EFFECT OF BIOFERTILIZERS APPLICATION ON THE PRODUCTIVITY OF *NIGELLA SATIVA* CULTIVATED IN DESERT SANDY SOILS AND EFFICIENCY OF PRODUCED SEEDS AGAINST SOME PATHOGENIC MICROORGANISMS.

By
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A thesis submitted in partial fulfillment
of
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Agricultural Botany Department
Faculty of Agriculture
Benha University

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Approval Sheet

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ABSTRACT

EFFECT OF BIOFERTILIZERS APPLICATION ON THE PRODUCTIVITY OF *NIGELLA SATIVA* CULTIVATED IN DESERT SANDY SOILS AND EFFICIENCY OF PRODUCED SEEDS AGAINST SOME PATHOGENIC MICROORGANISMS.

The present study was carried out in a private farm at El-Sheikh Zowayed North Sinai governorate, Egypt during the two successive seasons, 2001/2002 and 2002/2003 to evaluate the effect of inoculation with the most efficient strains of *Azotobacter chroococcum* and phosphate dissolving bacteria (*Bacillus megaterium* var. *phosphaticum*) in presence of different levels of inorganic nitrogen fertilizer on the growth, yield and antimicrobial activity of seed oil of *Nigella sativa* L. (black cumin).

The effect of local N_2-fixing bacteria namely *Azotobacter chroococcum* and phosphate dissolving bacteria namely *Bacillus megaterium* as a biofertilizers on the growth and yield of *(Nigella sativa*) was studied in field experiments. Microbiological parameters changes (total microbial counts, azotobacters and phosphate dissolving bacteria densities and dehydrogenase activity) were increased by inoculation with a mixture of *Azotobacter chroococcum* and *B. megaterium* under supplementation with full or half dose of inorganic N fertilizers during all plant growth stages. Obtained results also showed that vegetative growth of *Nigella sativa* was mostly stimulated when inoculated with a mixture of N_2– fixers and P-dissolving bacteria. Also, inoculation improved the yield and yield components of the tested plants and consequently increased oil yield and oil constituents to significant extents under drip irrigation.

Moreover, effect of black cumin seed oil (*N. sativa*) for antimicrobial effectiveness against different pathogenic microorganisms was studied. These pathogenes comprised three

foodborne pathogenes, three phytopathogenic bacteria and four phytopathogenic fungi. Crude essential oil of *N. sativa* showed a promising effect against some of the tested organisms.

Key words:

Azotobacter chroococcum, *Bacillus megaterium*, sandy soil, Biofertilization, Black cumin, Dehydrogenase, Irrigation and Minimum inhibitory concentration.

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