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Studies on the Cultural and Nutritional Aspects of *Alternaria cyamopsidis*, Causal Organism of Leaf Spot of Cluster Bean

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Abstract : Studies were undertaken on cultural and nutritional requirements of *Alternaria cyamopsidis*, causal organism of leaf spot of cluster bean. Among the different solid and liquid media tested, Richard's solution/agar supported maximum growth of the fungus but excellent sporulation was observed in potato dextrose and host extract agar. A wide range carbon sources were assimilated by the fungus. Sucrose supported maximum growth of the fungus followed by glucose, and fructose. Among the nitrogen sources tested, calcium nitrate supported good growth of the fungus followed by sodium nitrate.

Introduction

Cluster bean [*Cyamopsidis tetragonaloba* (L) Taub] is one of the important vegetable, green manuring and fodder crops. This crop suffers mainly from the leaf spot incited by *Alternaria cyamopsidis* Rangaswami and Venkatarao. The disease appears in the form of small light coloured spots which later on enlarge and coalsce together involving major portion of leaf blade and under such cases leaflet becomes chloratic and drops off. Such plants fail to produce flowers and fruits resulting in loss of yield. A perusal of the literature revealed that very little work has been done on the cultural and nutritional aspects. Therefore present study was undertaken on these aspects.

Material and Methods

The fungus was isolated on PDA from infected leaves of cluster bean after surface sterilization with 0.1% mercuric chloride. The culture was purified by single spore isolation technique and maintained on PDA.

For growth and sporulation studies, various solid media were used. Fifteen ml of each medium was poured into separate sterilised petri-plates. After solidification, these plates were inoculated in the centre with mycelial disc of 5mm in diameter cut from the periphery of 10 days old culture grown on PDA plates. Then these plates were incubated at 30 + 1°C temperature for a period of 10 days, at end of which observations were recorded on growth of fungus. Each treatment was replicated thrice. Colony colour, surface elevation and sporulation were noted.

In studies on liquid media, different liquid media were prepared twenty ml of each medium was added to each of 100 ml flasks. After sterilization, flasks were inoculated with mycelial disc of 5mm in diameter and incubated at 30 ± 1°C. Dry mycelial weights were recorded after 10 days of incubation.

For the studies on carbon nutrition, carbon source in the basal medium was replaced by an equivalent amount of various carbon sources like sucrose, glucose, maltose, fructose and starch. All these carbon sources were separately incorporated into the same basal medium following sterilization and inoculation. The flasks were incubated at 30 ± 1°C for 10 days. Dry mycelial weights

were taken after 10 days of inoculation.

Like carbon, various sources of nitrogen *viz.*, Urea, ammonium chloride, calcium nitrate and ammonium nitrate were incorporated into the same basal medium separately. Quantity of these nitrogen sources added to the basal medium were determined on the basis of molecular weight of each compound. Three replications were maintained for each treatment. The flasks were inoculated after sterilization and incubated at 30°C at the end of which dry mycelial weights were taken.

Results and Discussion

In studies on growth and sporulation, both Richard's sagar (69.6mm) and broth (620 mg) supported maximum growth of the fungus among various synthetic media, followed by oat meal agar (67.6mm) and oat meal broth (374.6 mg) among non-synthetic media. But excellent sporulation was observed in patato dextrose and host extract agar. This indicates that nutritional requirements for growth and sporulation are different. Similar results were obtained by Singh and Prasad (1973) in case of *A. cyamposidis*.

In the present investigation among the nine different carbon sources tested, sucrose was found to support the maximum growth (535.6 mg) of the fungus followed by glucose (523.6 mg) fructose (499.6 mg) and lactose (422.6 mg). This is probably because sucrose is major sugar component of photosynthetic plants and generally reported to be a good carbon source for plant pathogenic fungi. They are significantly superior to other carbon sources. Poor growth of fungus was recorded in citric acid (259.3mg) and cellulose (207 mg) as carbon sources. This may be attributed to complex nature of polysaccharide like cellulose which could not be efficiently utilised by the fungus.

In the present study among the various sources of nitrogen tested, calcium nitrate supported the maximum growth (490.6 mg) of the fungus followed by sodium (429.0 mg) and ammonium nitrate (408.6 mg). These are statistically significant to other nitrogen sources. The results are comparable with the previous findings on *A. tenuissima* which made good growth in calcium nitrate followed by sodium nitrate (Hanumanthaiah, 1976). In general organic nitrogen sources supported better growth of the fungus than inorganic nitrogen. Least growth of the fungus was obtained in ammonium oxalate (272.6mg) and ammonium chloride (234.3mg). Inferiority of ammonium salts as sources of nitrogen by some fungi was discussed by Cochrane (1958). However, Richards medium supported maximum growth of the fungus. Excellent sporulation was observed in potato dextrose and host extract agars. Sucrose as carbon source and calcium nitrate as nitrogen source supported good growth of the fungus.

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