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Effect of Carbon, Nitrogen and Soil Organic amendments Against *Phytophthora capsici*

Rashida Perveen, A. Shakoor Shakir and J.H. Mirza
Department of Plant Pathology, University of Agriculture Faisalabad, Pakistan

Abstract: Studies were undertaken to find out the hest source of carbon and nitrogen for the best growth of fungus *Phytophthora capsici* and its biological control. Different organic soil amendments were used against *P. capsici.* The best source of carbon and nitrogen were sucrose and ammonium nitrate respectively. Neem was the must effective organic source in reducing the number of propagules of the fungus.

Key words: *Phytophthora capsici*, collar rot, chiles, nitrogen, carbon, soil organic amendments, Neem

Introduction

Chilli (*Capsicum* L.) is an important vegetable crop cultivated through out the world. Rontrot of chillies appeared in epidemics form in late 1980's which resulted in heavy losses to farmers. Fungi require food for energy for various life activities. Carbon and nitrogen are among major essential elements for fungal growth. Among dilfwent three carbon sources i.e maltose, sucrose, glucose vciri tested for best fungal growth. Similarly three nitrogen sources i.e ammonium nitrate, ammonium sulphate and urea were tested for host nitrogen source. Control of *P. capsici* difficult due to its soil borne nature and complicated life cycle with motile zoospores and thick walled Oospores. In 1987-89 the yield of chillies was reduced from 4.3 tones/hac. to 1.2 tones (Anonymous, 1991).

Saleem *et al*. (1989) have shown that the disease was caused by *Phytophthora capsici* L. *Phytophthora* is truly a remarkable genus of plant pathogenic fungi. Its unique morphoiogical, genetic and physiological features (Sivakadadcham, 1988). Combined with the wide variety of diseases caused on large umber of plants. make *Phytophthora* one of the roost lasmating subjects for investigation.

Materials and Methods

Basal agar medium with following composition was used as substrate for the growth of fungus.

Basal agar medium:

Glucose	20 gm
Agar agar	20 gm
KH_2PO_4	1.5 gm
KNO_3	3.12 gm

Distilled water 1 lit

250 ml of Basal medium was prepared in two flasks. The mount ut glucose in Basal medium was replaced by 4.75 gm/250 ml of maltose and sucrose respectively, keeping in view to balance the amount of carbon in different sugars. Similarly KNO_3 was replaced by different N sources like Amm. Nitrate, Amm. Sulphate and urea separately added to basal medium at 0.30 gm/250 ml, 0.5 gm/250 ml and 0.337 gm/250 ml respectively. The 250 ml of each of the above mentioned media were prepared and autoclaved at 121°C for 20 minutes at a pressure of 151 lbs/sq inch. About 20 ml of each of the sterilized media was poured into each of the 90 mm diameter pew plates. Each plate was inoculated with 0.5 mm disc of *P. capsici* taken aseptically from a three week old culture. Tho inoculated pew plates were incubated at 25 ± 2°C. After 7 and 14 days data on radial growth of the fungus were reported.

Effect of organic amendments on pathogenic potential and population of *P. capsici*: The effect of different six organic amendments on the growth of *P. capsici* was studied the dried and chopped stunt and leaves of tone, wheat straw, Rice husk, dried neem leaves, sugarcane baciasse.

Seven 3 × 6" inch earthen pots were filled with 800 gm of sterilized soil with 8 gm dry matter into each pots. Each substrate was inoculated with ½ petridish (9 diameter) of *P. capsici* and kept for 15 days to allow rotting and 1.25 gm soil was taken from each pot and mixed with 100cc sterilized water to prepare the soil suspension with magnetic stirrer. Three cc of this soil suspension was taken and equally distributed in three petri dishes containing 20cc PARP midium. These petri dishes wore incubated at 25 ± 2°C and number of colonies of fungus were counted after 7 and 14 days and data was analysed statistically (Huang, 1991; Nam *et al*., 1988).

Results and Discussions

Three carbon sources i.e sucrose, glucose and maltose were tried for the growth of the fungus.

Table 1: Effect of different carbon, nitrogen and soil organic amendments on mean mycelial growth (in mm of *P. capsici*)

Treatment	Growth	No. of colonies/g of soil
Carbon sources		
Glucose	13.86 a	
Surcrose	16.33 a	
Maltase	9.73 b	
Treatments		
Nitrogen sources		
Amm. nitrate	44.33 a	
Amm. sulphate	19.06	
Urea	2.86	
Treatment of organic amendments		
Barseem		1.333 c
Toria		3.000 bc
Wheat straw		1.333 c
Rice husk		1.666 bc
Neern		0.667 c
Sugarcane bagasse		1.333 c
Control		4.667 a

The results of the experiment showed that the best source

of carbon was sucrose for the maximum growth of the fungus whereas maltose was poor source of carbon for the growth of *P. capsici*. Similarly Ammonium nitrate was the best source of nitrogen for the fungus and urea was found to be the most poor source of nitrogen but Ammonium sulphate was found comparatively better than Potassium nitrate and urea. Gumargalieva *et al*. (1991) concluded that nitrate increased the growth of *P. infestans in vitro*.

The mycelial growth of *P. capsici* was most sensitive to neem while least sensitive to toria and with an intermediate sensitivity to berseem, wheat straw and sugarcane basgasse. At the rate of 1% organic amendment, neem checked the propagule production (Hafiz, 1986; Ko, 1985). Berseem, wheat straw and sugarcane bagasse reduced the production of propagules greater than toria. So toria was least effective organic amendment in reducing the propagules as shown in Table 1.

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