ISOLATION AND SELECTION OF *Trichoderma* spp. EXHIBITING HIGH ANTIFUNGAL ACTIVITIES AGAINST MAJOR PATHOGENS IN MEKONG DELTA

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ABSTRACT

The aims of this study is to isolate and select of Trichoderma spp. with high antifungal activities against plant pathogenic fungi such as Rhizoctonia solani, Fusarium moniliforme and Phytophthora capsic, which are commonly present in arable soil of Mekong delta. The study was carried out in the Microbiology Lab of CLRRI during 2011 wet season. The media used for isolation and selection were Potato Dextrose Agar (PDA) and Rose Bengal Agar (RBA). 21 Trichoderma strains were isolated from 24 soil samples collected at provinces as Can Tho, Hau Giang, Vinh Long, Dong Thap, Ca Mau and Dong Nai, belong to Mekong Delta. The Trichoderma sp. Strains that were isolated from DT3 showed strong inhibitory effect against Phytophthora. Among of these the Trichoderma sp. strain of 1.1, 5.2, 8.1, 8.2 and HG1 showed to remarkbly inhibit the growth of Phytophthora but had no significant difference compared with T. viride strain as control strain. In the antagonist test against Rhizoctonia solani, Trichoderma sp. strain 1.1, 2.2, 2.3, VL, DT3, DT2.1, 8.1, 8.2, 2.1 and LT-HG1 expressed high antifungal activity against the pathogenic fungus. The statistical analysis also indicated the equivalent ability to compete with the pathogenic of isolated Trichoderma sp. when compared with two controls. Among selected Trichoderma sp. isolates, DT3.2, 2.2 and 2.3 strains exhibited their higher inhibitory effects against Fusarium as compared with controls. The remained Trichoderma sp. strains also showed higher effect but no significant difference to the controls (T. viride). Some Trichoderma strains as DT3.2, 2.2 and 2.3 expressed their ability of high antifungal activity against pathogens Rhizoctonia solani, Fusarium moniliforme and Phytophthora capsici.

***Keywords**: anti fungus, Fusarium moniliforme, disease biocontrol, Phytophthora capsici, Rhizoctonia solani, Trichoderma spp.*

INTRODUCTION

Many plant species have been destroyed by plant pathogens which strongly damage the crop yield. Soil borne pathogens are complex not only in their behavioral pattern but also in their biochemical constituents. Pesticides and organic compounds are widely used to control plant pathogens in many countries. Bio-control products with agricultural potential should possess several desirable characteristics such as: easy preparation and application, stability, adequate shelf life, abundant viable propagules, and low cost (Churchill, 1982). *Trichoderma* spp. are found to be very potential bio-control agents against many pathogens including *Fusarium* spp. (Somasekhara *et al*., 1998). The formulation should be amenable for application to both phylloplane and rhizosphere depending on the pathogens and plants to be controlled. Many researchers demonstrated the potential of *Trichoderma* spp. in controlling damping-off and wilt diseases of crop plants caused by *Rhizoctonia solani* and *Fusarium* spp. (Dubey *et al*., 2007). The main pathogens responsible for damping-off and wilt incidence of bean are *Rhizoctonia solani* (Kühn) and *Fusarium oxysporum* f.sp. *phaseoli*, respectively (El-

Mougy *et al*., 2007). A total of 18 isolates of *T. harzianum* were screened against *Fusarium equiseti* following dual plate culture technique. T6, T1, T2, T6, T9, T11, T14 and T18 isolates of *T. harzianum* are found to be most effective and show the highest inhibition of 71.69% in the colony growth against the test pathogen. The lowest inhibition of 50.91% in radial growth was obtained with the T16 and T10 isolates (Rahman *et al*., 2012). Some fungies *as Trichoderma harzianum* (Th1), *T. viride* (Tv1) and *T. spirale* (Ts3) isolates show different inhibitory effect against growth of both tested pathogens (damping-off and wilt in bean plants grown) due to damage by *Rhizoctonia solani* and *Fusarium oxysporum* f.sp. *phaseoli* (Nashwa *et al*., 2008). Among the three potential *Trichoderma* spp. Isolates, TN3 isolate is found highly effective against sheath blight pathogen, *R. solani* under *in vitro* conditions. It is found most effective in reducing disease incidence and increasing grain yield of rice. The bioagent can effectively controll the disease at the same time improved growth characters under the glasshouse conditions (Prasad and Kumar, 2011). *In-vitro*, species of *Trichoderma* strongly antagonized six different seed borne pathogenic fungi viz. *Fusarium moniliforme*, *Fusarium oxysporum*, *Rhizoctonia solani*, *Fusarium solani*, *Botryodiplodia theobromae* and *Alternaria alternata* in dual culture assay. *Trichoderma harzianum* give maximum inhibition of mycelia growth of all pathogenic fungi (Mustafa *et al*., 2009). Evaluation of the culture filtrate of *Trichoderma* on the pathogenic fungus *Fusarium spp*. growth show that inhibition rates ranged between 52 and 90% and the most effective isolate for *Fusarium spp*. inhibition are the isolate Ta.13 (*T. atroviride*) which produced 90% inhibition against *F. culmorum* (Boureghda and Renane, 2011). Twenty six isolates of *Trichoderma* spp. were tested *in vitro* for their tolerance against pesticides and on the antagonistic activity against sheath blight pathogen of rice, *Rhizoctonia solani*. The growth of all *Trichoderma* isolates are inhibited by three fungicides tested (Sarojini *et al*., 2011).

OBJECTIVES

The aims of this study is to isolate and select of *Trichoderma* spp*.,* a fungus exhibits high antifungal effects against some plant pathogenic fungi in cultivated soils of Mekong Delta.

Contents

1. Isolating *Trichoderma* spp. in various farming models in the Mekong Delta.
2. Screening and selecting *Trichoderma* spp. showing high antagonistic activities against *Rhizoctonia solani, Phytophthora capsici* and *Fusarium moniliforme.*
3. Evaluating the antifungal activities of isolated *Trichoderma* spp. against naturally soilborne pathogenic fungi in cultivated soil.

MATERIALS AND METHODS

Materials

Samples: Twenty four soil samples were collected at agricultural soils in different localities of the Mekong Delta such as Can Tho City, Vinh Long, Dong Thap, Hau Giang, and Ca Mau provinces.

Rhizoctonia solani and *Fusarium moniliforme* were collected from the Plant Pathology Department, Cuu Long Delta Rice Research Institute. *Phytophthora capsici* collected from the Plant Pathology Department, Can Tho University. *Trichoderma viride* in commercialized bio-fertilizer originated in India provided by the Plant Pathology Department, Cuu Long Delta Rice Research Institute.

Culture media

Potato Dextrose Agar (PDA): Potato (peeled) 200 g, dextrose 20 g, agar 18 g, distilled water 1000 ml.

Rose Bengal Agar: Glucose 10g, Peptone 5g, KH2PO4 1g, MgSO4.7H2O 0.05g, Streptomycin 30 mg, Rose Bengal 0.035g, Agar 15g, distilled water 1000ml.

Methods

Isolation of Trichoderma spp.: 10g of each soil sample was dissolved in 90ml distilled water, inoculated onto Rose Bengal agar plates and incubated at room temperature (around 30^{o}C) for 5 days. After an incubation period, colonies determined to be *Trichoderma* spp. according to Watts *et al*., and Rifai were purified on PDA medium.

Soil pH measurement: 10g of each soil sample containing *Trichoderma* spp. was dissolved in 20ml distilled water to determine the pH range which is favorable for growth and development of these fungi. The pH was measured by pH meter.

Soil moisture content measurement: 20g of each soil sample was dried in a Dry Heat Sterilizer at 121^{o}C and calculated its weight loss after complete evaporation of water in order to determine the moisture range which is favorable for growth and development of *Trichoderma* spp.

Soil moisture content by mass was calculated by this following formula:

Water (%) by mass = (wet mass - dry mass / dry mass) x 100

Determination of antifungal activities against Rhizoctonia solani, Fusarium moniliforme and Phytophthora capsici.

Each pure isolate of *Trichoderma* spp. and three plant pathogenic fungi were separately inoculated onto sterile PDA media and incubated at room temperature (30^{o}C) for 5 days for their colonies grow and develop. Mycelial discs of each *Trichoderma* spp. (7 mm in diameter) obtained from actively growing colonies were placed gently in the centre of the agar plates. Similarly, three discs of each type of plant pathogen fungi were then placed on these plates surrounding *Trichoderma* spp. disc with 2.5 cm of distance. Petri dishes were incubated at 30^{o}C for further 4 days and observed everyday. Two strains of *Trichoderma viride* were also used as the control samples. The radius of spreading colony of *Trichoderma* spp. inoculum toward plant pathogen inoculums after 24, 48, 72 and 96 hours were recorded.

Determination of antifungal activities against soil borne pathogens in cultivated soils

Selected *Trichoderma* spp. showing high antagonistic activities against *Rhizoctonia solani, Fusarium moniliforme* and *Phytophthora capsici* were then tested for their antifungal effects against soilborne pathogens in different agricultural fields.

Each 10g of 7 soil samples of each cultivated model was dissolved in 90 ml distilled water and inoculated onto Rose Bengal Agar media. Mycelial discs of each *Trichoderma* spp. (7 mm in diameter) obtained from actively growing colonies previously cultured on PDA medium were placed gently in the centre of the agar plates. These Petri dishes were incubated at room temperature (30^{o}C) for 3 days.

Recorded criteria: the radius of spreading colony of *Trichoderma* spp. inoculum on Rose Bengal medum after 24, 48 and 72 hours.

RESULTS AND DISCUSSION

***Isolation of Trichoderma* spp.**

Twenty one isolates of *Trichoderma* spp. were isolated from 11 among 24 soil samples collected from different agricultural fields in Can Tho, Hau Giang, Vinh Long, Dong Thap, Ca Mau and Dong Nai province (appendix 1). Most of these isolates' colonies are velutinous with white floccose surface along with scattered green patches. Pigment is secreted and diffused into the medium during growth of the isolates (Table 1 and Fig. 1).

Table 1. Colony morphology of *Trichoderma* spp. on PDA medium

No.	*Trichoderma* spp. strains	Colonies morphology
1	1.1	velutinous with white floccose surface, scattered dark-green patches, yellow-green pigment diffusing into the medium
2	2.1	velutinous with white rising floccose surface, scattered greenish patches, yellow pigment diffusing into the medium
3	2.2	velutinous with white rising floccose surface, yellow pigment diffusing into the medium
4	2.3	velutinous with white rising floccose surface, scattered dark-green patches, yellow pigment diffusing into the medium
5	5.1	velutinous with white spreading floccose surface, yellow pigment diffusing into the medium
6	5.2	velutinous with white raising floccose surface, scattered dark-green patches, yellow-green pigment diffusing into the medium
7	8.1	velutinous with white rising floccose surface, scattered green patches, yellow-green pigment diffusing into the medium
8	8.12	velutinous with white spreading floccose surface, scattered greenish patches, yellow pigment diffusing into the medium
9	8.2	velutinous with white spreading floccose surface, yellow pigment diffusing into the medium
10	8.3	velutinous with white rising floccose surface, scattered green patches, yellow pigment diffusing into the medium
11	8.4	velutinous with white floccose surface, scattered green patches, yellow pigment diffusing into the medium
12	DT2.1	velutinous with white rising floccose surface, scattered green patches, yellow-green pigment diffusing into the medium
13	DT2.2	velutinous with white rising floccose surface, scattered green patches, yellow-green pigment diffusing into the medium
14	DT3.2	velutinous with white floccose surface, scattered green patches, yellow-green pigment diffusing into the medium
15	HG1	velutinous with white rising floccose surface, scattered green patches, yellow-green pigment diffusing into the medium
16	HG2	velutinous with white rising floccose surface, scattered green patches, yellow-green pigment diffusing into the medium
17	LT-HG1	velutinous with white rising floccose surface, scattered green patches, yellow-green pigment diffusing into the medium
18	TB-VL	velutinous with white rising floccose surface, scattered green patches, yellow-green pigment diffusing into the medium
19	UM2	velutinous with white rising floccose surface, scattered green patches, yellow-green pigment diffusing into the medium
20	VL1	velutinous with white floccose surface, scattered green patches
21	TB-VL	velutinous with white floccose surface, scattered green patches

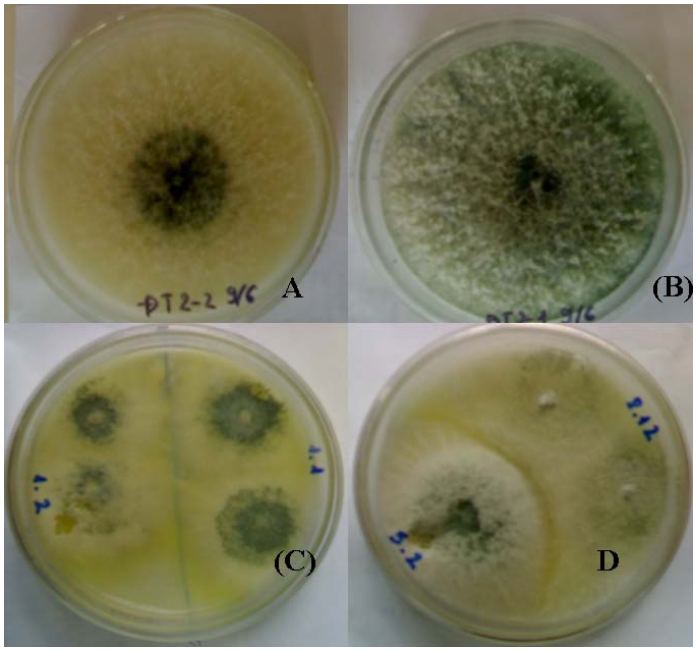

Figure 1. Colony of some isolated *Trichoderma* spp. strains
(A) DT2.2, (B) DT2.1, (C) 1.1 and 1.2, (D) 5.2 and 8.12

Soil pH and moisture measurement

Trichoderma spp. showed that they were ability to grow and develop in different pH conditions ranging from 4.42-7.91, the mean of pH value was 6.26 (Table 2). This demonstrated that *Trichoderma* fungi was distributed widely in various soil conditions with different pH values (Table 2).

Soil moisture content by mass averaged of 33.25%. Nevertheless, *Trichoderma* spp lived in various humid conditions ranging from 18.85% (5) to 51.65% (DT2).

Table 2. pH value of soil samples containing *Trichoderma* spp.

Sample	pH value	Moisture content (%)
1	7.91	20.75
2	4.51	20.75
5	5.30	18.85
8	4.42	27.40
CT3	6.77	42.30
DT1	7.60	36.05
DT2	6.58	51.65
DT3	6.77	32.85
DT-HG	6.51	49.15
LT-HG	5.64	24.55
VL	6.86	41.50
Mean	6.26	33.25

Determination of antifungal activities against *Rhizoctonia solani, Phytophthora capsici* and *Fusarium moniliforme*

Antifungal activities against Rhizoctonia solani

The data in table 3 shows information on antagonistic effect of *Trichoderma* spp. against *Rhizoctonia solani* when these fungi were inoculated in the same petri dish with *Trichoderma* spp. being in the centre surrounding by three discs of *Rhizoctonia solani*.

Table 3. Evaluating antifungal activities of *Trichoderma* spp. against pathogenic fungus causing sheath blight disease in plant (*Rhizoctonia solani*).

No.	*Trichoderma* spp.	Radii of *Trichoderma* spp. colonies after 72h of incubation (cm)	Antifungal activities of *Trichoderma* spp. against *Rhizoctonia solani* after 96h
1	1.1	2.53	+++
2	2.1	2.53	+++
3	2.2	2.66	+++
4	2.3	2.73	+++
5	5.1	0.50	-
6	5.2	2.30	++
7	8.1	2.60	+++
8	8.12	0.10	+
9	8.2	4.03	+++
10	8.3	2.16	++
11	8.4	1.33	-
12	DT2.1	2.93	++
13	DT2.2	1.66	+
14	DT3	2.43	+++
15	DT3.2	2.43	++
16	DT-HG1	1.80	++
17	DT-HG2	2.26	++
18	LT-HG1	2.13	+++
19	TB-VL	1.56	+
20	UM2	2.03	++
21	VL	2.90	+++
22	(DC1)- *T. viride*	2.80	+++
23	(DC2) – *T. viride*	2.53	+++
CV(%)		21.30	-
LSD (5%)		0.77	

***Note:** - nonresistant; + slightly resistant; ++ medium resistant; +++ strong resistant (Trichoderma spp. attack and spread over completely Rhizoctonia solani colony on petri dishes.*

After 72 hours of incubation period on PDA media at room temperature 30°C, many *Trichoderma* spp. showed high antifungal activities against *Rhizoctonia solani* in which three isolates of *Trichoderma* spp. Were 8.2, DT2.1 and VL isolates that had the highest effects against this plant pathogen with their spreading colony radii being 4.03, 2.93 and 2.90 cm, respectively, higher than DC1 and DC2 isolates of two control *T. viride* samples. By contrast, 8.12, 5.1, 8.4, TB-VL, 2.2, DT-HG1, 8.3, LT-HG1 and DT3 strains were not able to compete or compete slightly with *Rhizoctonia solani* as a result, they were not able to spread effectively over PDA media. The remained trains of *Trichoderma* demonstrated strong resistant property, showing no statistically significant difference with two control *T. viride* strains.

The results recorded after 96 hours of incubation showed that all the *Trichoderma* spp. strains isolated in different farming models in the Mekong Delta which had strong resistant activities (attacked completely on the surface of the fungus *Rhizoctonia solani* and covered Petri dishes) were 1.1, 2.2, 2.3, VL, DT3, 8.1, 8.2, 2.1, LT-HG1 strains and two *T. virde* strains of the control samples. (Table 1 and Fig. 6).

All strains isolated from *Trichoderma* spp. showed strong antagonistic activities against *Phytophthora capsici* after 72 and 96 hours of inoculation on PDA media at 30°C, particularlly, 1.1, 5.2, 8.1, 8.2, DT-HG1 strains of *Trichoderma* together with two *Trichoderma viride* control strains attacked *Phytophthora capsici* and covered fully the surface of Petri dishes after 72 hours (radii of spreading colonies were 5 cm (Table 4 and Fig. 3, 4). Recording at 96 hours after inoculation, all *Trichoderma* strains except DT3 cover all petri dishes, showing high antifungal effects of isolated *Trichoderma* spp. against this type of pathogen.

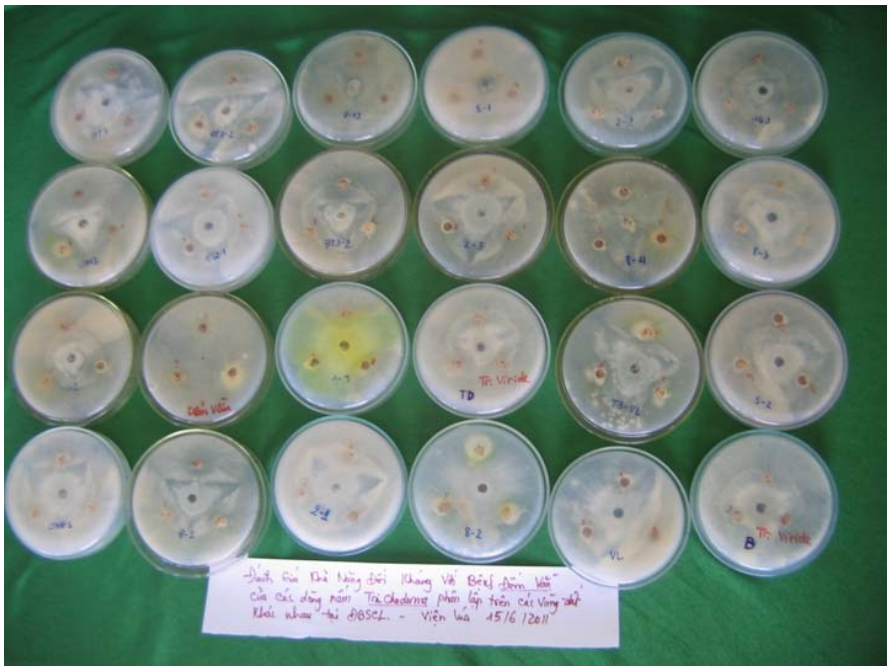

Figure 2. Antagonist effect against *Rhizoctonia solani* of isolated *Trichoderma* spp. after 72 hours of incubation.
A*ntifungal activities against Phytophthora capsici*

Table 4. Evaluating antifungal activities of isolated *Trichoderma* spp. Strains against *Phytophthora capsici.*

No.	*Trichoderma* spp.	Radii of *Trichoderma* spp. colonies after 72h of inoculation (cm)	Antifungal activities of *Trichoderma* spp. against *Phytophthora capsici* after 96h of incubation
1	1.1	5.00	+++
2	2.1	5.00	+++
3	2.2	4.40	+++
4	2.3	4.36	+++
5	5.1	4.63	+++
6	5.2	5.00	+++
7	8.1	5.00	+++
8	8.12	4.70	+++
9	8.2	5.00	+++
10	8.3	4.16	+++
11	8.4	3.23	+++
12	DT2.1	3.50	+++
13	DT2.2	3.63	+++
14	DT3	1.26	++
15	DT3.2	3.03	+++
16	DT-HG1	5.00	+++
17	DT-HG2	3.33	+++
18	LT-HG1	4.63	+++
19	TB-VL	4.86	+++
20	UM2	3.96	+++
21	VL	3.63	+++
22	(DC1)- *T. viride*	5.00	+++
23	(DC2) – *T. viride*	5.00	+++
CV(%)		**8.34**	-
LSD (5%)		**0.57**	

Note: *- nonresistant; + slightly resistant; ++ medium resistant; +++ strong resistant (Trichoderma spp. attack and spread over completely Phytophthora capsici colony on petri dishes).*

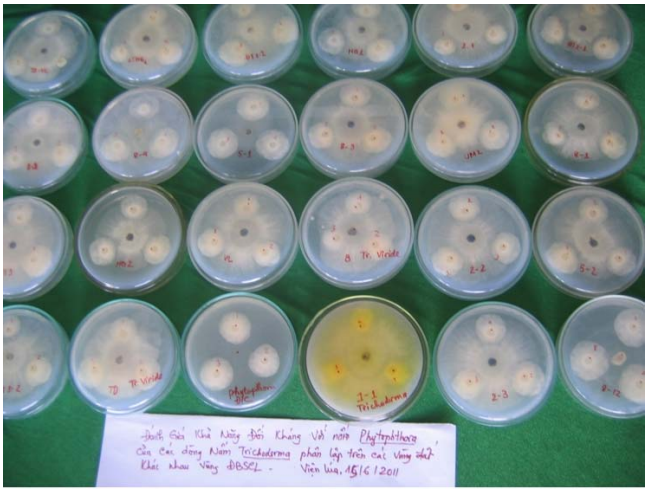

Figure 3. Antagonist effect against *Phytophthora capsici* of isolated *Trichoderma* spp. after 72 hours of incubation.

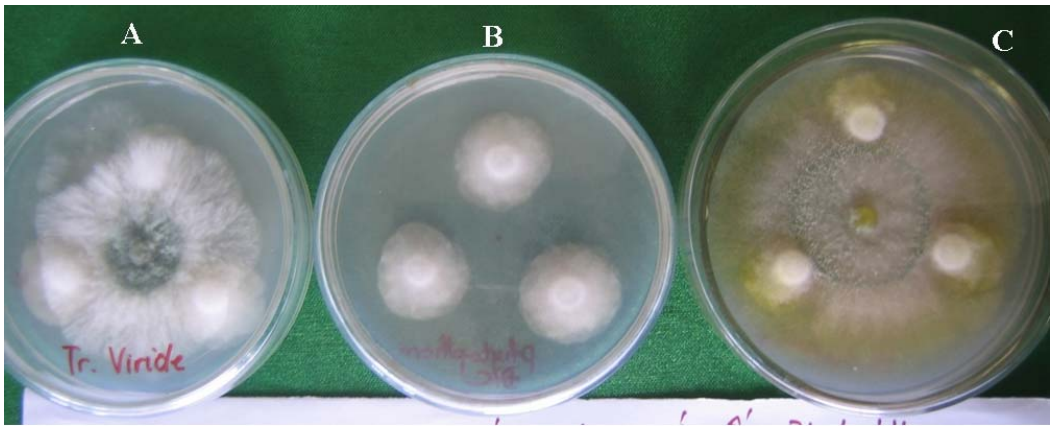

Figure 4. Antagonist effect against *Phytophthora capsici* of *Trichoderma* spp. strain 1.1 (C) compared with the positive control *T. viride* (A) and the negative control (B) after 72 hours of incubation.

A*ntifungal activities against Fusarium moniliforme*

Ten strains of *Trichoderma* spp. were selected and tested their antagonistic activities against *Fusarium moniliforme*. The DT3.2, 2.2 and 2.3 strains of *Trichoderma* spp. demonstrated stronger antagonistic activities against *Fusarium moniliforme* than *T. viride* represented by the length of radii (see in table 5). The remained strains also showed higher inhibitory effects against this kind of plant pathogen than the control *T. viride* but had no statistically significant difference with the control (Fig. 5).

Table 5. Evaluating antifungal activities of *Trichoderma* spp. against *Fusarium moniliforme (disease von rice)*

No.	***Trichoderma* spp.**	**Radii of *Trichoderma* spp. colonies after 72h of inoculation (cm)**	**Antifungal activities of *Trichoderma* spp. against *Fusarium moniliforme* after 96h of inoculation**
1	1.1	2.20	+++
2	2.1	2.10	+++
3	2.2	2.26	+++
4	2.3	2.26	++
5	8.2	2.10	+++
6	8.3	2.10	+++
7	DT2.1	2.13	++
8	DT3.2	2.40	+++
9	LT-HG1	2.06	+++
10	VL	2.10	++
11	(DC2) – *T. viride*	2.03	++
CV(%)		5.69	
LSD (5%)		0.21	

Note: - nonresistant; + slightly resistant; ++ medium resistant; +++ strong resistant

Determination of antifungal activities against soilborne pathogens in cultivated soils

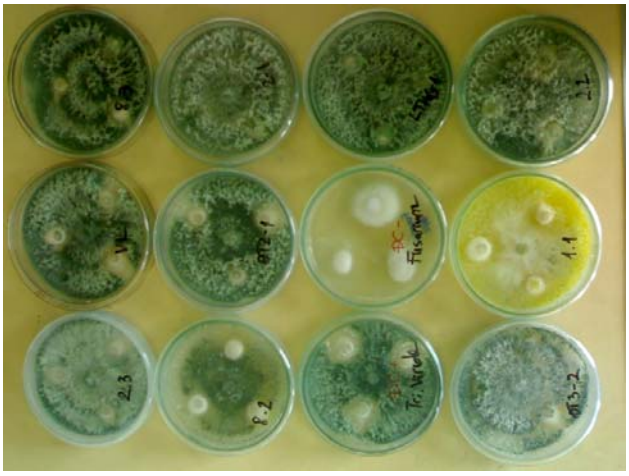

Figure 5. Antagonist effect against *Fusarium moniliforme* of isolated *Trichoderma* spp. after 72 hours of incubation.

Table 6. Determination of antifungal activities of *Trichoderma* spp. against soilborne pathogens in cultivated soils on Rose Bengal Agar medium.

Soil samples of farming models	***Trichoderma* spp.**	**Fungi colony x 10^1/g dry soil (72h) on Rose Bengal media not inoculated with *Trichoderma spp.***	**Radii of *Trichoderma* spp. colonies after 72h of inoculation (cm)**
8		-	
Rice	8.2		4.6
	1.1		7.6
	LT-HG1		3.0
DT3		29	
Rice	8.2		4.4
	1.1		6.0
	LT-HG1		3.6
LT-HG		26	
Rice	8.2		5.8
	1.1		7.2
	LT-HG1		4.0
DT1		25	
Crop	8.2		3.8
	1.1		4.6
	LT-HG1		3.6
DT4		21	
Fruit tree	8.2		3.6
	1.1		4.6
	LT-HG1		4.0
10		74	
Fruit tree	8.2		1.0
	1.1		7.0
	LT-HG1		2.2

Selected *Trichoderma* spp. strains showed high antagonistic activities against *Rhizoctonia solani, Fusarium moniliforme* and *Phytophthora capsici,* the *Trichoderma* spp strains as 8.2, 1.1 and LT-HG1 were tested for their antifungal effects against natural soilborne pathogens in collected soil samples including 2, 8, 10, DT1, DT3, DT4, LT-HG strains of various farming land models. The three of *Trichoderma* spp. strains as 8.2, 1.1 and LT-HG1 were able to grow and develop strongly on Rose Bengal media after 72 hours of inoculation that were previously inoculated with soiborne fungi. *Trichoderma* strain 1.1 exhibited high antagonistic activities against various fungi in soil samples of many different agricultural fields and this was visualized clearly through large spreading colony radii, at 4.6 cm- 7.2cm (Table 6; Fig 7). *Trichoderma* spp strain 8.2 and LT-HG1 also demonstrated their antifungal effects but lower than strain 1.1.

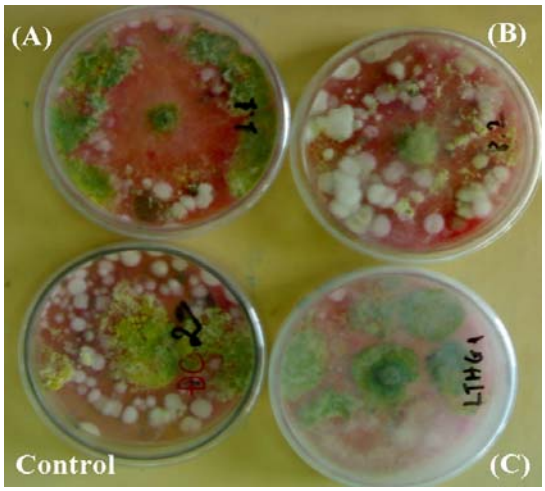

Figure 6. Antagonist effect of *Trichoderma* spp. strain 1.1 (A), 8.2 (B) and LTHG1 (D) against naturally soilborne fungi in cultivated soil in Binh Thuy, Can Tho after 96 hours of incubation. (Control is normal soil, not inoculate *Trichoderma*)

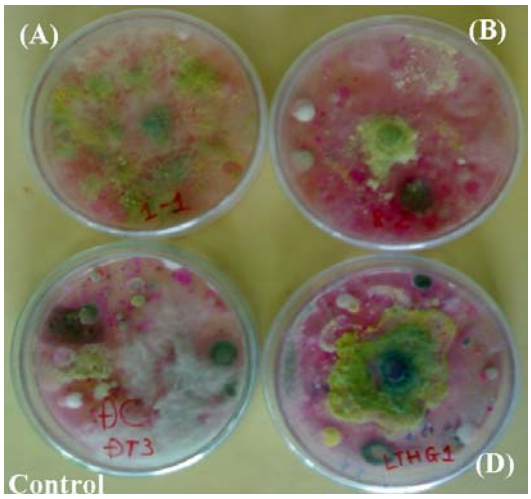

Figure 7. Antagonist effect of *Trichoderma* spp. strain 1.1 (A), 8.2 (B) and LTHG1 (D) against naturally soilborne fungi in cultivated soil in Binh Thuy, Can Tho after 96 hours of incubation**.** **(**Control is normal soil, no *Trichoderma* inoculated)

CONCLUSION AND SUGGESTIONS

Twenty one isolates of *Trichoderma* spp. isolated from 11 out of 24 soil samples collected from different agricultural models in the Mekong Delta show diverse morphology characteristics and occurre in a wide range of pH and moisture conditions of soil. All of the isolated *Trichoderma* sp. strains except ĐT3 show strong inhibitory effect against *Phytophthora*. Among these *Trichoderma* sp. strain as 1.1, 5.2, 8.1, 8.2 and HG1 remarkably inhibit the growth of *Phytophthora* and we found no significant difference compare with the control *T. viride.* In the antagonist test against *Rhizoctonia solani*, the *Trichoderma* sp. strains as 1.1, 2.2, 2.3, VL, ĐT3, ĐT2.1, 8.1, 8.2, 2.1 and LT-HG1 express in high antifungal activity against this kind of pathogenic fungus. They also indicate their ability to compete with *T. viride* species in antifungal activity against plant pathogenic fungi. Among selected isolates, *Trichoderma* sp. strain as ĐT3.2, 2.2 and 2.3 present higher inhibitory effects against *Fusarium* when compared with the controls. The remained *Trichoderma* sp. strains also show higher effect but no significant difference with the controls.

Overall, the three selected *Trichoderma* sp. strains are effectively inhibit the growth of some natural fungi under normal conditions. These results suggest that the promising application of these isolated *Trichoderma* sp. to the pathogenic fungi on rice, vegetables and fruit trees are possible. More researches should be carried out to determine the optimum conditions for growth as well as the antagonist activities against pathogenic fungi of these isolated *Trichoderma* spp. strains.

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PHÂN LẬP VÀ TUYỂN CHỌN DÒNG NẤM *Trichoderma* spp ĐỐI KHÁNG CAO VỚI MỘT SỐ LOẠI NẤM GÂY BỆNH CHO CÂY TRỒNG VÙNG ĐBSCL

Đề tài: "phân lập và tuyển chọn nấm *Trichoderma* spp có sự đối kháng cao với một số nấm gây bệnh cây (*Rhizoctonia solani, Fusarium moniliforme and Phytophthora capsici)* trên các vùng đất trồng của ĐBSCL". Nghiên cứu đã được thực hiện trong suốt vụ Hè Thu 2011 tại phòng thí nghiệm Vi Sinh Vật, Viện Lúa ĐBSCL. Môi trường được sử dụng phân lập và tuyển chọn các dòng nấm *Trichoderma* là Potato Dextro Agar và Rose Bengal Agar. Với 21 dòng nấm *Trichoderma* spp. được phân lập từ 24 mẫu đất được chọn từ các tỉnh vùng ĐBSCL như Cần Thơ, Hậu Giang, Vĩnh Long, Đồng Tháp và Đồng Nai. Kết quả cho thấy rằng tất cả các dòng nấm *Trichoderma* spp phân lập được trừ dòng nấm DT3 đều có khả năng đối kháng tốt đối với nấm gây bệnh *Phytophthora capsicii.* Trong số những dòng nấm *Trichoderma* này, dòng 1.1, 5.2, 8.1, 8.2 and HG1 có sự đối kháng mạnh với nấm gây bệnh và không khác biệt so với dòng nấm đối chứng *Trichoderma viride.* Kiểm tra sự đối kháng với nấm *Rhizoctonia solani*, các dòng *Trichoderma* sp. như 1.1, 2.2, 2.3, VL, DT3, DT2.1, 8.1, 8.2, 2.1 và LT-HG1 cho thấy có sự đối kháng cao với nấm gây bệnh này. Kết quả cũng cho thấy các dòng nấm *Trichoderma* spp. này so với dòng nấm đối chứng *T. viride* không khác biệt có ý nghĩa thống kê về sự đối kháng với nấm gây bệnh *Rhizoctonia solani.* Trong các dòng nấm *Trichoderma* sp. được tuyển chọn, DT3.2, 2.2 và 2.3 có sự đối kháng với nấm gây bệnh lúa von (*Fusarium moniliforme)* cao hơn đối chứng *T. viride.* Các dòng còn lại cũng không khác biệt có ý nghĩa về sự đối kháng với nấm gây bệnh lúa von *F. moliforme* so với nấm đối chứng *T. viride*. Kết quả cũng cho thấy các dòng nấm *Trichoderma*, DT3.2, 2.2 và 2.3 có khả năng đối kháng với các nấm gây bệnh cây (như *Rhizoctonia solani, Fusarium moniliforme* và *Phytophthora capsici).*