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ANTAGONISTIC PROPERTY OF UV INDUCED MUTANTS OF TRICHODERMA VIRIDE AGAINST RHIZOME ROT OF TURMERIC.

P.P. Kamble and S. S.Kamble

Mycology and Plant Pathology Research Laboratory, Department of Botany,Shivaji University, Kolhapur - 416 004 (M. S.)

ABSTRACT

Total 48 mutant isolates were obtained from wild *Trichoderma viride* after exposure to UV rays at different time intervals. Among these mutants $Tvuv_{40}$ showed highest percent inhibition (62.2%) of *Pythium aphanidermatum* causing rhizome rot of turmeric, as as compared to wild *Trichoderma viride* (58.8 %). Thus mutations can induce more antagonistic efficiency in *Trichoderma viride* for better results.

Key words: Turmeric, *Trichoderma viride*, Antagonistic potential, *Pythium aphanidermatum,* Rhizome rot *etc.*

Introduction:

Rhizome rot or soft rot of turmeric, caused by *Pythium aphanidermatum,* is destructive disease among all the turmeric diseases. (Anoop et al., 2014; Rathaiah, 1982; Muthulakshmi and Saveetha, 2009). Number of bacterial and fungal antagonists were used in past for control of turmeric rhizome rot. Maheshwari and Sirchabai (2011) successfully prevented rhizome rot disease of turmeric by using *Trichoderma* species, and concluded that *Pythium aphanidermatum* causing rhizome rot disease in turmeric can be biologically controlled by using *Trichoderma* species. Number of researchers attempted the technique of mutation in order to enhance antagonistic capabilities of *Trichoderma* species. Present investigation reports the antagonistic effect of the UV induced mutants of *Trichoderma viride* against *Pythium aphanidermatum.*

Material and Methods:

Seven days old culture of *Trichoderma viride* was used for mutation. Mycelial suspension of the culture was prepared by adding sterile distilled water into petriplate and rubbing sterile glass rod on *Trichoderma viride* culture. This mycelial suspension was used for UV treatment and kept at the distance of 5 cm from UV lamp. It was exposed to UV rays for 5, 10, 15, 20, 25 and 30 minutes, and inoculated on Czapekdox agar (CDA) (Santa Maria, 2017) plates by using dropper. Inoculated plates were kept for incubation for 7 days at 28 c in BOD Incubator and used for further experiments.

UV induced *Trichoderma viride* mutants were screened for their antagonistic activity against *Pythium aphanidermatum* using dual culture technique (Morton and Stroube, 1955; Skidmore and Dickinson,1976). Readings were recorded on 7th day of incubation period and Inhibition percentage was calculated following Vincet (1947) using the equation Inhibition Percentage (%) = $[(C - T/C) \times 100$, Where, I = Percent Growth Inhibition (%), C = Colony Diameter in Control plate and T = Colony Diameter in treatment plate

Results and Discussion:

Wild species of *Trichoderma viride* exposed to UV rays at different time intervals resulted into 48 UV induced Mutants of *Trichoderma viride*. All mutants showed

antagonistic activity against *Pythium aphanidermatum,* except the mutants obtained after 30 minutes time interval, as exposure to UV rays for 30 minutes was found lethal. Highest mutagenesis frequency was observed due to the exposure of 15 minutes time interval (27.08 %).as shown in Table 1.

Table 1: Induction of antagonistic potential in *Trichoderma viride* with exposure to UV light

Sr. No.	Time Interval	Number of Colonies Developed	Frequency Percentage (%)
1.	5 Minutes	08	16.66
2.	10 Minutes	12	25.00
3.	15 Minutes	13	27.08
4.	20 Minutes	10	20.83
5.	25 Minutes	05	10.41
6.	30 Minutes	00	00
Total Number of Mutant Isolates		48	

Wild and UV induced Mutants of *Trichoderma viride* were tested for antagonistic efficacy against *Pythium aphanidermatum* causing rhizome rot in turmeric. Mutant Tvuv40 showed highest inhibition percentage (62.20 %), as against 58.8 %.in wild species. Thus UV induced Mutant of *Trichoderma viride* isolate was found to be more antagonistic to *Pythium aphanidermatum.*

Many workers have reported enhancement of antagoistic potential of *Trichoderma viride* by exposing *T. viride* cultures to UV, gamma rays and chemical mutagens. In the present investigation nearly 37% mutant isolates showed antagonistic activity against rhizome rot of turmeric which was more than wild *Trichoderma viride.* (Table:2).

Abbasi et al., (2016) induced gamma rays mutation in antagonist *Trichoderma harzianum* antagonistic to *Macrophomina phaseolina* and *Rhizoctonia solani.* Molardi et al., (2013) studied Gamma rays induced mutants of *Tricoderma harzianum* and evaluated their antagonistic potential against *Rhizoctonia solani.* Patil and Kamble (2011) reported, out of five *Trichoderma koningii* UV mutants, *T. koningii- 2* showed highest antagonistic activity against *Macrophomina phaseolina* causing Charcoal rot in Sweet Potato.

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Table 2: Antagonistic potential of *Trichoderma viride* variants (T wild and T mutant - UV treated) against *Pythium aphanidermatum*

Sr. No.	*T. viride* Variant	Inhibition percentage (%)	Sr. No.	*T. viride* Variant	Inhibition percentage (%)
1.	T_{vuv1}	55.5	25.	T_{vuv25}	61.1
2.	T_{vuv2}	58.8	26.	T_{vuv26}	57.7
3.	T_{vuv3}	60.0	27.	T_{vuv27}	57.7
4.	T_{vuv4}	60.0	28.	T_{vuv28}	60.0
5.	T_{vuv5}	58.8	29.	T_{vuv29}	55.5
6.	T_{vuv6}	57.7	30.	T_{vuv30}	57.7
7.	T_{vuv7}	60.0	31.	T_{vuv31}	56.6
8.	T_{vuv8}	57.7	32.	T_{vuv32}	57.7
9.	T_{vuv9}	58.8	33.	T_{vuv33}	61.1
10.	T_{vuv10}	57.7	34.	T_{vuv34}	57.7
11.	T_{vuv11}	60.0	35.	T_{vuv35}	60.0
12.	T_{vuv12}	58.8	36.	T_{vuv36}	55.5
13.	T_{vuv13}	57.7	37.	T_{vuv37}	61.1
14.	T_{vuv14}	57.7	38.	T_{vuv38}	60.0
15.	T_{vuv15}	60.0	39.	T_{vuv39}	57.7
16.	T_{vuv16}	55.5	40.	**T_{vuv40}**	**62.2**
17.	T_{vuv17}	60.0	41.	T_{vuv41}	58.8
18.	T_{vuv18}	56.6	42.	T_{vuv42}	53.3
19.	T_{vuv19}	60.0	43.	T_{vuv43}	60.0
20.	T_{vuv20}	58.8	44.	T_{vuv44}	57.7
21.	T_{vuv21}	57.7	45.	T_{vuv45}	55.5
22.	T_{vuv22}	60.0	46.	T_{vuv46}	56.6
23.	T_{vuv23}	61.1	47.	T_{vuv47}	54.4
24.	T_{vuv24}	60.0	48.	T_{vuv48}	57.7
Control - 58.8					