

**“INVESTIGATION ON *Achyranthes aspera* L. FOR
THE TREATMENT OF LUNG INFECTION: AN
EVIDENCE BASED APPROACH”**

A

Thesis

**Submitted for
Partial fulltime of the requirement for the award of degree of**

**MASTER OF PHARMACY
[PHARMACOGNOSY]**



Session 2020-2022

**SUPERVISED BY
Dr. Bharti Ahirwar
(M. Pharm., Ph.D.)
Associate Professor**

**SUBMITTED BY
Prachi Agrawal
M. Pharm. IV semester
Enroll No.: GGV/20/06329
Roll No.: 20706009**

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

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

A
Thesis
on

**“INVESTIGATION ON *Achyranthes aspera* L. FOR
THE TREATMENT OF LUNG INFECTION: AN
EVIDENCE BASED APPROACH”**

Submitted for
Partial fulltime of the requirement for the award of degree of

**MASTER OF PHARMACY
[PHARMACOGNOSY]**



Session 2020-2022

SUPERVISED BY

Dr. Bharti Ahirwar
(M. Pharm., Ph.D.)
Associate Professor

SUBMITTED BY

Prachi Agrawal
M. Pharm. IV Semester
Enroll No.: GGV/20/06329
Roll No.: 20706009

**DEPARTMENT OF PHARMACY,
GURU GHASIDAS VISHWAVIDYALAYA, BILASPUR (C.G.)**
(A Central University Established by the Central University Act-2009 No. 25 of 2009)



DEPARTMENT OF PHARMACY,
GURU GHASIDAS VISHWAVIDYALAYA, BILASPUR (C.G.)
(A Central University Established by the Central University Act-2009 No. 25 of 2009)
Tel. No. 07752-260027; Fax No. 07752-260148

FORWARDING CERTIFICATE

This is to certify that **Ms. Prachi Agrawal** D/o **Mr. Ganesh Agrawal** is a student of M.Pharm. IV semester in Department of Pharmacy (GGV) has submitted her project report entitled **“Investigation on *Achyranthes aspera L.* for The Treatment of Lung Infection: An Evidence Based Approach”** for the partial fulfilment of the requirement for the Degree of **Master of Pharmacy (Pharmacognosy)** at Department of Pharmacy, GGV Bilaspur (C.G.). She has completed her project work under the supervision of **Dr. Bharti Ahirwar** (Associate professor)

I hereby forward her project report in M. Pharm. (Pharmacognosy) during the academic session 2020-2022.

FORWARDED BY

Date: 14/11/2022

Place: Bilaspur

Dr. Bharti Ahirwar
Associate Professor and HOD
Department of Pharmacy,
G.G.V. Bilaspur (C.G.)
Head

Department of Pharmacy
Guru Ghasidas Vishwavidyalaya
(A Central University)
Bilaspur (C.G.)



DEPARTMENT OF PHARMACY,
GURU GHASIDAS VISHWAVIDYALAYA, BILASPUR (C.G.)
(A Central University Established by the Central University Act-2009 No. 25 of 2009)
Tel. No. 07752-260027; Fax No. 07752-260148

CERTIFICATE

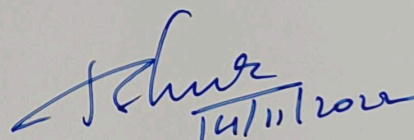
This is to certify that **Ms. Prachi Agrawal** D/o **Mr. Ganesh Agrawal** is a student of M.Pharm. IV semester in Department of Pharmacy (GGV) has submitted her project report entitled "**Investigation on *Achyranthes aspera L.* for The Treatment of Lung Infection: An Evidence Based Approach**" for the partial fulfillment of the requirement for the Degree of **Master of Pharmacy (Pharmacognosy)** at Department of Pharmacy, GGV Bilaspur (C.G.). She has completed his project report under my supervision.

I hereby forwarding her project report for the award of degree of M. Pharm. (Pharmacognosy) during the academic session 2020-2022.

I wish her every success in future life.

Date: 14/11/2022

Place: Bilaspur


14/11/2022

Supervised By

Dr. Bharti Ahirwar

Associate Professor

Department of Pharmacy,

G.G.V, Bilaspur (C.G.)

Dr Bharti Ahirwar

Assoc. Prof.

Institute of Pharm. Sciences
Guru Ghasidas Vishwavidyalaya
Bilaspur (C.G.) 495 009



DEPARTMENT OF PHARMACY,
GURU GHASIDAS VISHWAVIDYALAYA, BILASPUR (C.G.)
(A Central University Established by the Central University Act-2009 No. 25 of 2009)
Tel. No. 07752-260027; Fax No. 07752-260148

DECLARATION

I hereby declare that the project report entitled “**Investigation on *Achyranthes aspera L.* for The Treatment of Lung Infection: An Evidence Based Approach**” was done by me. The entire work was done with the guidance and suggestion received from my supervisor **Dr. Bharti Ahirwar** (Associate Professor) at Department of Pharmacy, GGV, Bilaspur (C.G.). The same is submitted to Guru Ghasidas Vishwavidyalaya Bilaspur for the partial fulfillment of the requirement for the degree of **Master of Pharmacy (Pharmacognosy)**.

Date: 14/11/2022

Place: Bilaspur

Prachi Agrawal

M.Pharm. IV Semester

Roll No. 20706009

Enrollment No. GGV/20/06329

Department of Pharmacy,
GGV, Bilaspur, (C.G.)

ACKNOWLEDGEMENT

I humbly and whole heartedly bow my head before Lord Almighty for blessing me all his grace to successfully complete my studies and research endeavour at Guru Ghasidas University.

It is a great pleasure to acknowledge my deepest thanks and gratitude to everyone who supported me throughout the course of thesis work. I wish to extend my sincere and heartfelt obligation to work all the personages who have helped me in this endeavour. Without their active guidance, help, cooperation and encouragement, I would not have made any progress in my project.

By the grace of Almighty, I take this opportunity to express my deep sense of gratitude to my supervisor **Dr. Bharti Ahirwar**, Associate Professor, Department of Pharmacognosy, Department of Pharmacy, Guru Ghasidas Vishwavidyalaya, Bilaspur (C.G.) for providing me excellent guidance, motivation, encouragement and care throughout my research work. I am highly thankful to him for critical inputs, thought provoking suggestions during the progress of the work and writing of dissertation.

I am also thankful to **Prof. Bharti Ahirwar** Head of Department of Pharmacy Guru Ghasidas Vishwavidyalaya, Bilaspur (CG) for providing me the required facilities and also their timely words of advice, despite of their busy schedule.

I am thankful to Dr. Vivekananda Mandal, Dr. Arjun Patra, Dr. Vinod D. Rangari and Dr. Neelirose beck for their constant efforts and support throughout my project work and post-graduation as well.

I would like to thanks all the non-teaching staff of the department for their contribution and assistance.

I would like to thanks and express my gratitude to my seniors and friends, Ms. Nirupama Rani Dewangan, Mr. Kavi Bhushan Chouhan, Ms. Varsha Yadav, Priyanka Sahu, Dalchand, Altamash Khan, Monika Chandrakar, Nirdesh Singh, Gita Singh, Urvashi Jain, Pragya Gupta and Sunil Sahu who contributed in some or other way for the success of this research work.

Now, Last but not the least; my unbound gratitude and affection drive to my beloved parents Mr. Ganesh Agrawal and Mrs. Kiran Agrawal for bringing me up in the best of ways, for rendering me the best of education, for nurturing in me the best of ideals. I am very happy to express my special appreciation and thanks to my sisters Ms. Pragya Agrawal, Ms. Pratha Agrawal and Ms. Pranshi Agrawal for their limitless love, affection and support.

Sincerely thanks to all.

Date: 14/11/2022

Place: Bilaspur

Prachi Agrawal

LIST OF TABLES

Tables S.No.	Title	Page No.
1.1.	Taxonomic classification	17
1.2.	Medicinal uses of plant parts	18-19
5.1.	Experimental design of in-vivo studies	51
5.2.	Experimental design in groups and treatment	51
6.1.	Percentage yield of solvent extracts of <i>Achyranthes aspera L.</i>	55
6.2.	List of phytochemicals present in plant	56
6.3.	Quantitative analysis obtained in mg/gm	59
6.4.	Antibacterial activity of plant extract (AAEA) against <i>E.coli</i> , zone size in diameter (cm)	60
6.5.	Antibacterial activity of plant extract (AAM) against <i>E.coli</i> , zone size in diameter (cm)	60
6.6.	Antibacterial activity of plant extract (AAEA) against <i>M.luteus</i> , zone size in diameter (cm)	60
6.7.	Antibacterial activity of plant extract (AAM) against <i>M.luteus</i> , zone size in diameter (cm)	61
6.8.	Antibacterial activity of plant extract (AAEA) against <i>P.aeruginosa</i> , zone size in diameter (cm)	61
6.9.	Antibacterial activity of plant extract (AAM) against <i>P.aeruginosa</i> , zone size in diameter (cm)	61
6.10.	Bioactivity of various extracts of <i>Achyranthes aspera L.</i> on <i>Escherichia coli</i>	63
6.11.	Bioactivity of various extracts of <i>Achyranthes aspera L.</i> on <i>Micrococcus luteus</i>	64
6.12.	Bioactivity of various extracts of <i>Achyranthes aspera L.</i> on <i>Pseudomonas aeruginosa</i>	65
6.13.	UV- visible spectrum of methanol extract of <i>Achyranthes aspera</i> <i>L.</i>	66
6.14.	UV- visible spectrum of ethanol extract of <i>Achyranthes aspera L.</i>	67
6.15.	UV- visible spectrum of ethyl acetate extract of <i>Achyranthes</i> <i>aspera L.</i>	67
6.16.	FTIR spectrum by frequency range of the methanol extract of <i>Achyranthes aspera L.</i>	70-71
6.17.	FTIR spectrum by frequency range of the ethanol extract of <i>Achyranthes aspera L.</i>	72
6.18.	FTIR spectrum by frequency range of the ethyl acetate extract of <i>Achyranthes aspera L.</i>	73-74

6.19.	TLC analysis of various extracts of <i>Achyranthes aspera L.</i>	74
6.20.	Rf values of various compounds	76
6.21.	The phytochemical compounds detected in HPTLC studies	79
6.22.	Effect of cigarette smoke on lung infection treatments of antioxidant enzyme and oxidative stress in the different experimental groups of COPD induced cigarette model.	84-85
6.23.	Histological examination of the rat lung tissues after inhalation of cigarette smoke.	85-87
6.24.	Histological examination of the rat bronchus tissues after inhalation of cigarette smoke.	87-89