

Sodium alginate coatings added with *Meyerozyma caribbica*: Postharvest biocontrol of *Colletotrichum gloeosporioides* in avocado (*Persea americana* Mill. cv. Hass)

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Abstract

Edible coatings have been used as a medium for the incorporation of functional compounds and biocontrol agents to postharvest diseases control on fruits and to maintain their quality parameters. However, there are few reports about the use of biocontrol agents entrapped in polymeric matrices; to our knowledge, there is no report of their application to anthracnose control in avocado fruit. Hence the aims of this study were to investigate the production of volatile organic compounds (VOCs) by *Meyerozyma caribbica* and the ability of the yeast entrapped in sodium alginate (SA) coatings to control anthracnose caused by *Colletotrichum gloeosporioides* Pa14 in avocado fruit. The yeast viability, biocontrol activity, effect on weight loss as well as the efficacy of the bioactive coatings to preserve postharvest quality by prevention or cure of *C. gloeosporioides* infection were assessed. The main VOCs identified were alcohols (1-Butanol, 3-methyl- and phenethyl alcohol) and esters (ethyl acetate). Results revealed SA as a matrix able to maintain the yeast viability during the storage on coated avocado fruit, with minimal reductions between 0.39 and 1 Log_{10} CFU mL^{-1} , depending on storage conditions. Moreover, it was demonstrated the ability of the yeast to increase its population during the ripening of avocado fruit previously-stored at 6 °C. Films with *M. caribbica* were capable to inhibit *C. gloeosporioides* growth *in vitro*. Meanwhile, *in vivo*, the preventive treatments were more effective than curative treatments in anthracnose controlling; at 25 °C the severity was halved, while at 6 °C the reduction reached 100 %. Additionally, in avocado fruit with the bioactive coatings, the weight loss was reduced by 2–3.7 % respect to the control. In conclusion, this study demonstrates the ability of *M. caribbica* to produce VOCs as a mechanism of action against *C. gloeosporioides*; additionally, SA coatings with *M. caribbica* were effective to reduce the weight loss and its potential as an alternative to control of postharvest diseases in avocado fruit.