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Green Pesticides: Utilisation of *Madhuca longifolia* Seed Powder to Reduce Post-Harvest Losses Caused by *Callosobruchus maculatus* (Coleoptera: Bruchidae) in Stored Cowpea

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Abstract

Callosobruchus maculatus is considered as one of the most damaging storage insect pests of legumes and pulses. Plants containing a rich source of bioactive chemicals have been exploited in pest management strategies mainly as repellents, toxicants and antifeedants. In this context, botanical insecticides appear to play a much greater role as a new class of eco-friendly products for the management of storage pests. From this perspective, the present study was aimed to investigate the possible use of *Madhuca longifolia* as an effective alternative to synthetic insecticides in controlling *C. maculatus*. Several bio-assays were made for the first time to evaluate bio-efficacy of *M. longifolia* seed powder under ambient laboratory conditions (28±2° C and 84±2% RH). Contact toxicity was evaluated using cowpea treated with 0.2 g, 0.4 g, 0.6 g, 0.8 g and 1 g of seed powder and the mortality of adult beetles was recorded after 24, 48 and 72 hours of exposure to treatments. Residual toxicity was assessed, introducing 20 newly emerged adults to grains treated with 0.8 g of seed powder and adult mortality was recorded after 72 hours. All dead and live beetles were then replaced by a similar number of new adults and mortality was again recorded. This procedure was repeated until no dead insect was observed in the set-up. Extent of bruchid damage was evaluated by counting exit holes of beetles emerged from cowpea treated with 0.35 g and 0.45 g of seed powder separately. Grain viability of cowpea was assessed after mixing grains with 0.2 g, 0.4 g, 0.6 g, and 0.8 g of seed powder and counting germinated grains. All treated doses elicited increasing contact toxicity effect with increasing exposure time, and 100% mortality was observed with the highest dose (1 g). *M. longifolia* seed powder produced considerably long-lasting residual toxicity effect until about 39 days after treatment while 100% toxicity was recorded up until 6 days which waned gradually with time. Grain damage to cowpea treated with both doses (0.35 g and 0.45 g) was significantly lower (19.20 and 23.44%) when compared to the control (91.12%). Grain viability was not adversely affected by seed powder and all doses exhibited high germination rates that were very similar to the control. In accordance with the overall findings, *M. longifolia* seeds can be endorsed as a highly promising, green pesticide to suppress of *C. maculatus* infestation.

***Keywords**: Callosobruchus maculatus, Madhuca longifolia,* Toxicity