CHRIST
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Notice for the PhD Viva Voce Examination

Mr S William Joseph Kamal (Registration Number: 2090183), PhD scholar at the School of Sciences, CHRIST (Deemed to be University), Bangalore will defend his PhD thesis at the public viva-voce examination on Tuesday, 29 October 2024 at 10.30 am in Room No. 044, Ground Floor, R & D Block, CHRIST (Deemed to be University), Bengaluru - 560029.

Title of the Thesis	:	**Unveiling the Effects of Heavy Metals: A Comprehensive Study on Physiological, Phytochemical, and Anatomical Responses in *Jacobaea maritima* (L.) Pelser and Meijden**
Discipline	:	**Botany**
External Examiner - I	:	**Dr Muralidhar Rao** Professor Department of Biotechnology Sri Krishnadevaraya University Anantapur - 515003 Andhra Pradesh
External Examiner - II	:	**Dr Jayarama Reddy** Professor and Director St Joseph's College (Autonomous) 36, Langford Road Bengaluru – 560027 Karnataka
Supervisor	:	**Dr Jobi Xavier** Associate Professor Department of Life Sciences School of Sciences CHRIST (Deemed to be University) Bengaluru – 560029 Karnataka

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.

Registrar

Place: Bengaluru
Date: 23 October 2024

ABSTRACT

Modernization and industrialization have been of great importance in the recent past, yet there are a few disadvantages including the release of harmful effluents into the environment. The medicinal plants that are found in these heavy metal polluted soils can have positive and negative effects as well. In this study the plant *Jacobaea maritima* (L.) Pelser & Meijden an important medicinal plant in the field of homeopathy was subjected to three different heavy metals- cadmium, chromium and lead at a concentration range of 50, 100, 150, 200 and 250ppm. The morphological parameters, shoot length and root length reduced more than 50% and 25% in case of shoot and root respectively. Phytochemical analysis shows significant variation in chlorophyll. The highest of protein was found in Cr 100ppm (7.47mg) and the least was found in Cd 250ppm (0.38mg). Proline was found to be high in Pb 200ppm (1.242mg/ml) and least in Cr 50ppm (0.368mg/ml). The Total Phenolic Content (TPC) was found to be highest in Cr 250ppm (3.229mg/g) and least in control (0.57mg/g) and Total Flavonoid Content (TFC) was found to be highest in Cd 100 ppm and least in Control (0.04mg/g) plant which include root, shoot and leaf. The highest chlorophyll was found in Cd100 concentration. The net photosynthetic rate was less affected in Pb150 (30.98±0.75), and most in Cr100 (4.05±0.09). The Cr 50 (0.19±0.02) showed the least. The Leaf stomatal conductance was drastically reduced in all the treated plants only Cr 100 (2298.25±1.85) showed minimal variation.

In morphology shoot length and root length were reduced more than 50% and 25% in case of shoot and root respectively. Phytochemical analysis shows significant variation including chlorophyll. The highest of protein is seen in Cr 100ppm (7.47mg) and least in Cd 250ppm (0.38mg). Proline which is a stress-induced compound was Found to be high in Pb 200ppm (1.242mg/ml) and least in Cr 50ppm (0.368mg/ml). The Total Phenolic Content (TPC) was seen to be highest in Cr 250ppm (3.229mg/g) and least in control (0.57mg/g) and the Total Flavonoid Content (TFC) was found to be highest in Cd 100 ppm and least in Control (0.04mg/g) plant which include root, shoot and leaf. It was found that many phytochemicals have the properties of antioxidant, antimicrobial, etc are produced in higher quantities with the treatment. The statistical analysis proved that there's a significant variation in the values obtained after the heavy metal treatment.

Keywords: *Heavy Metals, Jacobaea maritima, Phytochemicals, Plant anatomy.*

Publications:

1. **J. K. S. William** and J. Xavier, "Effect of heavy metals on the pigmentation and photosynthetic capability in Jacobaea maritima (L.) Pelser & Meijden," Plant Sci. Today, vol. 10, no. 4, pp. 192–197, Oct. 2023.
2. **W. J. K. Satuluri** and J. Xavier, "Assessment of heavy metal accumulation and its effect on phytochemical profiling in Jacobaea maritima (L.) Pelser & Meijden," Plant Sci. Today, vol. 11, no. 2, May 2024, Doi: 10.14719/pst.3071.