

# Elicitation of fruit defense response by active edible coatings embedded with phenylalanine to improve quality and storability of avocado fruit

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## Abstract

Edible coatings attract high research attention as an effective natural approach for maintaining fresh agricultural produce quality and storability. In this study, a series of polysaccharide-based coatings that contain, for the first time, an elicitor of fruit defense response, phenylalanine, were developed and applied on avocado fruit. After an initial screening of a series of polysaccharides coatings, the chitosan and carboxymethyl cellulose with stearic acid (CMC + StA) were chosen, and phenylalanine elicitor was added then to the polysaccharide matrices. These active edible coatings of either chitosan or CMC + StA that contained phenylalanine significantly reduced the fruit's natural decay caused by the fungal pathogens *Colletotrichum* and *Alternaria*. The coated avocado fruit has also demonstrated higher resistance to storage at sub-optimal temperature and showed less pitting, decay, and internal browning. The observed cold resistance correlated with a minor transcript upregulation of several genes as lipoxygenase, heat-shock protein, and several transcripts in the phenylpropanoid pathway. Interestingly, the coated fruit had a better flavor than the control fruit. Taken together, the reported results point to the ability of these new edible coatings to significantly increased fruit resistance to fungal pathogens and cold stress while maintaining the fruit quality and storability and improving their taste.