Evaluation of three composts as multi-strain carriers for biofertilizer and biocontrol agents against fusarium wilt disease of some legume plants

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ABSTRACT

Three composts manufactured from sawdust, potato processing wastes or rice straw were examined as multi-strain carriers for biocontrol of the fungi (Trichoderma harzianum, Penicillium oxalicum and Chaetomium globosum) and the biofertilizer bacteria (Azotobacter chroococcus and Azospirillium brasilense) under clean farming systems against fusarium wilt disease of some legume crops (pea, bean, lentil, and lupine). In a growth medium containing peat and vermiculite (1:1, w/w), survival of these microorganisms in multi-strain compost carriers accentuated high densities and no possible symptoms of antagonism were retrieved.

A conspicuous high enzyme activity for chitinase, B-1,3-glacturoranase and cellulase produced by biocontrol agents was distinct during an incubation period of 150 days. Application of multi-strain compost carriers fortified with biocontrol and biofertilizer agents in a field trail with some legume plants significantly reduced wilt disease incidence caused by Fusarium oxysporum and increased plant dry weight, plant height and yield. All tested composts furnished a proper medium for dense enzyme production under field conditions.

Key Words: *Biocontrol agents, biofertilizer, carriers, composts, enzymes, legume plants, Fusarium oxysporum, wilt disease.*

INTRODUCTION

Clean farming systems have endured greaten thoroughness as a persuasive solution for the inauspicious environmental and health consequences of chemical farming. They are systems that seek to magnify the capacity of microorganisms in farming practices. Biological control of plant pathogens and biofertilization, however, represent two prime machineries in clean farming systems. One major impediment facing the dissemination of this technology, is the production of proper inoculum at a large commercial scale. Host commercial systems still utilize liquid media for production of biomass.

Carriers adopted for biological control and biofertilizer agents should cater a befitting ecosystem competent to forward the bio-ingredients in the plant rhizosphere at high viable densities (Stratton *et al.*, 1995 and Requena *et al.*, 1996). Compost materials represent ideal base for the proliferation of biocontrol and biofertilizer agents, and offer a great opportunity to sustainable clean farming