

Preliminary Evaluation of Pomegranate Peel Extracts for the Control of Postharvest Brown and Sour Rots of Nectarines

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Abstract

Significant economic losses of nectarines and other stone fruits are caused worldwide by postharvest brown and sour rots, caused respectively by the fungi *Monilinia* spp. and *Geotrichum candidum*. Synthetic chemical fungicides, such as fludioxonil and pyrimethanil, are currently applied after harvest to control these diseases. However, due to potential harmful effects of chemical residues to human health and the environment, alternative non-polluting control strategies are needed. The obtention and evaluation of natural antifungal compounds from plant sources is an increasing strategy to reduce pesticide usage. The consumption of pomegranates (*Punica granatum* L.) has arisen once their antioxidant and nutraceutical activities and consequent human health benefits have been repeatedly demonstrated. However, the pomegranate juice and aril industries generate large amounts of peel by-products, which in some cases have been reported to provide antimicrobial activity, mainly attributed to their high polyphenol content. In this work, two previously selected peel extracts from pomegranate cv. Mollar de Elche (methanolic PGE and aqueous PGE) were preliminarily evaluated for the control of brown and sour rots on nectarines (*Prunus persica* var. *nucipersica* (Suckow) Schneid), cvs. Big Bang and Ambra, wound inoculated with *M. fructicola* and *G. candidum*, respectively. About 24 h after fungal inoculation, PGE extracts at 30 g/L were applied as drops into the same fungal inoculation site on the equator of each fruit. Although the results slightly differed among nectarine cultivars, PGE extracts, and target diseases, after 4 days of incubation at 20 °C, both aqueous PGE and methanolic PGE showed significant curative activity and reduced the incidence (percentage of infected wounds) of both brown rot and sour rot by 50-70%. These reductions, however, were lower after longer incubation periods. The severity (lesion diameter, in mm) of both diseases was also reduced by 40-50% after 4 days of incubation at 20 °C, and the extracts also significantly reduced pathogen sporulation on infected fruit. As a conclusion, PGE extracts showed significant fungistatic activity and potential to be used as antifungal postharvest treatments for the control of nectarine decay in integrated postharvest disease management programs.

Simulated commercial application modes, such as fruit spraying or dipping, commercial cold storage, and the combination of PGE extracts with other alternative non-polluting treatments of different nature should be considered in further studies.

Keywords: pomegranate by-products, stone fruits, postharvest decay, *Monilinia fructicola*, *Geotrichum candidum*

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