

Insecticidal formulation based on *Ocimum gratissimum* essential oil and montmorillonite clays for maize protection

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Bio-insecticides formulation was developed from natural Cameroonian clays using *Ocimum gratissimum* essential oil as active agent. The adsorption capacity of aroma compounds by clays was determined and improved by chemicals modifications of the clays. The treatment with cetyl trimethyl ammonium was particularly efficient and was explained by the increase of affinity of the adsorbate molecules toward the adsorbent. Insecticidal tests have been conducted against the maize weevil *Sitophilus zeamais* and have shown that the insecticidal effects of formulations have been improved after clays modifications. The mortality of *S. zeamais* decreased from 100% to 95%, 87% and 0% after 7 days respectively for the essential oil adsorbed on modified clay, on unmodified clay and for formulation without clay. The formulation prepared with unmodified clay completely lost insecticidal activity after 30 days, whereas the formulation with modified clay lost about 60% of its full insecticidal potency in the same time. The remnant effect of the formulations based on essential oil varied with the adsorbent used. The insecticidal effect of *O. gratissimum* essential oil persists during 107 days when it is adsorbed on the modified montmorillonite, while adsorbed on unmodified clay, it loses all its activity at the end of 45th days. These results allow us to assert that modified clays increase the duration of the insecticidal effect of essential oils and can be used for industrial application in the production of bio-insecticides based on essential oils. The findings suggest that formulations based on essential oils and modified clays should be considered as alternatives to synthetic insecticides for use in stored product pest control.

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