

Project Title : Biobased Microemulsion Formulations of Botanical Insecticide Rotenone

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The conventional, organic based insecticides are often toxic to mammals, non-target pests and persist in the environment as recalcitrant. The alternative is to search for natural bio-active compound and formulate it in suitable formulation with favorable properties such as effective on the target pest, economically viable, non toxic to non target organisms and biodegradable. Rotenone extracted from *Derris elliptica* and formulated as microemulsion using palm-based alkyl polyglucosides and methyl ester exhibits excellent biodegradability and good surface active properties. The surface tension of the prepared microemulsion of ME1, ME2, and ME3 was 22.7, 22.8 and 26.9 mN/m, respectively, while the particle size was 20.63 nm, 49.03 and 83.31 nm, respectively. The lower surface tension is good for insecticide spray deposition on the target while the smaller particle size facilitates the penetration of active ingredient through the insect cuticle. These formulations use least quantities of inert ingredients and have high range of dilution. Thus, they could be used at various spray volume application rates without affecting the spray droplet properties. The formulations are stable in water and able to maintain uniform concentration of the active ingredient. The rotenone microemulsion formulations when tested for the toxicity against the diamondback moth (*Plutella xylostella*) shows the LC<sub>50</sub> of comparable with the standard emulsion of conventional organic insecticides indicating similar effectiveness.