# Abstract

Chili leaf spot caused by *A. alternata* is the most devastating fungal infection responsible for huge yield losses. Chemical pesticides are widely used throughout the world to control fungal infection. The proposed study was conducted to check the efficiency of fungal antagonists (*T. harzianum* & *T. viride*) and botanicals (*A. indica* & *C. longa*) in pot experiment and determining their mode of action to control *A. alternata* infection in *C. annum*. The results of *in-vitro* trial demonstrated that *T. harzianum* and *T. viride* caused maximum inhibition up-to 70%. Pot experiment results revealed that *A. alternata* significantly ($P < 0.01$) reduced the plant growth and physiological parameters. Consortium of *T. harzianum* and *T. viride* performed best as it increased the root length(2.4 times), chlorophyll(3.8 times) and phenolics (2.2 times) under pathogenic inoculum as compared to control. Botanicals also performed well but their efficacy increased when they are applied in combination with *T. harzianum* and *T. viride*. *A. alternata* increased $H_2O_2$ content in plants. But individual and combined treatments of antagonists reduced the $H_2O_2$ content by enhancing their catalase and APX activities. $H_2O_2$ content was 3 times lower in F1D (*T. harzianum*+Disease) compared to infected plants. Tissue deformation and ruptured cells were observed on leaf surface inoculated with *A. alternata*. Treatment of *T. harzianum* and *T. viride* showed mycoparasitsm against *A. alternata* and control tissue deformation by their mycelium and spores. Many antifungal compounds like p-xylene, o-xylene, diethyl phthalate, phthalic acid, hexadecanoic acid, pentanol, butanol, 1,2-Benzenedicarboxylic acid, diisodecyl ester are reported in plants treated with *T. harzianum* and *T. viride*. Results of the present study concluded that consortium of *T. harzianum* and *T. viride* and their combination with botanicals exhibit potential to reduce the severity of infection caused by *A. alternata* and it should be further tested under field condition to control fungal infections in crops instead of using chemical pesticides as they are harmful for our environment and farmer community.