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Screening of Chilli Cultivars against Leaf Curl Disease and their Biochemical Components

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Abstract: The hot pepper or chilli (*Capsicum annuum* L.) is an important cash crop of irrigated arid areas. Its production has drastically declined during last one decade due to leaf curl disease. Five cultivars viz., Punjab Red, HC-28, HC-44, CH-1 and New Chilli Hybrid, were screened for their disease reactions with a popular local cultivar Mandoria in arid areas of western Rajasthan. In the disease free resistant cultivars (HC-28 and HC-44), activities of polyphenol oxidase and peroxidase enzymes were lower and the free proline content was 2-6 times higher than that diseased cultivars.

Key words: Chilli, *Capsicum annuum*, leaf curl disease, screening.

Chilli or the hot pepper (*Capsicum annuum* L.) is an important spice and vegetable crop in irrigated tracts of arid western Rajasthan. Traditional cultivars of the region, namely Mathania-Red, Haripur-Raipur, Mehsana and Mandoria are highly susceptible to leaf curl disease (LCD), caused by Tobacco Leaf Curl Gemini Virus (TLCuV). As a result, the chilli growing area has declined by 60-70% within a decade. Effective control of LCD with insecticides is difficult and uneconomical. Present studies were, therefore, undertaken to assess the performance of the cultivars procured from PAU, Ludhiana, and HAU, Hisar, regarding LCD resistance combined with acceptable qualities in arid region along with a local cultivar (Mandoria). Biochemical components like metabolites and enzymes were also assessed in these cultivars.

Materials and Methods

The studies were carried out in the net house at Central Arid Zone Research Institute, Jodhpur, during last week of June 2001 to second week of January 2002. Five cultivars viz. HC-28, Punjab Lal, CH-1, NCH (New Chilli Hybrid) and HC-44 (procured from CCS Haryana Agricultural University, Hisar and Punjab Agricultural University, Ludhiana) and a popular local cultivar Mandoria were sown in earthen pots of 30-cm diameter. The seedlings were thinned 20 days after sowing (DAS) and at 50 DAS, these were transplanted to experimental pots. Each pot contained three plants of a cultivar. The pots were arranged in a Randomized Block Design with three replications. The pots were watered immediately after transplanting and at 2-4 day interval thereafter. Yield parameters (no. of fruits/ plant, fruit size and fruit weight) were recorded at red ripe fruit stage. To estimate biochemical components and metabolites, fresh uniform top leaf samples were taken 45 days after transplanting. The LCD per cent incidence was recorded at the last picking stage.

Biochemical assay

For peroxidase (PO) and polyphenol oxidase (PPO) enzymes, method of Kar

Table 3. Metabolite (mg g^{-1} dry wt) in leaves of different chilli cultivars

Components	Cultivar			
	HC-44	HC-28	NCH	Mandoria
Total Phenols	3.8	3.1	2.6	3.4
O-dihydroxyphenols	2.1	2.3	1.7	2.5
Free proline	1.187	0.434	0.143	0.227
Sugars				
Total	122.5	122.3	104.2	85.4
Reducing	15.8	13.5	15.2	8.0
Non-reducing	106.6	108.8	89.0	77.4
Pigments				
Chlorophyll-a	4.5	4.9	5.2	5.2
Chlorophyll-b	1.6	1.7	1.7	1.8
Carotenoids	1.1	1.9	1.3	1.261

infection in *C. annuum* plants affect biochemistry of physiological functions in the susceptible cultivars. Higher free proline content in the leaves of resistant cultivars appears to be of some value in advance screening of cultivars against the LCD of chillies.

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