

**EFFECT OF CHEMICAL FERTILIZATION,
PLANT SPACING AND DRYING METHODS ON
THE HERB AND ESSENTIAL OIL PRODUCTION
OF SUMMER SAVORY PLANT**

By

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B.Sc. Agric. Sci. (Ornamental Horticulture), Fac. Agric., Cairo Univ., 2009
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DEDICATION

*I dedicate this work to **my father** (Dr. Abdel Ghafour Awad) and **my Mother** (Dr. Iman Haiba) for all the support they lovely offered during my post graduate studies.*

*Also, I dedicate this work to **my sister** (Dr. Ayah) and **her husband** (Dr. Islam) and **my Nieces** Hoor and Ahella*

*Special dedication to **my brother** (Dr. Mohamed).*

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ABSTRACT

This study was conducted at the experimental farm of the Ornamental Horticulture Department, Faculty of Agriculture, Cairo University and Medicinal and Aromatic Plants Research Department, National Research Center, Dokki, Giza, Egypt during the two successive seasons of 2014 and 2015. The aim of this study was to investigate the effect of nitrogen rates of 0.0, 40, 80 and 120 kg N/feddan, and plant spacing at 15×50, 30×50 and 45×50 cm on the growth, yield and chemical composition of summer savory, *Satureja hortensis* L. plant. Also, the effect of different drying methods sun, shade, oven at 45°C and freeze at -45°C on the dry weight %, essential oil % and constituents and pigments content were investigated. The results pointed out that the fertilized plants by N especially at high levels 80 and 120 kg N/fed. increased plant height, fresh and dry herbs yield, glandular hairs, essential oil yield / plant and per feddan, chlorophyll a, b and carotenoids and N, P and K contents. Stem and leaf anatomy was investigated. The narrowest spacing (15×50 cm) increased the yield of herb and essential oil per feddan, while the widest (45×50 cm) increased it per plant. The plant spacing had different effect on the pigments and nutrients contents at both cuts in the two seasons. The plants fertilized with the highest level of N (120 kg N/fed.) and cultivated at narrowest spacing significantly increased the herb and oil yields per feddan than the other combination treatments. Generally, seven components were identified in the essential oil of summer savory plant. Carvacrol and γ -terpinene % were the two major constituents, while the other components; ρ -cymene, terpinene, α - terpinene, α -pinene, α - thujene % were found in small contents indescending order. All components had no clear trend as affected by nitrogen fertilization and plant spacing at both cuts in both seasons.

Sun drying method increased the dry weight of herb, while shade drying method increased the essential oil %. Moreover, the freeze drying method increased the carvacrol % in the oil and pigments contents of chlorophyll a, b and carotenoids compared to the other drying methods. Currently, the freeze drying method was the best for the high quality of the dry herb production by increasing the green color in the dried herb.

Key words: Summer savory, nitrogen fertilization, plant spacing and drying methods

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