Bioinsecticidal formulation based on lecithin-clay and terpenic compounds for control of voandzou weevil (*Callosobruchus subinnotatus*)

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The infestation of grain stocks after harvest by harmful insects are permanent risk during the storage period, and represents the major cause of seeds' quality damage in post-harvest situations. To overcome the low yield and post-harvest losses, farmers use synthetics insecticides approach. These have a negative impact on the environment and mainly, they directly affect human health, been the cause of some diseases such as cancer, which encounter an increasing mortality rate as well in developing countries and Africa in particular. This framework aims to contribute not only to solve the problem of conservations of foods, but especially to preserve human health and the environment against synthetic insecticides aggression. This through testing of biological insecticides based on montmorillonite clay modified with lecithin and terpenics compounds. The treatment effect of clay by lecithin (MMT-L) on their adsorption capacity was evaluated by comparing its powder with the same montmorillonite just made homosodic (MMT-Na). The insecticidal tests on obtained powders were performed on the Voandzou weevil *C. subinnotatus* to assess the treatment effect of the modified clay and also to compare the toxicity of the two terpenics compounds. The results obtained from the adsorption isotherms show that lecithin improve the adsorption capacity of the studied clay. According to the six insecticidal formulations obtained: MMT-Na-eugenol; MMT-Na-Limonene; MMT-Na-Eugenol-Limonene; MMT-L-eugenol; MMT-L-Limonene; and MMT-L-Eugenol-Limonene, the MMT-Eugenol formulation caused the highest mortality. The calculation of lethal days (LD) DL_{50} and LD_{98} shows that eugenol is more toxic on *C. subinnotatus* than limonene. Overall, powder formulations obtained present insecticidal activity on the insect studied. In addition, the clays treated with lecithin seem to have a better insecticidal effect an especially faster than homosodic clays. The MMT-L causes 50% mortality within 2 days while mortality induced by MMT-Na does not reach 50% even at the 5th days.The MMT-L-Eu formulation is more efficient than MMT-L-Li because MMT-L-Eu induce 50% of mortality after 21h 65s and MMT-L-Li the same mortality rate more than 8h later (28h 42s). Moreover MMT-L-Eu causes 98% of mortality 10h rather than MMT-L-Li (29h 39s and 38h 49s respectively). Bioinsecticid based on lecithin-clay and essential oils could be a way to substitute synthetic insecticids whose have bad effects on human health.

Key words

Montmorillonite clay; lecithin; *Callosobruchus subinnotatus*; exfoliation; terpenic compound; adsorption.