

Resistance and Protection of Apples from Storage Disorders



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Importance

Postharvest decay caused by fungal diseases is one of the main factors limiting storage and shelf life of apples; especially problematic in organic production where no application of fungicides is allowed. The damage is caused mainly by three fungi, i.e. *Penicillium expansum*, *Colletotrichum gloeosporioides* and *Neofabraea alba* (*N. malicorticis*) known as blue mould, bitter rot and bull's eye rot, respectively. In organic production, cultivation of disease-resistant cultivars can simplify disease control and meet consumer demands concerning the avoidance of pesticide residues in the fruit.



Apple research at Balsgård



At Balsgård-SLU, a project was started with the screening of a large apple collection in 2010. Storage disease tolerance of these apple cultivars was quantified by performing inoculation tests with fungal spores on harvested fruits. Possible associations with factors that may be connected to the level of fungal disease resistance were studied. The protective effect of an alkylresorcinol (AR) product obtained from rye bran, was also investigated. ARs were isolated from rye bran using a fractionated supercritical carbon dioxide extraction process. Various AR-based emulsions were prepared and tested for antifungal activity.

Promising results

A significant, negative correlation was found between the amount of blue mould infection and harvest time (number of days since harvest of the earliest-ripening cultivar) as well as with initial fruit firmness whereas a positive correlation was found with fruit softening (loss of firmness during storage).

A significant inhibition of disease symptoms was obtained with applying some of the AR emulsions to fruits of different apple cultivars ('Ingrid Marie', 'Gloster' and 'Frida') that had been inoculated with *P. expansum*. Possibly, an AR-containing plant strengthening product may be developed for use in, e.g., organic apple production.

