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Ectophoma salviniae sp. nov., Neottiosporina mihintaleensis sp. nov. and four other endophytes associated with aquatic plants from Sri Lanka and their extracellular enzymatic potential

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ABSTRACT

Endophytic fungi associated with selected aquatic plants, *Eichhornia crassipes, Nymphaea nouchali,* Salvinia minima and S. molesta were evaluated. Ectophoma salviniae sp. nov. and Neottiosporina mihintaleensis sp. nov. are introduced as novel taxa from Salvinia spp. from Sri Lanka. Chaetomella raphigera is reported as a new geographical record, Colletotrichum siamense and C. truncatum are reported as novel host records in aquatic plants, while Phyllosticta capitalensis has been identified on the same host (Nymphaea nouchali) in the North-Central Province of Sri Lanka. Identification of the fungi was based on morphological characteristics and multi-locus phylogenetic analyses using ITS, LSU, SSU, ACT, CHS-1, GAPDH, tub2, rpb2, and tef1- α molecular markers. The identified fungi were analysed for extracellular enzymatic properties. According to the qualitative analysis, Ectophoma salviniae sp. nov. exhibited the highest amylase production, Chaetomella raphigera exhibited the highest laccase production. The results demonstrate the aquatic fungal diversity in this region and their extracellular enzymatic potentials, providing valuable insights for future biotechnological approaches.

About the Journal

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Biochar-based controlled-release fertilizers for enhancing plant growth and environmental sustainability: a review

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ABSTRACT

Pursuing sustainable agricultural production necessitates innovative approaches to enhance nutrient use efficiency and mitigate the environmental impact of fertilizer use in cropping systems. Biochar-based controlled-release fertilizers (BCRFs) have emerged as a promising solution to address these challenges. This paper reviews BCRF production methods, nutrient retention mechanisms, and effects on plant growth and the environment compared with conventional fertilizers. Various techniques have been used to improve the fertilizer efficiency of BCRFs, including impregnation, coating, granulation, co-pyrolysis, hydrothermal synthesis, and in-situ pyrolysis, each offering unique advantages in controlling nutrient release. BCRFs facilitate nutrient retention and gradual release, improving soil nutrient use efficiency. The BCRFs also improve soil structure and enhance microbial activities and root growth, thereby fostering resilient and productive crops. BCRFs have considerable potential for carbon sequestration, mitigation of greenhouse gas emissions, reduction in nutrient leaching and environmental impact, contributing to sustainable agricultural practices compared to the use of conventional fertilizers (e.g., synthetic or chemical fertilizers). However, attention is needed to address challenges concerning the economic feasibility, scalability, and regulatory frameworks associated with using BCRFs. BCRFs offer a promising pathway for improving nutrient management in agriculture; however, interdisciplinary efforts are needed to unlock their full potential in enhancing plant growth and environmental sustainability.

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