

**MONITORING OF CERTAIN PESTICIDE
RESIDUES IN VEGETABLES IN EGYPT AND
ASSESSMENT SAFETY LEVEL OF
ACETAMIPRID ON RATS**

By

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THESIS

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

DOCTOR PHILOSOPHY

In

**Agricultural Sciences
(Pesticides)**

**Department of Economic Entomology and Pesticide
Faculty of Agriculture
Cairo University
EGYPT**

2019

Format Reviewer

Vice Dean of Graduate Studies

APPROVAL SHEET

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ABSTRACT

The present study planned to investigate the following points:

1. Monitoring of pesticides Residue in some vegetables and leafy vegetables in Egyptian markets.
2. Estimated dietary intake for chronic risk for most frequently pesticides, which were detected in the studied vegetables.
3. Assessment safety level of Acetamiprid in rats.

A total of 578 samples of different commodities as pepper, cucumber, spinach, water cress, green dill, green coriander and green parsley were collected from six Egyptian local markets located in six governorates (Great Cairo, Fayoum, Gharbia, Monufia, Ismailia, and Sharkiya) during 2012 and 1006 samples during 2013. Samples were analyzed for detection of 450 pesticides. The MRLs of Codex Alimentarius were used for comparison when those limits were available. In the absence of Codex MRLs, European limits were used data shows there is no pesticide residues were detected in 124 samples (21.45%), on the other hand, a total number of 454 samples (78.55%) had detectable pesticide residues, 230 samples (50.66%) out of 454 samples exceeding the MRLs during 2012 and No pesticide residues were detected in 115 samples (11.43%), on the other hand, a total number of 891 samples (88.57%) had detectable pesticide residues, 304 samples (34.12%) out of 891 samples exceeding the MRLs during 2013

Data showed the estimated average daily intake (EDI) and the hazard index (HI) for most frequently detected pesticide residues (the ratio of EDI to ADI) in the studied vegetables during 2012 and 2013 The HI values of pervious detected pesticides in samples were not exceeded accepted value (100%) that refers to the consuming of studied commodities is considered a negligible risk to the consumers.

The Effect of Acetamiprid on albino rats data showed the significant effect of 1/10 LD₅₀ on body weight, ALT, AST, Blood urea and cholinesterase more than 1/20 LD₅₀ more than 1/30 LD₅₀ and there is no significant effect on total Protein for three doses.

Key words: Pesticide residues, MRL, Hazard Index, ADI, EDI and Acetamiprid toxicity.

DEDICATION

I dedicate this work to my parents, my sisters, my wife Eman, my sons (Moataz and Ahmed) and my daughter Kenzy for all the support they lovely offered during my post-graduate studies.

ACKNOWLEDGMENT

Firstly unlimited thanks to Allah.

*I wish to express my sincere thanks, deepest gratitude and appreciation to This **Dr. Nabil M. Ibrahim**, Prof. of Pesticide, Economic Entomology and Pesticide Department, Faculty of Agriculture, Cairo University, for suggesting the problem, supervision, continued assistance, and guidance through the course of my study and for their revision of the manuscript of this thesis. A lot of thanks go to **Dr. Essam Eldein Abdel-Raouf Eweis**, Prof. of Pesticide, Economic Entomology and Pesticide Department, Faculty of Agriculture, Cairo University, for his valuable suggestions, and sincere supervision, guidance and unlimited help he gave during the work. Sincere thanks go to **Dr. Sanaa Abdel Kader Mohamed El-Sawi**, Chief Researcher of Pesticides, Central Laboratory of Residue Analysis of Pesticides and Heavy Metals in Food, Agric. Res. Center, for her supervision, help and kindly support.*

Special deep appreciation is given to my parents, my sisters, my wife, my sons, and my daughter for their encouragement and support.

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INTRODUCTION

1. Monitoring of pesticide residues and risk exposure

Food contamination monitoring is an essential element for ensuring the safety of the food supply, managing health and environmental resources. It provides information on the levels and sources of contamination in foods, the amount of contaminants ingested by humans, and contamination levels. A series of measures of good agricultural practices including optimum dosage, number of application and maximum intervals between application and harvest can be used to keep residue levels as low as possible. Implementation of these measures ensures that the applied pesticides are safe as possible.

As agricultural production is being increased every year to meet the growing demand of the people, uses of pesticides also being rose up. The widespread use of pesticides may contaminate the environment as well as foods, which may create health problem (Rahman, 2000; Parveen and Nakagoshi, 2001; Islam *et al.*, 2009).

It has been reported that some of the pesticides are being used in vegetables where no pre-harvest time frame after application is maintained because of their high demand for farm produce and low perception of the toxic effects of pesticides in food, which resulted in the occurrence of residues in vegetables (Darko and Akoto, 2008). There are areas where pesticides are used in excessive quantities. Therefore, the presence of these pesticide residues in food commodities has always been a matter of serious concern especially when these commodities are consumed fresh (Solecki *et al.*, 2005; Chen *et al.*,

2011; Osman *et al.*, 2011). Pesticides have been associated with a wide spectrum of human health hazards, ranging from short-term impacts such as headaches and nausea to chronic impacts like cancer, reproductive harm, and endocrine disruption (Ali and Tahir, 2000; Berrada *et al.*, 2010; Chowdhury *et al.*, 2012).

WHO (2002) estimated about 849,000 people death globally from acute toxicity of the pesticide in 2001. Pesticide poisoning and deaths occurred in the developing countries are far greater quantities than that of the developed countries (Bhanti *et al.*, 2004).

2. Toxicity of Pesticides:

Pesticides are the chemical formulation increasingly used in agriculture, animal husbandry and public health operation to kill the insects, weeds and fungi and to get rid of insect transmitted diseases. The frequent and continuous use of pesticide has resulted in their widespread distribution in the environment. These pesticides are toxic not only to insects and pests but at different levels to animals and human beings (Mondal *et al.*, 2012). These agrochemicals, if not properly used, may pose serious hazards to human and animal health. Therefore, the present-day concern with regard to their judicious and proper use, so that they can be applied safety with proper instructions and guidance to have minimum risk to human and animal health (Mondal *et al.*, 2009a). The neonicotinoids, the newest major class of insecticides, have outstanding potency and systemic action for crop protection against piercing-sucking pests (Mondal *et al.*, 2009b) and they are highly effective for flea control on cats and dogs (Tomizawa

and Casida, 2005). Several neonicotinoids are harmful to honeybees, either by direct contact or ingestion. This may lead to a reduction in pollination (Blacquiere and Smugghe, 2012).

Acetamiprid, a member of the Neonicotinoid insecticide family. It is used in floriculture widely, on leafy vegetables, cole crops, citrus, cotton, ornamentals, and fruiting vegetables. Studies found Acetamiprid concentration in bee collected materials, i.e., pollen, bee bread, honey and beeswax (Genersch *et al.*, 2010). Widespread use of Acetamiprid is causing pesticide entry into the food chain, which in turn causing toxicity to man and animal. Information regarding selectivity of insecticide for judicial use may be generated only through properly designed laboratory and field studies.

The objectives of the present study can be summarized as follows:

1. Monitoring of pesticides Residue in some vegetables and leafy vegetables in Egyptian markets.
2. Estimated dietary intake for chronic risk for most frequently pesticides, which were detected in the studied vegetables.
3. Assessment safety level of Acetamiprid in rats (Sprague Dawley).