



Use Agro-Waste as a Culture media for Sporulation and conidia Production of *Trichoderma harzianum*

KEYWORDS

Waste, Culture media, Sporulation and conidia Production, *Trichoderma harzianum*

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ABSTRACT

Abstract Carried out this study to investigate the viability making Culture media using Agricultural Waste such as orange husk, tangerine husk , Mixture , potato media compared to production conidia and Sporulation, was results fungal growth on the potato media the highest among the media the four while he was the tangerine peel media highest in the process of Sporulation among them, as the rate of Sporulation 6.4, and after the separation of the tangerine peel Pith from tangerine peel and found that the tangerine peel Pith media was the best in the Fungal growth and production of spores, and then tested different concentrations of tangerine peel Pith media was concentration 12.5 best among the concentrations of five when he reached the diameter of growth of 8.2 while the diameter of Sporulation 6.5.

Introduction

Large amount of wastes is generated every year from the industrial processing of agricultural raw materials. Most of these wastes are used as animal feed or burned as alternative for elimination. However, such wastes usually have a composition rich in sugars, minerals and proteins, and therefore, they should not be considered "wastes" but raw materials for other industrial processes. The presence of carbon sources, nutrients and moisture in these wastes provides conditions suitable for the development of microorganisms,(1) Thus agricultural residues can be used the agricultural Media industry IN Development fungal Or Microorganism, In addition Because of the high cost of production of agricultural media that are used for the development of fungi, has become necessary to produce cheap media used where agricultural residues.

The solid media described could be useful for evaluating individual fungi and for rapid screening of genetic variants for the presence or absence of enzyme production , as well as for ecological studies and possible chemotaxonomic differentiation (2) .

For a long time, *Trichoderma* species have been known as biological agents for control of plant diseases(3,4) it is widely used as bio-control agent against several root pathogenic fungi throughout the world (5,6,7). *Trichoderma* spp. is free living fungi that are highly interactive in root, soil foliar and environments. It has been known for many years that they produce a wide range of antibiotic substances and they paralyze other fungi (8).

The high degree of ecological adaptability shown by strains within the genus *Trichoderma* is reflected its worldwide distribution, under different environmental conditions, and survival on various substrates.(9) that Several fungicides based on *Trichoderma* spp. have been commercialized in the last few years. However, there is still considerable interest in finding more efficient mycoparasitic fungi especially within *T. harzianum* strains, which differ considerably with respect to their biocontrol effectiveness(10,11).

Trichoderma harzianum is a common soil species and is used in biological control of a variety of plant-pathogenic fungi. *T. harzianum* is effective against pathogenic fungi and diseases such as *Rhizoctonia solani* root rots, *Phytophthora megasperma* f. sp. *glycinea* root rot on soybean, *Gaeumannomyces graminis* take-all of wheat, *Sclerotinia sclerotiorum* rots,

Sclerotium rolfsii Southern stem blight of tomato, and *Cylindrocadium scoparium*(12).

The process of Sporulation in fungi, especially fungal biological control of important processes for being the first step in the increase the numbers of fungi and by including *Trichoderma harzianum* , Therefore the present study was aimed to find out the suitability of various solid media in Sporulation and conidia Production of *Trichoderma harzianum* .

Materials and Methods

use potato-dextrose agar prepared According to the manufacturer's instructions growth of fungi, to prepare the agricultural community of agricultural residues have been grinding mill waste using manual and electric mill type of LG OF Japanese, While prepared media tangerine peel pith , be done separation peel pith about peel, next grinding method herself .

solid media was prepared using of 10 g different agro – wastes VIZ Orange husk, tangerine husk, tangerine peel pith , With the addition of 20 g sucrose and 15 g of agar , and use potato-dextrose agar prepared According to the manufacturer's instructions ,After sterilization the media were inoculated *Trichoderma harzianum* and incubated at 27 C.

Observation were recorded on growth rate and Sporulation rate at 48 hour after incubation, It was measurement depending on the size the diameter of growth and Sporulation

Results and Discussion

Trichoderma harzianum of in solid media in different substrate

Trichoderma harzianum in solid media using different substrate, the growth rate was Orange husk 3cm, while tangerine husk was 6.6 cm, and in Mixture(Orange husk + tangerine husk) was 5.7cm and Potato was 8.4cm.

The Sporulation was in the media consisting of Orange husk was 2.8cm, tangerine husk was 5.5cm , Mixture(Orange husk + tangerine husk) 4.8cm, and Potato was zero and respectively.

The potatoes media highest in fungal growth while the tangerine husk media was the highest in the Sporulation rate , But the rate of growth and the production of spores in the media of the mixture was medium ability and this is probably due to the presence of compounds in orange peel lead to

obstruction the growth of fungus and configure spores In the study carried out by (13) *The maximum biomass production of Trichoderma spp. observed in pulses (19.98 gm in 250 ml), while In another study carried out by the (14) maize husk was found supported maximum spore production for Trichoderma viride (2.0x10⁸ per gram substrate) and 1.2x10⁸ per gram substrate for Trichoderma harzianum .*

TABLE – 1
Trichoderma harzianum of in solid media in different substrate

Substrate	SP	GR	Growth rate	Sporulation rate
Potato	S	+++	8.4	Zero
Orange husk	S	+	3	2.8
tangerine husk	F	++	6.6	5.5
Mixture	M	++	5.7	4.8

+ = Slow growth M = Mediation
++ = Moderate (M) GR = Growth rate
+++ = Abundant (Fast) SP = Sporulation pattern
F = Fast



Figure 1 *Trichoderma harzianum* of in solid media in tangerine husk



Figure 2 *Trichoderma harzianum* of in solid media in Mixture

Trichoderma harzianum in solid media in tangerine husk and tangerine peel pith

the growth rate *Trichoderma harzianum* in tangerine husk media was 4cm While was growth rate in tangerine peel pith media 8.2cm.

The rate Sporulation *Trichoderma harzianum* in tangerine husk media was 2.4cm While was growth rate in tangerine peel pith media 6.4 cm .

The growth rate and Sporulation was top in tangerine peel pith media This is probably due to the presence of active compounds in the tangerine peel pith medium does not exist in a tangerine husk medium.

TABLE – 2
Trichoderma harzianum of in solid media in tangerine husk and tangerine peel pith

Substrate	SP	GR	Growth rate	Sporulation rate
tangerine peel pith	F	+++	8.2	6.4
tangerine husk	M	++	4	2.4

+ = Slow growth M = Mediation
++ = Moderate (M) GR = Growth rate
+++ = Abundant (Fast) SP = Sporulation pattern
F = Fast



Figure 2 *Trichoderma harzianum* of in solid media in tangerine husk and tangerine peel pith media :
1- tangerine peel pith media
2- tangerine husk media

Trichoderma harzianum of in solid media in different concentrations tangerine peel pith :

difference in growth rate and Sporulation rate of *Trichoderma harzianum* on tangerine peel pith media of weak to middle to high and very high , Fungal colony appeared in the concentration of 5 color light green surrounded by a small transparent zone , While was in the concentration 7.5 of fungal colony light green color surrounded by a small white zone , was in the concentration 10 of fungal colony green surrounded by a white zone, was in the concentration 12.5 of fungal colony dark green color surrounded by a white zone Inclined to milky color, While was in the concentration 15 of fungal colony a small green color surrounded by a white zone

Result revealed the variation of growth rate among different concentrations tangerine peel pith media, which recorded mean growth zone of (7.9,8,8.2,8.1,7.3)cm for concentrations (5, 7.5, 10, 12.5,15)g respectively .

the Sporulation rate of different concentrations tangerine peel pith medium which recorded of (5,6.2,6.4,6.5,5.2)cm for concentrations (5, 7.5, 10, 12.5,15)g respectively . in The concentration of 5cm was least in the rate of growth and Sporulation ,where colony color light green surrounded by a small transparent zone and diameter of growth 7.3cm and Sporulation 3.2cm This may be out of lack active compounds because of few concentration.

The concentration of 12.5 was the highest in the composition of spores and demonstrated by colony color and Sporulation rate it was dark green color , as reached diameter of Sporulation 6.5cm and this may be due to the presence of chemical compounds in the stimulate the process of Sporulation .

begins to decline in concentration of 15 in the composition of spores where the color a small green colony surrounded by white zone and reached diameter of Sporulation 5.6 cm, This may be due to a lack of active compounds because of lack of concentration .

If the colony dark green color indicates the abundant Sporulation (15) while the colony green light color indicates Few Sporulation .

TABLE – 3
Trichoderma harzianum of in solid media in different concentrations tangerine peel pith

Concentration	SP	GR	Growth rate	Sporulation rate
5	S	+++	7.3	3.2
7.5	F	+++	8	6.2
10	F	+++	8.2	6.4
12.5	F	+++	8.1	6.5
15	S	++	7.9	5.6

+ = Slow growth M = Mediation
++ = Moderate (M) GR = Growth rate
+++ = Abundant (Fast) SP = Sporulation pattern
F = Fast



Figure 4 *Trichoderma harzianum* in solid media of Concentration of 5 g per liter .



Figure 4 *Trichoderma harzianum* in solid media of Concentration of 12.5 g per liter

CASE STUDY

The study aimed to find an inexpensive agricultural circles for the Growth of fungi by taking advantage of some agricultural waste , also aimed to produce quantity and ample of spores, which are important in the study of qualities and too .are the foundation of any industrial process such production of enzymes or biocides from fungi .

CONCLUSIONS

Through the study We can say that the media-containing of tangerine peel pith is best among the other media and can use it as a medium for the Growth of fungi and production fungal spores too .

We can also say that the concentration of 12.5 was the highest among the media where diameter of growth was 8.2 , Similarly, in the process of configuring the spores if the diameter of 6.5.

Recommendations

- The study of the chemical composition of the peel tangerine peel pith
- Use of the center in the development of other fungi
- Use tangerine waste in the Mass scale cultivation of biological control fungi.

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