Determination of thiabendazole in fruits and vegetables

By:

Maria Naz

ID: 15005140014

SUPERVISOR:

Dr. Ayesha Mohyuddin

Department of chemistry
School of science
University of management and technology, Lahore, Pakistan
2017

DETERMINATION OF THIABENDZOLE IN FRUITS AND VEGETABLES

Submitted to University of Management and Technology Lahore

In partial fulfillment of the requirements

For the award of degree of

MS
IN
CHEMISTRY

BY
MARIA NAZ

ID

1	5	0	0	5	1	4	0	0	1	4

SESSION: 2015-2017

DEPARTMENT OF CHEMISTRY
SCHOOL OF SCIENCE
UNIVERSITY OF MANAGEMENT AND TECHNOLOGY,
LAHORE, PAKISTAN

RESEARCH COMPLETION CERTIFICATE

Certified that the research work contained in this thesis titled, "**Determintion of thiabendazole in fruits and vegetables"**has been carried out and completed by Maria Naz, **ID: 15005140014.** The quantum and the quality of the work contained in this thesis are adequate for the award of Degree of MS.

_____

Supervisor
Dr. Ayesha Mohy-Ud-Din
Associate Professor
Department of Chemistry,
UMT, Lahore.

_____

External Examiner

_____

Chairperson
Dr.SammiaShahid
Associate Professor
Department of Chemistry,
UMT, Lahore.

_____

Dean
Dr. Muhammad Azhar Iqbal
Professor
School of Science,
UMT, Lahore.

DECLARATION

I,**Maria Naz** D/O **Muhammad Suleman** ID: **15005140014**Session **2015-2017** hereby declare that the matter printed in the thesis titled **"Determintion of thiabendazole in fruits and vegetables"** is my own work and has not been printed, published and submitted as research work, thesis or publication in any form in any University, Research institution etc. in Pakistan or Abroad.

Dated: _____ _____

(Maria Naz)

DEDICATION

Dedicated to ones who gave me life and grew me up
Those angles who always my supportive.
I owe them each moments of my life and praise them in every breath.
Dedicated to the most holy person, **Mother**
And the dearest person, **Father**
And along with all hard working and respected **Teachers**.

CONTENTS

LIST OF TABLES

LIST OF FIGURES

ACKNOWLEDGEMENTS

Firstly, I am thankful to **Allah Almighty** for giving me courage at each and every step of my life and especially in accomplishment of this research work. Countless salutations are upon the **Holy Prophet** (peace be upon him) who enabled me to recognize my Creator and declared it to be an obligatory duty of every Muslim to acquire knowledge.

I will owe my special regards to **Dr. Muhammad Azhar Iqbal** Dean of School of Science UMT, who takes special interest in research activities.

I feel great honor in expressing my profound gratitude to **Dr. SammiaShahid**, Chairperson of Chemistry Department UMT, for her learned guidance and kind behavior during the course of my studies.

I am thankful to my dissertation supervisor and my inspiration **Dr. Ayesha Mohy-uddin**not onlyfor providing me opportunity to do my research work but also for her dynamic elaborate instructions, enlightening suggestions, illustrious advices,and persistent help and clarifying my concepts relating to course work and guiding me at each and every step of this research work.

I would like to honor the authority of UMT, School of Science,to provide me the good environment and facilities to complete this research work.

In last, especially I want to thank my**Parents**, my sincere friends, andmy brother's**,** my colleagues, friends and all those people whohave been very helpful for me in finalizing this research work within the limited time.

May Allah bless all of these people.

(Maria Naz)

ABSTRACT

Thiabendazole is a member of benzimidazole fungicide group which is mostly used in citrus fruits and vegetables. Some fungicides pesticides contain benzimidazole compounds like thiabendazole, imazalil used for fruit's post-harvest treatment. Pesticides are important source of diffuse pollutants that are the major cause of environmental and food contamination, as well as health risk for living organisms. Therefore there is a need to control the risk related to the application of these pesticides. Therefore there is a necessity of simple, fast and cost effective techniques for the quantitative determination of pesticides in both environment and food samples. Analysis of the exit level of thiabendazole residue in citrus fruits and vegetables are important for government and private food laboratories. The presented research explained techniquesused for the estimation of residue of thiabendazole in food samples by high performance liquid chromatography and UV spectrophotometer. In this analysis, extraction of sample peels and pulps was done separately with the help of chloroform. Thiabendazole separated from the obtained extract through hydrochloric acid. By comparison of absorbance of standard thiabendazole with food samples absorbance, it was observed that lemon peel and pulp absorbed more thiabendazole.

Further work was carried out by HPLC technique for determination of thiabendazole. The procedure was based on the solvent extraction by adding acetonitrile in the sample. To remove the moisture of the sample, sodium chloridewas used. Results obtained from HPLC chromatograms showed that lemon had high concentration of thiabendazole as compared to others sample. Cucumber had lowest concentration of thiabendazole. It was

observed that thiabendazole concentration was low in market available fruits and vegetables.Both these techniques showed accurate and more precise results that were needed for the analysis of pesticide residue in fruits and vegetables.

INTRODUCTION

1.1: PESTICIDES AND THEIR CLASSIFICATION

The use of pesticides is increasing tremendously since 1960. It basically reduce crop loses and also improve the yields of crops such as vegetables and fruits. Pesticides are designed to kill weeds, insects, rodents, fungus and mould. Some pesticides are formed naturally while most in use are produced from man-made chemicals. The use of chemical pesticides makes sure of high and good quantity of products, low cost, less time consumption, and can be applied on large area. But the negative effect of pesticides in environment cannot be neglected. The unconscious use of pesticides damage natural balance, cause soil erosion, water and air pollution and also leave residue in food. When pesticides stay active for long time, bioaccumulation trends and their effect on non-target species create a great danger for ecosystem and health. Therefore, pesticides require monitoring and analysis in food and environment for health protection, environmental assessment and pollution.