

**Dedicated to**

**My Father Late Siddheswar Roy**

## DECLARATION

I declare that the thesis entitled "**Metal free C- H Functionalization: a unique tool for library synthesis of functionalized 4-pyrimidiones**" has been prepared by me under the guidance of Dr. Sajal Das, Professor of Chemistry, University of North Bengal. No part of this thesis has formed the basis for the award of any degree or fellowship previously.

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### CERTIFICATE

I certify that Mr. Sanjay Roy has prepared his thesis entitled “Metal free C- H Functionalization: a unique tool for library synthesis of functionalized 4-pyrimidiones” for the award of Ph.D. Degree (Doctor of Philosophy) from the University of North Bengal, under my supervision. He has worked at the Department of Chemistry, University of North Bengal. The content of this thesis, in full or in parts, has not been submitted to any other Institution or University for the award of any degree or diploma

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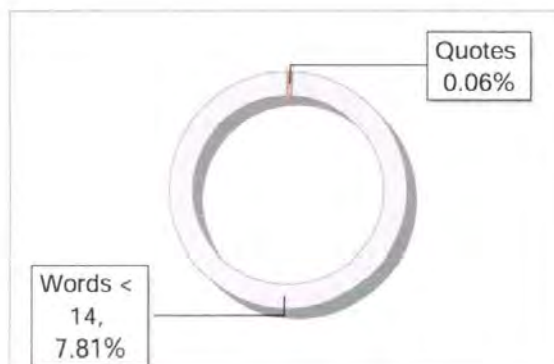
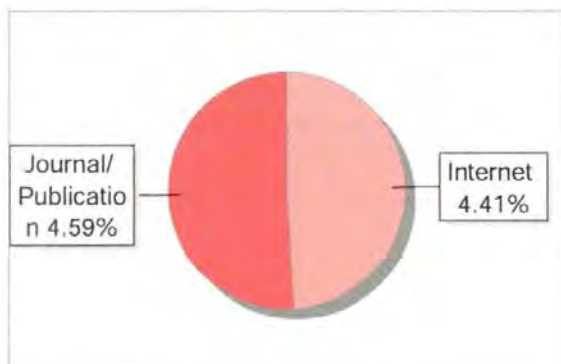
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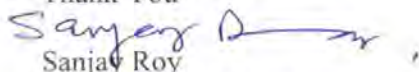
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Sanjay Roy

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## **PREFACE**

In the preparation of this research work, I have precisely established all the significant work categorically through four chapters. I have made my best possible efforts to highlight all the possible efforts to portray my research work, which will have enormous medicinal and pharmacological evidence.

It is a great pleasure for me to thank all those valuable suggestions that have been given to me by Dr. Sajal Das, Professor Department of chemistry, North Bengal University. I must thank the almighty for this inspiration and guidance as well as my parents, teachers who supported and helped me to complete this research work.

### Appendix A: List of Research Publications

1. **Microwave-assisted straightforward synthesis of 2-substituted alicyclic fused pyrimidone**; Sanjay Roy, Samir K Mandal, Anirban Mandal, and Sajal Das\*, Tetrahedron Letter, 133 (2023), 154832 (DOI: .org/10.1016/j.tetlet.2023.154832)
2. **“Regioselective C(sp<sup>2</sup>)<sub>3</sub>-H thiocyanation of substituted 4H-Pyrido[1,2-a]pyrimidin-4-ones and its late-stage derivatization”** Sanjay Roy, Prasanjit Ghosh Shibaji Ghosh, Samir K Mandal, Anirban Mandal, and Sajal Das\*, ChemistrySelect 2023, 8, e202303465 (3 of 8), DOI:. org/10.1002/slct.202303465
3. **“Regioselective substituted Selenylation at (C-SP<sup>3</sup>-H) of 4-pyrimidione under ambient condition”** Sanjay Roy, Sajal Das\* (Under process of submission)

## Appendix B: List of Oral /Poster/Lecture/ Seminar presentations

1. **Delivered Invited lecture:** in National Seminar on Chemistry behind Photochemical and their medicinal importance in curing various diseases of human beings. Topic: ***Delivered Invited Lecture Entitled: “Indian Kitchen & Chemistry”*** Sanjay Roy, in the National Seminar held on 21-March 2023 at Saldiha College, Bankura; Sponsored by Inclusion and Diversity Fund Royal Society Of Chemistry, London, in collaboration with Indian Chemical Society, India
2. **Oral Presentation: *Regioselective C(sp<sup>2</sup>)<sub>3</sub>-H thiocyanation of substituted 4H-Pyrido[1,2-a]pyrimidin-4-ones and its late-stage derivatization*** Sanjay Roy, in the 8<sup>th</sup> National Conference on Science and Technology for Nation Development: Opportunities of Global Challenges . Organized by Arya PG college, Panipat; Haryana, Dated 28-Feb 2023
3. **Poster Presentation: *Microwave-assisted straightforward synthesis of 2-substituted alicyclic fused pyrimidone*** Sanjay Roy, Samir K Mandal in National Seminar on Chemistry behind Photochemical and their medicinal importance in curing various diseases of human beings held at Saldiha College, Bankura; Sponsored by Inclusion and Diversity Fund Royal Society Of Chemistry, London, in collaboration with Indian Chemical Society, India

### Seminar Atended:

1. *“International Seminar on “Recent Trent in Chemistry 2020”* organized by the Department of Chemistry, NBU with collaboration with chemical Research Society of India. 2020:
2. *“International Seminar on Frontier in Chemistry, 2020”* Organized by Department of Chemistry, University of North Bengal with collaboration with chemical Research Society of India. Dated: 1<sup>st</sup> Oct 2020

## CHAPTER I

### ABBREVIATION

DCE	1,2-Dichloroethene
DMF	Dimethylformamide
DMSO	Dimethyl sulfoxide
DG	Directing group
PIFA	(Bis(trifluoroacetoxy)iodo)benzene
THF	Tetrahydrofuran
Equiv	equivalent
RT	Room temperature
TEMPO	2,2,6,6-Tetramethylpiperidine 1-oxyl,
BHT	Butylated hydroxytoluene
C-O	Carbon-Oxygen
C-N	Carbon- Nitrogen
C-C	carbon-carbon
C-S	Carbon-Sulphur
C-Se	Carbon-Selenium
C-H	Carbon-Hydrogen
C-FG	Carbon-Functional Group
C-S	carbon Sulphur
MHz	Mega Hertz
EMME	Ethoxymethylene malonate