



شبكة المعلومات الجامعية

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ





شبكة المعلومات الجامعية



شبكة المعلومات الجامعية

التوثيق الالكتروني والميكرو فيلم

جامعة عين شمس

التوثيق الالكتروني والميكرو فيلم

قسم

نقسم بالله العظيم أن المادة التي تم توثيقها وتسجيلها
علي هذه الأفلام قد اعدت دون أية تغيرات



يجب أن

تحفظ هذه الأفلام بعيداً عن الغبار

في درجة حرارة من 15 – 20 مئوية ورطوبة نسبية من 20-40 %

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بعض الوثائق الأصلية تالفة



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بالرسالة صفحات
لم ترد بالأصل

**EFFECT OF SOME FERTILIZERS
ON BOTANICAL AND CHEMICAL
CHARACTERS OF POT MARIGOLD PLANT**
(*Calendula officinalis* L.)

By

KHOLOUD MOHAMED EL AMIN AL MASHAT

B.Sc. (Agric. Sci.), Fac. Sci. 7th of April Univ., Libya, 2006

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Faculty of Agriculture
Cairo University**



APPROVAL SHEET

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ABSTRACT

This study was carried out during the two successive seasons of 2008/2009 and 2009/2010 at the Experimental Nursery of the Ornamental Horticulture Department, Faculty of Agriculture, Cairo University, Giza, A.R. Egypt. This work was designed to study the effect of different treatments of organic manures (cattle and sheep); biofertilizer (a liquid culture of composite inocula of *Azotobacter chroococcum*, *Azospirillum brasilens*, *Bacillus polymyxa*, *Pseudomonas putida*, *- Enterobacter agglomerans* and *Klebsiella pneumoniae*) and inorganic nitrogenous fertilizer (ammonium sulphate, 20.5% N) on morphology, yield components and chemical composition of pot marigold (*Calendula officinalis* L.) plants grown in a sandy soil. Seeds were sown on October 22nd and 24th of the two seasons respectively. The seedlings were transplanted after 40 days from seeding using plastic pots 30 cm in diameter. Each organic manure was added (350 or 700 cm³/pot) 10 days before transplanting. For biofertilizer, soaking roots directly before transplanting for 30 minutes in it+ 25 ml/pot after one month and 25ml/pot one month later. N fertilizer was added (1½ or 3g/pot) 15,45 and 75 days after transplanting. P and K fertilizers were used as a basal dressing for all treatments. Organic manures treatments with biofertilizer caused more positive effects on plant height, stem length, internode length and diameter, number of secondary branches and leaves/plant, leaf area, flower head diameter and stalk length, number of capitula / plants, fruits weight / capitulum, fruit oil%, fresh and dry weights of leaves, leafless shoot and roots / plant, structure of stem and leaf blade and total chlorophylls (a+b) and carotenoids contents as well as total carbohydrates%, N, P and K% in shoot and roots. The combined treatment of sheep manure (350 cm³/pot) and biofertilizer was the reliable treatment for increasing most of the studied characters.

Kew words: *Calendula officinalis* L. – pot marigold – organic manure – biofertilizer – inorganic fertilizer – nitrogen – morphology – yield – chemical composition.

R. Same

DEDICATION

I Dedicate this work to whom my heart felt thanks; is given to my father, my mother, my husband, my daughter for their patience and help; as well as, my brothers and sisters also I feel deeply grateful to my dear country Libya.

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INTRODUCTION

Calendula officinalis L. (pot marigold) is a herbaceous plant belonging to family Asteraceae. It is of Mediterranean origin, and has been cultivated by the Egyptians, Greeks, Hindus and Arabs. Pot marigold is cultivated outdoors as a winter annual plant. It is 30-60 cm height; its main stem is erect, glabrous, more or less hairy, solid, pentagonal, bearing 5-7 branches developed on the fifth node and upward. The growth of the main stem or each lateral branch is determined by an inflorescence produced at apex. Leaves are simple, entire, alternate, exstipulate, hairy, sessile, oblong to oblong-ovate, 5-15 cm long. The development of vegetative and reproductive organs continued parallel to each other. The inflorescences are capitula, terminal, racemose and simple. Flower heads are solitary on stout stalks, 3.8-10 cm diameter, consisting of one row or more of legulate, female, white-yellow to deep orange ray flowers surrounding the central, tubular, regular, functionally male, undeveloped ovary, yellow orange disc flowers, and floral bracts are absent. The flowers are arranged on a flat receptacle which surrounded by two series of hairy bracts. The fruit is one-seeded achene. The root system is mainly composed of a stout tap root developing a large number of lateral roots of different branching degrees. (Wallis, 1960; Rendle, 1963; Bailey, 1969; Saad, 1979; Pandey, 1982; Abd Al Mageed, 1989; Naguib *et al.*, 2005; Azzaz *et al.*, 2007 ; Ganjali *et al.*, 2010 and Rudnicki, 2010).

Calendula officinalis L. is considered one of the most versatile and easy to grow flowers in a garden. It is used as a greenhouse as well as outdoors flowering plant (Christopher, 1958 and Baciú and Sestras,

2009). Pot marigold is an important ornamental, medicinal and decorative plant. Also, it is used in cooking, manufacturing cosmetics and phytotherapeutic products as well as a dye for fabrics (Carvalho *et al.*, 2007; Chengqi, 2007; Marta *et al.*, 2008).

Calendula officinalis L. is considered to be one of the valuable medicinal plants which has anti-viral, anti-HTV, anti-mutagenic, anti-inflammatory and anti-oxidant effects. It has also anti-spasmodic effect and acts as a bactericide and immunomodulatory (Yoshikawa *et al.*, 2001; Wilen *et al.*, 2004; Madani and Jain, 2005; Ukiya *et al.*, 2006; Azzaz *et al.*, 2007; Gomes *et al.*, 2007 and Muley *et al.*, 2009). Also, it is used to treat hepatic injuries, tension, difficulty falling asleep, controlling bleeding, soothing irritated tissues, remedying burns and bruises, and as an emollient (Bilia *et al.*, 2001; Jimenez *et al.*, 2006 and Yris *et al.*, 2010).

Seed oil of pot marigold was found to contain up to 60% calendic acid, as a useful industrial feed stock. Seed oil had properties similar to tung oil, *i.e.* high viscosity and refractive index and a high tendency to air drying. Application of seed oil can be found as binders in paints and coatings (Muuse *et al.*, 1992; Cromack and Smith, 1998 and Vatavu *et al.*, 2008).

Plant nutrition is one of the most important factors that increases plant growth and production. However, large amounts of nutrients are exhausted every year from the soil, replenishment is possible through integrated nutrient management with judicious use of mineral fertilizers, organic manures and biofertilizers.

Organic matter is regarded as a very important parameter of soil fertility and productivity due to improving its physical, chemical and biological properties. Also, it can be used as a soil conditioner, as well as a nutrient source for plants (Vleck *et al.*, 1981; Ibrahim and Al-Afifi, 1989; Yamada and Kamata, 1989; Khandkar and Nigam, 1996; Tsai and Chen, 1993; Smith, 1992 and Zia *et al.*, 1998)

Interest of growers and consumers for organic floriculture had increased in the last years. Organic material can be beneficial to improve organic matter status in sandy soils that are very poor in nutrients. The organic gardening principles are much more likely to increase both yield and quality habit of the plants and producing plants that are safe, flavorsome, and chemicals free (Hamilton, 1991; Cacini *et al.*, 2006). However, organic farming suits best sandy and newly reclaimed desert soils of Egypt away from the constraints that have been raised due to the deleterious effects of using chemical fertilizers on the environment, public health and national income.

Biofertilizers are microbial inoculants for application to either seeds or soil in order to increase soil fertility as well as plant growth and productivity. The enhancing effects of biofertilizers on plant growth and productivity are attributed to their N fixing proficiency, solubilization of mineral nutrients, promoting the synthesis of auxins, gibberellins and some vitamins and amino acids and producing antibiotic and anti-fungal compounds. So, biofertilizers are useful for recycling elements, reserving natural resources and to avoid increasing pollution due to extensive use of mineral fertilizers. However, they are safe for environment, and they reduce the need for chemical fertilizers