

Use of compost formulations fortified with plant growth promoting rhizobacteria to control root rot diseases in some vegetables grown in plastic-houses

(Accepted: 28-09-2000)

Wafaa, M. Haggag and M.S.M., Saber *

Plant Pathology Department and *Agricultural Microbiology Department, National Research Centre, Dokki, Egypt.

ABSTRACT

Composts ready-made from either rice straw, sugarcane bagas or bean wastes were fortified with certain plant growth promoting rhizobacteria (PGPR) and exploited in controlling root-rot disease in cucumber, pepper and tomato plants grown under plastic-house conditions. All tried PGPR, i.e., *Pseudomonas putida*, *Pseudomonas fluorescence* and *Pseudomonas aeruginosa* survived up to 12 months in dry compost formulations. Merging of these compost formulations into growth media exhibited high production of antibiotics (phloroglucinol and phenazine), siderophores, growth regulators (gibberellin and indol acetic acid) as well as dense bacterial counts. Application of these compost formulations to soil at the rate of 1% reduced root-rot disease incidence in cucumber, pepper and tomato grown in soil infested with *Rhizoctonia solani*, *Phytophthora capsici* and *Fusarium solani*. When applied to seedbed under plastic-house conditions, they also attenuated significant reduction in root-rot disease incidence. Fortified compost formulations promoted plant height, increased yield and leaf mineral contents. Formulations containing either bean or rice straw compost fortified with *P. putida* and *P. fluorescence* were more competent in disease control, strengthening plant growth and flourishing crop harvests. Generally, fortified composts might be used as formulations for bio-control agents as they invigorate their proliferation, feat and increase their puissant against soil borne pathogens besides intensifying soil fertility.

Key words: Fortified compost formulations, plant growth promoting rhizobacteria, root-rot disease, tomato, pepper, cucumber.

INTRODUCTION

Root-rot diseases are among the most devastating diseases in crops grown under plastic-house conditions, particularly cucumber (*Cucumis sativus* L.), pepper (*capsicum annum* L.) and tomato (*Lycopersicon esculentum* L.) causing thoughtful economic outlay. These diseases are troublesome because of the high plant

densities and auspicious ecosystem for their development. *Rhizoctonia solani* (Kuhn), *Phytophthora capsici* (leonian) and *Fusarium* spp. are the more familiar pathogens that have been habitually isolated from different crops grown under plastic-house conditions (Anandaraj and Sarma, 1995, Haggag, 1998 and Wu, 1998).

Striving to control these pathogens by, for example, pre-plant soil fumigation and