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SPORULATION PATTERN IN *ALTERNARIA PORRI (ELLIS) CIF* CAUSING PURPLE BLOTCH OF ONION

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Abstract:

Fungi usually require Thiamine (B1), Riboflavin (B2), Pyridoxine(B6), Biotin, Nicotinic acid, Panthothenic acid, Folic acid, P-aminobenzoic acid, Inesitol and Cyanocobalmin (B12). For the formation of reproductive structures usually require higher concentration of vitamins than that needed for vegetative growth. In view of this concept the induction of sporulation in Alternaria porri(Ellis) Cif causing purple blotch in onion was examined.

Keywords- *Fungal nutrition, vitamins, sporulation, Alternaria porri, . Allium cepa*

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INTRODUCTION:

Vitamins are organic compounds, which are necessary and stimulatory in minute amounts for the growth of various organisms. They act as catalytic agents for constituting the parts of co- enzymes in the cells. Purple blotch caused by *Alternaria porri* (*Ellis) Cif* is one of the most important disease of onion (*Allium cepa*) causing 60-90% losses in yield under severe infection in onion growing region of Central India. A perusal of literature shows that the sporulation in *A. porri* has always been found difficult. Near-UV radiations tried and obtained some success in getting sporulation (1). Whereas various other means like temperature, light, pH and humidity etc, also reported good sporulation by the treatment of light and temperature (2). When the experiments were repeated in this laboratory. Little sporulation was seen. Therefore attempt was made to improve sporulation of *A. porri* by amending Richard's medium with 8 different vitamins.

MATERIALS AND METHODS:

Stock solutions of all the vitamins except Biotin were prepared in double distilled sterilized water autoclaved at 10 Ibs pressure for 10 min added to the medium. Biotin was first dissolved in 5ml of 50% ethanol and made upto required volume with distilled water. The pH of the Richard's basal medium was adjusted to 6 before autoclaving. Basal Medium without vitamin served as control. Triplicate flask contains 100 ml medium were incubated at 25 ± 2^0 C for 20 days. Mycelial mats were filtered through Whatman No. 42 filter paper, washed thrice with distilled water and dried to a constant wt at 60^0 C. Another experiment was carried out to determine the need of each vitamin (Table2). For this purpose besides basal medium as control 1, another set of basal medium containing all the vitamins together was prepared to serve as control 2. The other treatments contained all but minus one vitamin. For the estimation of sporulation fungal growth was homogenized in a pestle and mortar, and making the volume upto 100 ml and mixed thoroughly. Four equal drops of suspension as spread over a glass slide and number of spores counted under microscope. The data was graded from nil to excellent (Table1).

RESULT AND DISCUSSION:

The Present study gave very promising result which was helpful in improving sporulation with the addition of various vitamins to provide favourable environment. Table1 shows the effect of 8 vitamins on the sporulation of the fungus. *A. porri*. Pyridoxine and nicotinic acid promoted maximum growth and excellent sporulation of the fungus. Thiamine and biotin significantly increased mycelial growth but fair sporulation. Calcium penthothenate showed depression of growth and poor sporulation. Ascorbic acid and Folic acid showed very poor mycelia growth and totally checked sporulation. Presence of all vitamins in the medium promoted good growth of the fungus but supported fair sporulation. Dry mycelia weight taken in absence of all the vitamins i.e. control exhibited sporulation. All the vitamins studied improved sporulation except folic acid and ascorbic acid. All the vitamins when present in the medium as in control 1 showed fair amount of sporulation but vitamin less medium showed nil sporulation. Removal of pyridoxine and nicotinic acid decreased the mycelia growth as well as sporulation. Whereas by omitting thiamine and biotin mycelial growth was increased significantly and good sporulation was also observed. Riboflavin less medium showed good fungal growth and fair sporulation while calcium penthothenate less medium supported good fungal growth as well as sporulation. Ascorbic acid and folic acid deficient media also supported good fungal and sporulation. The results were very specific and highly significant. The above results unequivocally proved that the Richard's medium+500mg pyridoxine and double distilled water to make it 1 litre yielded maximum sporulation comparatively with that of other vitamins containing Richard's medium and control. Present study supports previous findings with other fungi (3-11). Although *A. porri* has no obligate vitamin requirements under the conditions tested, yet pyridoxine, nicotinic acid, riboflavin considerably increased the rate of growth and proved to be good stimulants for sporulation. These vitamins had more pronounced effect than others. All vitamins proved to be good for sporulation except ascorbic acid and folic acid. Large increase in growth can be brought about by disproportionately increasing the concentration of food present in their one time best synthetic medium. If this proves to be true for *A. porri* then there is no reason to expect that it will not be same for others.

Table 1: Effect of different vitamins on the growth and sporulation of *A. porri* (Average of triplicates)

Vitamins sources	Concentration (µg/ml)	Final pH	Dry wt. (mg)	Sporulation
Thiamine	1	8.2	56.5	F
Biotin	5	7.0	54.1	F
Riboflavin	1	7.4	71.2	G
Pyridoxine	500	7.4	78.7	E
Nicotinic acid	500	7.1	74.2	G
Calcium Pentothenate	200	7.2	42.0	P
Ascorbic acid	4	8.2	32.8	N
Folic acid	1	8.1	24.4	N
All vitamins	-	8.1	67.7	F
Control (No vitamins)	-	7.1	71.5	N

* S.E ± 0.270, C.D. at 1% 1.099

*N= Nil, P= Poor, F= Fair, G= Good, E= Excellent

Table 2: Effect of different vitamins specifici ty on the growth and sporulation of *A. porri* (Average of triplicates)

Vitamins sources	Final pH	Dry wt. (mg)	Sporulation
All vitamins	8.2	69.2	F
AV- Thiamine	8.0	71.0	G
AV- Biotin	6.8	72.5	G
AV- Riboflavin	8.3	60.2	F
AV-Pyridoxine	8.4	58.3	P
AV-Nicotinic acid	6.8	63.7	G
AV-Calcium Pentothenate	8.0	69.8	G
AV-Ascorbic acid	8.2	52.2	P
AV-Folic acid	8.5	69.4	G
Control (No vitamins)	7.1	75.4	N

* S.E ± 0.17, C.D. at 1% 0.57

*N= Nil, P= Poor, F= Fair, G= Good, E= Excellent

CONCLUSION:

Thus it seems reasonable to predict that the susceptibility of its host is determined in part by the presence and proportion of necessary food and in part by the interaction between these positive factors and various negative factors which may also be present at the same time. A complete analysis of this problem in this more simple situation should make possible generalization of significance in the whole field of parasitism.

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