

## Induced Resistance in Cotton Seedlings Against Fusarium Wilt by Dried Biomass of *Penicillium chrysogenum* and Its Water Extract

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Dry mycelium (DM) of killed *Penicillium chrysogenum* and its water extract (DME) were used to induce resistance in cotton plants against *Fusarium oxysporum* f.sp. *vasinfectum* (*Fov*). Results showed that the efficacy of either DM or DME in controlling the disease depends on both the concentration and the mode of application. DM amended to the soil at 0.25–2% (w/w) provided 32–75% protection against *Fov*. Soil drench with 2–5% DME (w/v) and pre-sowing seed soakage with 5–10% DME provided 51–77% and 28–35% protection against the wilt disease, respectively, whereas no protection was obtained with foliar sprays of 1–10% DME. DM and its water extract had no direct antifungal activity on growth of *Fov in vitro*, suggesting that disease control with DM or DME resulted from the induction of natural defense mechanisms in the cotton plants. Soil drench with 5% DME was as effective as 2% DM powder in inducing resistance against *Fov*, implying that the resistance-inducing substances were mostly water-soluble. Four cotton cultivars with various genetic resistance levels against *Fov* were tested at the seedling stage: two resistant ‘Pima’ cultivars and two susceptible ‘Acala’ cultivars. The level of protection achieved in the two susceptible cultivars with DME was equal to, or higher than, that of the two resistant cultivars treated with water. Innate and induced peroxidase activity in cotyledons or hypocotyls and roots coincided with the level of genetic resistance and DME-induced resistance, respectively. Based on our results, an integrated control strategy of *Fov* with both genetic resistance and induced resistance is suggested.

KEY WORDS: Genetic resistance; peroxidase activity; *Penicillium chrysogenum*; *Fusarium oxysporum* f.sp. *vasinfectum*.

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