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EFFECT OF DIFFERENT NITROGEN SOURCES ON THE GROWTH OF FUSARIUM OXYSPORUM F. SP. CORIANDRII CAUSING WILT OF CORIANDER

Dr. Rajiv Savanta Karpe*

Assistant Professor Department of Botany, Ajara Mahavidyalaya, Ajara, Dist. Kolhapur (Maharashtra) *Corresponding Author

ABSTRACT Nitrogen is one of the most important and essential nutrition required for the proper growth and development of pathogen. It is an important component required for protein synthesis and other vital functions. In the present study investigation has made on the effect of different nitrogen sources (sodium nitrate, ammonium nitrate, potassium nitrate and calcium nitrate) on the mycelial growth of Fusarium oxysporum f. sp. coriandrii causing wilt of Coriander. For this study wild sensitive and highly resistant isolate were selected. It was observed that, there was variation in the mycelial growth of the sensitive and resistant isolate on the different Nitrogen sources. However, Sodium nitrate was found to be the best source of nitrogen. Resistant isolate always showed highest growth as compared to the sensitive isolate. This research work helps to manage the growth of pathogen.

KEYWORDS : Coriander, Nitrogen, Fusarium oxysporum, coriandrii

Introduction:

Coriander (Coriandrum sativum Linn.) is an important spice crop belonging to family Apiaceae. The plant is used in preparing chutney and leaves used for flavouring curries soups and savouries. Dry fruits are extensively used in pickle preparation, curry powder seasoning and sausages. The seeds are also considered to be carminative, diuretic stomatic, tonic antibilious, refrigerant and aphrodisiac (Duke,1981)

The wilt of coriander caused by Fusarium oxysporum f. sp. coriandrii Narula and Joshi is very serious disease in India. According to Tewari and Mukhopadhyay (2003) wilt of coriander caused by Fusarium oxysporum f. sp. coriandrii Narula and Joshi is one of the most serious disease. Wilt of coriander is controlled by using fungicide benomyl, but there are several reports stating benomyl resistance in Fusarium oxysporum Schlec., (Kamble and Gangawane 1994).

Nitrogen is one of the most important and essential nutrition required for the proper growth and development of pathogen. It is an important component required for protein synthesis and other vital functions. In the present study investigation has made on the effect of different nitrogen sources (sodium nitrate, ammonium nitrate, potassium nitrate and calcium nitrate) on the mycelial growth of Fusarium oxysporum f. sp. coriandrii causing wilt of Coriander. For this study wild sensitive and highly resistant isolate were selected. It was observed that, there was variation in the mycelial growth of the sensitive and resistant isolate on the different Nitrogen sources. However, Sodium nitrate was found to be the best source of nitrogen. Resistant isolate always showed highest growth as compared to the sensitive isolate. This research work helps to manage the growth of pathogen.

Material and Methods:

a) Isolation of Pathogen:

The survey of major coriander growing regions was conducted in different districts of Maharashtra state. For collection the samples of coriander showing wilt symptoms were brought to laboratory in clean sterilized polythene bags. Infected parts were cut in to 4-5 mm pieces, these were surface sterilized with 70% alcohol for few seconds and then rinsed 3 times with sterilized distilled water to remove traces of alcohol.

The cut pieces were aseptically blotted and inoculated on Czapek Dox Agar medium plates amended with streptomycin sulphate to avoid bacterial growth and incubated at 28 ± 20C for 8 days. The pathogen Fusarium oxysporum f. sp. coriandrii Narula and Joshi, was identified with the help of relevant mycological literature (Subramanian, 1972; Barnett and Hunter, 1972) and then followed the Kochs postulates. Pure cultures were transferred to Czapek's Dox Agar slants and maintained at 50C in refrigerator and used for further study whenever necessary.

b) Effect of Nitrogen Sources: -

Different nitrogen sources like sodium nitrate, ammonium nitrate, potassium nitrate and calcium nitrate (each 0.2%) were added in Czapek's Dox Agar medium. 8mm discs of sensitive and resistant isolates were taken from actively growing mycelium and were placed upside down on Czapek's Dox Agar medium. Plates without nitrogen source served as control. Plates were incubated at 28 ± 20C. The linear mycelial growth was recorded at specific intervals of time up to 8 days.

Table 1 – Effect of different nitrogen sources on the radial mycelial growth (mm) of sensitive isolate of Fusarium oxysporum f. sp. coriandrii Narula and Joshi on Czapeck Dox Agar medium.

Nitrogen (0.2%)	Days							
	1	2	3	4	5	6	7	8
Sodium nitrate	14.66	28.33	32.66	46.66	63.33	65.66	74.66	86.33
Ammonium nitrate	14.33	16.33	24.33	32.66	40.66	49.66	60.33	67.66
Potassium nitrate	15.66	18.66	26.66	33.33	46.66	55.33	63.33	70.33
Calcium nitrate	10.33	15.33	24.33	26.66	33.33	44.33	52.33	56.66
Control	10.33	14.66	22.33	28.66	36.33	43.33	49.33	55.33

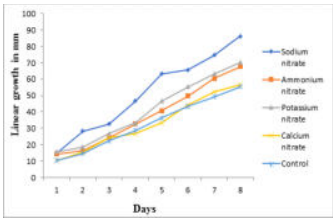

Fig. 1. Effect of different nitrogen sources on the radial mycelial growth (mm) of sensitive isolate of Fusarium oxysporum f. sp. coriandrii Narula and Joshi on Czapeck Dox agar medium.

Table 2 – Effect of different nitrogen sources on the radial mycelial growth (mm) of resistant isolate of Fusarium oxysporum f. sp. coriandrii Narula and Joshi on Czapeck Dox agar medium.

Nitrogen (0.2%)	Days							
	1	2	3	4	5	6	7	8
Sodium nitrate	15.66	29.66	40.33	50.66	60.33	70.33	78.66	89.33
Ammonium nitrate	14.33	24.66	33.33	50.66	57.33	65.33	73.33	79.33
Potassium nitrate	15.33	23.66	35.66	51.33	63.66	70.33	79.66	87.33
Calcium nitrate	13.33	24.33	33.66	41.66	52.33	63.66	66.33	72.33
Control	12.66	17.33	22.66	28.66	38.33	47.66	55.33	62.66

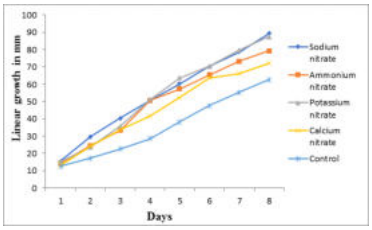

Fig. 2. Effect of different nitrogen sources on the radial mycelial growth (mm) of resistant isolate of Fusarium oxysporum f. sp. coriandrii Narula and Joshi on Czapeck Dox agar medium.

Result and Discussion:

Different nitrogen sources such as Sodium nitrate, Ammonium nitrate, Potassium nitrate and Calcium nitrate were incorporated in medium at the rate of 0.2% and linear mycelial growth of sensitive and resistant isolates was recorded every day up to 8 days. It was observed that nitrogen sources are much essential for growth of both the isolates of Fusarium oxysporum f. sp. coriandrii Narula and Joshi. Resistant isolate always showed highest growth as compared to the sensitive isolate. Maximum growth of both the sensitive and resistant isolates observed on Sodium nitrate. It was best source of nitrogen for both the isolates of Fusarium oxysporum f. sp. coriandrii Narula and Joshi, followed by Potassium nitrate, Ammonium nitrate and Calcium nitrate (Tables 1 and 2, Figs. 1 and 2).

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