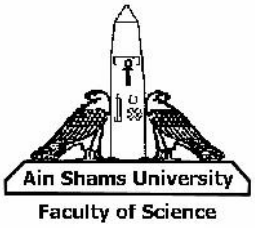

PHYSICOCHEMICAL STUDIES AND TOXICOLOGICAL EFFECTS OF SOME EMULSION FORMULATIONS AND THEIR APPLICATIONS AS PESTICIDES

A Thesis

Submitted To Faculty of Science for the Degree of

Doctor of Philosophy

In Chemistry

By:

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(M.Sc.Chemistry)

Chemistry Department

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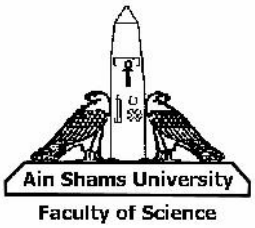
Ain Shams University

Cairo 2010



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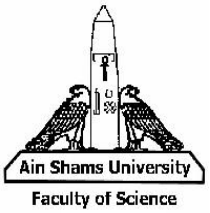

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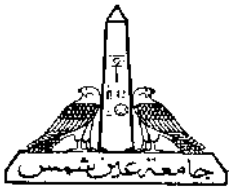

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ABSTRACT

Name: Tahany Gaber Mohammaden Mohammad

Title: 'Physicochemical Studies and Toxicological Effects of Some Emulsion Formulations and Their Applications as Pesticides'

This study conducted to investigated the effects of some essential oils on some phytopathogenic fungi, such as *Fusarium solani*; *Rhizoctonia solani*; *Sclerotium rolfsii*; *Botrytis cinerea*; *Aspergillus niger* and *Aspergillus flavus*, which cause serious diseases on plants. The essential oils were formulated as soluble concentrates (SL), oil water emulsion (EW) and w/o/w double emulsion. The obtained formulations, characterized in terms of pH, surface tension, conductivity, flash point; centrifugation, rheological tests, and monitoring of the particle size to determine the optimal formulation. Checking, the long-term stability of the w/o/w double emulsion formulations was performed through the electrolyte release with time via the measured conductivity. Also, the antifungal activity was evaluated on the most stable prepared formulation. All prepared formulations are more effective than the corresponding their active ingredients according to the value of the effective concentrations (ppm) that causes 50% growth inhibition (EC_{50}) of all examined fungi. The thymol formulation (10%EW), exhibit high potential activity against all the tested phytopathogenic fungi. Hence, this leads us to evaluate the adverse effects of thymol formulation after acute and repeated oral toxicity studies for 28 days in male albino rats. Our results indicated that the median lethal dose value (LD_{50}) of thymol formulation (10% EW) in male albino rats is found to be 2462.23 mg/kg body weight.

In repeated oral dose toxicity studies, seventy two male rats were used and divided into six groups, each had 12 animals. The rats of group I was administrated normal saline (0.9 % NaCl) at a dose of 1.0 ml/kg body weight and served as control group. Group II was administrated 1/160 of the LD_{50} (15.39 mg/kg bw), while, group III administrated 1/80 of the LD_{50} (30.78 mg/kg bw) and group IV was administrated 1/40 of the LD_{50} (61.55 mg/kg bw) and group V was treated with 1/20 of the LD_{50} (123.11 mg/kg bw) and last group VI was administrated with 1/10 of the LD_{50} (246.23 mg/kg bw). Once daily oral dosing was carried out for 28 days.

Weekly, all animals were weighed to monitor body weight gain. After 28 days of treatment, all survival animals were sacrificed and some vital organs (i.e., brain, heart, kidneys, liver, lungs, spleen, testes and epididymis) were collected and weighed, in addition to certain organs, i.e. liver, kidneys, testes and thyroid glands were taken to histopathological examination. No obvious toxicity signs were noted at all dosage levels used and also there was no significant difference in body weight gain of experimental animals as well as the absolute and relative weights of

different organs did not change significantly in comparison with control group.

No haematological changes after 28 days of treatment were detected in all treated groups in comparison with those in control group at the end of the experiment. Dose dependent significantly increase in serum alanine aminotransferase (ALT), aspartate aminotransferase (AST) and alkaline phosphatase (ALP) activities of the rats treated with 123.11 and 246.23 mg/kg bw of thymol formulation after 28 days of treatment, this in turn, indicate to the ability of tested formulation to produce systemic effect in treated animals. However, there was a significant increase in hepatic malondialdehyde (MDA) level, which used as a marker of lipid peroxidation and this associated with a significant elevation in the hepatic glutathione content (GSH) at the same doses. Also, there was an elevation markedly in the concentrations of creatinine and blood urea nitrogen (BUN) and urea in rats treated only with 246.23 mg/kgbw for 28 days.

However, hypotriglycerdemia associated with reducing in the level of very low density lipoprotein (VLDL) and hypocholesterolemia and (TC/HDL) ratio, whereas, a significant elevation in the level of high density lipoprotein (HDL) was detected in rats treated with thymol formulation at the doses 123.11 and 246.23 mg/kgbw. Meanwhile, glucose levels did not significantly throughout the experimental period.

However, rats treated with thymol formulation at doses of 61.55, 123.11 and 246.23 mg/kgbw had a significant decrease in the concentrations of testosterone (T), follicle stimulating hormone (FSH) and luteinizing hormone (LH). The same trend was noticed only in the level of triiodothyronine (T3) at the same doses, whereas the level of thyroxine (T4) unaffected throughout the experimental period. The extent of histopathological findings of liver, kidney, testes and thyroid gland, was in a dose-dependent manner. The no-observed adverse effect level (NOAEL) for repeated oral dose toxicity study for 28 days is considered to be 30.78 mg/kgbw in male albino rats.

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