# Notice for the PhD Viva Voce Examination

Ms Manisha Mishra (Reg. No. 1540082), PhD scholar at CHRIST (Deemed to be University), will defend her PhD thesis at the public viva voce examination on Saturday, 17 July, 2021 at 11.00 am. The defense will be conducted online on the WebEx Meeting platform.

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| **Title of the Thesis** | : | **Multi-Component Condensation Mediated Synthesis of Bioactive Heterocyclic Compounds** |
| **Discipline** | : | **Chemistry** |
| **External Examiner** (Outside Karnataka) | : | **Dr Keisham Sarjith Singh**<br>Senior Scientist<br>Bioorganic Chemistry Laboratory<br>CSIR-National Institute of Oceanography<br>Dona Paula, Goa |
| **External Examiner** (Within Karnataka) | : | **Dr Nagendra G**<br>Assistant Professor<br>REVA University<br>Rukmini Knowledge Park<br>Kattigenahalli, Yelahanka<br>Bengaluru - 560064<br>Karnataka |
| **Supervisor** | : | **Dr Aatika Nizam**<br>Associate Professor<br>Department of Chemistry<br>School of Sciences<br>CHRIST (Deemed to be University)<br>Bengaluru – 560029<br>Karnataka |

The faculty members of the Department and the School, interested experts and research scholars of all the branches of research are cordially invited to attend this open viva.

**Registrar**

**Place:** Bengaluru
**Date:** 11 July 2021

# ABSTRACT

Aromatic heterocycles constitute the most diverse family of organic compounds. Moreover, aromatic heterocycles are widely used for the synthesis of dyes and polymeric materials of high value. The development of selective reactions that utilize easily available and abundant precursors for the efficient synthesis of heterocyclic compounds is a long-standing goal of chemical research. Despite the centrality of its role in a number of important research areas, including medicinal chemistry, total synthesis, and materials science, a general, selective, step-economical, and step-efficient synthesis of heterocycles is still needed.

Pyrano[2,3-c]pyrazole derivatives have been synthesised by a one-pot multicomponent condensation of different aldehydes, dialdehydes, and ketones with malononitrile, ethyl acetoacetate, hydrazine hydrate (or phenylhydrazine) in the presence of magnetic nano-[$CoFe_2O_4$] catalyst under ultrasonic irradiation. The catalyst can be retrieved using an external magnet and used repeatedly. A practical, scalable method for obtaining various pyranopyrazoles has been demonstrated.

Zirconia-supported silica from rice husk - an agricultural waste - is utilised as a novel and effective heterogeneous catalyst for the synthesis of bioactive tetrahydrobenzo[b]pyran derivatives through a multicomponent condensation reaction of various aldehydes, dimedone, and malononitrile. This technique provides various advantages such as high yields, simple experimental work-up procedures, short reaction time, no byproducts, economic efficiency, quick purification, and reusability of the catalyst.

Bismuth aluminate catalyst was successfully applied for azlactone synthesis via a condensation reaction with hippuric acid and a variety of aldehydes under solvent-free conditions. It was proved that the catalyst prepared was highly efficient in azlactone preparation giving high yield of products in a short reaction time following a simple experimental procedure. Moreover, the reaction was carried out in the absence of solvent making this reaction eco-friendlier and more convenient. The catalyst was stable at high temperatures and reused for several cycles without leaching.

Easy and effective one-pot condensation reactions of aromatic aldehydes with thiobarbituric acid and ammonium acetate were carried out using molecular iodine in an aqueous medium to afford corresponding pyrido[2,3-d]dipyrimidines in high yields. The present strategy demonstrates numerous benefits such as operationally simple, atom-economical, eco-friendly, and the use of inexpensive catalysts. This green and effective approach also displays a unique aspect in driving the four-component reaction to completion within a few minutes. The extraordinary catalytic role of the various catalyst has been discovered in the processes, which reveals a possible character of enhancing reaction rates and stabilising the intermediates during the course of the reactions.

*Keywords: (Multicomponent reaction, pyranopyrazole, magnetic nano-[ $CoFe_2O_4$], aqueous medium, ultrasound, tetrahydrobenzo[b]pyrans, zirconia supported rice husk silica, heterogeneous reusable catalyst, solvent-free, azlactones, bismuth aluminate, pyrido-dipyrimidine, aldehyde, 2-thiobarbituric acid, iodine).*