

Prickly Pear Edible Coating effect on Raspberries' Shelf-life.

A preliminary study

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Introduction

Raspberries are highly perishable fruits, which means a rapid ripening period and fast senescence, making storage and marketing more challenging. *Opuntia ficus-indica* (L.) cactus, produces a large number of cladodes characterized by the existence of a hydrocolloid commonly known as mucilage. Researchers have demonstrated the ability of mucilage, an environmentally friendly and renewable substance, to form edible films and coatings. Coatings used on fruits should reduce respiration and transpiration rates, maintain firmness, and control fruit decay, thus allowing longer shelf life.

Objetive

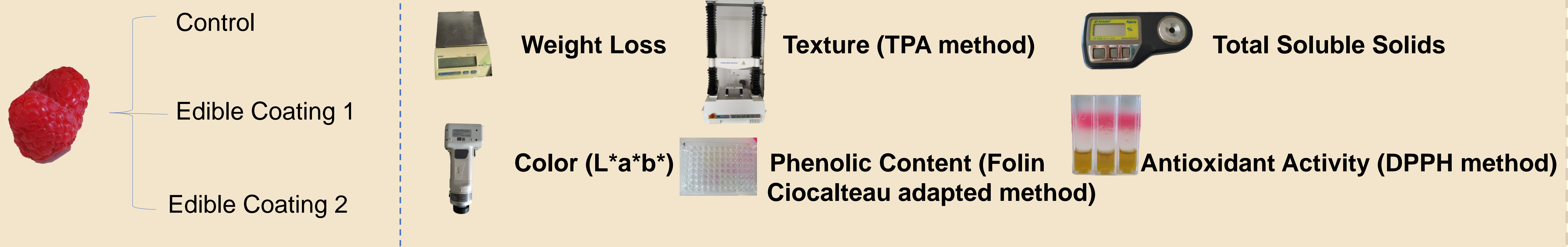
This preliminary study seeks to evaluate the potential of *Opuntia ficus-indica* mucilage edible coating to increase raspberries shelf-life.



Materials & Methods

The mucilage was extracted from cladodes of the regional "orange" variety, produced by "PepeAromas"© in Alentejo region. Raspberries were dipped in the coating for 10 seconds and then set to dry at room temperature.

Tests:



Fruits were stored at 2° C, 95% HR for 8 days. On day 0, 30 fruits were tested to characterize the raspberries to be studied. The different test subjects were a control sample without any treatment, and edible coating formulation 1 and formulation 2 which differ in concentration, the latter being less concentrated.

Results & Discussion

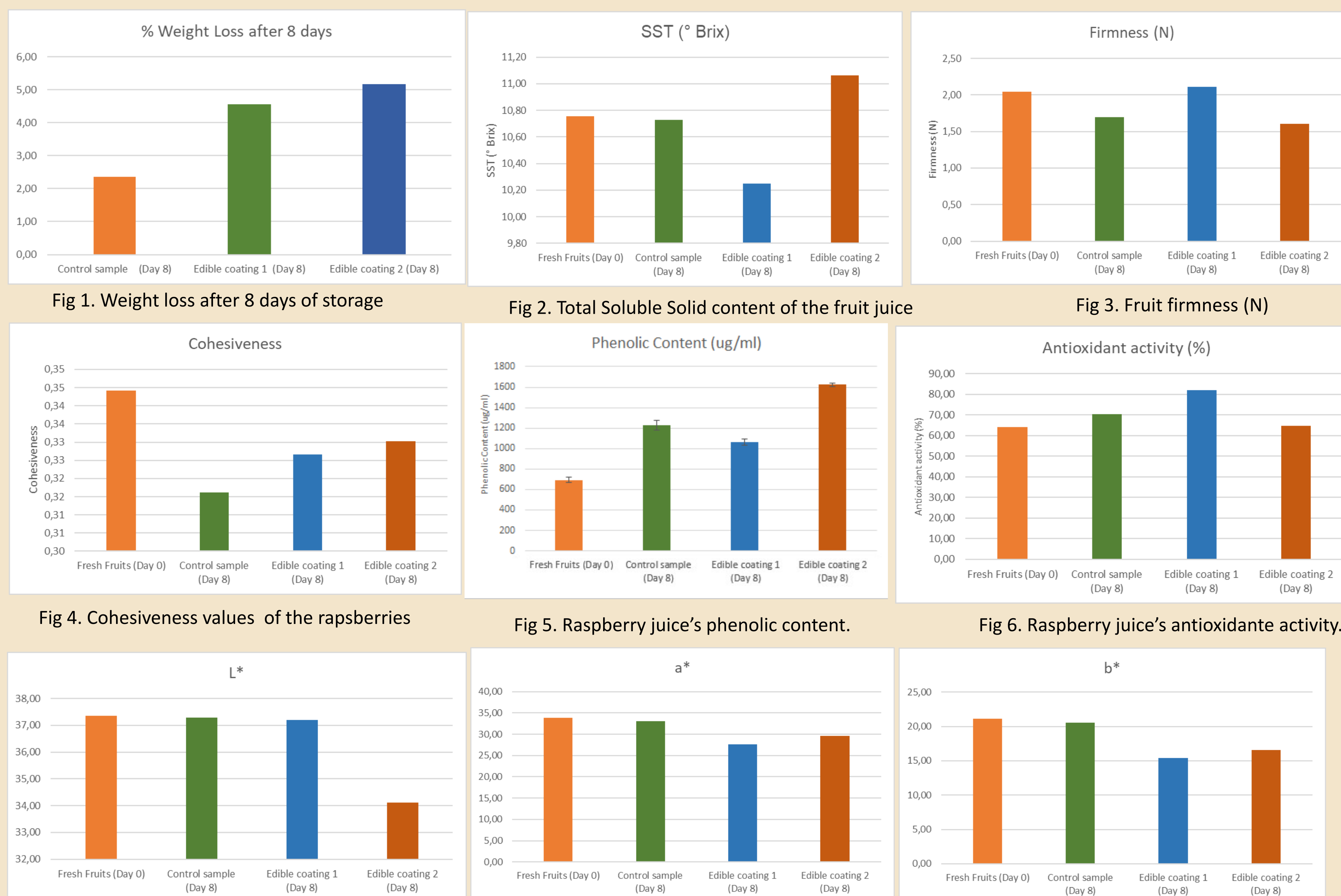


Fig 7. Color values for the different coordinates (L*, a*, b*)

The raspberries showed no remarkable **color** changes during the 8 days of cold storage (Fig.7). Only the fruits treated with the most diluted edible coating appear to darken during the storage period, as confirmed by the decrease in L* values. This visual aspect of color is of great commercial interest because it is a decisive element in the preference of consumers when buying raspberries

- The **weight loss** in general was below the 5%, which is the limit value to prevent visible loss of quality. ¹(Fig.1). However, the coated fruits showed a higher weight loss, which may have been caused by skin damage of the drupeolae during the coating procedure leading to higher water loss and even fungal growth.
- The **SST** values remained stable because after 8 days of storage the values were very close to each other and similar to day 0, being respectively 10.74; 10.50; 10.91 for the control, formulation modality 1 and 2. SST during storage time is usually influenced by weight loss and by the presence of fungi (Fig.2).
- The results in terms of **texture**, firmness and cohesiveness, showed that the coated fruits had better conservation of their texture, than those of the untreated sample, since the values are extremely close to the values obtained in the tested raspberries on day 0 (Fig.3-4) with the coated fruits having a slight advantage in terms of cohesiveness. This aspect of quality is very important as it is usually very difficult to maintain during the shelf life of the raspberries.
- Phenolic content** and **Antioxidant activity** can also be influenced by weight loss, since a decrease of water content leads to an increase of concentration of per volume (Fig 6-7).

Conclusion

Following other preliminary tests carried out so far, this one aimed to verify the possibility of applying this type of coating to raspberries. So after this preliminary test we can state that it is possible to create a coating made of 100% *Opuntia Ficus indica* mucilage, which will form a protective barrier around the fruit. We can also conclude *a priori* that this coating should contribute to maintain some characteristics of the fruits, such as colour and texture. Contrary to what was expected the coating, with this application and drying procedure, did not prevent weight loss, which has been previously reported by some authors. It is evident that further research and tests are necessary to improve the formulations, the application and drying methods of the coatings and test them on fruits in order to know their effect on the fruit storage and shelf-life.

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