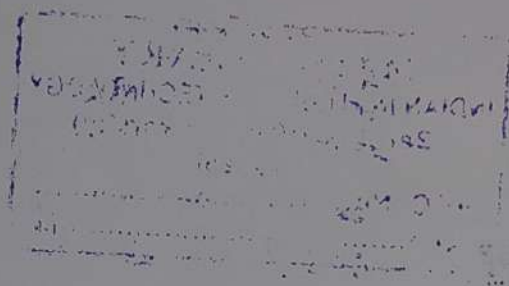


## CERTIFICATE

It is to certified that the work contained in the thesis titled **“Isolation production, and characterization of bioactive metabolites from endophytic bacterial isolates”** by **Mr. Moti Lal** has been carried out under my supervision and that this work has not been submitted elsewhere for a degree.

It is further certified that the student has fulfilled all the requirements of comprehensive examination, candidacy and SOTA for the award of Ph.D. Degree.



*M. Debnath-(Das)*

**Signature:**

**Dr. Mira Debnath** 16/12/2019  
**Professor**  
**School of Biochemical Engg**  
**IIT (BHU)**  
**Varanasi-221005**

Prof. Mira Debnath Das

(Supervisor)

School of Biochemical Engineering

Indian Institute of Technology

(Banaras Hindu University)

Varanasi-221005 (UP)

## DECLARATION BY THE CANDIDATE

I, **Mr. Moti Lal**, certify that the work embodied in this thesis is my own bona fide work and carried out by me under the supervisions of **Prof. Mira Debnath Das** in **School of Biochemical Engineering** from **July 2013** to **December, 2019**, at Indian Institute of Technology (BHU), Varanasi. The matter embodied in this thesis has not been submitted for the award of any other degree/diploma. I declare that I have faithfully acknowledged and given credits to the research workers wherever their works have been cited in my work in this thesis. I further declare that I have not willfully copied any other's work, paragraphs, text, data, results, *etc.*, reported in journals, books, magazines, reports dissertations, theses, *etc.*, or available at websites and have not included them in this thesis and have not cited as my own work.

Date: 16/12/2019.

Place: IIT (BHU), Varanasi



Signature of the Student

(Moti Lal)

## CERTIFICATE BY THE SUPERVISOR

It is certified that the above statement made by the student is correct to the best of my knowledge.

Coordinator

M. Debnath - (Das)

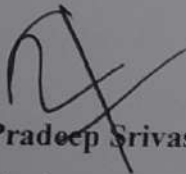
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Professor Pradeep Srivastava  
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Varanasi-221005

## ACKNOWLEDGMENTS

*Through this page I offer my salutation, to creator of this pious seat of learning  
**Mahamana Pt. Madan Mohan Malviya Ji.***

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*I am thankful to **Prof. R. S. Singh**, my external RPC member, Department of Chemical engineering, IIT (B.H.U) for giving me valuable suggestions throughout my research period.*

*I can never forget Dr. **Kranthi Kumar tungla** and **Mr. Nagendra Kumar** for their help in NMR structure prediction he gave lot of time for my help.*

*I am highly obliged to express my appreciation towards my senior **Dr. Yogendra Singh, Dr. Devenra Verma, Dr. Ashish, Dr. Rupika Sinha** and **Dr. Anand Kumar** for their time to time help and assistance in each and every step of the research work.*

*I am especially grateful to **Ms. Neelam Tia, Rahul Kumar, Sukhendra Singh, Saroj Kumar** for help in the experimental work related to my research. I am especially grateful **Rahul kumar** cooperated lots during my research work.*

*I am especially grateful to **Mr. Deepankar Shrma** and **Mr. Subhankar Anand** for help in the area of RSM related to my research work.*

*Words plunge insufficient to express my regards and deep emotion to my beloved parents for being a source of unconditional love and inspiration to move on the way to my goal of achieving higher education. Their everlasting encouragement, patience, sacrifice and blessings are the sources which brought me up to this stage. Parents being earthly God in my life, deserves much more than what I can express in words. I take this occasion to acknowledge the financial assistance provided by **University Grant Commission** and*

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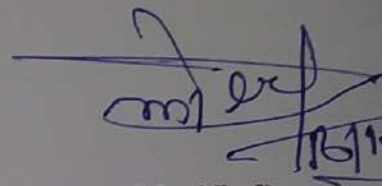
*Ministry of Human Resource and Development in the form of Ph. D fellowship and Teaching Assistantship.*

*Again, I wish to express a word of thanks to all those hands that helped me in some way or other in pursuing my research work and for the completion of thesis. I apologize unreservedly for any mistakes, omissions or failure to acknowledge fully.*

*Finally, I bow my head humbly before the almighty **God** without whose consent and blessings, this work would have been impossible.*

*Date: 16/12/2019.*

*Place: IIT (BHU), Varanasi*

A handwritten signature in blue ink, appearing to be 'Moti Lal', with a horizontal line drawn through it. To the right of the signature, the date '16/12' is written vertically.

**(Moti Lal)**