**New technological strategies to preserve the pasty-making confectionery food through biological material packaging.**

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**Highlights**

* Edible film slows down the water migration of stored product, decelerating the staling.
* Prevention of growth of mold without use preservative substances like alcohol.
* Low fat content without compromise the sensorial properties of products during shelf life.

**1. Introduction**

Today the consumption of high amounts of fat is one of the main nutritional problems and it is considered one of the causes of serious health problems such as coronary heart disease and obesity. The foods that mainly contribute to intake of fats, above all in the case of the children, are the confectionary products. Nevertheless, the fats cannot be easily replaced in these kinds of products since they deeply influence their sensorial characteristics. In fact, fat provides to flavour, mouth feel, appearance, palatability, texture and lubricity. Moreover, soft pastries are generally filled with creams with high content of fat rich in saturated fatty acids. A complex set of conditions determines bakery product shelf life, which complicates efforts to extend the "life" of these foods. In fact, when stored at room temperatures, soft bakery product crumb undergoes a progressive deterioration of quality commonly known as staling that involves: hardening and toughening of the crumb; appearance of crumbliness and finally, moisture loss by evaporation. Moreover, during storage of bakery products can occur the development of molds, above all for the products preserved at room temperature and ordinary atmosphere. Ethanol is considered to reduce staling by acting as a plasticizer in the protein network of dough and it is able to inhibit the growth of microorganism. Alcohol give a typical smell when the packet is opened that it is not appreciated by consumers because of aromatic changes of food being in the packaging. In addition, this preservative, although perfectly safe, is more and more criticised above all for food devoted to the children because could be toxic for theirs also at low concentration. A possible solution to these technological drawbacks could be the use an edible biological material packaging applied directly on bakery products that would be able to preserve hygienic and quality characteristics of these kinds of food during shelf life.

The aim of this research was to study an innovative edible film that allows realizing pastry-making confectionery food with low fatty fraction without addition of additive and preservative ingredients, which is able, also, to keep its hygienic and sensorial properties during storage at room temperature and ordinary atmosphere.

**2. Methods**

Sponge cakes filled with sweet cream, coated with edible coating [1] or not and produced without the addition of preservative and additive substances, were stored at room temperature for 85 days and packaged in plastic bags under ordinary atmosphere. Ten samples were taken every 17 days to evaluate the chemical and mechanical characteristics changes of samples during storage. The moisture and activity water (aw) were carried out on crust, crumb and cream while the determination of hardness and the microbiological analyses were evaluated on the whole samples and the apparent viscosity on the filling cream. All analyses were replicated at least three times. The variation of analytical indexes during storage was calculated subtracting the values at the end of storage from the that measured at the start. A positive variation meant an increase of values of analytical index during storage while a negative value meant the decrease one.

**3. Results and discussion**

The moisture content and aw values of crust increased during storage while those of crumb and cream decrease for both type of samples even if more moderately for samples with coating.

(Table 1). Moreover, samples with edible film did not present mold growth during storage while samples without coating showed a mold concentration like 1.4\*104 FCU/g at the end of storage.

The hardness of bakery products and apparent viscosity of cream increased during storage, even if samples coated with edible film showed an increase of hardness and viscosity of cream lower than products without coating (Table 2).



**Table 1.** Moisture and aw variation of samples coated or no with edible film during storage.



**Table 2.** Hardness and viscosity variation of samples coated or no with edible film during storage.

**4. Conclusions**

The presence of edible film is able to slow down the water migration inside product and the water evaporation outside food that cause its staling. Moreover, the edible film studied showed a good barrier to water vapor transmission and oxygen transmission. These gas barrier properties prevent the grown of mold without use preservative substances like alcohol, sulphurous anhydride, salts of sorbic acids, etc. The main innovation and advantageous characteristics of this edible film is relating to principal ingredients used to produce it, which are constituted by natural ingredients.

**References**

1. T. De Pilli, A. Derossi, M. Prosperi, C. Severini, A. Stasi, Patent number: 0001413327, (2015).