INFLUENCE OF NITROGEN NUTRITIONS ON ASEXUAL REPRODUCTION OF FIVE SPECIES SPHAEROPSIS SACC. IN CULTURE

by

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ABSTRACT

Effect of fourteen different nitrogen sources on five species of Sphaeropsis i.e. S. cactinae, S. cycadis, S. jodhpurensis, S. muelhenebeckiae and S. punicae, obtained respectively from the infected parts of Citrus medica, Cycas circinalis, Cordia gharaf, Muehlebeckia platyclados and Punica granatum was studied, under cultural conditions on Asthana and Hawker's Medium "A" by substituting its nitrogen with equal quantity of an other nitrogen source. All the present species reproduced well on potassium nitrate, sodium nitrate, ammonium sulphate and ammonium nitrate. None of the present species could grow on sodium nitrite. Out of all amino acids, no one was found to be excellent for the growth and sporulation of the present fungi. Most of the amino acids supported poor growth and sporulation of three of the five species of Sphaeropsis, S. cactinae, S. cycadis and S. punicae on L-asparagine, Glycine, L-cystine and L-alanine. Maximum and minimum pH for growth and sporulation ranged from 6.5 to 7.8 and 5.3 to 4.2 respectively. Decrease in adjusted pH was also observed for all the species on L-asparagine and DL-valine.

INTRODUCTION

Parasitic diseases occur as a result of metabolic interchanges between the parasite and the host. Metabolites of the pathogens may act as acute provokers of the disease which kill the host tissues by producing inter- or intracellular mycelium with enormous number of asexual and sexual reproductive structures. The development of growth and propagative bodies by the pathogens depend on their efficacy of utilizing the nutritional substances present in the substrate, as they are highly specific in their food requirements. The earlier workers investigated that among all the nutritional substances, carbon and nitrogen compounds are of much value for the development of fungi, but nitrogen compounds are reported to be less effective than carbon compounds. Mix (1933) reported that various isolates of Phyllosticta solitaria responded differently towards certain nitrogen compounds, but in general, nitrate nitrogen was found to be most favourable. Saksena & Kumar (1961) have observed that Botryodiplodia sp. reproduced well on potassium nitrate while B. theobromae Pat. was not able

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to produce spores on this source. Inability to utilize nitrates is specially common in some higher groups of fungi e.g. the Basidiomycetes, the Saprolegniales and the Blatocladiales so far as known (LILLY & BARNETT, 1951). ELLIS (1931), however, recorded only negligible sporulation of *Pleospora herbarum* (Pers.) RABENH., on nitrogen compounds.

In class Imperfecti, members like *Diplodiazeae* (HAWKER, 1950), *Phyllosticta cycadis* and *P. artocarpina* (TANDON & BILGRAMI, 1954 and 1957), *Phoma betae* and *Septoria nodorum* (LILLY & BARNETT, 1951) have been reported to be reproduced differently on various media containing nitrogen compounds.

The pH values of the medium also influence the fungal growth as well as reproduction. A fungus grow maximally over a certain range of initial pH and fail to grow over high and low extremes of pH. However, basically the pH is not a unitary factor because the mechanism of its action differs at various concentration of the hydrogen ions present in the medium. Most plant pathogens e.g. *Septoria pepli*, *Cercospora kikuchii* and *Fusarium aqueductum* grow best in media with a constant range, respectively at 4.8-6.8, 4.1 and 4.0-9.0 (LILLY & BARNETT, 1951).

**MATERIALS AND METHODS**

Five species of *Sphaeropsis* i.e. *S. cactinae* RAO, *S. cycadis* MUNDKUR & AHMAD, *S. jodhpurensis* SHREEMALI & BILGRAMI, *S. muehlenbeckiae* BILGRAMI & SHREEMALI and *S. punicae* SHREEMALI & BILGRAMI, obtained respectively from the leaf spots of *Citrus medica* LINN., *Cycas circinalis* (BOED.) THUNB., *Cordia qharaf* (FORSK) EHRENB. ex ASCHERS were selected for the present investigation. Nitrogen was substituted from Asthana and Hawker's medium A (Glucose 5 g, KH$_2$PO$_4$ 1.75 g; MgSO$_4$ 7H$_2$O 0.75 g; KNO$_3$ 5g; agar agar 20 g and distilled water 1 litre) by fourteen different nitrogen substances and their quantities were adjusted in such a manner so as to furnish the 0.485 mg of nitrogen per litre. Pure Chemicals supplied by B.D.H. or Sarabhai Merck and Pyrex glass wares were used during the experiment. 15 ml of liquid culture media were taken in 150 ml of conical flasks and sterilized at 15 lb pressure for 15 minutes. The pH of the different media was adjusted to 5 as it was recorded to be the optimum pH for the development of fungi. The flasks were incubated at room temperature for 25 days. The cultures were filtered through previously dried and weighed Whatman's filter paper No. 1 and dried in an electric oven at 60°C. It again weighed after allowing to cool and noted the dry weight of fungal mycelium. The final pH of the filtrate after 25 days has also been recorded.

Gradation of sporulation was done on the basis of the spore count as well as the visual observation, as follows: