23rd International
Forestry and Environment Symposium
2018

Theme:

Towards Sustainable and Greener Future

Proceedings of the International Forestry and Environment Symposium Volume 23 (2018)

23-24 of November 2018

Citrus Waskaduwa, Waskaduwa, Sri Lanka

Organised by

Department of Forestry and Environmental Science

University of Sri Jayewardenepura

(185)

Inducement of Agarwood Resin Formation in *Aquilaria crassna* Using Three Endophytic Fungal Species

Vidurangi A.N.G.C.K., Subasinghe S.M.C.U.P.*, Fernando K.M.E.P.

Centre for Forestry and Environment, Department of Forestry and Environmental Science, University of Sri Jayewardenepura, Nugegoda, Sri Lanka
**upuls@sjp.ac.lk*

Abstract

Agarwood is a highly valuable fragrant resinous wood, formed in the stem, branches and roots of *Aquilaria* and *Gyrinops* genera of family Thymelaeaceae. Formation of agarwood mainly occurs due to infections, especially by fungal species. This study identified the potential of *Aspergillus terreus, Fusarium equiseti* and *Trichoderma harzianum* to induce agarwood resin formation in *A. crassna.* These fungal species were selected based on a previous study which identified 19 different fungal species from agarwood tissues of both *A. crassna* and *G. walla*. Hundred ml of spore suspension of each fungal species in potato dextrose broth was inoculated at two opposite points of *A. crassna* stems with three replicates. After four months of inoculation, these trees were cut and discoloured tissue samples were collected at 20 cm intervals above (+) and below (-) each inoculation point. Agarwood resin content was analysed by solvent extraction and constituents were identified by GC-FID method. Munsell soil colour chart was used to record tissue and resin colour. According to the results, the colour of tissues formed at inoculation point due to *A. terreus*, *F. equiseti* and *T. harzianum* were brown, dark brown and strong brown respectively. The colour of the oils formed by the above three fungi were pale yellow, olive yellow and yellow respectively. The tone of the colours faded when the distance increased from the inoculation point. *F. equiseti* caused the highest length of agarwood formation (+10.40, -8.70 cm). The formations caused by *A. terreus* and *T. harzianum* were +6.10, -5.60 cm and as +4.10, -3.90 cm respectively. Width of formation at the inoculation point were 5.40, 4. 50 and 7.10 cm for *A. terreus*, *F. equiseti* and *T. harzianum* respectively. The average oil contents formed by above species were 1.52%, 1.38% and 2.43% respectively. GC analysis revealed nine key compounds of five classes in oils formed by *A. terreus.* There were five compounds of four classes for *F. equiseti* and eight compounds of five classes for *T. harzianum*. Among them agarofuran, agarospirol, valecane, vetispirane, guaiene, eremophilane, selinene and fatty acids were the most common compounds identified in the oil formed by all three fungal species. The results confirmed that the percentages of resin content and constituents were higher due to *T. harzianum* than the other two species.

Keywords: *Aquilaria crassna*, Agarwood, Fungi, Artificial induction, Chemical constituents

Acknowledgement: Central Instrument Facility, Faculty of Applied Sciences, University of Sri Jayewardenepura, Sri Lanka