

**Title** Chitosan reduces dry rot caused by *Fusarium sulphureum* on potato tubers: fungistatic and induced-resistance effects

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#### **Abstract**

Dry rot, caused by *Fusarium* spp. is reported as the most important postharvest disease of potato in China. *F. sulphureum* is one of the principal pathogens. The ability of postharvest application of chitosan to control dry rot was studied on potato cv. Atlantic. The results showed that lesion diameter after inoculation with *F. sulphureum* was significantly reduced in tubers and slices treated with 0.25% chitosan. In vitro tests showed that chitosan decreased mycelium growth, dry weight of mycelium and spore germination. Changes in hyphal morphology were observed such as intertwining, distortion and swelling; inflated mycelium became blasted, wizened and cupped. Alteration of hyphal structure included abnormal distribution of cytoplasm, non-membranous inclusion bodies assembling in cytoplasm, considerable thickening of hyphal cell walls and very frequent septation with malformed septa. New hyphae (daughter hyphae) inside the collapsed hyphal cells were often found in the cytoplasm. Protection by chitosan was also associated with activation of peroxidase (POD), polyphenoloxidase (PPO), phenylalanine ammonia-lyase (PAL), the accumulation of total phenolics and flavanoids, and the production of H<sub>2</sub>O<sub>2</sub> and O<sub>2</sub> -.. This suggests chitosan has dual effects: fungistasis and induced resistance, and is promising as a potential natural compound to control dry rot on potato tubers.