

## Shelf life of Pietrain and Duroc pork bellies packed on high-oxygen modified atmosphere

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**Introduction:** Consumer demand for leaner meat products have encouraged a continuous intensive selection for an increased lean meat production resulting in a reduction of belly fat content from up to 74% (Soladoye et al., 2015). Leaner bellies tend to present a softer texture (Sather et al., 1995) and might result in a reduced shelf-life due poor oxidative stability (Soladoye et al., 2017). The aim of this study was to investigate the impact of different breeds on the shelf life of pork belly packed in high-oxygen modified atmosphere, a common packaging practice for sliced fresh belly in the Spanish market.

**Materials and methods:** Deboned pork bellies from different breeds (n=24) were selected from a local cutting plant to obtain a range of fat contents: low (Pietrain lean=PI), medium (Pietrain fatty=Pf), and high (Duroc=D). The bellies were scanned with the computed tomography to predict the fat content. Fat firmness was evaluated by measuring the flop distance and flop angle using the bar suspension method skin side down. Bellies were sliced at 1 cm thick and packed using a modified atmosphere (MAP) with 70% O<sub>2</sub> / 30% CO<sub>2</sub>. The samples were stored in refrigerated display cabinets and exposed to 12 h lightness/ 12 h darkness cycles for 20 days. Odour, visual aspect, pH, oxidation (TBARS), microbiological content, and colour (computer vision system analysis) were measured. Variance analysis was performed with SAS software (version 9.4).

**Results:** All studied breeds presented significant differences among them in fat content (D=65.96±2.49%, Pf=43.66±3.0%, PI=24.42±3.35%) and fat firmness measured as flop distance (D=39.94±5.81, Pf= 19.50±3.10, PI= 11.94±3.61). The most important quality losses during the shelf life of all studied samples were mainly due to colour changes (decrease of a\* and increase of L\* and b\* of the lean, and increase of L\* of the fat) and fat oxidation (increase of TBARS and odour of rancidity). Sliced belly samples showed slow microbial growth with no significant increase of TVC (Total Viable Count) until day 13 of storage. Duroc bellies showed better sensory rating (odour and visual appearance), lower TBARs values and less colour changes throughout its shelf life than Pietrain, while no differences were observed between Pf and PI. These results indicate that sliced Duroc bellies, with higher firmness and fat content would result in longer shelf life than Pietrain bellies when packed in high-oxygen modified atmosphere.

**Conclusions:** The obtained results highlight the importance of choosing an appropriate packaging system for each belly type. In the studied conditions, MAP with high oxygen content proved to be a suitable packaging system for Duroc bellies. However, alternative packaging systems with low or no oxygen should be studied to extend the shelf life of bellies from breeds with low oxidative stability such as Pietrain.

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