A Final report

On

Minor Research Project Entitled

"Studies on synthesis and bioactivity of some new heterocyclic compounds having β-indol aldehyde moiety"

Submitted to

University Grant Commission,
Western Regional Office
Pune 411007

Submitted by

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UNIVERSITY GRANTS COMMISSION
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PROFORMA FOR SUBMISSION OF INFORMATION AT THE TIME OF SENDING THE FINAL REPORT OF THE WORK DONE ON THE PROJECT

1. Name and address of the Principal investigator: **Dr. Subhash Babarao Junne.**
2. Name and address of the Institution: Post Graduate Department of Chemistry, Yeshwant Mahavidyalaya, Nanded431602.
3. UGC approval no. and date: File No. 47-876/09) and date: 04/Sept/2009.
4. Date of implementation:
5. Tenure of the project: Two Years 4-Sept-2009 to 30-Sept-2011.
6. Total grant allocated: 1,45,000/- only.
7. Total grant received: 80,000/- only.
8 Final expenditure: 1,52,847=00/- (only
9. Title of the project: *Studies on synthesis and bioactivity of some new heterocyclic compounds having β-indol aldehyde moiety"*
10. Objectives of the project: To Synthesize new heterocyclic Schiff bases and related heterocycles like secondary amines, 2-azetidinones etc and screened their antibacterial and antifungal activity.
11. Whether objectives were achieved : Yes (*Enclosed herewith Published papers)*
12. Achievements from the project: Four Publications.

13. **Summary of the findings**

I have synthesized new substituted iodoamines under microwave irradiation by using iodine and iodic acid as an iodinating agent. These substituted iodoamines were used to synthesize new Schiff bases on β-indole aldehyde moiety. Further these Schiff bases are used as synthon for the synthesis of heterocyclic compounds. Also, it can be used for the synthesis of Secondary amines from imines or Schiff bases by using sodium borohydride as a reducing agent. In continuation of earlier research program here we wish to report first time a typical condensation between substituted aryl amines and indole-3-aldehyde at room temperature with combination of grinding to afford heterocyclic imines.

In grindstone technique reaction occurs through generation of local heat by grinding of crystal of substrate and reagent by mortar and pestle. Reactions are initiated by grinding with transfer of very small amount of energy through friction. In some cases, a mixture and reagent turns to glassy material. Such reactions are simple to handle, reduce pollution, comparatively cheaper to operate and may be regarded as more economical and ecologically favorable procedure in chemistry. In order to optimize the capability and efficiency of present method, we carried out above reaction by conventional method using ethanol as reaction solvent. We found that solid state reaction occur more efficiently and more selectively than does the solution reaction. Since molecules in the crystal are arranged tightly and regularly. Thus in grindstone technique reaction occurs efficiently in terms of clean reaction conditions, operationally simple, short reaction time giving quantitative yields of product and environmentally ecofriendly. In view of these observations we turned our attention towards various

substituted aryl amines. In all cases, reaction proceeds smoothly in high yields using grindstone technique.

Structure of newly synthesized compounds were established on the basis of their spectroscopic data were IR spectra of condensed products display disappearance of band at 1710 due to C=O of indole-3-aldehyde and appearance of band at 1620 cm^{-1} due to C=N formed. The ^{1}H NMR spectra show presence of azomethine proton at δ 8.86-8.92 ppm. In summary, we have synthesized novel heterocyclic imines by condensation of substituted aryl amines under solvent-free grinding technique. This method often lead to a remarkable decrease in reaction times, simplicity of operation, increased yield, easier workup and matches with green chemistry protocols. The preliminary in vitro antimicrobial screening of this series revealed most of the compounds showed potent activity when compared with standard drug. The structures of the newly synthesized compounds have been characterized by spectral and analytical data. All newly synthesized compounds screened for their antimicrobial activity by using different pathogens.

14. **Contribution to the society:**

Our synthesized heterocyclic compounds in this project show encouring result as antibacterial and antifungal agent, also they show growth stimulating activity on selected plants. Particularly, the work on iodohydroxy biphenyl moiety is used in peptides, proteins and antibodies. This work is demanded on ***Richard Fang, China Peptides, Co. Ltd. which is beneficial to the society. Further, studies are proposed to be made with botany and biotech department in our institute***

(**Published paper** entitled "Synthesis and antibacterial activity of some new Schiff bases and 2-azetidinones containing iodo hydroxy biphenyl moiety. ***International multidisciplinary research journal,*** **2(6), 2012, 44-47.**)

15. Whether any Ph.D. enrolled/produced out of the project: No.

16. No. of publications out of the project: No **Reprints of publications**

1) **S.B. Junne**, Archana B.Kadam, S.L. Shinde, G.S. Waghamare and Y.B. Vibhute. "Synthesis, characterization and antibacterial activity of some halo substituted Schiff bases", ***E-Journal of Chemistry*****, 7 (3), 2010, 882-886.**
2) **S.B. Junne**, Archana B. Kadam, Archana Y. Vibhute, S.L. Shinde, R.B.Patil and Y.B. Vibhute. Reduction of Schiff bases with sodium borohydride possessing antibacterial activity. ***Asian Journal of Research in chemistry*****, 3 (3), 2010, 578-580.**
3) **Subhash B. Junne** and Sainath B. Zangde. An atom efficiency, solvent free synthesis of some new heterocyclic imines and antibacterial activity. ***Orbital. The Electronic Journal of Chemistry,*** **4(1), 2012**, **23-32.**
4) **Subhash B. Junne,** Archana B. Kadam, Sainath B. Zangde, Saheb L. Shinde and Yeshwant B. Vibhute. Synthesis and antibacterial activity of some new Schiff bases and 2-azetidinones containing iodohydroxy biphenyl moiety. *International multidisciplinary research journal,* 2(6), **2012,** 44-47.