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I-CReST 2025: 012-074 – Harnessing Endophytic Fungi for Antifungal Potential in Sustainable Rubber Cultivation in Malaysia

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ABSTRACT

Rubber tree disease poses a major threat to Malaysia's rubber industry, causing significant reductions in latex yield and quality. If left uncontrolled, these diseases can severely impact farmer income and industry sustainability. In response to increasing concern among local rubber farmers, this study was conducted to identify endophytic fungal pathogens from infected rubber trees and evaluate the antifungal potential of selected plant extracts. Leaf samples were collected from diseased rubber trees in Lakota, Jeli, Kelantan. Endophytic fungi were isolated using the tissue transplantation method. A total of 40 fungal isolates were obtained and characterized based on morphological features such as colony shape, margin, color, and pigmentation. From these, 25 distinct isolates were selected for antifungal screening using the well diffusion method against five plant extracts: mulberry root, mulberry fruit, mulberry stem, garlic, and senna leaves. Among them, two plant extracts showed notable antifungal activity. Mulberry root extract inhibited the growth of 10 isolates (L1S4, L1S6, L2S5, L3S2, L3S5, L3S8, L4S1, L4S2, L4S4), while garlic extract was effective against isolate L1S9. The antifungal activity is likely due to bioactive secondary metabolites present in the extracts, which may suppress or eliminate fungal pathogens. These findings highlight the potential of plant-derived compounds as sustainable alternatives for managing fungal diseases in rubber trees. Further investigation is needed to isolate and characterize the active compounds and assess their efficacy for practical application in rubber plantations.

Keywords: Endophytic fungi; Rubber tree disease; Antifungal activity; Plant extracts; Sustainable agriculture