MICROSCOPIC AND CHEMICAL ANALYSIS OF HONEY AND BEE BREAD AT CERTAIN APIARIES IN QALYUBIA GOVERNORATE AND AVAILABLE HONEY IN THE LOCAL MARKET, EGYPT

By

MAI MOSTAFA EL-SAYED HASSANIEN HASSAN

B.Sc. Agric. Sc. (Economic Entomology), Ain Shams University, 2007

A Thesis Submitted in Partial Fulfillment

Of

The Requirements for the Degree of

MASTER OF SCIENCE
in
Agricultural sciences
(Economic Entomology)

Department of Plant Protection
Faculty of Agriculture
Ain Shams University

2017

Approval sheet

MICROSCOPIC AND CHEMICAL ANALYSIS OF HONEY AND BEE BREAD AT CERTAIN APIARIES IN QALYUBIA GOVERNORATE AND AVAILABLE HONEY IN THE LOCAL MARKET, EGYPT

By

MAI MOSTAFA EL- SAYED HASSANIEN HASSAN

B.Sc. Agric. Sc. (Economic Entomology), Ain Shams University, 2007

This thesis for M.Sc. degree has been approved by:

Dr. Mohamed Atia Oweis …….
Prof. of Economic Entomology and Apiculture, Faculty of Agriculture, Cairo University

Dr. Adel Mohamed Elbassiouny …….
Prof. of Economic Entomology and Apiculture, Faculty of Agriculture, Ain Shams University

Dr. Mohamed El Saeed Mohamed El-Sherif …….
Prof. of Economic Entomology and Apiculture, Faculty of Agriculture, Ain Shams University

Dr. Ahmed Ahmed Abd- El Rahman Salem …….
Prof. of Economic Entomology and Insect Physiology, Faculty of Agriculture, Ain Shams University

Date of Examination: / / 2017

MICROSCOPIC AND CHEMICAL ANALYSIS OF HONEY AND BEE BREAD AT CERTAIN APIARIES IN QALYUBIA GOVERNORATE AND AVAILABLE HONEY IN THE LOCAL MARKET, EGYPT

By

MAI MOSTAFA EL- SAYED HASSANIEN HASSAN

B.Sc. Agric. Sc. (Economic Entomology), Ain Shams University, 2007

Under the supervision of:

Dr. Ahmed Ahmed Abd- El Rahman Salem

Prof. of Economic Entomology and Insect Physiology, Department of Plant Protection, Faculty of Agriculture, Ain Shams University (Principal Supervisor)

Dr. Mohamed El Saeed Mohamed El-Sherif

Prof. of Economic Entomology and Apiculture, Department of Plant Protection, Faculty of Agriculture, Ain Shams University

Dr. Mahmoud Abd-Al Samiaa Mohamed Ali

Prof. of Economic Entomology and Apiculture, Department of Plant Protection, Faculty of Agriculture, Ain Shams University

ABSTRACT

Mai Mostafa El-Sayed Hassanien: Microscopic and chemical analysis of honey and bee bread at certain apiaries in Qalyubia Governorate and available honey in the local market, Egypt. Unpublished M.Sc. Thesis, Department of Plant Protection, Faculty of Agriculture, Ain Shams University, 2017.

This work was conducted at the Bee Research Unit, Dept. of Plant Protection, Faculty of Agriculture, Ain Shams University, Shoubra El-kheimah, Al Qalyubia Governorate, and Bee Research Branch in Kanater, Bee Research Division, Institute of Plant Protection, Ministry of Agriculture, Giza, Egypt, during the period from 2013 to 2016**.** It aims to to: 1) do qualitative pollen analysis from the flowering plants around the year in the study area in Kanater, Qalyubia Governorate, 2) do quantitative and qualitative analysis of the pollen in the honey of Qalyubia Governorate and local market in Egypt, 3) determine certain chemical properties (diastase activity, ash content, pH, acidity, sugars, water content, and HMF) of honeys collected from certain apiaries of Qalyubia Governorate and honeys collected from local market, and 4) study the effect of storage at 5°, 22° and 32°C for 1 year and 2 years on chemical properties of this honeys and their effects on the quality of honey samples in Egypt.

The obtained results revealed that: 1) the bee workers have a preference selection for the flowers from which pollen grains are collected as they do not accept to collect pollen grains from all the flowers located around their colonies, 2) quantitative and qualitative analyses of the pollen grains in the honey are good indicators to the quality of honeys and their plant sources; where the quality of honey will raise when the number of pollen grains in honey increases. Its plant source is determined according to the majority of the % of pollen predominant and then attributed to the plant species, and 3) honey keeps its natural and chemical properties when stored at refrigerator temp. (5° c)

for up to two years, followed by room temp. (22 ° c) in the medium of mild humidity, while it loses many of its properties when stored at colony temp. (32°C) for 1 or 2 years.

Key words: Bee honey, Bee bread, Pollen analysis of honey, Quantitative pollen analysis, Qualitative pollen analysis, Chemical analyses, Diastase activity, Ash content, pH, free acidity, lactone content, total acidity, Sugars, water content, Hydroxymethyl furfural (HMF) and Storage effects on honey properties.

ACKNOWLEDGEMENTS

Thanks to Allah for everything from the beginning to the end

I wish to express my profound gratitude and the deepest immeasurable thanks to **Dr. Ahmed Ahmed Abd- El Rahman Salem** Professor of Economic Entomology, Department of Plant Protection, Faculty of Agriculture, Ain Shams University for his help, positive effort in supervising the work, continous encouragement and preparing the manuscript in its final form.

I also would like to extend my deepest appreciation and sincere thanks to **Dr. Mohamed El Saeed Mohamed El-Sherif** Profesor of Economic Entomology and Apiculture, Department of Plant Protection, Faculty of Agriculture, Ain Shams University for supervising this work, valuable suggestion, assistance sincere and encouragement throughout the course of this work.

Thanks are also to **Dr. Mahmoud Abd- Al Samiaa Mohamed Ali** Professor of Economic Entomology and Apiculture, Department of Plant Protection, Faculty of Agriculture, Ain Shams University, for his assistance and encouragement.

Sincere thanks to all the staff members and assistants in the Department of Plant Protection, Faculty of Agriculture, Ain Shams University for their co-operation and encouragement.

Thanks will not be enough to my dear husband, my kind mother, my beloved father and my brothers for their help, continuous encouragement and sincere support.

CONTENTS

LIST OF TABLES