

Response of mint to some organic agriculture practices under greenhouse conditions

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ABSTRACT

A green house experiment was laid out at Giza Research Station, Agricultural Research Center (ARC), in clay loam soil, during summer season 2012. The effect of application of some plant growth promoting rhizobacteria (PGPR) on growth, yield and components of mint plant spearmint (*Mentha viridis* Linne) in combination with using organic fertilizers, i.e., compost at a rate of 15 ton/fed⁻¹ was studied. Also, the application of recommended NPK mineral fertilizers with a rate of 500 Kg Ammonium sulphate, 150 Kg P₂ O₅ and 225 Kg K₂O /fed⁻¹ was evaluated. The PGPR used were 1) N₂ fixing bacteria e.g. *Azotobacter chroococcum*, *Azospirillum brasilense* and *Cyanobacteria*, e.g., *Anabaena*, *Nostoc* and *Spirulina*, 2) Phosphate dissolving bacteria (PDB), e.g., *Bacillus megaterium* and 3) Potassium release bacteria (PRB), e.g., *Bacillus circulans*. The results indicated that application of various PGPR did support both vegetative growth and yield of mint plants. Also, *B. megaterium*, *B. circulans* and *Azospirillum brasilense* had a significant influence as compared to other PGPR applied. Moreover, mixed PGPR scored higher values for all tested parameters as compared to applied compost as such. Application of *B. circulans* resulted in higher percentage (1.52%) of total oil yield more than the application of each *B. megaterium* 0.98%, *Azotobacter chroococcum* (1.00%), *Cyanobacteria* (1.04%) and compost (1.08%).

Key words: Plant growth promoting Rhizobacteria (PGPR), Mint, Organic farming, Biofertilizres.

INTRODUCTION

The genus *Mentha* L., family Lamiaceae, contains about fifty known species. Only a few species have a great economic importance (Hornok, 1992). Menthol mint is a potential source of natural and other constituents like mint terpenes, minthone, isomenthone, menthyl acetate *etc.*, which are widely used in various pharmaceutical and cosmetic products. In addition, essential oils and their valuable chemical constituents obtained from menthol mint have a great export potential (Gul, 1994 and Anwar *et al.*, 2010).

The most popularly accepted definition of organic farming is: a production system that sustains the health of soils, ecosystems and people. It relies on ecological processes, biodiversity and cycles adapted to local conditions, rather than the use of inputs with adverse effects. Also, it combines tradition, innovation and science to benefit the shared environment and promote fair relationships and a good quality of life for all involved (IFOAM, 2008).

Compost as an organic waste can be a valuable and inexpensive fertilizer and source of plant nutrients. Composting is the most