PRODUCTION OFCOMPOST FROM AGRICULTURAL CHITINIC WASTES FOR ORGANIC FARMING AND BIOLOGICAL CONTROL APPLICATIONS

By

BASSANT HASSAN MOHAMED FAHMY
B.Sc. Agric. Sci. (Biotechnology), Fac. Agric., Cairo Univ., 2008

THESIS

Submitted in Partial Fulfilment of the Requirements for the Degree of

MASTER OF SCIENCE

In

Agricultural Sciences
(Agricultural Microbiology)

Department of Agricultural Microbiology
Faculty of Agriculture
Cairo University
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Date: 2 / 6 /2019

.SUPERVISION SHEET

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DEDICATION

First of all, I would like to express my deepest thanks to ALLAH (God) for helping me to carry out and complete this work.

I dedicate this work to whom my heart felt my late mother thanks; to my husband, my brother and sister for their Patience, help and for all the support they lovely offered throughout the period of my post-graduation.

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Special deep appreciation is given to my late mother, my husband and my brother and sister and my best friend walaa.

Name of Candidate: Bassant Hassan Mohamed Fahmy **Degree:** M.Sc

Title of Thesis: Production of Compost from Agricultural Chitinic Wastes for Organic farming and Biological Control Applications

Supervisors: Dr. Mohamed Abd El-Aleem Ali ,
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ABSTRACT

The aim of this study was to produce a valuable compost through recycling of agricultural (rice straw, banana peels, pomegranate peels) and chitinic waste (shrimp shell peel) All waste materials were mixed with cattle dung as a natural source of nitrogen and composed aerobically in a pile. Rock phosphate and feldspar were used as natural sources of P and K respectively. They were used in equal amounts (1:1) at a rate of 5% from the pile size. Fungal inoculant of *Trichoderma harzianum* and *Phanerochaetec hrysosporium* at ratio 1:1. were added to the pile at the rate of 5L per ton of the pile size , during the composting process, as a biodegradable agent.. The composting process was continued up to 12 weeks till maturation.. The physical and chemical analyses included temperature bulk density, moisture content, pH, EC, dry matter, organic matter, organic carbon, C/N ratio ,ash contents, ammoniacal-nitrogen (NH_4^+-N), nitrate-nitrogen (NO_3^- N) and total N, P, K % were determined at zero time and after, 2and 4 and 6, and 10 and 12, weeks of composting. Counts of mesophilic and thermophilic bacteria, fungi, actinomycetes and cellulose decomposers were also determined at the same intervals. Counts of total and fecal coliforms as well as *Salmonella* and *Shigella* were determined at the end of composting period.

The produced compost used with *Azotobacter chrococcum* as organic and bio-fertilizer for eggplants in a greenhouse experiment. The obtained results referred to a positive growth promoting effect of the compost product in addition to the bacterial inoculum on eggplant seedling. Compost application in addition to bacterial inoculation increased eggplant dry and fresh weight as well as improved the nutritional values of grain, *i.e.,* total carbohydrates, total phenol and total chlorophyll. In addition, soil organic matter was increased in pots received the combined treatment with compost and the bacterial inoculum. Slight changes were recorded in soil pH and EC as a result of organic or bio fertilizer application. The examined compost product from shrimp shells might be used with the bacterial inoculum as potential soil amendments in organic farming program.

Key words: Agricultural waste, chitinic waste, *Azotobacter chrococcum*, bio fertilizer, compost, organic fertilizer, eggplant

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