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Efficacy of Flavonoids from Selected Plants in Controlling *Callosobruchus maculatus* on Cowpea Seeds (*Vigna unguiculata*)

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Abstract

Phytochemicals act extensive active against stored pest have long been exciting alternative to synthetic pesticides besides, evidenced flavonoids that among the plant constitute a rich source of bio-active chemical which are much safe with eco-friendly that applicable to protect insects. The experiment especially aims to investigating influence of flavonoids from the selected plants leaves such as *Moringa oleifera* (moringa), *Lantenna camera* (nayunni), *Justicia adhatoda* (adhathodai), *Pepper nigrum* (pepper), *Annona reticulate* (annona), *Eichhornia crassipes* (water hayasinth), *Eucalyptus globules* (eucalyptus), *Citrus aurantiifolia* (lime), *Azadiracta indica* (neem), *Achyranthes aspera* (nayuruvi), *Ocimum tenuiflorum* (thulsi), *Cymbopogon citratus* (lemon grass), *Capsicum annum* (chilli), *piper longum* (thipilli) and *Vitex trifolia* (nochchi), located in Eastern Regions of Sri Lanka against cowpea weevil, *Callosobruchus maculatus* on stored cowpea seeds (*V. unguiculata*) during storage. 10 g of each leaf dry powder separately extracted with 100 mL of 80% aqueous methanol at room temperature and filtrates were transferred in to 100 mL conical flask and evaporated into dryness to over a water bath and used standard scientific method to obtained flavonoids. 200 cowpea seeds thoroughly mixed with 2 mg flavonoids and replicated thrice for one treatment. As similar manner other treatments and untreated control were designed and introduce with 5 pairs of newly emerged cowpea weevil, *C. maculatus* in 100 mL capacity plastic bottle with arranged in Complete Randomized Design (CRD) and started to monitor from 1st day after treatment (DAT). Adult mortality and number of eggs laid on seeds of each treatment were recorded daily until 6th DAT and retained for further 30 days to assess new progeny production of the weevil *C. maculatus*. Flavonoids from *J. adhatoda* and *P. nigrum* shown excellent constituent to kill all the adult *C. maculatus* within 6 days followed by *O. tenuiflorum* (80%) and it was significantly ($p \leq 0.05$) as par with *E. globules* (72.6%) and *A. indica* (74%). Similarly, the flavonoids from these above mentioned leaves dry powders except *P. nigrum* significantly active against fecundity of an adult which shown *J. adhatoda* (6.3 egg/female), *C. aurantiifolia* (7 eggs/female) and *O. tenuiflorum* (7 eggs/female), however *J. adhatoda* totally affect the development of F1 new progeny production. According to the observations the differences were not statistically significant about the fecundity between the flavonoids from *P. nigraum*, *A. indica* and *C. annum*. *L. camera*, *E. crassipes* and *C. citratus* did not show any significant effect on adult mortality, fecundity, new progenies as well as obtained much damage seeds next to control and obtained unsatisfactory results as untreated control while, *M. oleifera*, *A. reticulate*, *V. trifolia* and *C. annum* obtained moderately against adulticidal activities of *C. maculatus* on cowpea seeds during the storage until 30 days. However, *J. adhatoda* proven its efficacy on cowpea seeds to control *C. maculatus* by highly effective to suppressing new progeny production and led without any damage in the seeds during the storage.

Keywords: Flavonoid, Adult, Mortality, *Callosobruchus maculatus*, *Justicia adhatoda*