Screening of essential oil as potential post-harvest biofungicide


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Plant extracts, such as essential oils (EOs), have been known for centuries for their ability to prevent and/or to cure diseases through their fungicidal and bactericidal effect.

In this project we evaluated the fungicidal activity of 90 essential oils on several pathogens associated with post-harvest diseases (Botrytis cinerea, Penicillium expensum, Pectobacterium atrosepticum and Pectobacterium carotovorum). The efficacy of the EOs was first tested in vitro using 96 wells ELISA microplates.

This step allowed the selection of 9 EOs, sufficiently effective (complete growth inhibition up to 72 hours of contact with pathogen in liquid of medium) against these pathogens to be tested under in-vivo conditions.

The phytotoxicity of the selected EOs was then tested on apples, pears and potatoes. While no phytotoxicity was observed when the EOs were applied on intact fruits and tubers, a clear toxicity was observed when EOs were applied on wounded fruits.

For the EOs showing a moderate toxicity, the in-vivo tests were carried on by inoculating the pathogens into wounded apples (P. expensum), pears (B. cinerea) and potatoes (P. atrosepticum and P. carotovorum) treated with lower EOs concentration.

At these concentration, the EOs showed less phytotoxicity but also a lower efficiency (30% in the best case).

To conclude, while the EOs showed good results in-vitro, the efficiency in-vivo was too low at the concentration tested in order to be used as a way to control post-harvest diseases.

Key words: essential oils, fungicide