

**COMPARATIVE STUDIES TO EVALUATE
THE EQUIVALENCY OF GENERIC
PESTICIDES WITH SPECIAL REFERENCE
TO THEIR IMPURITIES**

By

DYAA MOHAMMED NASSAR

**B.Sc. Agric. Sci. (Plant Production), Fac. Agric., Sababasha,
Alexandria Univ., 2011**

THESIS

**Submitted in Partial Fulfillment of the
Requirements for the Degree of**

MASTER OF SCIENCE

In

**Agricultural Sciences
(Pesticides)**

**Department of Economic Entomology and Pesticides
Faculty of Agriculture
Cairo University
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Title of Thesis: Comparative Studies to Evaluate the Equivalency of
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ABSTRACT

The aim of the study was directed to compare the effect of accelerated storage on the stability of brand and generic fungicides (carbendazim and chlorothalonil). In this respect two technical and three formulations from carbendazim and three formulations from chlorothalonil were selected in this studies. In addition, associated impurities for carbendazim and chlorothalonil were determined. Also, Subchronic effects of both fungicides on male albino rat's reproductive system were investigated. Pesticides were stored at temperatures ($72\pm 2^{\circ}\text{C}$ for 3 days, $54\pm 2^{\circ}\text{C}$ for 14 days and $35\pm 2^{\circ}\text{C}$ for 3 months). Results indicated that all tested carbendazim were relatively stable under accelerated storage except for the formulation (Kemazid 50% WP) was markedly deteriorated when storage at $72\pm 2^{\circ}\text{C}$ for 3 days and $35\pm 2^{\circ}\text{C}$ for 3 months. Regarding the carbendazim impurities (2-amino-3-hydroxy-phenazine and 2,3diaminophenazine) were not detected in all samples.

Chlorothalonil active ingredient it is stability not affected after storage stability test where the percentage loss of chlorothalonil was about 0.11% to 1.64% in all tested formulations. The percentage of hexachlorobenzene in chlorothalonil formulations, Open 72% SC formulation before and after accelerated storage was above the FAO limit.

Concerning the subchronic effect of Carbendazim and chlorothalonil which, were orally administered to male rats daily for 65 successive days. Results revealed that Carbendazim significantly reduced the fertility index, testis weight, the sperm counts and motility. Also, LH and FSH were decreased. Histopathological examination showed testicular damages and severe changes in seminiferous tubules. The results indicated that carbendazim produce reproductive toxic effect, resulting a reduced fertility in male rats. In contrast, there were no adverse effects attributable to chlorothalonil were noted under the ingestion of chlorothalonil on the fertility index, testis weight,

the sperm counts and motility. Also, Chlorothalonil appear to have negative feedback effects on LH and FSH hormones.

Key words: Carbendazim, accelerated storage, Chlorothalonil, Fertility, sperms, Reproductive

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INRODUCTION

Over the past 100 years, population growth has forced the improvement of global agricultural production. However, agriculture is always adversely affected by pests (insects, weeds and plant pathogens) which cause up to 45% of crops to be lost annually (Kohler and Triebkorn, 2013).

Pesticides are substances that use to control pests, including weeds. The term pesticide includes herbicide, insecticides (which may include insect growth regulator, termiticides, *etc.*) molluscicide, nematocide, pesticide, rodenticide, bactericide, avicide, insect repellent, animal repellent fungicide, antimicrobial, disinfectant (antimicrobial), and sanitizer. (Randall *et al.*, 2013). Most pesticides are intended to serve as plant protection products (also known as crop protection products), which in general, protect plants from weed, fungi, or insect (Konstantinou *et al.*, 2001).

In recent years, the generic pesticides have increased. A generic pesticide is as one which is manufactured by a company other than the original manufacturer, whilst a generic manufacturer is, a company, or division of a company, whose major activity consists of manufacturing the active substances of pesticides, the patents for which have expired, and for which it did not hold the original patents (Hicks, 2001).

Pesticide production has increased significantly and associated with the processes of synthesis and the different method of preparation, especially in the case of generic pesticides, and what can happen as a result of different materials in the interaction or interaction conditions.