Title Control of brown rot on stonefruit by synthetic and glucosinolate-derived isothiocyanates

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Abstract

The potential use of five isothiocyanates (ITCs) (allyl, butenyl, benzyl, 2-phenylethyl and 4-methylthiobutyl-ITC) to control *Monilinia laxa* was tested by *in vitro* and *in vivo* trials. In *in vitro* trials, ITC activity on spore germination and mycelial growth was evaluated. The 4-methylthiobutyl-ITC was more efficient in controlling *M. laxa* than the other ITCs, showing the lowest values of ED_{50} and ED_{95}, respectively, 0.04 and 0.10 mg L^{-1} for conidia germination and 0.30 and 0.52 mg L^{-1} for mycelial growth. In addition, a significant reduction in conidia germination was observed after only 90 min of ITC vapour exposure. In *in vivo* trials, artificially infected nectarines and peaches were exposed for 3–6 h in an ITC-enriched atmosphere, resulting in a substantial difference in the pathogen control from the *in vitro* tests. Among the 5 ITCs tested, only allyl and butenyl-ITC reduced brown rot by more than 85% after 3–4 days of fruit incubation at 20 °C but in the case of butenyl-ITC, some phytotoxic effects can occur. Similar results were obtained in further experiments with allyl and butenyl-ITC vapours produced *in situ* from defatted meal of *Brassica carinata* and *Brassica rapa*, respectively. Although further studies are necessary to exclude any detrimental effects on fruit quality, this study provides experimental evidence that supports the use of biofumigation based on ITCs, allyl-ITC in particular, as a technique to control postharvest brown rot in nectarine and peach fruit.