

## Cardboard container formulated with oregano oil for the inhibition of the fungus (*Colletotrichum gloeosporioides*) in Hass Avocado (*Persea americana*)

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The globalization of markets, the growth of exports in Colombia, the restrictions on the use of pesticides in Europe, and the deterioration of fruits caused by fungi are fundamental aspects that make it necessary to develop new packaging alternatives for the conservation of avocado during its commercialization, exploring the use of natural fungicides such as essential oils. The objective of the present study was to develop an active packaging from cardboard with a coating based on modified cassava starch, glycerol, and essential oil of oregano (EOO) to evaluate the inhibition of the fungus *Colletotrichum gloeosporioides* (CG) and quality parameters in packaging avocados. For the study, cardboard pieces of 30 mm x 30 mm were cut, and the coating was applied with four treatments, coating without EOO (T0), coating with 1.5% EOO (T1), with 2.5% (T2), and 3.5% (T3), the sheets adhered to the lids of the Petri dish, the fungus (CG) was inoculated. The percentage of inhibition of its growth was determined at room temperature for 12 days to determine the concentration of oregano to apply in the boxes for the shelf life studies. The results showed that different concentrations of EOO decrease the mycelium growth of the C.G fungus in a petri dish, giving % inhibitions equivalent to  $0.78 \pm 1.73$  for T0 and  $2.88 \pm 2.93$ ,  $13.29 \pm 6.76$  and  $65.94 \pm 32.92$  % for T1, T2, and T3, respectively. When taking the avocados to storage in the active container with 3.5% (T3) and without essential oil (T0), the active container made with corrugated cardboard and EOO at 3.5% does not negatively affect the physicochemical quality of the fruit stored. No affectation by the CG fungus was observed in the avocados during 22 days at 9 and 25 °C, while the avocados stored in the boxes of the T0 treatment presented deterioration by the fungus in 20% of the fruits. It can be concluded that it is possible to develop an active container with corrugated cardboard boxes coated with modified cassava starch and essential oil of oregano and delay the incidence of the fungus *Colletotrichum gloeosporioides* during the commercialization of avocados.