

Research Paper :

Quantitative changes in sugar and phenolic contents of *Brassica* leaves induced by *Alternaria brassicae* infection

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SUMMARY

Quantitative changes in biochemical constituents in leaves of *Brassica campestris* L. var. Varuna type-59 infected with *Alternaria brassicae* causing leaf and pod blight were studied. The total soluble sugars, reducing sugars, non-reducing sugars and total phenols were estimated in healthy and different diseased tissues of infected leaves 20 and 40 days after inoculation. The amount of all four constituents were also recorded and compared with those at 40 Days after sowing (*i.e.* before inoculation). All the four chemicals decreased with increase in plant age in both diseased and healthy tissues. The reduction was also recorded in total phenol contents in diseased leaf tissues.

Key words :

Alternaria brassicae,
Brassica campestris,
Sugars, Phenols

Brassica campestris L. is one of the important oil-yielding crops in India. It is a rich source of vitamins and minerals and also contains many medicinal properties. *Brassica* crops are infected by a number of pathogens culminating in huge losses in seed yield. Among various diseases, *Alternaria* leaf and pod blight caused by *Alternaria brassicae* is highly destructive leading to 10-70 per cent yield losses (Kolte *et al.*, 1987). This fungus also deteriorates the quality of the produce (Kadian and Saharan, 1983).

Alternaria infection causes considerable changes in the sugar and phenolic contents of the plant (Chopra and Jhooty, 1974; Nema, 1983; Chahal, 1986; Gupta *et al.*, 1987; Kumar and Singh, 1996; Saharan and Saharan, 2004; Joshi *et al.*, 2004; Kushwaha and Narain, 2005). Therefore, the present study was undertaken to know the effect of *Alternaria brassicae* infection on different biochemical constituents of *Brassica* leaves.

MATERIALS AND METHODS

Alternaria brassicae was isolated from diseased leaves of *Brassica campestris* from fields in Rae Bareli district, purified by single spore technique and maintained on PDA slants. The 15 day old cultures grown on PDA medium were used for inoculation.

The locally grown variety of *Brassica campestris* (Varuna Type-59) was taken for the study. The surface sterilized seeds were

sown in 30cm pots and 5 plants/pot were maintained. After attaining the age of 40 days the plants were inoculated with spore-cum-mycelial suspension of the pathogen and were kept covered for 48 hrs in humid plastic bags. A set of control plants were also raised in sterilized soil and sprayed with distilled water only.

The leaves for biochemical estimations were collected at 40 days after sowing (before inoculation) and 20 and 40 days after inoculation (DAI). From infected leaves the diseased portions (consisting of necrotic and chlorotic *i.e.* halo-region tissues), pre-halo tissues and intervening tissues between 2 spots (apparently healthy green tissues) were collected separately. The leaves from uninoculated healthy plants were also collected. All the samples were oven dried at 60°C for 24 hrs and powdered.

One gram leaf samples were used for the estimations of total soluble sugars, reducing sugars, non-reducing sugars and total phenols. The total soluble sugars were estimated by the Anthrone method of Dubois *et al.* (1951) and reducing sugars by Nelson's method, 1944 (Nelson's modification of Somogyi's method). Standard curves were prepared with glucose to calculate the total sugars and reducing sugars. Non-reducing sugars were calculated by subtracting reducing sugars from total sugars. The total phenols were estimated by Folin-Ciocalteu method given by Bray and

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