

Control of *Botrytis cinerea* using thyme essential oil and its potential in inducing resistance in apple fruit

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Grey mold disease caused by *Botrytis cinerea* is considered one of the most serious postharvest diseases on various fruit including apples. To control postharvest diseases of fruits, few synthetic fungicides are admitted. However, pathogen resistance to fungicides and the willingness to use safer treatments, have generated interest in the development of alternative non-chemical methods such as plant essential oils (EOs).

EOs show great interest for their potential use to control postharvest pathogens of pome and stone fruits. Most EOs have been studied for their efficacy *in vitro* but only few of them have been investigated *in vivo* (Prusky and Gullino, 2010).

In the present work, we assessed the efficacy of thyme (*Thymus vulgaris*) EO in the control of *B. cinerea* on apple cv. Fuji and investigate their ability to enhance fruit defense mechanisms.

Thyme EO has significantly reduced gray mold rot disease in stored apples artificially inoculated with *B. cinerea* and treated with thyme EO applied at different concentrations (Figure 23). When applied at the concentrations 0.5% and 1%, thyme EO show higher efficacy than 0.1%, suggesting that 0.5% could be its minimum inhibitory concentration to control *B. cinerea* on apple. Gene expression analysis by RT-PCR of the pathogenesis of related gene *Pr8*, which codes for a class III chitinase and is involved in apple host defense response, was investigated. *Pr8* gene was consistently highly induced by thyme EO in apple applied at 1% concentration at different time points compared to wounded apples (Figure 24).

This study demonstrates the capacity of thyme EO to control gray mold disease on apple and proposes the involvement of the host resistance induction particularly *Pr8* gene in its antimicrobial activity.

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Lavori citati

PRUSKY, D., GULLINO, M.L. (2010). Post-harvest Pathology. Springer Netherlands, Dordrecht. doi:10.1007/978-1-4020-8930-5



Figura 23 - Effetto dell'olio essenziale di timo (th) usato a diverse concentrazioni (0,1%, 0,5% e 1%) su mele cv Fuji conservate per 6 giorni alla temperatura ambiente (22°) dopo inoculazione artificiale con *Botrytis cinerea*.

Figure 23 - Effects of thyme essential oil (Th) applied at different concentrations (0.1%, 0.5% and 1%) on apple fruit cv. Fuji stored for 6 days at room temperature (22°C) after artificial inoculation with *Botrytis cinerea*.

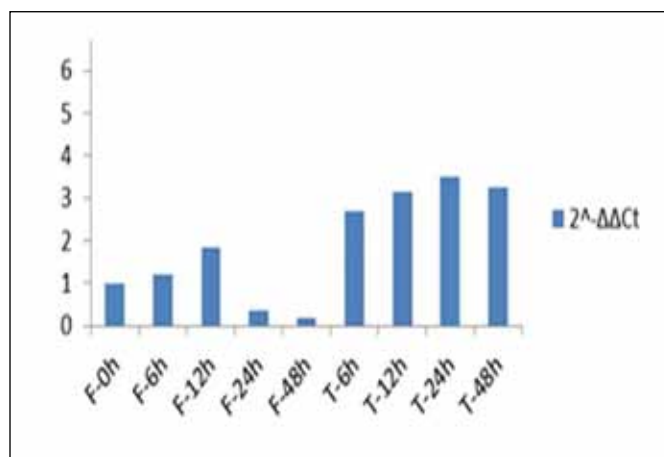


Figura 24 - Espressione media del gene Pr8 in frutti di mele infetti (F) e trattati con l'1% di olio essenziale (T) a 6,12,24,48 ore dopo i trattamenti.

Figure 24 - Average relative expression level of *Pr8* gene in wounded apple tissue (F) and treated with 1% thyme essential oil (T) at 6, 12, 24, 48 hours after treatments.