Ain-Shams University
Environmental studies
and research institut

MARKET BASKET SURVEILLANCE OF PESTICIDE RESIDUES CONTAMINATING FOOD STUFF AND EFFECT OF COOKING PROCESSES

A Thesis
Submitted for Partial Fulfilment of the Requiment for the
Award of the M.Sc. Degree

In
Environmental Science

By
Emil Youssef Salama
B.Sc.
Faculty of Science, Cairo University

Supervised by
Mohamed Tarek Mohamed Zaki
Professor of Chemistry
Facfulty of Science
Ain Shams University

Salwa Mohamed Ali Dogheim
Professor od Pesticide Chemistry
Central Agricultural Pesticides
Laboratory

Samy Mohamed Ali El-Sayes
Ass. Prof. of Entomology
Environmental & Research
Studies Institute

Institute of Environmental Studies and Research
Ain Shams University
1993

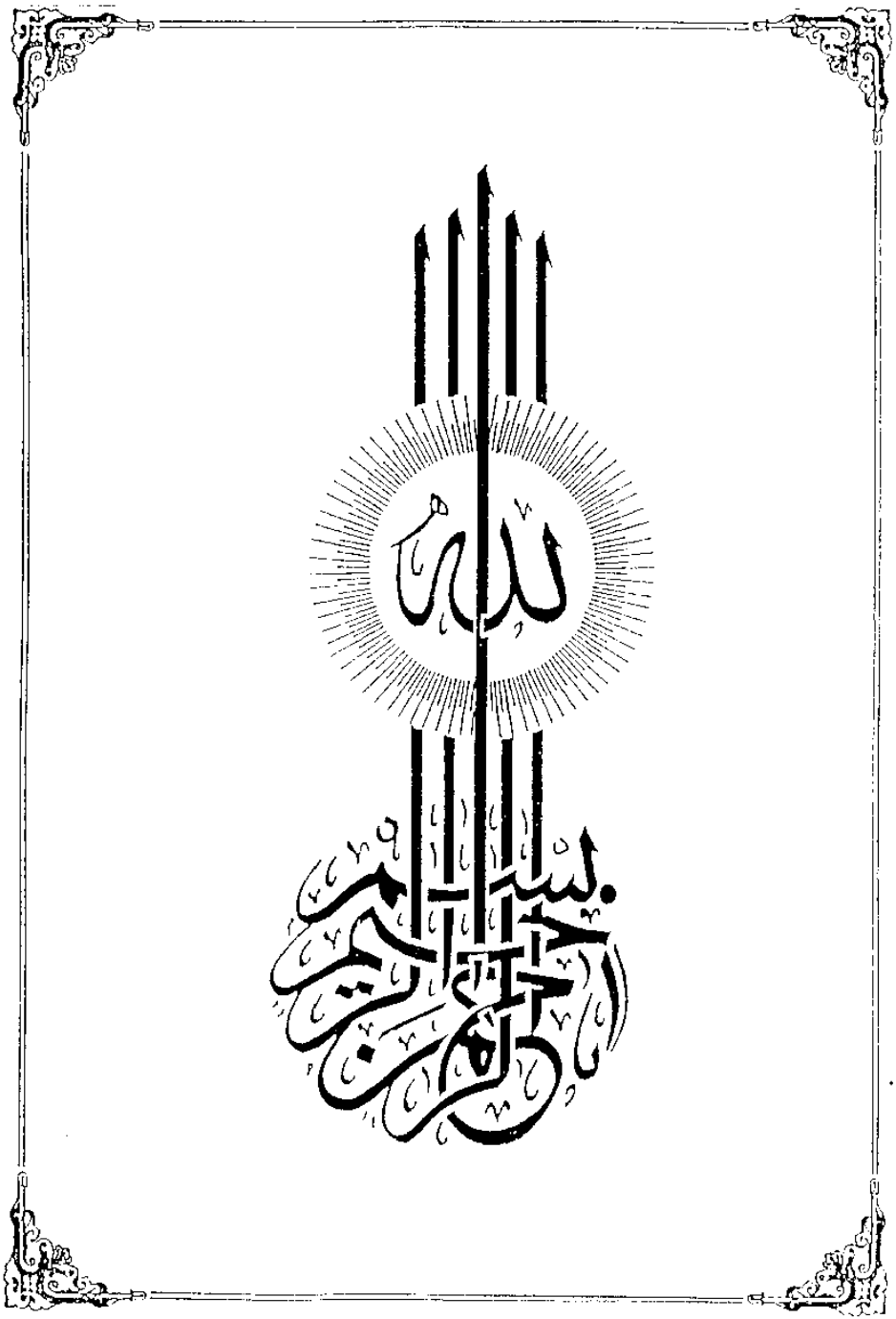
APPROVAL SHEET

Student name : Emil Youssef Salama
Degree : M.Sc. of Environmental Studies
(Biological and Physical Department)

1- Samy El Sayed
2- [illegible]
3- Salwa Dogheim
4- M. Tahmi Saddik

Committee

Signature



CONTENTS

* * * * * * * * * * * * * * * * * * *

ACKNOWLEDGMENT

ACKNOWLEDGMENT

I am deeply indepted to Dr. Mohamed Tarek Zaki Professor of Analytical Chemistry, Faculty of Science, Ain Shams University for his constructive guidance and supervision of this work. It is actually due to his continuous support and encouragement that this work became a reality.

My deepest gratitude is also addressed to Dr. Salwa Mohamed Ali Dogheim, Head of Pesticide Residues Analysis and Environmental Pollution Department, Central Agricultural Pesticides Laboratory, Agricultural Research Center, Ministry of Agriculture for planning the scheme of work, making all the facilities available and writing the manuscript. It is due to her that this work has been fully accomplished.

Thanks are also due to Dr. Samy Mohamed Ali El-Sayes, Ass. Professor of Entomology, Institute of Environmental Studies and Research, Ain Shams University, for his valuable advice and scientific revision of this work.

INTRODUCTION

INTRODUCTION

Contamination of food items is one of the most important problems resulting from the use of pesticides in agriculture. Such problem is getting more interest allover the world and especially in developing countries. Strict regulations have been set in the developed countries to control pesticide residues in food. It is realyzed that health hazards occur to the general population from pesticides are 90 % due to contaminated food.

Monitoring programmes of pesticide residues in the foods at the local markets are currently carried out in all developed countries in order to generate a flow of data that serves in following up the regulation of pesticides use and evaluates the situation of food contamination with pesticide residues.

Dietary intake studies also help to identify the pesticide residue concentrations that reach the human beings through daily diets. This intake differs from one country to another according to food consumption and cooking habits.

Data from continuous monitoring programmes and dietry intake studies is a survy essential tool that help in drawing pest control stratigies in any country. The feedback of such data to decision makers enables to take corrective actions to minimize health hazards and adverse impacts of pesticide use.

Pesticides based on chlorinated organic compounds were developed in 1940's to 1950's and were the first of the synthetic insecticides to be used successfully against a range of insect pests. They are only sparingly soluble in water, but are soluble in fats and oils resulting in being stored in body fat. Chlorinated organic pesticide toxicity is associated with the nervous system and it is through that they interfere with the chemical massages between nerve axons. Such group of chemicals was extensively used in Egypt prior to 1980 at which it was banned. According to the long persistence of organochlorine pesticides, accumulating tendency and concentrating through the food chain they are still detected in the environment and in certain food items at different degrees.

Organophosphorous pesticides are mostly esters of phosphoric or other phosphate containing acids. Because of the susceptibility of esters to chemical decay, they are unstable in biological systems and do not tend to accumulate. The organophosphorous pesticides act on the nervous system and prevent acetylcholine from transmitting signals between nerve cells. Such group is mainly used in Egypt in these years especially on food crops.

This study was carried out on the purpose of monitoring the residues of organochlorine and organophosphorous that contaminate potatoes, oranges and fish in the Egyptian local markets. Home processing and cooking effect on such residues were also investigate in order to provide data needed for dietary intake study.

* * * * * * * * * * * * * *

REVIEW OF LITERATURE

REVIEW OF LITERATURE

1. Monitoring of pesticide residues:

Johansson and Winell (1976) working in Sweden, found that out of 8161 samples of fruits, vegetables, roots and mushrooms studied during 18 months, 4099 were found to contain no pesticide residues, 30 samples had more than the Swedish tolerance limits of aldrin + dieldrin, DDT and lindane, and 20 samples exceeded the tolerances of ethion and parathion. FAO/WHO tolerances for diazinon, fenitrothion, chlordane and parathion-methyl were exceeded in 43 samples. In 267 samples of deep frozen fruits and vegetables, concentrations of pesticides were very low.

A total of 9762 samples of fruits, vegetables and mushrooms (including both Swedish and imported samples) were analysed for residues of wide range of organochlorine and organophosphorus pesticides and various fungicides. Eighty seven samples of the total examined samples were found to contain pesticide residues exceeding allowed tolerances permitted in 1977, while 249 sample were found to contain pesticide residues exceeding the tolerances allowed in 1978. Approximately 5490 of the samples studied were entirely free from pesticide residues. Most frozen and dried fruits and vegetables samples studied had low pesticide residues, (Andersson, *et al*. 1981).

Studies conducted on levels of pesticide residues in foods in New-Zealand revealed that 30% of the studied samples contained organophosphorous residues as stated by (Dick *et al.*, 1978). The highest organophosphorus residues concentrate was 0.40 ppm of dimethoate in fruits.

A survey of pesticide residues in vegetables and fruits in Japan was carried out by (Emico and Tomoko, 1982). They stated that (BHC) was detected in 5 of 41 fruit and vegetable. samples at (0.01 - 0.006 ppm), DDT appeared in many samples yet being under the maximum permissible amounts. Some samples contained endrin, dieldrin and aldrin but at levels for lower than maximum permisible amounts.

Ten samples each of imported grape fruit (G), Lemons (L) and Oranges (O) were obtained every season for 5 seasons from Japanese fruit stores and analysed for biphenyl (Biph), o-phenylphenol (OPP) and thiabendazol (TBZ). All fruits contained (Biph) at average concentrations of 22, 26 and 26 ppm for G, L and O, respectively; OPP residues were found in 64, 36 and 60 % of G, L and O, samples at overall average concentration of 1.2, 1.1 and 1.3 ppm, respectivelly. Nearly all samples (98-100%) contained 2, or 3 of the fungicides simultaneously. (Isshiki *et al.*,1982).