HERB AND ESSENTIAL OIL PRODUCTION OF THREE *Ocimum* SPECIES AS AFFECTED BY CHICKEN MANURE AND HUMIC ACID TREATMENTS

By

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THESIS

Submitted in Partial Fulfillment of the Requirements for the Degree of

DOCTOR OF PHILOSOPHY

In

Agricultural Sciences
(Ornamental Horticulture)

Department of Ornamental Horticulture
Faculty of Agriculture
Cairo University
EGYPT

2015

APPROVAL SHEET

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Department: Ornamental Horticulture **Approval:** 26 / 5 /2015

ABSTRACT

This study carried out at the experimental nursery of the Ornamental Horticulture Department, Faculty of Agriculture, Cairo University, during the successive seasons of 2012 and 2013. The aim of this study was to investigate the effect of chicken manure at rates of 10 and 20 m^3/feddan + humic acid at rates of 125 and 250 ppm and their interactions on growth, herb yield, essential oil yield, essential oil constituents, number of glandular hairs and chemical constituents of *Ocimum spp.* (*O. basilicum*, *O.sanctum* and *O. citriodorum*) plants. The results in both seasons pointed out that the treated plants with chicken manure at 10 m^3 (100 g/pot) then sprayed with humic acid at 125 ppm in the second cut of *Ocimum* species significantly increased plant height, number of branches, leaf area, fresh and dry weights, number of glands and essential oil yield per plant and per feddan compared to control plants (untreated) but *O. basilicum* gave the highest values.GC.MS analysis of the essential oil of all treatments was performed to study the main constituents of the different *Ocimum spp*. Twelve components have been identified in the oil. The major components of the essential oil were linalool , estragole and eugenol followed by α-citral , β-citral , terpinen-4-ol , trans-α-bergamotene ,t-cadinol , trans-caryophyllene , germacrene , methyl eugenol , and nerol. The highest values of chemical constituents(total chlorophylls, total carbohydrates, N, P and K) were obtained from plants treated with NPK in the third cut of *Ocimum spp.* plants followed by the treated plants with chicken manure at 10 m^3 (100 g/pot) then sprayed with humic acid at 125 ppm. The lowest nitrate content in both seasons resulted from plants treated with chicken manure at 10 m^3/feddan +humic acid at 125 ppm in the first cut of *O. basilicum* .

Key words: *Ocimum spp.,* chicken manure, humic acid, vegetative growth , herb yield, essential oil, Linalool, Estragole, chemical constituents, galndular hairs.

DEDICATION

I dedicate this work to ***my father, my Mother, my sisters and brothers*** *for all the support they lovely offered during my post graduate studies.*

Special dedication to ***my husband*** *(Ahmed Fawzy) and my son (Abd Allah).*

ACKNOWLEDGMENT

First of all, full praise and gratitude is due to Allah. I wish to express my hearty appreciation and sincere gratitude to ***DR. Abdel Ghafour Awad,*** *Professor of Medicinal and Aromatic Plants, Faculty of Agriculture, Cairo University, for his supervision, indispensable advice, valuable comments and constructive criticism during the performance of this investigation.*

I wish to express my indebtedness and profound gratitude to ***DR. SAFIA HAMDY MAHMOUD,*** *Professor of Ornamental Horticulture, Fac. Agric., Cairo University, for suggesting the subject of this work, kind supervision, long lasting beneficial instructions and continuous guidance during the course of this work.*

I wish to express ***Dr. Saber Hendawy*** *Professor of Medicinal and Aromatic Plants, National Research Center, Dokki, Giza, Egypt for his supply seeds of plant materials.*

Deep and great thanks are due to all ***my professors*** *of Medicinal and Aromatic Plants, Faculty of Agriculture, Cairo University, for their constructive encouragement and advices throughout the course of the study.*

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Ocimum species are annual and perennial herbs and shrubs, mostly native to the tropical and warm temperate regions. They are members of the Lamiaceae family and are cultivated worldwide under a variety of ecological conditions. The genus *Ocimum* consists of 50–150 species with a large number of varieties (Runyoro *et al*., 2010). Among the species of the genus, *Ocimum basilicum* L. (sweet basil) is the major essential oil crop around the world and is cultivated in many countries. Basil has been used as a medicinal and aromatic plant for centuries their pharmaceutical and medical properties, basil species are used in the treatment of headaches, cough, diarrhoea, antihelminthic treatments, and in kidney dysfunctions. The leaves can be used fresh and dried, as edibles or spices (Labra *et al*., 2004). Essential oils extracted from both fresh and dried materials are frequently used as a flavour additives in food, pharmaceutical and cosmetics. *Ocimum* plants are sometimes used against pest insects.

There are many varieties of *Ocimum basilicum*, as well as several related species or hybrids species also called basil. The type used in Italian food is typically called sweet basil, as opposed to thai basil (*O. basilicum* var. *thyrsiflora*), lemon basil (*O. citriodorum*) and holy basil (*Ocimum tenuiflorum*), which are used in Asia. While most common varieties of basil are treated as annuals, some are perennials in warm, tropical climates, including holy basil and a cultivar known as 'African Blue'. (Paton, 1992).