

Research Paper :

## Biochemical alterations caused by *Alternaria alternata* in *Raphanus sativus* L. var. (Mino Early)

NEERAJ AND SHILPI VERMA

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See end of the article for authors' affiliations

Correspondence to :

NEERAJ

Department of Botany,  
Feroze Gandhi College,  
RAI BAREILLY (U.P.)  
INDIA

### SUMMARY

The alterations in total soluble sugar, reducing sugar, non-reducing sugar and total phenol contents caused by *Alternaria alternata* in *Raphanus sativus* L. var. Mino Early were studied. The quantitative estimations were done at 40 days after sowing (DAS) *i.e.* before inoculation, 20 days after inoculation (DAI) and 40 DAI. It was observed that total sugars and non-reducing sugars decreased with age and infection. In case of reducing sugars a decline was recorded in all the tissues with increasing plant age but the amount increased in all the infected tissues as compared to healthy tissues. Total phenols however, were reduced with both, plant age and infection.

### Key words :

*Raphanus sativus* L.,  
*Alternaria alternata*, Sugars,  
Phenols

Radish (*Raphanus sativus* L.) is one of the most ancient brassicaceous root vegetables grown in both tropical and temperate regions. It is a good source of vitamin A, thiamine, riboflavin, nicotinic acid and vitamin C. Yield of radish is affected by several factors, among these, diseases are the major constraints in successful cultivation of this crop. Among diseases, infection caused by *Alternaria alternata* lead to severe foliage and pod blight. Suhag *et al.* (1983) reported that *A. alternata* infection in radish reduced seed yield by as much as 18%.

Various metabolites of host tissues suffer modifications in their composition due to infection by a pathogen. Alteration in the levels of sugars and phenols in many plants due to *Alternaria* infection have been investigated by many workers (Chandramohan *et al.*, 1967; Gupta *et al.*, 1987; Saharan *et al.*, 2000; Joshi *et al.*, 2004; Saharan and Saharan, 2004 and Kushwaha and Narain, 2005). The present investigations were therefore, made to study the effect of *A. alternata* infection on sugar and phenol contents of *Raphanus sativus* L.

### MATERIALS AND METHODS

The locally grown variety of radish (*R. sativus* L. var. Mino Early) was selected as host for the study. The pathogen, *Alternaria alternata* isolated by single spore culture technique from naturally infected radish leaves growing in Rai Bareilly district was maintained

on PDA slants. 15-days old cultures growing on PDA medium were used for inoculation of experimental plants.

The surface sterilized seeds were sown in 30cm pots and 5 plants/pot were maintained. There were 15 replicates of such pots. 40 days after sowing (DAS) the plants were inoculated with spore-cum-mycelial suspension of *A. alternata* and were kept covered by plastic bags to maintain humid micro-environment for 48hrs. A set of control plants was also raised by sowing surface sterilized seeds in sterilized soil and sprayed with distilled water only.

For biochemical estimations the leaves were collected forty days after sowing (DAS) just before inoculation and thereafter 20 and 40 days after inoculation (DAI). The respective tissues were taken from control plants. From inoculated plant leaves, diseased (necrotic + chlorotic portions), pre-halo and intervening tissues (apparent green tissues between pre-halo tissues of adjacent spots), were collected. The samples were oven dried at 60°C for 48hrs. One gram of powdered leaf tissue samples was used for all the estimations.

The total soluble sugars were estimated by the Anthrone method of Dubois *et al.* (1951) and reducing sugars by Nelson - Somogyi's method (Nelson, 1944). Standard curves were prepared with glucose. Non-reducing sugars were calculated by subtracting reducing sugar values from total sugars content values. Total phenols were estimated by Folin-ciocalteu

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