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Notice for the PhD Viva Voce Examination

Mr Joshua Jose, Registration Number: 2170238, PhD Scholar at the Department of Chemistry, School of Sciences, CHRIST (Deemed to be University) will defend his PhD thesis at the public viva-voce examination on Thursday, 29 January 2026 at 02.00 pm in Room No. 044, Ground Floor, R&D Block, CHRIST (Deemed to be University), Bengaluru - 560029, Karnataka, India.

Title of the Thesis	:	**Cellulose Nanomaterials for Sensing, Electromagnetic Interference Shielding, and Biomedical Applications**
Discipline	:	**Chemistry**
External Examiner - I	:	**Dr Arun Kumar C** Associate Professor Department of Sensor and Biomedical Technology School of Electronics Engineering Vellore Institute of Technology Tamil Nadu -632014
External Examiner - II	:	**Dr Pravin G Ingole** Senior Scientist Chemical Engineering Group, ESTD CSIR-North East Institute of Science and Technology Jorhat-785006 Assam
Supervisor	:	**Dr Vinod T P** Associate Professor Department of Chemistry School of Sciences CHRIST (Deemed to be University) Bengaluru – 560029 Karnataka, India

The members of the Research Advisory Committee of the Scholar, 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 – voce examination.

Place: Bengaluru
Date: 21 January 2026

Registrar (Academics)

Registrar (Academics)
CHRIST (Deemed to be University)
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ABSTRACT

There is a growing demand for the preparation of nanomaterials from sustainable and renewable precursors, as the unique physical, chemical, and optical properties of nanomaterials and their composites can be harnessed for variety of applications including sensing, electromagnetic interference and biomedical applications. Cellulose is a biopolymer found abundantly in nature especially in plants, algae, tunicates, and bacteria. Nanocellulose extraction from natural sources is relatively simple and easy, when compared to the preparation of synthetic nanocellulose. Nanocellulose can be used in sensing applications and composites/membranes of nanocellulose finds its application in sensing, electronics, medicine and other applications. This thesis explores the synthesis of nanocellulose with the usage of minimum number of steps and lesser chemicals compared to conventional synthesis routes. Cellulose nanomaterials were successfully extracted from coconut midrib through an optimized acid hydrolysis procedure. Using the acid hydrolysis procedure, fluorescent nanocellulose from Plectranthus Barbatus plant was synthesized and the selective sensing of lead ions was achieved. In another work, we present a new and general method for the preparation of hybrid nanomaterials of desired composition and functionality using sacrificial electrospun nanofibers. In another work, Cadmium ions were imprinted on paper derived nanocellulose through precursor modification technique. The ion imprinting startergy, along with the autofluorescent property of nanocellulose were utilized for the selective detection of cadmium ions. The research outcomes presented in this thesis helps in expanding the repertoire of procedures and versatile applications of nanocellulose derived from natural sources.

Keywords: *Cellulose, Nanocellulose, Metal Ion Sensing, EMI Shielding, Cellulose Nanohybrid and Ion Imprinting on Nanocellulose.*

Publications:

1. **Jose, Joshua,** and T. P. Vinod. "Nanocellulose from coconut midrib used for antibacterial and electromagnetic interference shielding applications." New Journal of Chemistry 49.22 (2025): 9475-9483. https://xlink.rsc.org/?DOI=D5NJ01022E

Patent Publications:

1. **Jose, Joshua,** T. P.,Vinod. "Cellulose nanomaterials synthesized from coconut (cocos nucifera) midrib for electromagnetic interference shielding", IN 202441037053 A, 2024/5/17.
2. **Jose, Joshua**, T. P., Vinod. "Electrospun fibers as sacrificial templates for the synthesis of ZnO@CA-PVP hybrid", IN 202541001393 A, 2025/1/17.