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Optimisation of Fungal Inoculum for Inoculation of *Gyrinops walla* for Inducing Agarwood Formation

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Abstract

Various fungi including *Aspergillus* and *Fusarium* induce agarwood resin formation as a self-defense mechanism in *Gyrinops walla*, a tree belongs to the family Thymelaeaceae. Since artificial fungal inoculation induces to form agarwood, there is a growing need for potential fungal inocula to promote the formation of agarwood resin in *G. walla*. The aim of the study was to determine the optimum inoculum densities of *Aspergillus* sp. and *Fusarium* sp. which can act as inducing agents of agarwood resin formation in *G. walla*. Cultural conditions for optimum growth, sporulation, germination, and inoculum density and incubation period of selected two species of *Aspergillus* and *Fusarium* were examined. The radial growth of the fungal colony on different culture media (PDA, YEGA, MEA and CDA) was measured to determine the suitable medium for the growth. Sporulation on different media was examined at different time intervals after incubation at room temperature. Percentage of spore germination was determined using freshly prepared spore suspension in water and in potato dextrose broth by counting the germinated spores. Optimum spore density for the germination was measured examining five different spore densities ranging from 10^3 ml⁻¹ to 10^7 ml⁻¹. The pH of the suitable medium and wood of the live stem (aqueous wood extract) of the tree was measured.

Both *Aspergillus* sp. and *Fusarium* sp. showed maximum colony growth on PDA medium. However, the colony growth and the sporulation were much faster in *Aspergillus* than in *Fusarium* on this medium. The pH of the live stem of the tree was recorded as 6.08 which is approximately equal to the pH of PDA medium 6.22. The highest spore germination for *Aspergillus* was at the density of spores 10^5 ml⁻¹ while *Fusarium* at 10^7 ml⁻¹. Both fungal species reached the highest percentage of spore germination after 12 hours of incubation. Results reveal that the spore densities of 10^5 ml⁻¹ and 10^7 ml⁻¹ of water are optimum inoculum densities for *Aspergillus* and *Fusarium* respectively. The recorded optimum inoculum densities of *Aspergillus* and *Fusarium* can be recommended as potential inocula for inducement of agarwood in *G.walla*.

Keywords: *Aspergillus*, *Fusarium*, *Gyrinops walla*, Agarwood, Inoculum density, Sporulation