Indian J. Hill Farmg. 11(1 & 2) : 113 — 115 1998

ROLE OF REDUCING AGENTS ON ELECTROLYTE LEAKAGE FROM RICE CHLOROPLASTS INFUSED WITH *XENTHEMONAS ORYZAE* PV. ORYZAE DYE

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Bactrial blight (BB) is a serious disease in most of the rice growing areas of the world. It has been observed that the lesion development in leaves depends on the compatibility between the host pathogon system, Moreover, chloroplast is mostly affected in a compatible host pathogon interaction resulting into early symptom expression and yield loss. In the present investigation the nature of chloroplast dearrangement was evaluated by infusing chloroplast of rice cultivars varying in their degree of suspeptibility to BB with virulent cells of X-o-pv oryzae. Also, the effect of a reducing agent was evaluated in suppression of electrolyte leakage from the chloroplasts infused with the bacteria.

Chloroplasts of the rice cultivars TN I (highly susceptible to BB) and IR 20 (least susceptible to BB) were isolated by using method suggested by Vivekanandan and Gnanam (1975). Nine ml of isolated chloroplasts from each of susceptible and resistant cultivar were taken in separate sterilized culture tubes. Bacteria from 48th old culture in Potatosucrose agar media were suspended in sterlie distilled water and was adjusted to 108 cells/ml (CFU). One ml of this suspension was added to nine ml of the isolated chloroplesta and mixed thoroughly. To evaluate the effect of a reducing agent (sodium thio-sulphate) on the intensity of electrolyte leakage from the chloroplast infused with bacterium, sodium thio-sulphate 5 and 10 per cent solution was prepared and 0.5 ml and 1.0 ml of this preparation was added to 9.5 ml and 9.0 ml of the chloroplast bacterial suspension respectively contained in separate test tubes. For thorough mixing the suspension were shaked in mechanical shaker for 10 minutes. A control was run simultaneously wherein no reducing agent was added. To study the electrolyte leakage from the chloroplasts infused with bacterial cells, the electrical conductivity was measured at different time interval of 0, 2, 6, 12, 24, 48, 72 and 96th. After recording the initial reading at O all the tubes were placed in an incubator at 28°C and the conductance recorded by taking out the samples at different times as scheduled earlier. For calculation of electriical conductivity (EC) the methods of Chopra and Kanwar (1975) was followed.

The extracted chloroplast of both susceptible (TN1) and resistant (IR 20) rice cultivars when infused with virulent cells of X.O - pv oryzae exhibited leakage of

electrolytes. The electrolyte leakage was highest with chloroplast of susceptible rice cultivar (Table 1).

The extracted chloroplasts of cultivar TN 1 incubated for different time intervals showed a linear increase in conductivity value. In contrast, chloroplst bacteria combination showed increase in conductivity upto 72 h after incubation. On the other hand in chloroplast of cultivar IR 20 when infused with bacteria, the electrolyte leakage was significantly lower as compared to leakage in TN 1. The electrical conductivity value 72 h after incubation was 45.35 and 99.77 micromhms respectively. However, the conductivity value in case of both the cultivars declined after 96 h of incubation. Introduction of a reducing agent (sodium thio-sulphate) at the rate of 5 and 10 per cent respectively to the chloroplast-bacterial suspension of both the cultivars suppressed electrolyte leakage. The action of the reducing agent was more significant in case of IR 20 chloroplast bacterial suspension (Table 1). Moreover, with increase in concentration was enhanced in restricting a electrolyte leakage. Less of electrolyte from bacteria infused chloroplast depends on several factors, such as concentration of inoculum, age of the host, incubation time, rate of bacterial multiplication and plant genetic characters. Our observation in the present investigation reveals greater loss of chloreplasts in susceptible host pathagons interaction. Also, that bacterial pathagon act in the cellular level damaging protoplasmic membrane and allowing the electrolyte to leak out. The protective effect of sodium thio-sulphate which is on effective reducing agent may be due to that it inhibits bacterial activity.

ACKNOWLEDGEMENT

The authors are grateful to the professor and Head, Dept. of Plant Pathology and the Professor and Head Dept. of Crop Physiology, AAU, Jorhat for providing necessary facilities.

REFERENCES

Chopra, S.K. and Kanwar, J.S. (1975), Analytical Agricultural Chemistry, Kalyani Publishers Ludhiana, PP 227

Vivekanandan, M. and Gnanam, A. (1975). *Indian J. Biochem. Biophys.* 12 : 374 - 378.

Table 1 Electrical conductivity value of the treatments at different time intervals in micromhos for both suscectible and resistant cultivars

Cultivars		Treatments	Time in hours							
			0	2	6	12	24	48	72	96
TN1	1	Chloroplast + Bacteria	0.97	11.25	30.72	53.82	71.76	90.70	99.77	91.09
	2.	Chloroplast + Bacteria + Reducing agent (Sodium thiosulphate .5 ml)	0.62	6.55	6.98	10.58	11.78	15.06	12.56	8.65
	3.	Chloroplast + Bacteria + Reducing agent (Sodium) thiosulphate 1 ml)	0.59	5.81	5.95	7.46	9.78	12.55	10.84	6.55
	4.	Chloroplast alone	0.46	1.01	1.12	1.12	1.46	1.58	1.59	1.49
IR-20	5	Chloroplast + Bacteria	0.86	3.51	10.62	17.94	26.91	36.19	45.35	36.04
	6	Chloroplast + Bacteria + Reducing agents (Sodium thiousulphate 0.5 ml)	0.58	4.82	4.91	5.16	3.86	3.98	3.86	2.98
	7.	Chloroplant + Bacteria + Reducing agent (Sodium thiosulplate 1 ml)	0.57	3.86	3.86	4.89	3.96	4.12	3.72	2.55
	8.	Chloroplast alone	0.46	0.95	1.17	1.12	1.35	1.46	1.51	1.36