

Title Activity of extracts from wild edible herbs against postharvest fungal diseases of fruit and vegetables

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Abstract

The use of plant extracts could be a useful alternative to synthetic fungicides in the management of rot fungi during postharvest handling of fruit and vegetables. The aim of this study was to assess the *in vitro* and *in vivo* activity of extracts obtained from nine wild edible herbaceous species (*Borago officinalis*, *Orobancha crenata*, *Plantago coronopus*, *P. lanceolata*, *Sanguisorba minor*, *Silene vulgaris*, *Sonchus asper*, *Sonchus oleraceus*, and *Taraxacum officinale*) against some important postharvest pathogens, i.e. *Botrytis cinerea*, *Monilinia laxa*, *Penicillium digitatum*, *P. expansum*, *P. italicum*, *Aspergillus carbonarius*, and *A. niger*. Phenolic composition of all extracts was evaluated by HPLC. Several derivatives of caffeic acid, of the flavones apigenin and luteolin, and of the flavonols kaempferol and quercetin, were identified. Extracts from *S. minor* and *O. crenata* showed the highest efficacy in all the trials. In particular, *S. minor* completely inhibited *in vitro* the conidial germination of *M. laxa*, *P. digitatum*, *P. italicum*, and *A. niger* and strongly reduced those of *B. cinerea*; *O. crenata* extract showed a lower but still significant reduction of conidial germination on all the tested fungi. Moreover, the extracts from both species were effective in reducing the germ tube elongation also when a slight inhibition of conidial germination was observed. In many cases, a dose effect was observed, with an increase of antifungal activity as the phenolic concentration increased. In trials performed on wounded fruit, *S. minor* extract completely inhibited brown rot on apricots and nectarines; *O. crenata* extract strongly reduced grey mould, brown rot, and green mould on table grapes, apricots and nectarines, and oranges, respectively. The inhibition efficacy of extracts was ascribed to the presence of some caffeic acid derivatives and/or flavonoids. HPLC phenolic analyses provided useful information to identify the possible active compounds.