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The use of antioxidant compounds to control root rot disease in peas caused by *Rhizoctonia solani*

Abstract:

Objective

This investigation evaluated the effects of the antioxidants citric acid (CA), salicylic acid (SA), and glutathione (GSH) on *Rhizoctonia solani* in vitro and in vivo to control root rot disease in pea plants (*Pisum sativum* L.).

Materials and Methods

Rhizoctonia solani was extracted from infected pea roots, purified applying the hyphal tip technique, and identified morphologically and microscopically. Root fragments were cultured on Potato Dextrose Agar (PDA) and incubated at 25 ± 2 °C for 7 days. CA, SA, and GSH were incorporated into PDA in 8.5 cm Petri dishes at concentrations of 0, 50, 100, and 200 mg/L. Fungal colony areas were calculated applying ImageJ software after incubation at 25 °C, and inhibition percentages were calculated. For in vivo experiments, sterile soil was inoculated with *R. solani* at 3 g biomass kg^{-1} soil, two days before planting. Pea seeds were sown in pots with five replicates per treatment. Post-germination, disease incidence and harshness were documented. Peroxidase and polyphenol oxidase activities were quantified applying enzymatic assays, and total phenolic content was calculated.