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EFFECT OF SALICYLIC ACID & CHITOSAN ON INDUCTION OF RESISTANCE IN CHICKPEA AGAINST FUSARIAL WILT & ROOT ROT *

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Abstract

There are many reports that Fusarium species causing wilt (*F. oxysporum* f. sp. *ciceri*) and root rot (*F. solani*) are among the main causes of yield loss in chickpea production. Since chemical treatment against these fungi are not so effective, it seems that application of non-toxic chemicals to induce defense mechanism in plant host is desirable. Induction of host resistance in chickpea against these diseases using salicylic acid (SA) and chitosan were investigated. Foliage spray of solutions in 0, 200 and 400 ppm concentration were applied. Plants were grown in growth chamber; at 24 ºC and 16:8 (L:D) photoperiod for forty days. Application of 400 ppm of SA had a significant effect on reduction of wilt symptoms, but other applied concentrations of SA had no significant effects on root rot symptoms. Application of 400 ppm concentration of chitosan had a significant effect on wilt symptoms reduction, whereas application of 200 ppm of chitosan had partial effect on reduction of root rot symptoms. An *in vitro* experiment carried out, application of different SA & chitosan concentrations had a direct effect on mycelium growth of both fungal species on PDA. The level of free SA variations in plant tissues treated by 400 ppm concentration of SA was detected by using HPLC method in different post inoculation intervals. The results indicated that the free SA levels decreased after 168 h post inoculation, and wilt disease symptoms appeared gradually afterwards. Chitinase and β-1,4 glucanase enzymes activity and total phenol content in chickpea leaf tissues were evaluated as induced resistance indicators (among others) at 0, 48, 96, and 168 h after inoculation. Increased levels of enzymes activities were observed in 200 ppm of SA however, no significant effects on root rot disease control were obtained in this treatment. The results would suggest that the application of this elicitor (SA) could have partial effects on chickpea wilt symptoms reduction. Maximum levels of indicators activities were observed in 400 ppm of chitosan however, no significant effects on root rot disease control were obtained in this treatment. The results would support the idea that application of this elicitor (chitosan) can play an important role in inducing systemic resistance in chickpea plants against Fusarial wilt disease.

Keywords: Chitinase, β-1,4-glucanase, Total phenolic compounds, HPLC, Chickpea.

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