

EFFECT OF TWO TYPES OF PACKAGING ON QUALITY OF PREVIOUSLY FROZEN LAMB MEAT

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Introduction

The consumption of ovine meat is mainly focussed on lamb and adult animals. The consumption per capita in Mexico of this meat is 0.4 kg (SAGARPA, 2004), mainly prepared at informal gatherings such as barbecues and mixotes, a typical Mexican food. The production of lamb meat in Mexico does not meet the demand that exists and for that reason, it is necessary to import it from other countries, in cuts generally frozen. The Pelibuey breed, well-known like Tabasco, is one alternative that can contribute to satisfying the demands of meat in our population. The interest and demand for Pelibuey sheep in Sonora has been increasing. The evidence of this trend is the increase in the production of this species and the incorporation of new producers. The Pelibuey is the most widespread breed of sheep in Cuba and is an animal very tolerant to extreme environmental conditions. Different packaging methods exist, including, modified atmosphere (MAP) and over-wrapped.

The objective of this investigation was to evaluate the quality of the lamb meat after frozen over wrapped during six months, and the effect of two types of package (modified atmosphere and over-wrapped) in order to observe if the quality of the product is altered over the course of time at refrigerated storage.

Materials and Methods

Raw material. Back legs from Pelibuey lambs at age 200 days were used; legs of 48 hours *post-mortem* were frozen for six months. *Semimembranosus* muscles from each leg were obtained and 6 steaks of 1.27cm thickness were packaged. **Packaging and storage.** Two different methods of packaging were used: 1) modified atmosphere packaging (80%O₂/20%CO₂) and 2) over-wrapped. All treatments were stored either for 18 days at 2-4°C, or under darkness. **Sampling and analyses.** The sampling and analyses were carried out on days 0, 4, 7, 11, 14 and 18. Percentage of moisture and fat were determined at day 0. Other quality analyses were colour (L*, a*, b*), lipid oxidation (TBARS), haeminic pigments, water holding capacity, pH and weight loss by purge. **Experimental designs.** A completely randomised design in duplicate with three experimental repetitions was used. The data were analysed using an ANOVA. The statistical analysis was carried out with software NCSS (2000).

Results and Discussion

Moisture and fat. No significant differences were showed between treatments (data not shown).

Purge. The averages of weight between treatments were stable during the time of storage (Figure 1).

pH. The pH values of treatments (Figure 2) did not show significant difference (P>0.05). These values are lower than those reported by Tschirhart (2003) with values of 5.90, but similar to those reported by Koochmarai and Wheeler (1994).

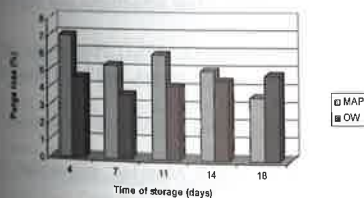


Figure 1: Loss of weight by purge in lamb meat.

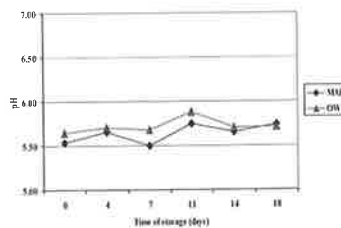


Figure 2: Evolution of pH in lamb meat.

Water holding capacity (WHC). The values associated with WHC, expressed as loss of free water are shown in Figure 3. No statistically significant difference existed between treatments (P>0.05), but higher values were found compared to those reported by Tschirhart (2003) in the *Semimembranosus* muscle of lamb.

Haeminic pigments. Results (Figure 4) indicate a reduction in the pigment content based on the time for both treatments. Larzul (1997) reports values of 1.91 ± 0.03 and 1.98 ± 0.03 in fresh tissue pig, in female and male reproducers, respectively. On the other hand, Cano Expósito *et al.* (2003) showed similar values to day 0 in *L. dorsi* and *T. brachii* muscles with 3.57 and 3.47 mg Mb/g, respectively.

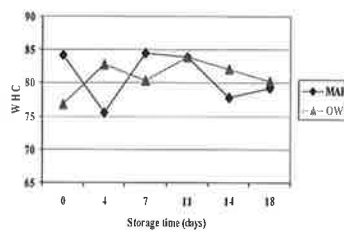


Figure 3: Water holding capacity in lamb meat.

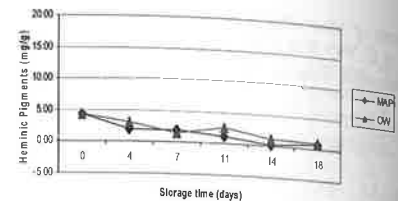


Figure 4: Haeminic pigments (mg/g) in lamb meat.

Lipid oxidation. In both treatments, lipid oxidation (TBA) (Figure 5) revealed similar behaviours between treatments. However, initial TBA values were high, indicating that the lamb meat was oxidised before beginning the experiment; this was probably due to the over-wrapped packaging used during freezing of the meat.

Colour. The values of a^* and Hue (Figure 6) indicate that no differences exist between treatments ($P > 0.05$). Hue values were in the range of 48.12 ± 5.02 and 50.72 ± 9.01 , for over-wrapped and modified atmospheres respectively. The a^* values decreased for both treatments during the first four days, indicating loss of red colour and corresponding to increased %MetMb, however, it remained constant during storage.

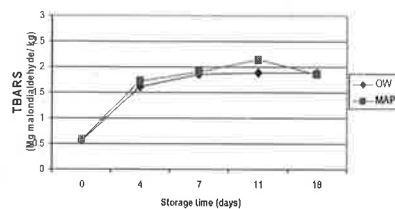


Figure 5: Lipid oxidation (TBA) in lamb meat.

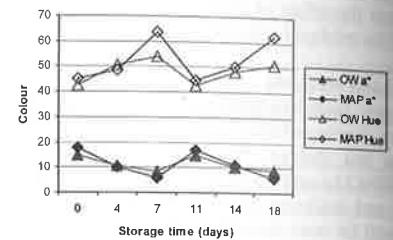


Figure 6: Colour in lamb meat.

Conclusions

The types of packaging used for *Semimembranosus* muscle of lamb do not show significant differences ($P > 0.05$) during the time of refrigerated storage, indicating that type of packaging used during freezing was an important factor that influenced the quality of meat.

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