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**Physiological Studies on Chemically Induced
Systemic Resistance against Charcoal Rot
Disease in Sunflower Plant**

2900

Presented by

Ahmed Mahmoud Saleh Mohamed

A Thesis Submitted
to
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Cairo University**

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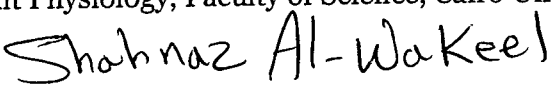
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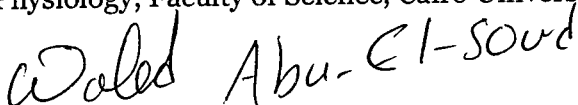
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ABSTRACT

Induction of systemic resistance to charcoal rot disease caused by *Macrophomina phaseolina* (Tassi) Goidanich in sunflower (*Helianthus annuus* L.) was studied after priming the seeds with salicylic acid (SA) and coumarin (COU) at three different levels (0.3, 1.0 and 3.0 mM), under greenhouse conditions. Treatments of sunflower seeds with SA or COU significantly decreased disease severity and improved the host plant growth. The protective effect of these treatments is due to their ability to stimulate the induction of pathogenesis related proteins (β -1,3-glucanase, chitinase, phenylalanin ammonia lyase and peroxidase), polyphenol oxidase and phytoalexins (ayapin, scopoletin and scopolin), as well as soluble sugars, proline, phenolic glycosides, flavonoids and anthocyanins. The isozyme pattern of peroxidase revealed the induction of two novel isoforms by both 0.3 mM COU and 1.0 mM SA treatments in healthy or infected plants. Semi-quantitative RT-PCR analysis indicated that COU-induced resistance is associated with the activation of the *Ha-Def* gene, while the expression of the *Ha-hsr* gene was only detected under SA treatment.