

**IMPACT OF BIO-FERTILIZATION ON GROWTH ,
VOLATILE OIL CONTENT AND CHEMICAL
COMPOSITION OF THYME
(*THYMUS VULGARIS* L.)**

By

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B.Sc. Agric.Sc. (Horticulture), Ain Shams Univ. 2009

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للحصول على

درجة الماجستير في العلوم الزراعية

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ABSTRACT

Ahmed Nazmy Abdel-hamid. Impact of Bio-fertilization on Growth , Volatile Oil Content and Chemical Composition of Thyme (*Thymus vulgaris* L.) Unpublished M.Sc. Thesis, Department of Horticulture, Faculty of Agriculture, Ain Shams University,2012.

This study was carried out during the two successive seasons of 2010 and 2011 at the experimental farm of Faculty of Agriculture, Ain Shams University, Cairo, Egypt . The aim of this study was to evaluate the effect of partially replacement of nitrogen mineral fertilization by bio-fertilizations sources (*Azotobacter chroococcum* and *Bacillus polymyxa*), on growth , volatile oil percentage and its components, chemical composition In addition to, microbiological evaluations of thyme plants (*Thymus vulgaris* L.). Ten treatments including mineral fertilization and bio-fertilization and their combinations were arranged in a complete randomized block design .

Data Showed that, bio-fertilization treatments increased plant height, number of lateral branches, shoots and root fresh and dry weights of herbs and roots, essential oil % and N,P ,K percentage in herbs compared with fully mineral nitrogen fertilized plants .However, a reduction in NO₃ and NO₂ in herbs were obtained with bio-fertilization treatments either alone or in combination with partially nitrogen fertilization .Additionally, volatile oil percent clearly increase with bio-fertilization treatments whereas volatile oil constituents appear 16 components clearly changed within their concentrations. Ten components appear with high values in volatile oil analysis i.e thymol (43.2%) , p-Cymene (25.20%) , Linalool , (4.16%) , Myrecen (3.50%) , , Boroneol (3.20 %) α- Pinene (3.18%) , γ-terpinene (2.70%) , β – pinene (2.32 %) , Terpinol (2.14%) and Thymolacetate (1.12%) . On the other , there are six components recorded slight amounts ranged from 0.23 to 0.86 in volatile oil % of thyme plants.

Moreover , microbiological studies showed an evident increase in total count of bacteria (TCB) : *Azotobacter chroococcum* and *Bacillus polymyxa*, count of both Az and Bp microbes and increase in soil CO₂ evolution .Generally , it could be concluded that bio-fertilizations by *Azotobacter chroococcum* and *Bacillus polymyxa* and partially replacement to nitrogen mineral fertilization with the two sources of biofertilization had great effect on producing safe herbs of thyme plants for safe local consumption or exportation.

Key words: Thyme (*Thymus vulgaris* L.) - bio-fertilization - *Azotobacter chroococcum* - *Bacillus polymyxa* - herbs - nitrate & nitrite - volatile oil - total count of bacteria (TCB).