

Insecticidal and larvicidal activities of Cinamic acid esters isolated from *Ocimum gratissimum* L. and *Vitallaria paradoxa* leaves against *Tribolium castaneum* Hebst (Coleoptera:Tenebrionidae)

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Insect pest of stored products is one major threat to food safety globally. Various techniques are being employed to address these pest problems. Pest management using botanicals have been widely practiced in recent times. The natural compounds present in these botanicals have been known to be responsible for the protection they offer against insect pests. Some of these compounds may act as single compounds to produce an effect or may be synergistically effective. In the present study using a bioassay guided approach, two cinnamic acid derivatives; Methyl cinnamate and Sitosterol cinnamate were isolated from the leaves of *O. gratissimum* and *V. paradoxa* respectively. Adults and a week old larvae of *T. castaneum* were dipped in the samples and transferred into clean petri dishes containing wheat flour and observed for mortality or larval growth activity. These compounds show high levels of insecticidal, larvicidal and larval growth inhibition activities against *T. castaneum*. The LC50 of methyl cinnamate was determined to be 26.92 mg/mL against the adult, 8.31mg/mL against the larvae whiles the LC50 of sitosterol cinnamate was determined to be 6.92 mg/mL against the adult and 3.91 mg/mL against the larvae. Generally, the susceptibility of adult *T. castaneum* to these cinnamic acid esters can be directly associated with the concentration as well as time of exposure to the compounds. Several studies have confirmed the safety of cinnamic acid esters by evaluating acute toxicity, skin irritation and genotoxicity and therefore can be used safely for stored product protection.

Assai (*Euterpe oleracea* Mart.) fruit: Green method development by Andiroba oil (*Carapa guianensis* L.) for Hemiptera control

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The assai (*Euterpe oleracea* Mart.), in Portuguese açai, is a Brazilian fruit grown mainly in the Amazon forest (Northern region) and Cerrado (Northeastern region) which has a quite high staple & economic importance to the country. It is part of the region's culture and the fruit is consumed in salty dishes (mixed with cassava or tapioca flour and also with fried fish) by the natives. Although the main consumption is in those regions, its frozen pulp is the best-known worldwide available product (exported to the United States & European Union, mainly) and has increased in recent years. Apart from Amazon forest natives high lipid and protein food source, assai fruit is rich in antioxidants (anthocyanins & flavonoids), with high levels of vitamin C and fibers - that makes it highly consumed by the youngsters and sports people (as diet supplement - frozen pulp / ice-cream). Despite that, insects (Hemiptera *Triatoma brasiliensis*) infestation with subsequent disease development caused by *Trypanosoma cruzi* (parasite present in the mosquitoes faeces) may take place at the assai fruit stage. Considering the lack of information on assai fruit contamination and mosquito (parasite vector) control, the current study aimed to develop a green method through Andiroba oil (*Carapa*