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PRODUCTIVITY OF TOXIC METABOLITES BY ISOLATES OF RHIZOCTONIA SOLANI

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ABSTRACT

Five different isolates of *R.Solani* collected from Coimbatore, Madurai, Aliyar, Ambasamudrum and Gobi in Tamilnadu were assessed for the production of toxic metabolites. The culture filtrate of each isolate was considered as a toxic sample and was assayed for toxicity by bioassay of seed germination and radicle length of toxin treated rice seeds. All the isolates were found to reduce significantly the germination percentage of rice seeds and also the radicle length in germination seeds as compared to control indicating the presence of some toxic metabolites produced by the pathogen.

Production of toxin by *R.Solani* has been reported by many workers. (Kohomoto et.al. 1973, Ramalingam 1981, Iacobellis and Devey; 1986). In the present study, the isolates collected from various places showed variation among themselves. They differed in their germination of sclerotia, growth in different media, colour of mycelia, branching pattern and growth habit of mycelium, the colour, size, pattern of distribution and number of sclerotia/per unit area. It was also found desirable to

see whether there is any difference in the toxic metabolites produced by them and hence this study.

MATERIALS AND METHODS

In order to find out toxin production, if any, by the isolates of *R.Solani*, the various isolates from Madurai, Coimbatore, Aliyar, Ambasamudrum and Gobi in Tamilnadu were grown in Czapek's-dox liquid medium. One hundred ml. of czapek's-dox medium was taken in a

flask for growing each isolate. The isolates were inoculated individually and incubated at room temperature, $26 \pm 2^\circ\text{C}$. After 10 days of incubation, the culture filtrates were filtered through what man No. 42 filter paper. The culture filtrate of each isolate was considered as a toxin sample. The experiment was conducted in replicated conditions.

Bio Assay of Toxin

The toxins were assayed by the following Methods.

(a) **Seed germination** : Paddy seeds of variety IR.50 were soaked for 8 hours in the culture filtrates. For each replication, 25 seeds were taken and spread on a filter paper and moistened with 5 ml of culture filtrate solution. This was done for the culture filtrate of all the

five isolates. Sterile water served as control (Ludwig, 1957)

(b) **Bio assay of radicle growth** : Paddy seeds of variety IR.50 were placed inside sterilized petridishes containing filter paper wetted with 5 ml of culture filtrates for germination. After four days, the radicle lengths were measured and compared with the radicle lengths were measured and compared with the radicle length of paddy seedlings grown in petridishes containing filter paper wetted with sterile water. The toxic metabolites of all the five isolates were also sprayed on IR.50.

RESULTS AND DISCUSSION

To find out whether toxic metabolites are produced by *R.Solani*, the germination percentage and radicle length

Table 1. Effect of culture filtrates of *R.Solani* isolates on rice seed germination of radicle growth.

Source of Isolates	Germination percentage	Per-cent reduction over control	Mean length of radicle	Per-cent reduction over control
Madurai	168.4 (25.37)	81.04 (69.46)	3.8	55.81
Ambasamudram	24.0 (29.20)	75.40 (71.11)	3.9	54.65
Aliyar	30.4 (33.22)	68.85 (60.01)	4.5	47.67
Coimbatore	32.8 (34.92)	66.39 (57.97)	5.5	35.93
Gobi	49.6 (44.76)	49.18 (46.12)	4.2	51.16
Control (Water)	97.6 (83.08)	-	8.6	-
C.D. (P=0.05)	1.4		0.68	

Figures in parentheses are transformed values.

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of paddy seeds treated with culture filtrates of the five isolates were recorded (Table : 1) The culture filtrates of all the isolates caused a significant reduction in the germination of the paddy seeds. The radicle length was also reduced significantly. The difference in germination of paddy seeds between the isolates were also significant. The Madurai and Ambasamudram isolates reduced the radicle length by 55.8 and 54.7 percent. However, they were on par with Aliyar, and Gobi isolates when their effect on radicle length was compared. The Coimbatore isolate also reduced the radicle length was compared. The Coimbatore isolate also reduced the radicle length but it was least when compared to other isolates. None of these toxic metabolites produced any symptoms on the sprayed plants. The testing of culture filtrates of *R.Solani* isolates indicated the presence

of toxic metabolites which caused reduction in germination as well as inhibition of radicle growth in paddy seeds as observed by Kannaiyan (1977) Though he reported that toxins play a role in the physiology of plant pathogenic *Rhizoctonia*, he also observed only reduction in seed germination. However the exact role of these toxic metabolites in pathogenesis of isolates has not yet been established.

Iacobellis and Davey (1986) noted that production of toxins by all isolates of *R.Solani*. They also reported that total phenylacetic acid (PAA) derivatives by the isolates of *R.Solani* was not related to their pathogenicity and virulence and the non-pathogenic and weakly virulent isolates of *R.Solani* were found to produce the highest quantities of PAA derivatives.

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