

Chemical Composition of Essential Oil Seed of *Hydnocarpus pentandra* and its Nanoemulsion Synthesis for Insecticidal Activities against *Sitophilus oryzae*

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Abstract

Synthetic pesticides are widely used to control pests in stored grains. In recent years, consumer awareness of the health hazard from residual toxicity and the growing problem of insect resistance to these conventional insecticides have led the researchers to look for alternative strategies for stored grains protection. Nanoemulsions are now widely using for enhancing delivery and biological functions of pesticides. Therefore, in the present investigation, the oil extracted from *Hydnocarpus pentandra* (Garudphal / Maravattai) seed were first tested for its physical, chemical properties and active compounds like free fatty acids through TLC and HPLC methods. Then it has been utilized to produce a nanoemulsion as an alternative and efficient tool to control rice weevil (*Sitophilus oryzae*) population. After 72 hrs of exposure time nanoemulsion oil possess phytotoxic effect against *Sitophilus oryzae* (adult mortality) which caused 94% mortality at the low doses of 1, 2, 3 and 4 mL/mg when compared to oil alone treatment. This toxic effect might be due to the aromatic flavonoids and free fattyacid contents present in the essential oil of *H. pentandra*. Hence, it can be concluded that nanoemulsion produced from *Hydnocarpus pentandra* seed oil can be used as a biopesticide to control *Sitophilus oryzae*. However, further investigations on its mode of action, side effects, effects on other pests and effects on grain quality are important.

Keywords: Stored pest; *Hydnocarpus pentandra*; Fumigants; Nanoemulsion; *Sitophilus oryzae*.

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