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Effect of Urea on Growth Inhibition of *Colletotrichum gloeosporioides* under *In vitro* Conditions

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ABSTRACT

The present investigation was carried out under in vitro conditions in the Department of Plant Pathology, CCS, Haryana Agricultural University Hisar to test the efficacy of urea against Colletotrichum gloeosporioides. The experiment was carried out through poison food technique under in vitro conditions. Urea was found effective in inhibition of mycelial growth up to 62.3 per cent at 2 per cent concentration, while at 5 per cent concentration it inhibited mycelial growth up to 72.8 per cent.

Key words: *Urea, Mycelial growth, Colletotrichum gloeosporioides.*

INTRODUCTION

Mango (*Mangifera indica* L.) is one of the world's most important fruit of the tropical and subtropical countries. It is cultivated extensively as a commercial fruit crop in India, China, Indonesia, Thailand and Mexico. By virtue of its wide adaptation, delicious taste, superb flavour, very high nutritive and medicinal value as well as its religio-historical significance, it is called the "King of the fruits"[8,9]. India is the world's largest producer of mango followed by China and Thailand. In India, the major growing states are Uttar Pradesh, Andhra Pradesh, Bihar, West Bengal, Kerala, Karnataka, Maharashtra, Punjab, Himachal Pradesh and Jammu and Kashmir. In India, it is cultivated in an area over 2163470 hectare with a production of 1852980 metric tonnes of fruit. However, in Haryana mango is cultivated in area over 9220 hectares with a production of 8872 metric tonnes[1]. *C. gloeosporioides* (Penz. and Sacc.), the causal agent of anthracnose of mango (*Mangifera indica* L.) is a devastating pre and post-harvest fungal disease which has wide occurrence and causing substantial yield losses. In India, the pathogen has been reported to infect wide range of cultivated crops, including the mango cultivar[10]. Various biotic and abiotic stresses cause immense loss to mango crop throughout the world and destructive disease of mango are those caused by fungi, bacteria, viruses and phytoplasma. Among biotic stresses, mango anthracnose is the most serious fungal disease that causes maximum damage in mango[6]. Once the pathogen is established, it is difficult to manage due to its wide host range.

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Control of this pathogen by the use of different fungicides with varying degree of success has been reported in literature but literature is silent on the use of urea for the management this *C. gloeosporioides* pathogen in mango crop. Amendments of soil with individual application of mustard oil cake, urea, triple supper phosphate, muriate of potash, zince sulphate and calcium sulphate and their mixed application reduced the level of infection of anthracnose on immature guava[5]. Urea is effective in the control of *Phellinus noxius* (Corn.) G. H. Cunn, which causes brown root disease that, is responsible for damage to numerous orchard and forest tree species in the tropics[2]. Urea is able to reduced populations of certain soil born fungi through NH_3 release upon hydrolysis[4]. The concentration of 0.6M of urea completely inhibited the growth of *C. gloeosporioides*[11]. The aim of our study was to explore the sensitivity of *C. gloeosporioides* to urea under laboratory conditions.

MATERIALS AND METHODS

Effect of urea on inhibition of *C. gloeosporioides* under *in vitro*

The efficacy of urea on the growth of *C. gloeosporioides* was tested *in vitro* using the standard procedure of poison food technique as given by Mayer[7]. Stock solution of urea was prepared in double strength *i.e.* 2% and 5% by dissolving weighed or measured quantity of urea in a measured volume of sterilized water. The double strength PDA medium was also prepared and sterilized at 15 lbs pressure for 20 minutes. An equal volume of urea solution and PDA was mixed in a sterilized conical flask and poured aseptically in the Petri plates. After solidification of medium, each Petri plate was centrally inoculated with 5 mm disc of fungus taken from 8 days old culture of *C. gloeosporioides* with the help of sterilized cork borer and incubated at 25±1°C. Suitable controls were maintained for each concentration with four replications and complete randomize design was followed. The per cent inhibition of mycelial growth over control was calculated by following formula given by Vincent[12].

$$\text{Growth inhibition (\%)} = \frac{(C-T)}{C} \times 100$$

Where,

C= Radial growth of *C. gloeosporioides* mycelium in control.

T= Radial growth of *C. gloeosporioides* mycelium in treatment.

RESULTS AND DISCUSSION

The efficacy of urea was tested under laboratory conditions for the per cent mycelia growth inhibition of *C. gloeosporioides*. The results of experiment in table 1 clearly show that urea inhibited mycelial growth up to 62.3 per cent at 2% concentration, while at 5 per cent concentration inhibited mycelia growth up to 72.8 per cent (Plate 1).

Table 1: Effect of urea against *C. gloeosporioides in vitro*

Urea Concentrations	Per cent growth inhibition	
	Urea	Control
2%*	62.6	0.0
5%*	71.5	
Mean	67.05	

*Mean of four replications

Plate 1: Effect of urea on the inhibition of mycelial growth of *C. gloeosporioides*

Urea is effective in the control of *Phellinus noxius* (Corn.) G. H. Cunn, which causes brown root disease that, is responsible for damage to numerous orchard and forest tree species in the tropics[2]. Urea is able to reduced populations of certain soil born fungi through NH_3 release upon hydrolysis[3,4]. The concentration of 0.6M of urea completely inhibited the growth of *C. gloeosporioides*[11].

REFERENCES

1. Anonymous, *Indian Horticulture Database*. National Horticulture Board, Ministry of agriculture, Government of India, Gurgaon, Haryana (2016).
2. Chang, T. T. and Chang, R. J., Generation of volatile ammonia from urea fungicidal to *Phellinus noxius* in infected wood in soil under controlled conditions. *Plant Pathol.*, **48:** 337-344 (1999).
3. Chowdhury, M.N.A. and Rahim, M.A., Integrated crop management to control anthracnose (*Colletotrichum gloeosporioides*) of mango. *J. Agri. Rural Dev.*, **7:** 115-120 (2009).
4. Chun, D. and Lockwood, J.L., Reduction of *Pythium ultimum, Thielaviopsis basicola* and *macrophomina phaseolina* in soil associated with ammonia generated from urea. *Plant disease,* **69:** 154-158 (1985).
5. Hossain, M. D., Meah, M. B. and Kashem, M.A., Biochemical changes of guava fruit due to infection of anthracnose as influenced by soil amendments. *Bangladesh J. Plant Path.,* **12:** 33-36 (1996).
6. Kumari, P., Singh, R. and Punia, R., Evaluation of fungicides and botanicals against mango (*Mangifera indica*) anthracnose. *Current Journal of Applied Science and Technology*, **23:** 1-6 (2017).
7. Mayer, C.R., Response of selected *Rhizoctonia solani* isolates to different soil chemical tests. *Phytopathology*, **59:** 19 (1962).
8. Pandey, A., Yadav, L.P., Mishra, R.K., Pandey, B.K. and Muthu Kumar, M., Studies on the incident and pathogenesis of *Colletotrichum gloeosporioides* Penz.

Causes anthracnose of mango. *Int. J. Sci. Nat.*, **3:** 220-232 (2012).

9. Shad, M.A., Ansari, T.M., Pervez, H., Rubab, M. and Mahmood, T., Department of Chemistry, Bahauddin Zakariya University, Multan-60800, Pakistan mango research station, Shujabad, Punjab, Pakistan. *Online J. Biol. Sci.,* **2:** 694-696 (2002).
10. Sharma, M. and Kulshrestha, S., *Colletotrichum gloeosporioides*: An anthracnose causing pathogen of fruits and vegetables. *Biosci. Biotech. Res. Asia*, **12:** 1233-1246 (2015).
11. Veverka, K., Stolcova, J. and Ruzek, P., Sensitivity of fungi to urea, ammonium nitrate and their equimolar solution UAN. *Plant Protect. Sci.*, **43:** 157-164 (2007).
12. Vincent, J.M., Distortion of fungal hyphae in the presence of certain inhibitors. *Nature*, **15:** 850 (1947).