

# Influence of Nitrogen Sources on the Growth and Sporulation of *Alternaria carthami*

Shinde. A. B.

Sharda Mahavidyalaya, Parbhani, Maharashtra, India

**Abstract:** The growth of pathogen i.e. *Alternariacarthami* causing *Alternaria* Blight of Safflower in presences of different nitrogen containing Organic sources like Asparagine, Leucine, Cystine, and Urea along with different nitrogen containing Inorganic sources viz Potassium nitrate ( $KNO_3$ ), Ammonium nitrate ( $(NH_4)_2NO_3$ ) and sodium sulphate ( $Na_2SO_4$ ) were used for the study at 0.25 percent. The nutritional requirement of both the nitrogen sources was different. Some nitrogen sources stimulated the growth of the pathogen and some sources are best for sporulation. The Asparagine among the organic and potassium nitrate among the inorganic nitrogen sources were found to be the best sources for the growth and sporulation of *Alternaria carthami*, whereas cystine and urea were found to be inhibitory for growth and sporulation.

**Keywords:** Nitrogen sources, *Alternaria carthami*, safflower

## I. INTRODUCTION

*Carthamus tinctorius L.*, commonly known as safflower or kardi, is an important oilseed crop belonging to the family Asteraceae and grown worldwide. It is a rich source of essential polyunsaturated fatty acid and lactic acid, which helps in reducing cholesterol level in human blood. The potential yield of this crop is affected by a number of diseases. The decreased productivity of safflower is due to the attack of fungal, bacterial and viral diseases are responsible for seed, seedlings and foliar destruction by causing diseases and ultimately yield was lost (Kalpana Shastry and Jayashree Jayaman, (1993). Seed born pathogen with *Alternaria* blight caused by *Alternaria carthami* causes heavy losses to the crop (Klisiewicz, 1963). In order to investigate the control of *Alternaria* blight of safflower the effect of different nitrogen sources on the growth of *Alternaria carthami* was studied.

## II. MATERIAL AND METHODS

In present study the influence of nitrogen sources on the growth & sporulation of *Alternaria carthami* were studied. Whereeight nitrogen sources were used., in which four were organic nitrogen sources and four were inorganic. The Czapek's dox agar media were sterilized in autoclave at 15 lbs/inch<sup>2</sup> pressure for 15 min.and after cooling at room temperature poured 15 ml /plates into sterile glass petriplates aseptically. The media without nitrogen sources was acted as control. These plates were inoculated with 5 mm mycelial disc of *A. carthami* was inoculated in the centre of the periplate. The inoculated plates were incubated at room temperature. Each treatment was replicated thrice. The observation on radial mycelial growth in diameter(mm) & sporulation were recorded at 24 hrs interval and continue till 10 days after inoculation.

**Table 1: Effect of different nitrogen sources on the growth & sporulation of *Alternaria carthami*.**

Treatment	Mean colony diameter( mm)*	Sporulation
<b>Organic sources</b>		
Asparagine		
46.8	++++	
Cystine		
20.2	+	
Urea	15.5	+
Leucine	32.5	+++

Inorganic Source		
Potassium nitrate (KNO <sub>3</sub> )	40.2	++++
Ammonium sulphate (NH <sub>4</sub> )SO <sub>4</sub>	32.5	++
Ammonium nitrate (NH <sub>4</sub> )NO <sub>3</sub>	37.0	+++
Sodium sulphate NaSO <sub>4</sub>	28.5	++
Control	55	++++
S.E +/-	0.48	-
C.D.(P=0.05)	1.60	-

\*Mean of the three replication

++++ Excellent, +++ Good, ++ fair, + poor

### III. RESULTS AND CONCLUSION

Cultural characteristic viz., mycelial growth and sporulation of *A. carthami* were studied *in vitro* using eight nitrogen sources. Out of eight nitrogen sources four were organic and four were inorganic. The results (Table-1) revealed that amongst the organic sources Asparagine was found most suitable for the growth and sporulation of *A. carthami* followed by leucine & cystine. Urea was found least suitable for radial mycelial growth of test pathogen. Whereas in inorganic nitrogen sources potassium nitrate was found most suitable for radial mycelial growth of test pathogen followed by ammonium nitrate, Ammonium sulphate & sodium sulphate.

#### Sporulation:

All eight nitrogen sources tested demonstrated a wide range of sporulation, varying from excellent (++++) to poor (+). Among the organic sources, asparagine exhibited excellent (++++) sporulation, while leucine and cystine showed good (+++) sporulation. In contrast, urea resulted in poor (+) sporulation. Regarding inorganic nitrogen sources, potassium nitrate recorded excellent (++++) sporulation, and ammonium nitrate showed good (+++) sporulation. Ammonium sulphate and sodium sulphate yielded fair (+) sporulation.

Different researchers have utilized various nitrogen sources in their studies. Pande and Verma (1992) examined the impact of ammonium salts as nitrogen sources on the growth and sporulation of three seed-borne fungi in pigeon pea. Solunke (1996) investigated the effects of 0.25% ammonium nitrate, potassium nitrate, and sodium nitrate on *Sclerotium rolfii*. The present study corroborates earlier findings by Deshpande (1973) and Narwade (1994), highlighting the superiority of asparagine over leucine, cystine, and urea among organic sources, as well as the superiority of potassium nitrate over ammonium sulphate, ammonium nitrate, and sodium sulphate among inorganic sources (Ramjegathesh & Ebenezer, 2012; Gholve et al., 2015).

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