

CHANGES IN OXIDATIVE ENZYMES OF RESISTANT AND SUSCEPTIBLE VARIETIES OF GREENGRAM (*VIGNA RADIATA* (L.) WILCZEK) INOCULATED WITH *XANTHOMONAS PHASEOLI*

The oxidative enzymes like polyphenol oxidase (PPO), peroxidase (PO) and ascorbic acid oxidase (AAO) are often studied in interpreting the response of the hosts to pathogenic invasion in several host parasite interactions (Kuc, 1967; Fric, 1976). The oxidative enzymes oxidise the free phenolics to toxic quinones in the tissue which restrict the movement of the pathogen. Though impressive amount of literature was available on the role of oxidative enzymes on many host parasite interactions, there was no information available on the role of PPO and PO in greengram inoculated with *Xanthomonas phaseoli* (E. F. Smith) Dowson and hence the present study was undertaken.

The plants of moderately resistant and susceptible cultivars of greengram Co 2 and Co 1 respectively were raised under glass house conditions. Thirtyfive day old plants were spray inoculated with *X. phaseoli* cell suspension as detailed by Marimuthu (1978). Leaf samples of uninoculated healthy and inoculated plants of the varieties were collected at intervals of 0, 0.5, 1,3, 5 and 10 days after inoculation and used for analysing the various oxidative enzymes.

Extraction of enzymes: One g of the fresh leaves was frozen and extracted with 5 ml of chilled 0.1 M sodium phosphate buffer at pH 7.0, centrifuged at 10,000G for 10 min and the clear supernatant was used as the enzyme source (Maxwell and Bateman, 1967).

Estimation of polyphenol oxidase (EC 1.10.3.1): The enzyme activity was assayed as per the methods of Matta and Dimond (1963). The activity of the enzyme was expressed as units per minute per g of fresh tissue. One unit is that amount of enzyme which catalyse the transformation of one micromole of the substrate per minute at 28+ 1°C (Anon., 1965).

Estimation of peroxidase (E. C. 1.11.1.7): Peroxidase activity was measured as per the methods of Hampton (1963).

The results (Table 1) reveal that Co 2, the moderately resistant variety contained more of PPO and PO than that of Co 1, the susceptible one. In general, there was no significant variation in the activity of PPO due to *X. phaseoli* inoculation. Due to pathogenic inoculation the activity of PO showed a swift increase throughout the sampling period in Co 2 while the susceptible Co 1 recorded a reduction in the activity of PO after third day of inoculation. Such increase in PO activity in resistant bean variety inoculated with *X. phaseoli* var *fuscans* has also been observed by Cinar (1975). In many plants which either lack PPO or having limited distribution, the role of PPO is carried out by PO. It has been reported that in rice plants, PO mediates the oxidation of phenols (Purushothaman, 1971). The resistance of Co 2 towards *X. phaseoli* might be attributed to the heightened activity of PO.

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Table 1
Changes in PPO and PO activities of the greengram varieties due to *Xanthomonas phaseoli* inoculation

Sampling interval (days)	Enzyme activity in enzyme units							
	Varieties							
	Co 2		Co 1		Co 2		Co 1	
H	I	H	I	H	I	H	I	
0	189	190	170	171	247	247	212	217
0.5	190	193	172	173	254	264	219	232
1	192	196	179	180	261	276	216	237
3	181	195	175	178	264	299	242	224
5	187	190	180	175	250	285	258	233
10	191	192	178	173	244	269	250	221
	S.E		C.D (P=0.05)		S.E		C.D (P=0.05)	
Variety (V)	0.70		2.03		0.61		1.77	
Inoculation (I)	0.70		N.S		0.61		1.77	
Sampling (S)	1.21		3.52		1.05		3.07	
V x I	0.99		2.87		0.86		2.50	
V x S	1.71		N.S		1.49		4.34	
S x t	1.71		N.S		1.49		4.34	
V x I x S	2.41		N.S		2.11		6.13	

H Healthy
I = Inoculated

സംഗ്രഹം

സാന്തോമോണാസ് ഫാസിയാളി എന്ന ബാക്ടീരിയയുണ്ടാക്കുന്ന ഇലകരിച്ചിൽ രോഗത്തെ ചെറുത്തുനിൽക്കാൻ കഴിവുള്ള Co 2 എന്ന ചെറുപയറിനത്തിൽ Co 1 എന്ന ഇനത്തിലുള്ളതിനേക്കാൾ കൂടുതലായി പി. പി. ഒ., പി. ഒ. എന്നീ എൻസൈമുകളുണ്ട്. രോഗം കൃത്രിമമായി ഉൽപ്പാദിപ്പിക്കുമ്പോൾ പി. ഒ എൻസൈമിന്റെ അളവ് Co 2 എന്നയിനത്തിൽ കൂടുന്നതായും Co 1 എന്നയിനത്തിൽ കുറയുന്നതായും കാണപ്പെട്ടു.

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