

EFFECT OF DIFFERENT AMINO ACIDS ON GROWTH AND SPORULATION OF *FUSARIUM SOLANI* IN CULTURE.

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In order to study the different amino acids on growth and sporulation of *Fusarium solani*, seven amino acids were tested in liquid Czapek's synthetic medium, among which asparagine showed excellent mycelial growth at 0.1% followed by methionine (0.1%), serine (0.2%), aspartic acid (0.2%) and others. Sporulation of the test-fungus was also exhibited maximum in all cases except tryptophane where the mycelial growth and sporulation of the test-fungus was not satisfactory. In control the mycelial growth and sporulation of the fungus was negligible, due to absent of amino acids.

INTRODUCTION

The specificity of response to different amino acids indicates that in fungi as in other organism, amino acids are assimilated primarily as such and that conversion to ammonia before assimilation of the nitrogen as at best a secondary pathway (Cochrane, 1958). The value of the individual amino acids for fungi is customarily assayed by growth on media containing the amino acid of interest as the sole nitrogen source. Fungi do not absolutely require any particular amino acids (Foster, 1949). From the literature it is evident that amino acids vary in effectiveness and that even different strains of the same organism response differently to the same source of nitrogen. In addition, amino acids from natural sources may be contaminated with vitamins and there may be metabolic consequences of the chelation of inorganic ions by amino acids. Pilletier and Keitt (1954) have graded the different amino acids depending upon the result recorded from observations on 22 organisms belonging to different groups of fungi.

MATERIALS AND METHODS

The present investigation has been designed to study the effect of different concentrations of some amino acids on growth and sporulation of *Fusarium*

solani isolated from the decayed Singapuri variety of Banana, collected from Burdwan market.

To study the effect of different amino acids on the test-fungus, *Czapek's liquid medium* was selected with different concentrations of seven amino acids viz., aspartic acid, glycine, tryptophane, asparagine, serine, methionine and leucine. The nitrogen source of the *Czapek's* medium was replaced by different concentrations of amino acids viz., 0.02, 0.04, 0.05, 0.10 and 0.20%. The pH of the medium was adjusted to optimum 6.0 by adding N/15 phosphate buffer before sterilization and this did not appreciably change after autoclaving. 25 ml of the medium was taken in 250 ml conical flask, plugged and sterilized at 15 lbs pressure for 15 minutes. The flasks were then inoculated with inocula (5 mm) punched out from cultures on solid *Czapek's agar media*. Three replicates were made for each concentrations. Amino acid-free-medium served as the control. The flasks were then incubated at a constant temperature (30°C) and in complete darkness for 5 days. After the incubation period, the mycelia were harvested, washed and dried at 60°C to constant weight. The dry weight of the mycelium was taken as a measure of growth. For sporulation, the mycelial mat was thoroughly mixed with distilled water and gradation of sporulation were made under the field of microscope by taking 1 ml of the original solution. Gradation of sporulation have done by the method using the sign 4+, 3+, 2+, 1+, -, (excellent, good fair, poor and absent respectively).

RESULTS AND DISCUSSIONS

From the Table, it is evident that out of seven amino acids tested for growth and sporulation of *F. solani*, asparagine (0.1%) shows a remarkably good source of nitrogen, which is most satisfactorily utilised among amino acids included in the study and this is in-conformity with the results obtained by Agarwal (1958), Srivastava (1950), Wolf (1953), and Sethi and Munjal (1963). This is due to the fact that asparagine readily yields ammonia. With the addition of amino acids, however the growth and sporulation of the test-fungus increases considerably in comparison with the control value. In presence of methionine and lysine the mycelial growth of the test-fungus increases gradually from 0.02 to 0.10%, after which the growth of the mycelium gradually declines with further increase in percentage. In case of aspartic acid and serine the fungus shows significant increase in mycelial growth with the increase in concentration from 0.02 to 0.20%. On the other hand, leucine and tryptophane shows less growth even at higher concentrations. Similar results have also been reported by several authors (Basis *et al*, 1970 ; Singh, 1973). Growth of the fungi is usually better with a mixture of different amino acids than with any single amino acid (Cochrane, 1958).

Sporulation of the test-fungus (Table), indicates that excellent sporulation is supported by asparagine (0.10%), methionine (0.10%), serine (0.20%), lysine (0.10%) and aspartic acid (0.20%). Good sporulation is recorded in leucine (0.10%). Fair sporulation is noted in tryptophane. In control the sporulation of the fungus is very poor.

Table 1. Effect of different concentrations of amino acids on growth and sporulation of *Fusarium solani* in culture.

Amino acids	Concentrations in percentage											
	0		0.02		0.04		0.05		0.10		0.20	
	DW	SP	DW	SP	DW	SP	DW	SP	DW	SP	DW	SP
Aspartic acid	0	0	33.0	2+	33.5	2+	36.0	2+	45.0	3+	90.0	4+
Leucine	0	0	36.5	2+	38.0	2+	38.5	2+	43.0	3+	46.5	3+
Tryptophane	0	0	21.0	2+	22.5	2+	26.0	2+	34.5	2+	39.5	2+
Asparagine	0	0	59.0	3+	69.0	3+	99.0	3+	132.5	4+	101.0	3+
Methionine	0	0	55.0	3+	78.5	3+	98.0	4+	124.5	4+	123.5	4+
Serine	0	0	36.5	2+	38.5	2+	62.0	3+	76.0	4+	121.5	4+
Lysine	0	0	35.0	2+	35.5	2+	36.5	3+	86.5	4+	73.0	4+
Control	20.0	1+										

DW=Dry weight in mg.

SP=Sporulation.

Thus it can be stated that significant difference occurs with variation in concentration of amino acids. Moreover, out of seven amino acids, asparagine offers the best source for growth and sporulation of the test-fungus followed by others.

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