Study on the Efficacy of Mikania micrantha Extracts Incorporated With Nano Clay as a Pest Controlling Method Against Aphids

Weerakoon, Anusara (School: Dharmaraja College)

This study explores the pesticidal efficacy of Mikania micrantha (bitter vine, wathupalu) leaf extracts to be used as a freely available and low cost botanical pesticide against Myzus persicae (aphids) and examines its improvement through nanoclay. M. micrantha, an invasive alien species in Sri Lanka and tropical regions of the world, possesses bioactive compounds with pesticidal and cytotoxic effects, indicating its potential as a natural pesticide. A fresh leaf extract (FLE) was obtained by blending 100 g of fresh leaves with 100 ml of distilled water, followed by filtration. Laboratory bioassays and survival assays confirmed that FLE reduced aphid numbers and fecundity considerably, affirming its potential as a botanical pesticide. In addition, a toxicity test on Apis cerana (honeybees) confirmed the specificity of FLE as a target pesticide, with no effect on honeybee survival. To improve stability and delivery, a nanoclay formulation, FLE(N), was prepared by intercalating FLE into bentonite nanoclay. Contact toxicity and leaf bioassays revealed FLE(N) to have marginally better aphid control, with ingestion-based delivery being more effective than direct exposure. Scanning electron microscopy (SEM) verified the maintenance of the nanoclay structure, indicating a slow-release effect for extended activity. Fourier-transform infrared spectroscopy (FTIR) and Raman microscope analysis confirmed successful intercalation, improving the stability of the formulation. These results demonstrate the prospect of M. micrantha as a botanical pesticide and the contribution of nanotechnology to enhancing the stability and effectiveness of pesticides within Integrated Pest Management, thus limiting the use of synthetic pesticides.

Awards Won: