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RESEARCH NOTE

Enzyme activities of *Brassica nigra* influenced by the infection of certain seed borne fungi

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ABSTRACT

The present study has been carried out to find out the effects of seed borne fungi on enzyme activities of *Brassica nigra* CV. MAHI GOLD. Seeds of brassica nigra were inoculated with three different pathogenic fungal species *viz.*, *Pythium aphanidermatum, Fusarium_oxysporum* and *Alternaria brassicae.* Activity of some enzyme increased in infected plants whereas activity of some other enzymes decreased in the same infected pants. Some other enzyme *i.e.* nitrate reductase and super oxide dismutase were almost equal to healthy plants. However, activity of some other enzymes of the healthy and infected plants was unchanged.

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Seed develops form a fertilized ovule and encloses a miniature plant, the embryo. The embryo grows and forms root and shoot during germination. The cotyledons and endosperms provide nourishment for the early growth of root and shoot axis. The germination potential of the seeds and development of healthy seedling may be regarded as an index of better yield.

The chemical composition of the seed is an important factor in determining the germination of seeds and early growth of seedling. The major components of seeds are carbohydrates, protein and lipids. The seeds imbibe water initiating metabolic changes during germination such as high rate of respiration, protein and nucleic acid synthesis. The enzymes become active for the hydrolysis of reserve food present in the cells which becomes available to the growing embryonic cells in the soluble form resulting in the development of embryo leading to the formation of young seedling.

It has been observed that fungi present on the surface of the seeds or inside the seed cells reduce germination and may cause pre or post-emergance mortality of the young seedling. Hence, the aim of this study was to investigate the physiological changes due to enzymes activity.

Activities of the enzymes catalase was determined as per method suggested by Sinha (1972). Catalase facilitates the dismulation of H_2O_2 to water and oxygen. Peroxidase was studied as per method suggested by Curine and Galston (1954). Enzyme peroxidase catalyses oxidation of substrate which combines with H_2O_2 and release water. Lipid peroxidation was calculated using its extinction coefficent of $155mM^{-1}cm^{-1}$ by Health and Packer (1968) Nitrate reductase was measured by the method of Jowarski (1971) in leaves of *Brassica nigra* and expressed as g^{-1} fresh weight hr^{-1}. Super oxide dismutase activity was measured following the method of Beachamp and fridovich (1971) in fresh leaves of *Brassica nigra* and expressed as units.

The results obtained are presented in Table 1. Catalase activity of infected plants was found lower than healthy plants. Catalase activity was recorded in the leaves infected with *Pythium aphanidermatum* followed by *Fusarium oxysporum* and minimum in *Alternaria brassicae.*

Peroxidase activity was low in all the diseased plants and the lowest activity was observed in the leaves infected with *Alternaria brassicae*.

Nitrate reductase activity of healthy and diseased plants was unchanged.

Table 1 : Enzymatic activities of *Brassica nigra* (CV. MAHI GOLD) raised from the seed inoculated with different fungal species at the end of the experiment (after 120 days)

Sr. No.	Enzymes	Fungal species			
		Alternaria brassicae	*Flusarium oxysporum*	*Pythium aphanidermatum*	Control
1.	Peroxidase (Activity/g fresh wt./min)	0.70	1.80	1.50	2.60
2.	Catalase (Unit/g fresh wt./min.)	2.10	1.80	1.30	2.90
3.	Nitrate reductase(g^{-1}fresh wt.hr^{-1})	3.12	3.52	3.8	3.62
4.	Superoxide dismiutase (Units)	13.0	13.0	13.4	13.9
5.	Lipid peroxidation ($mM^{-1}Cm^{-1}$)	7.5	7.5	7.2	7.11

Super oxide dismutase activity of diseased plants was found lower than the healthy plants. The lowest activity was observed in the leaves infected with *Fusarium oxysporum* followed by *Alternaria brassicae* and *Pythium aphanidermatum.*

Lipid peroxidation was observed in leaves of the infected plants and healthy plants. An increase in lipid perixidation activity was found in the leaves infected with *Alternaria brassicae* but the activity of other plants infected with *Fusarium oxysporum* and *Pythium aphanidermatum* was almost equal to healthy plants.

Activity of some enzymes such as catalase, peroxidase, nitrate reductase, super oxide dismutase and lipid peroxidation was studied in infected as well as healthy plants in the present investigation. A decrease in the activity of catalase and peroxidase and an increase in lipid peroxidation over control were recorded. However, the activity of nitrate reductase and super oxide dismutase was almost equal to healthy plants. Almost similar results were found by other investigators. Dhindsa *et al.* (1981) corelated senescence of leaves of *Nicotiana tobaccum* with increased level of membrane permeability and lipid peroxidation and decreased level of catalase and super oxide dismutase. Pauls *et al.* (1980) studied *in vitro* stimulation of senescence – related to membrane damage by ozone induced lipid peroxidation in *Zingiber officinale* infected by *Pythium graminicola* and found an increase in the activity of lipid peroxidation.

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