Thesis Summary

Biochemical Base of Resistance Against Fusarium Wilt of Chillies and its Management Through Plant Activators

Fatima Nasir, Muhammad Atiq and Iqra Mubeen
Department of Plant Pathology, University of Agriculture, Faisalabad, Pakistan

Key words: Chilli, Fusarium wilt, Fusarium oxysporum f. sp. capsici, Catalase (CAT), Peroxidase (POD), Superoxide dismutase (SOD), Hydrogen peroxide ($H_2O_2$), Protein, Plant activators

Chilli (Capsicum annuum L.) is a self pollinating crop belongs to the family Solanaceae, which also includes potato, tomato and eggplant. It is the third important vegetable crop of family Solanaceae after tomato and potato. In Pakistan, chilli crop has an important economic value because it is used as a vegetable and spice crop. Chillies contain capsaicinoids which are alkaloids that play a significant role in the pharmaceutical industry. Fresh chillies are a rich source of carotenoids, provitamin A, vitamin B and vitamin C, which contains ascorbic acid.

More than 83 different diseases attack a chilli crop among them 40 diseases are caused due to the fungal pathogens. Fusarium wilt disease is a potential threat to chilli production, which is caused by Fusarium oxysporum f. sp. capsici. Fusarium oxysporum is a soil-borne fungus. It survives for several years in soil. Symptoms of Fusarium wilt is characterized by wilting of the plant. High temperature and high moisture play a significant role in the symptom development of wilt. There are 80 strains of F. oxysporum which causes wilt diseases. It causes upward and inward rolling of the leaves. Then leaves turn yellow and die. The Fungus enters in the vascular systems through the root tissues and subsequently uses the xylem vessels as a venue to rapidly colonize the plant. The temperature favourable for F. oxysporum f. sp. capsici is 12-32ºC. Maximum growth observed at 28ºC.

The present research was conducted under randomized complete block design (RCBD) in the research area of the Department of Plant Pathology, the University of Agriculture, Faisalabad for the screening of chilli germplasm against Fusarium wilt disease under field conditions. Twelve chilli varieties/laces Green Pridf, CBS-1292, Skyline, Capino, 1310, 49, 52-2012, 60, Fenjiao, P6, Highline and ADV-513 were collected from Ayub Agricultural Research Institute (AARI) which were used as research
material to screen resistant germplasm against Fusarium wilt disease. Out of twelve varieties five varieties 52-2012, ADV 513, Green pridf, P6 and 1310 showed moderately resistant response with 27.83, 33.06, 36.10, 36.90 and 37.73% disease incidence, respectively.

For biochemical base of resistance against fusarium wilt disease Catalase (CAT), Peroxidase (POD), Superoxidase dismutase (SOD), Hydrogen peroxide (H2O2) and protein activity were analyzed in the Biochemistry laboratory of University of Agriculture Faisalabad. Level of POD in moderately resistant cultivars (52-2012, ADV 513, Green pridf, P6 and 1310) increases from (0.030, 0.151, 0.053, 0.059 and 0.147) to (1.058, 0.272, 0.297, 0.243 and 0.232) respectively. Amount of SOD in moderately resistant cultivars (52-2012, ADV 513, Green pridf, P6 and 1310) enhanced from (0.971, 0.809, 0.627, 1.158 and 1.831) to (3.073, 2.790, 2.142, 0.639 and 2.531) respectively. Amount of H2O2 in moderately resistant cultivars (52-2012, ADV 513, Green pridf, P6 and 1310) shows maximum root length, which was (17.93 cm). Capino which variety showed maximum fresh and dry weight of shoots, shoot length, plant height and yield while ADV 513 showed maximum NOL.

Conclusively, biochemical markers can become an effective tool for the selection of resistant varieties. P6 is a moderately resistant variety with good horticultural attributes it should be incorporated into the breeding programme. Salicylic acid is statistically significant plant activator to minimize the losses and disease incidence caused by Fusarium wilt of chilli.

REFERENCES