DESIGN AND APLICATION OF A NATURAL FILM TO PROLONG SHELF LIFE AND QUALITY OF AVOCADO (*PERSEA AMERICANA*) VAR. "HASS"

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Natural films are an excellent alternative to prolong the shelf life of diverse foods, mainly climacteric fruits like avocados (*Persea americana* Mill.). Mexico is the main producer and exporter of avocados worldwide; nevertheless its commercialization is affected by postharvest losses that can achieve from 20 to 50%, mainly due to spoilage and damage of diverse microorganisms, specifically by *Alternaria alternata, Botrytis cinerea*, *Fusarium oxysporum* and *Colletotrichum gloeosporioides.* To formulate the films it is need a plasticizer, a hydrophobic component and a complex matrix to hold up the mixture (Ahmadi et al., 2012), also it is possible add an antioxidant and antifungal extract to prevent microbial growth in the fruit. These materials have been attached the attention of researchers in recent years due to the variety of applications and advantages of the edible or natural films like the capability of regulate moisture lose, lipid migration and gas transportation (Bosquez-Molina *et al*., 2010) and preserve thermolabile compounds like flavors, aromas and vitamins (Ochoa *et al*.,2010). In the present work candelilla wax (*Euphorbia antisyphilitica Zucc.*) was used as hydrophobic agent, pectin as natural polymer, glycerol as plasticizer and creosote bush (*Larrea tridentata*) extract as antifungal and antioxidant component. Minimum inhibitory concentration for the 50 percent of the fungal growth compared with the control (MIC_{50}) for *Alternaria alternata, Botrytis cinerea, Fusarium oxysporum and Colletotrichum gloeosporioides* was evaluated *In vitro* in concentrations of 250, 500, 750, 100 and 1250 ppm of polifenols from creosote bush (PFC) in Petri dishes with poisoned medium, an explant of 3 mm diameter of a 7 day old culture of each microorganism was collocated in the petri dish, the diameter of radial growth was kinetically evaluated each 8 hours until the control (medium without PFC) invades the plate. A test *In vivo* was used in the avocados inoculating 20 µL of a $1x10^6$ spores/mL of the microorganisms, after 24 h of inoculation at room temperature the film was lay out in the surface of the inoculated avocados, the films were added with concentrations of 320, 620 and 920 ppm of PFC, with a control with film without PFC and a control without film. After 7 days of inoculating at room temperature the avocados were cut by the middle and the fungi invasion was calculated in mm according to the total area of avocado pulp and expressed as percentage of fungus invasion. Results indicate that was possible obtain concentration of PFC of the MIC_{50} for the main postharvest phytopatogen fungi for avocado crop and other important crops in Mexico, like: *Alternaria alternata, Botrytis cinerea, Fusarium oxysporum and Colletotrichum gloeosporioides* with concentrations of 566, 558, 612 and 579 ppm of PFC respectably. In the case of the *In vivo* assay the results demonstrates that the treatment with the highest concentration of PFC that correspond to 920 ppm can inhibit the internal damage caused by the inoculation of the microorganisms compared with the controls.

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