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Effects of different carbon and nitrogen sources on growth and spore-production of *Alternaria alternata* Kleissler causal fungus of leat spot and bud rot of marigold (*Tagetes erectus* L.)

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Effect of six carbon and six nitrogen sources on the growth and sporulation of *Alternaria alternata* was recorded *in vitro*. Among the carbon and nitrogen sources, maximum growth (dry weight) was observed on peptone and sucrose respectively. In case of carbon sources excellent sporulation occurred on sucrose and maltose, while remaining carbon sources supported good sporulation. No sporulation was found in control. Among nitrogen sources, peptone and sodium nitrate gave excellent spore-production. No sporulation was observed on urea and control.

Key words : *Alternaria alternata*, marigold, growth, sporulation

INTRODUCTION

Marigold (*Tagetes erectus*) is now an important flower crop cultivated in India and abroad. Marigold as cut-flower has tremendous demand in local market and has been exported in foreign countries. This flower crop is highly vulnerable to *Alternaria* leaf spot and bud rot discases caused by *Alternaria alternata* Kleissler fungal pathogen (Sohi 1991). The objective of this study was to evaluate various carbon and nitrogen sources on the growth and sporulation of *Alternaria alternata in vitro.*

MATERIALS AND METHODS

Basal Czapeck-Dox Broth (Raper and Thom, 1949) medium was used for culturing the fungus. Six carbon compounds viz. sucrose, dextrose, galactose, maltose, mannose, mannitol were used to replace sucrose individually in equivalent quantities of 30g of sucrose. A carbon-free medium served as control. Similarly, six nitrogen sources viz. peptone, potassium nitrate, ammonium nitrate, ammonium acetate, sodium nitrate and urea were substituted singly for sodium nitrate in the medium. The concentration was so adjusted to get the amount of nitrogen present in 2 g of sodium nitrate per litre of the basal medium.Peptone was substituted in equal amount to sodium nitrate. Medium without nitrogen served as control. Each sterilized flask (150 ml) containing 50 ml of Czapeck-Dox broth at 6.5 pH was inoculated with 5mm disc of fungus obtained by a sterilized cork borer and incubated at 28 ± 1° C in B.O.D. incubator for 10 days in triplicate. Mycelial mats from each flask were obtained through Whatman's filter paper No. 42, washed with sterile distilled water and dried in over at 60° C for 48 h, then cooled in desiccator and to measure the fungal growth as dry weight for *A. alternata* on every carbon or nitrogen sources.

The efficacy of different carbon and nitrogen sources in spore production was determined by counting the number of conidia per ml of fungal suspension in liquid media under microscope.

RESULTS AND DISCUSSION

The results from Table 1 indicate that carbon source sucrose supported maximum growth (610.20 µg) followed by dextrose, galactose, maltose respectively. Sporulation was excellent on sucrose and maltose, good on dextrose, galactose and mannitol but in control no sporulation occurred. These findings were at par with Maheshwari *et al.* (2000) and Mathur and Sarbhoy (1977) who reported that sucrose yielded best spores of *A. alternata* pathogenic to bean and pea respectively.

Table 1 : Effects of different carbon sources on the growth and sporulation of *A. alternata* at 28 ± 1°C

Carbon Sources	Mycelial dry Weight (µg)*	sporulation
Sucrose	610.20	++++
Dextrose	580.10	++
Galactose	530.00	++
Maltose	528.20	++++
Mannose	440.30	++
Mannitol	409.10	++
Control	80.20	–
C.D. at 5% level	25.20	

– = Nil ; ++ = good ; ++++ = Excellent
* Average of three replications.

Table 2 : Effects of different nitrogen sources on the growth and sporulation of *A. alternata* at 28 ± 1°C

Nitrogen Sources	Mycelial dry Weight (µg)*	sporulation
Peptone	820.10	++++
Potassium nitrate	720.00	++
Ammonium nitrate	705.00	++
Ammonium acetate	680.20	++
Sodium nitrate	630.10	++++
Urea	401.00	–
Control	90.20	–
C.D. at 5% level	20.12	

– = Nil ; ++ = good ; ++++ = Excellent
* Average of three replications.

The data tabulated in Table 2 show that peptone was the best source of nitrogen for the growth of *A. alternata* followed by potassium nitrate, ammonium nitrate, ammonium acetate respectively. The control supported poor growth. In case of sporulation, peptone and sodium nitrate yielded excellent spores. Other nitrogen sources supported good spore-production but urea and control have no positive effect on sporulation of *A. alternata*. These results are in accordance with the observations of Susuri and Hagedorn (1986) and Maheshwari *et al.* (2000) who recorded best growth and sporulation of *A. alternata* in peptone.

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