposition and environmental modifying factors	07-09
3(d) Pathophysiology of multiple sclerosis	10-12
3(e) Latitude-driven sunlight variability influencing serum calcitriol level.	12-14
3(f) Vitamin D and immune system	14-18
3(g) Vitamin D deficiency criteria, ideal serum range	19-21
4. CLINICAL EVIDENCE	21-23
5. CONCLUSION	24-24
6. REFERENCES	25-29



**Chronotype variability and its implications on  
academic performance of research scholars: A  
Gender based Study**

A Project dissertation submitted  
in partial fulfillment for degree of  
M.Sc. Zoology

By

**Simran Eqbal**

Roll no. 22062135

Enrollment no. GGV/22/03433

Under supervision of

**Prof. Seema Rai**

Department of Zoology

Dean, School of Studies of Life Science



**GURU GHASIDAS VISHWAVIDYALAYA**

Department of Zoology

Guru Ghasidas Vishwavidyalaya, Bilaspur (C.G.)

2022-2024



**Department of Zoology**  
**Guru Ghasidas Vishwavidyalaya, Bilaspur (C.G.)**  
(A Central University established by Central University Act 2009 no.25 of 2009)

**CERTIFICATE**

This is to certify that **Miss Simran Eqbal**, Roll no. **22062135**, Enrollment no. **GGV/22/03433** has worked on postgraduate dissertation project entitled **"Chronotype variability and its implications on academic performance of research scholars: A Gender based study"** under my supervision for months and this work has not been formed the basis for the award of any other similar title.

It represents entirely an independent work on the part of candidate.

Date: **03/9/2024**

Place: Bilaspur

  
**Signature of Supervisor**

Date: **03/9/2024**

Place: Bilaspur

  
**Head of Department**

**विभागाध्यक्ष**  
**HEAD**  
**जन्तु विज्ञान विभाग**  
**Department of Zoology**  
**गुरु घासीदास वि. वि. बिलासपुर**  
**Gur Ghasidas Vishwavidyalaya, Bilaspur**

## CONTENTS

ABSTRACT	1
INTRODUCTION	2-4
REVIEW OF LITERATURE	5-8
METHODOLOGY	9-15
RESULTS	16-25
DISCUSSION	26-28
CONCLUSION	29
REFERENCES	30-34



**Oxidative Stress Responses in Fresh Water Teleost *Labeo Rohita*  
(Hamilton) after Exposure to Insecticide Profenofos**



**A Dissertation Report**

**Submitted in partial fulfillment of the requirements for degree of  
Master of Science In Zoology**

**By**

**Sneha Bhalekar**

**Under the supervision of**

**Dr. Sushant Kumar Verma  
(Assistant Professor)**



**DEPARTMENT OF ZOOLOGY**

**GURU GHASIDAS VISHWAVIDYALAYA, BILASPUR (C.G.) 495006**

**A central university established by act of parliament 2009 no.25 of 2009)**

**2024**



DEPARTMENT OF ZOOLOGY  
GURU GHASIDAS VISHWAVIDYALAYA

(A Central university established by central university Act 2009 No. 25 of 2009)

CERTIFICATE

This is to certify that **Ms. Sneha Bhalekar**, has worked on dissertation entitled “**Oxidative stress responses in fresh water teleost *Labeo rohita* (Hamilton) after exposure to insecticide profenofos**” for the completion of M.Sc. (Zoology) degree under my supervision and this dissertation report has not formed the basis for the award of any other degree.

It represents entirely independent work on the part of the candidate.

Signature of Supervisor

Head of the Department

DATE: 03.09.2024

PLACE: Bilaspur

विभागाध्यक्ष  
HEAD  
जन्तु विज्ञान विभाग  
Department of Zoology  
गुरु घासीदास विश्वविद्यालय  
Bilaspur



## Contents

S.No.	Content	Page No.
1.	Introduction	1 – 4
2.	Review of literature	5 – 7
3.	Material and Methods	8 – 11
4.	Results and Observations	12 – 14
5.	Discussion	15 – 17
6.	Conclusion	18
7.	References	19 – 23

**EFFECTS OF K<sup>+</sup> IONS ON THE XANTHOPHORE RESPONSE IN THE  
FISH, *Labeo rohita***



**A**

**Project dissertation submitted  
In partial fulfillment for degree of  
M.Sc. Zoology IV Semester**

**By**

**Sonali Bhuyan**

**Under Supervision of  
Dr. Naresh Chandra Agrawal  
(Assistant Professor)**



**Department of Zoology  
Guru Ghasidas Vishwavidyalaya, Bilaspur (CG)**

**2024**



**Department of Zoology**  
**Guru Ghasidas Vishwavidyalaya**

(A central university established by act of parliament 2009 no.25 of 2009)

**CERTIFICATE**

This is to certify that **Miss. Sonali Bhuyan** has on postgraduate dissertation project entitled **“Effects of K<sup>+</sup> ions on the xanthophore response in the fish, *Labeo rohita*”** under my supervision for 3 months and this work has not been formed the basis for the award of any other similar title.

It represents entirely an independent work on the part of candidate.

Date: **03-09-2024**

Place: Bilaspur (C.G.)

**Signature of Supervisor**

Date: **03-09-2024**

Place: Bilaspur (C.G.)

**Head of the Department**

विभागाध्यक्ष  
जन्तु विज्ञान विभाग  
Department of Zoology  
गुरु घासीदास वि.वि., बिलासपुर  
Ghasidas Vishwavidyalaya Bilaspur

# **Contents**

<b>Introduction</b>	<b>01-05</b>
<b>Review of Literature</b>	<b>06-07</b>
<b>Materials and Methods</b>	<b>08-12</b>
<b>Results</b>	<b>13-15</b>
<b>Discussion</b>	<b>16-18</b>
<b>Conclusion</b>	<b>19</b>
<b>References</b>	<b>20-32</b>

# **Unveiling the impact of Obesity on Polycystic Ovarian Syndrome: A Meta-analysis study**

A Project dissertation submitted  
in partial fulfilment for degree of  
M.Sc. Zoology

By

**Sony Patel**

Roll no. 22062138

Enrollment no. GGV/22/03436

Under supervision of

**Prof. Seema Rai**

Department of Zoology

Dean, School of Studies of Life Science



**GURU GHASIDAS VISHWAVIDYALAYA**

Department of Zoology

Guru Ghasidas Vishwavidyalaya, Bilaspur (C.G.)

2022-2024





**Department of Zoology**  
**Guru Ghasidas Vishwavidyalaya, Bilaspur (C.G.)**  
(A Central University established by Central University Act 2009 no.25 of 2009)

**CERTIFICATE**

This is to certify that **Miss Sony Patel, Roll no. 22062138, Enrollment no. GGV/22/03436** has worked on postgraduate dissertation project entitled **“Unveiling the impact of Obesity on Polycystic Ovarian Syndrome: A Meta-analysis study”** under my supervision for months and this work has not been formed the basis for the award of any other similar title.

It represents entirely an independent work on the part of candidate.

Date: **03/09/2024**

Place: **Bilaspur**

Date: **03/09/2024**

Place: **Bilaspur**

**Signature of Supervisor**

**Head of Department**

**विभागाध्यक्ष  
HEAD**

**जन्तु विज्ञान विभाग**

**Department of Zoology**

**गुरु घासीदास वि.वि., बिलासपुर**

**Gur Ghasidas Vishwavidyalaya Bilaspur**

## CONTENTS

ABSTRACT	1
INTRODUCTION	2 - 3
REVIEW OF LITERATURE	4 - 9
MATERIALS AND METHOD	10 – 11
RESULTS	12 - 24
DISCUSSION	25 - 26
CONCLUSION	27
REFERENCES	28 - 38

**Phytochemical and antioxidant profiling of standard  
horse feed: Qualitative and quantitative analysis**



**Dissertation submitted  
in partial fulfilment for degree of**

**M. Sc. in Zoology**

**By**

**Mr. Sudhamaya Nag**

**Under the supervision of**

**Prof. Monika Bhadauria**

**Department of Zoology  
Guru Ghasidas Vishwavidyalaya,  
Koni- Bilaspur 495009 (C.G.)**

**2024**



**Department of Zoology  
Guru Ghasidas Vishwavidyalaya  
Koni, Bilaspur 495009 (C.G.)**

(A Central University Established under Central University Act 2009, No. 25 of 2009)

**CERTIFICATE**

This is to certify that **Mr. Sudhamaya Nag** has worked for M.Sc. (Zoology) dissertation entitled **"Phytochemical and antioxidant profiling of standard horse feed: Qualitative and quantitative analysis"** under my supervision for about 3 months and this work has not been formed the basis for the award of any other similar title.

It represents entirely an independent work on the part of candidate.

**Date: 03/09/2024**

**Place: Bilaspur**

**Signature of Supervisor**

**Date: ....09/2024**

**Place: Bilaspur**

**Head of the Department**

विभागाध्यक्ष

HEAD

जन्तु विज्ञान विभाग

Department of Zoology

गुरु घासीदास वि. वि., बिलासपुर

Guru Ghasidas Vishwavidyalaya Bilaspur

**Date: ....09/2024**

**Place: Bilaspur**

**External Expert**

## **CONTENTS**

<b>[1] Introduction</b>	<b>01-03</b>
<b>[2] Review of literature</b>	<b>04-25</b>
<b>[3] Materials and methods</b>	<b>26-28</b>
<b>[4] Results and Discussion</b>	<b>29-33</b>
<b>[5] Conclusion</b>	<b>34</b>
<b>[6] References</b>	<b>35-45</b>
<b>[7] Research paper communicated</b>	<b>46-</b>



# **Effect of Insulin resistance in Non-alcoholic Fatty Liver Disease**

A Project dissertation submitted

In partial fulfilment for the degree of

**M.Sc. Zoology**

By

**Mr. Sudhansu Sekhar Sabar**

Under Supervision of

**Dr. Santosh Singh**

*Assistant Professor*



**DEPARTMENT OF ZOOLOGY,**

**GURU GHASIDAS VISHWAVIDYALAYA, KONI,**

**BILASPUR (C.G.) 2024**



**Department of Zoology**  
**Guru Ghasidas Vishwavidyalaya**

(A central university established by act of parliament 2009 no.25 of 2009)

**CERTIFICATE**

This is to certify that **Mr. Sudhansu Sekhar Sabar** worked on a postgraduate dissertation project entitled '**Effect of Insulin resistance in Non-alcoholic Fatty Liver Disease**' under my supervision for 3 months and this work has not been formed the basis for the award of any other similar title. It represents entirely independent work on the part of the candidate.

Date: 03/09/2024

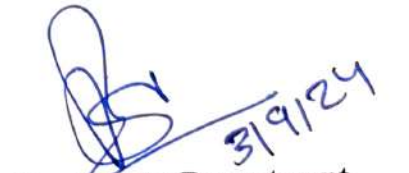
Place: Bilaspur

  
31/9/24

Signature of supervisor

**Dr. Santosh Singh**

  
3.9.2024

  
31/9/24  
Head of the Department  
विभागाध्यक्ष  
HEAD  
जन्तु विज्ञान विभाग  
Department of Zoology  
गुरु घासीदास वि.वि., बिलासपुर  
Guru Ghasidas Vishwavidyalaya Bilaspur

## INDEX

SI NO.	TOPIC NAME	PAGE NO.
1	Abstract	01
2	Introduction	02-03
3	Mechanism linking insulin resistance to fatty acids diseases	04-17
4	Clinical implications	18-19
5	Therapeutic approaches and management strategies	20-25
6	Challenges, controversies and future directions	26-29
7	Conclusion	30
8	References	31-33

**Histopathological alterations in some tissues of teleost *Labeo rohita*  
exposed to insecticide profenofos**



**A Dissertation Report**

**Submitted in partial fulfillment of the requirements for degree of  
Master of Science in Zoology**

**By**

**Swati Agrawal**

**Under the supervision of**

**Dr. Sushant Kumar Verma  
(Assistant Professor)**



**DEPARTMENT OF ZOOLOGY  
GURUGHASIDAS VISHWAVIDYALAYA, BILASPUR (C.G.) 495006  
A central university established by act of parliament 2009 no.25 of 2009)**

**2024**





DEPARTMENT OF ZOOLOGY  
GURU GHASIDAS VISHWAVIDYALAYA

(A Central university established by central university Act 2009 No. 25 of 2009)

CERTIFICATE

This is to certify that **Swati Agrawal**, has worked on dissertation entitled "**Histopathological alterations in some tissues of teleost *Labeo rohita* exposed to insecticide profenofos**" for the completion of M.Sc. (Zoology) degree under my supervision and this dissertation report has not formed the basis for the award of any other degree.

It represents entirely independent work on the part of the candidate.

Signature of Supervisor

Head of the department  
विभागाध्यक्ष  
HEAD

जन्तु विज्ञान विभाग  
Department of Zoology  
गुरु घासीदास वि.वि., बिलासपुर  
Guru Ghasidas Vishwavidyalaya Bilaspur

DATE: 03/09/2024

PLACE: Bilaspur

3.9.24



## CONTENTS

S.NO.	TITLE	PAGE.NO.
1.	INTRODUCTION	1-2
2.	REVIEW OF LITERATURE	3-4
3.	AIM AND OBJECTIVE	5
4.	MATERIALS AND METHODS	6-14
5.	RESULT	15-18
6.	DISCUSSION	19-20
7.	CONCLUSION	21
8.	REFERENCES	22-26

**A Review of Alcohol Use Disorders**

**A Project Dissertation Submitted  
In Partial Fulfilment for Degree of  
M.Sc. Zoology**

**By**

**Mr. Tapindra Rana**

**Under Supervision of  
Prof. LVKS Bhaskar  
(Professor of Zoology)**



**DEPARTMENT OF ZOOLOGY**

**GURU GHASIDAS VISHWAVIDYALAYA, KONI,  
BILASPUR (C.G.).**

**(A Central University Established By Act of Parliament 2009, No. 25 of 2009)**

**2024**



**A Review of Alcohol Use Disorders**

**A Project Dissertation Submitted  
In Partial Fulfilment for Degree of  
M.Sc. Zoology**

**By**

**Mr. Tapindra Rana**

**Under Supervision of  
Prof. LVKS Bhaskar  
(Professor of Zoology)**



**DEPARTMENT OF ZOOLOGY**

**GURU GHASIDAS VISHWAVIDYALAYA, KONI,  
BILASPUR (C.G.).**

**(A Central University Established By Act of Parliament 2009, No. 25 of 2009)**

**2024**



**Department of Zoology**  
**Guru Ghasidas Vishwavidyalaya**

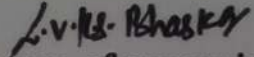
(A Central University Established By Act of Parliament 2009, No. 25 of 2009)

**CERTIFICATE**

This is to certify that Mr. Tapindra Rana worked on a postgraduate dissertation project entitled "A Review of Alcohol Use Disorders" under my supervision for 3 months and this work has not been formed the basis for the award of any other similar title. It represents entirely independent work on the part of the candidate.

Date: 3/9/2024

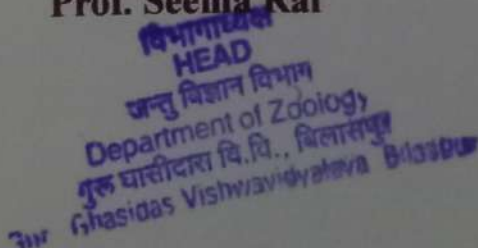
Place: Bilaspur

  
Signature of supervisor

Prof. LVKS Bhaskar

  
Head of the Department

Prof. Seema Rai



## CONTENTS

	Page No.
1. Introduction.....	1
2. Alcohol absorption.....	2
3. Prevalence.....	2
4. Epidemiology.....	3
5. Pathway of alcohol metabolism.....	4
6. Genetic polymorphism.....	7
7. Clinical Courses.....	11
8. Pathophysiology.....	12
9. Diagnosis.....	15
10. Treatment.....	16
11. Conclusion.....	18
12. References.....	19



**A Review On: Hepatocellular Carcinoma General  
Description and Emerging Immunotherapies**

**A Project Dissertation Submitted  
In Partial Fulfilment for Degree of**

**M.Sc. Zoology**

**By**

**Ms. TEJASWINI SAHU**

**Under Supervision of  
Prof. LVKS Bhaskar  
(Professor of Zoology)**



**DEPARTMENT OF ZOOLOGY  
GURU GHASIDAS VISHWAVIDYALAYA, KONI,  
BILASPUR (C.G.).**

**(A Central University Established by Act of Parliament 2009, No. 25 of 2009)**

**2024**





**Department of Zoology**  
**Guru Ghasidas Vishwavidyalaya**

**(A Central University Established by Act of Parliament 2009, No. 25 of 2009)**

**CERTIFICATE**

This is to certify that **Ms. Tejaswini Sahu** worked on a postgraduate dissertation project entitled "**A Review On: Hepatocellular Carcinoma General Description and Emerging Immunotherapies**" under my supervision for 3 months and this work has not been formed the basis for the award of any other similar title. It represents entirely independent work on the part of the candidate.

**Date: 3/09/2024**

**Place: Bilaspur**

*L.V.K.S. Bhaskar 3/9/2024*  
**Signature of supervisor**

**Prof. LVKS Bhaskar**

*[Signature] 3/9/24*

**Head of the Department**

**Prof. Suman Rai**  
**HEAD**

**जन्तु विज्ञान विभाग**

**Department of Zoology**

**गुरु घासीदास वि.वि. बिलासपुर**

**Guru Ghasidas Vishwavidyalaya Bilaspur**

## **CONTENTS**

<b>1. Abstract</b>	<b>[1]</b>
<b>2. Introduction</b>	<b>[2]</b>
<b>3. Risk Factors</b>	<b>[3]</b>
<b>4. Mechanism of HCC progression</b>	<b>[5]</b>
<b>5. Biomarkers of HCC</b>	<b>[7]</b>
<b>6. Tumor Staging</b>	<b>[8]</b>
<b>7. Conventional therapies</b>	<b>[9]</b>
<b>8. Tumor Microenvironment</b>	<b>[10]</b>
<b>9. Immunotherapy</b>	<b>[12]</b>
<b>10. Immune Related Adverse Events</b>	<b>[18]</b>
<b>11. Conclusion</b>	<b>[19]</b>
<b>12. References</b>	<b>[19]</b>

**QUALITATIVE ANALYSIS OF STOMACH CONTENTS OF A  
CAT FISH, *Mystus vittatus***



**A**

**Project dissertation submitted  
In partial fulfillment for degree of  
M.Sc. Zoology IV Semester**

**By**

**Yogeshwari Koshle**

**Under Supervision of  
Dr. Naresh Chandra Agrawal  
(Assistant Professor)**



**Department of Zoology  
Guru Ghasidas Vishwavidyalaya, Bilaspur (CG)**

**2024**



**Department of Zoology**  
**Guru Ghasidas Vishwavidyalaya**

(A central university established by act of parliament 2009 no.25 of 2009)

**CERTIFICATE**

This is to certify that **Miss. Yogeshwari Koshle** has on postgraduate dissertation project entitled **“Qualitative analysis of stomach contents of a cat fish, *Mystus vittatus*”** under my supervision for 3 months and this work has not been formed the basis for the award of any other similar title.

It represents entirely an independent work on the part of candidate.

Date: 03-09-2024

Place: Bilaspur (C.G.)

**Signature of Supervisor**

Date: 03-09-2024

Place: Bilaspur (C.G.)

**Head of the Department**

**विभागाध्यक्ष  
HEAD**

**जन्तु विज्ञान विभाग**

**Department of Zoology**

**गुरु घासीदास वि.वि., बिलासपुर**

**Ghasidas Vishwavidyalaya Bilaspur**



# **Contents**

<b>Introduction</b>	<b>01-07</b>
<b>Review of Literature</b>	<b>08-10</b>
<b>Materials and Methods</b>	<b>11-14</b>
<b>Results</b>	<b>15-19</b>
<b>Discussion</b>	<b>20-24</b>
<b>Conclusion</b>	<b>25</b>
<b>References</b>	<b>26-32</b>

**Alzheimer's disease: Accumulation of amyloid protein and  
its effect.**

A Project Dissertation Submitted  
In Partial Fulfilment for Degree of

**M.Sc. Zoology**

By

**Ms. Yogita Gupta**

Under Supervision of

**Prof. LVKS Bhaskar**

**(Professor of Zoology)**



**DEPARTMENT OF ZOOLOGY**

**GURU GHASIDAS VISHWAVIDYALAYA, KONI,  
BILASPUR (C.G.).**

(A Central University Established By Act of Parliament 2009, No. 25 of 2009)

**2024**



**Department of Zoology**  
**Guru Ghasidas Vishwavidyalaya**

**(A Central University Established By Act of Parliament 2009, No. 25 of 2009)**

**CERTIFICATE**

This is to certify that Ms. Yogita Gupta worked on a postgraduate dissertation project entitled **“Alzheimer’s disease: Accumulation of amyloid protein and its effects”** under my supervision for 3 months and this work has not been formed the basis for the award of any other similar title. It represents entirely independent work on the part of the candidate.

**Date:** 3/9/2024

**Place:** Bilaspur

*L.V.K.S. Bhaskar*  
**Signature of supervisor**

**Prof. LVKS Bhaskar**

**Head of the Department**

**Prof. Seema Rai**

विभागाध्यक्ष  
HEAD  
जन्तु विज्ञान विभाग  
Department of Zoology  
गुरु घासीदास वि.वि., बिलासपुर  
Gur Ghasidas Vishwavidyalaya Bilaspur

## CONTENTS

1. Abstract	[1]
2. Introduction	[2]
3. Epidemiology	[3]
4. Genetics of alzheimer's disease	[5]
5. Structure of Amyloid Precursor Protein	[6]
6. Amyloid Protein toxicity	[8]
7. Function of Amyloid protein	[10]
8. Mechanism of protein Aggregation	[11]
9. Other causes	[13]
10.     Aclinical Phenotypes	[13]
11.     Biomarkers	[17]
12.     Neurodegenerative pathways	[20]
13.     Drug therapy	[21]
14.     Immunization	[23]
15.     Conclusion	[23]
16.     References	[24]