*J. Biol. Control*, 10:129-131, 1996 **Research Note**

# Evaluation of certain organic substrates and adjuvants for the mass multiplication of *Trichoderma harzianum* Rifai.

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**ABSTRACT** : The study was taken up to evaluate cheaper organic substrates for the mass multiplication of *Trichoderma harzianum* with and without nutrient additives. Out of 7 organic substrates tested, pigeonpea husk was found to be the best followed by tapioca waste (after starch extraction) and pressmud. Addition of urea reduced the multiplication, whereas ammonium sulphate enhanced the colonization and propagule number of *T. harzianum*.

**KEY WORDS** : Additives, mass multiplication, organic substrates, *Trichoderma harzianum*

The success of biological control depends on the development of economic and easier techniques for mass multiplication of biocontrol agents. The production and commercialisation of biocontrol products is a dynamic process and the most critical obstacle is the paucity of methods for mass multiplication and delivery of antagonists (Papavizas, 1985). The mass culturing of *Trichoderma harzianum* was first attempted by Wells *et al.* (1972) using rye grass seeds + soil as substrate.

Elad *et al.* (1980) prepared a medium consisting of wheat bran, saw dust and tap water at the proportion of 3:1:4 for the mass multiplication of *Trichoderma*. In all cases the base materials used were primarily either waste products or by-products of agriculture. The uniform growth of the antagonist in these media warrants considerably longer period of incubation. There are no reports about the effect of additives like N fertilizers on the growth of *Trichoderma*. Hence, the present investigation was taken up to evaluate certain cheaper organic substrates and to

study the effect of addition of two nitrogenous fertilizers *viz.*, urea and ammonium sulphate on the growth and sporulation of *T. harzianum*.

Seven organic subtrates *viz.*, farm yard manure, bio-gas slurry, coir waste, pressmud, tapioca waste (product from sago industry), rice husk and pigeonpea husk were screened with and without additives *viz.*, urea and ammonium sulphate individually at 0.1 per cent for the mass multiplication of *T. harzianum*.

The above substrates were collected (200g), sterilized in polypropylene bags and inoculated with the spore suspension of *T. harzianum* (x$10^8$ cells / ml) @ 2ml / bag (Kousalya and Jeyarajan, 1990). The nitrogenous additives (urea and ammonium sulphate) were individually incorporated at 0.1 per cent to the substrates before inoculation. The bags were incubated at 28°C for 15 days. After incubation the samples were drawn and the population of *T. harzianum* was estimated through plating in *Trichoderma* selective medium, (with metalaxyl 0.3g, PCNB 0.2g, and chloramphenicol 0.25g) (Elad and Chet, 1983).

Amongst the substrates, pigeonpea husk was found to be the best and recorded the maximum population of propagules (63.5 x $10^6$ CFU / g) followed by tapioca waste (56.2) and pressmud (50.8) (Table 1). Addition of urea to the substrates reduced the multiplication and population of *Trichoderma* in all the cases, while ammonium sulphate stimulated the growth

Table 1. Effect of various organic substrates and additives on the mass multiplication of *T. harzianum*

| Organic substrate | Population of *T. harzianum* (x$10^6$ CFU/g) | | |
|---|---|---|---|
| | Control | Urea | Amm. sulphate |
| Farm yard manure | 32.5 | 18.0 | 86.5 |
| Bio-gas slurry | 14.8 | 7.8 | 18.8 |
| Coir waste | 12.9 | 26.2 | 61.0 |
| Pressmud | 50.8 | 24.6 | 74.6 |
| Tapioca waste | 56.2 | 13.6 | 101.6 |
| Rice husk | 45.6 | 16.6 | 85.8 |
| Pigeonpea husk | 63.5 | 35.6 | 129.5 |

| | SEM± | CD (P=0.05) |
|---|---|---|
| Organic substrate | 0.102 | 0.291 |
| Additive | 0.067 | 0.190 |
| Org.substrate x Additive | 0.176 | 0.502 |

of *Trichoderma*. The highest population was recorded in pigeonpea husk (129.5 x $10^6$ CFU / g) followed by tapioca waste (101.6 x $10^6$ CFU / g) and FYM (86.5 x $10^6$ CFU / g).

[illegible] is said to be the [illegible] (Elad *et al.*, 1980), the [illegible] higher cost prohibits its use for mass multiplication of *Trichoderma* on large scale. All the substrates used in the present studies are relatively cheaper than wheat bran. Kousalya and Jeyarajan (1990) tried various substrates for mass multiplication of *Trichoderma* spp. of which tapioca rind and waste were found to be the best followed by FYM and pressmud. However, in the present studies tapioca waste was only next best to pigeonpea husk. Being a leguminous crop residue, rich in nitrogen, it would have supported better growth and multiplication of *Trichoderma* than others, during the early phase of colonization of the substrate. The strong inhibitory action of urea upon growth of the antagonist is not clearly understood.

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