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Potential of Making Fungal Toxins at Commercial Scale for Agarwood Inducement

Malithi R.A.P.^{1*}, Subasinghe S.M.C.U.P.¹, Fernando T.H.P.S²

¹Department of Forestry & Environmental Science, University of Sri Jayewardenepura, Sri Lanka

²Plant Pathology & Microbiology Department, Rubber Research Institute, Sri Lanka

*21pramodyaranasinghe@gmail.com

Abstract

Agarwood, a highly valuable resin formed in the stems and roots of certain tree species of the family Thymelaeaceae can be induced the formation in artificial manner by using different fungal species. The potential of fungal toxins using certain strains of *Aspergillus niger* and *Fusarium solani* to form agarwood in *Gyrinops walla*, which is a native species to Sri Lanka, was identified in 2016. However, the potential of extracting fungal toxins in large scale was not studied previously for the purpose of inducing agarwood formation at commercial scale. Therefore selected strains of *A. niger* and *F. solani* were grown on Potato Dextrose Agar (PDA) medium and three agar plugs of *A. niger* were inoculated in Czapek Dox Broth (CDB) and *F. solani* in Yeast Extract Glucose Broth (YEGB). A 50, 100, 150, 200, 250, 300 and 500 ml series was prepared for CDB and YEGB to identify the potential impacts of different volumes of toxins. Mycotoxins were extracted after 14 days for *A. niger* and after 10 days for *F. solani* based on the results of a previous study. The impacts of those toxins were detected by a bioassay using *A. crassna* and *G. walla* leaves. A comparison was made using diameters of lesions caused by toxins in *A. crassna* and *G. walla* leaves after 48 hour. According to the results, the effects of toxins of *F. solani* and *A. niger* were not significant on *A. crassna*. Further the damage caused by *F. solani* (F=1.02; P=0.428) and *A. niger* (F=1.41; P=0.238) grown in different volumes was not statistically significant. However, the effect of toxins of *F. solani* was significantly higher than that of *A. niger* (F=10.69; P=0.000) on *G. walla*. Damage caused by toxins formed in different volumes of *F. solani* was not significant (F=1.81; P=0.103) on the leaves of both species. However, the damages caused by toxins *A. niger* grown in 50 ml and 100 ml were significantly lower on *G. walla* leaves than the rest of volumes. Based on these results, 500 ml can be used as an effective volume to extract toxins from *A. niger* and *F. solani* for inducing agarwood formation at commercial scale.

Keywords: *Fusarium solani*, *Aspergillus niger*, Agarwood resins, Mycotoxins

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