

**STUDIES ON NOVEL PESTICIDE FORMULATIONS BASED ON  
BOTANICAL EXTRACTS**

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## ABSTRACT

Natural pyrethrins are highly active and safe insecticides but are not photostable. In this study, the effect of blending pyrethrum extract with garlic extract, neem oil, yellow oleander oil, cotton oil and tea extracts on the biological efficacy and stability of the pyrethrins was investigated.

More stabilized mixtures were developed based on neem (*Azadirachta indica* A. Juss) oil, cotton oil, yellow oleander (*Thevetia peruviana*) oil and tea extracts. The photostabilization effect was confirmed by studying UV profiles and by HPLC determination of the pyrethrins content of the mixtures before and after exposure to UV light at 254nm and 366nm.

The various botanical oils under investigation were found to stabilize pyrethrins in a dose related relationship against UV radiations. At a concentration of 3% cotton oil and yellow oleander oil in the pyrethrum extract based mixtures; the best photo stabilizing effect to the pyrethrins was realized compared to the 1% and 2% concentrations. Various extracts of tea prepared using different solvents were also found to stabilize pyrethrins against UV light to varying degrees. Ethanolic (50%) tea extract was found to provide the best UV screening effect to the pyrethrins. The rate of degradation of pyrethrins in the formulations when exposed to ultraviolet (UV) radiation was reduced by the UV screening effect of the photo stabilizers.

The effect of mixture interactions on the bio - activity of the pyrethrins was evaluated by comparing brine shrimp lethality test results of the mixture with those ones of individual plant extracts.

The biological activity of the novel bio-pesticide mixture was also tested and compared with Neempyretto, Pyagro and Pyegar by carrying out *in vitro* tests against maize weevil, *Sitophilus zeamais*.

Results showed that blending pyrethrum extract with garlic extract improved the biological efficacy of the pyrethrins. Solutions of pyrethrum extracts (1%) blended with the botanical oils under investigation in this study were found to be more efficacious against the maize weevils compared to neempyretto, pyagro and

pyegar. Weevil mortality caused by the latter was observed with high concentrations of over 20% of the bio - pesticides. However, the order of activity was Pyagro (pyrethrum based) > Neempyretto (neem and pyrethrum based) > Pyegar (garlic based).

This research shows that blending pyrethrum extract with other botanical extracts and oils can improve its efficacy as a pesticide.