

Extending the shelf-life of pork patties using protein hydrolysates obtained from porcine liver

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Introduction: Oxidation reactions produce the loss of essential fatty acids and vitamins leading to a reduction of the nutritional value, affect negatively the sensory quality, as well as, generate numerous toxic compounds (Domínguez et al., 2019). Antioxidants can retard the oxidation of biomolecules such as proteins and lipids in meat products, improving the stability and therefore, extending the shelf life of the product (Sohaib et al. 2017). Food safety concerns are growing regarding the use of synthetic additives, which have been used for many years, but due to their harmful effects, the search for natural antioxidants is arousing interest among consumers (Lorenzo et al., 2018). This strengthens the importance of searching for new sources of natural bioactive compounds, highlighting the porcine liver as an interesting source of antioxidant compounds (Lopez-Pedrouso et al., 2020). Therefore, the objective of the present research was to determine the effectiveness of peptide extracts obtained from the enzymatic hydrolysis of porcine liver to extend the shelf life of pork patties.

Materials and methods: Hydrolysates of pig livers were obtained following the methodology of Borrajo et al. (2020) after 8 hours of incubation. Three batches were processed: a control (without enzymatic hydrolysis), and two hydrolysed with flavourzyme and bromelain enzyme, respectively. Hydrolysates extracts were added at 250 mg/kg. After elaboration, pork patties were packed under modified atmosphere (20% CO₂, 80% O₂) and stored at 2 °C. The pH, colour and lipid oxidation index were determined according to the procedures described by de Carvalho et al. (2020). The effect of enzyme type and the storage days on physicochemical traits was evaluated using a one-way analysis of variance (ANOVA).

Results: The pH values showed significant differences ($P < 0.001$) among batches and days of storage. The TBARS values were significantly ($P < 0.01$) different on day 12, since bromelain treatment achieved the lowest oxidation value (0.63 mg MDA/kg). On the contrary, pork patties elaborated with flavourzyme extract showed higher TBARS values than control ones at the end of the storage (2.27 vs. 1.45 mg MDA/kg, for flavourzyme extract and control treatment, respectively). This could be due to the presence of pro-oxidative compounds on this extract since depending on the concentration antioxidant compounds could have antagonistic properties (Sotler et al. 2019). The only colour parameter affected by storage time was the redness, which showed a significant ($P < 0.01$) reduction on day 12 in all patties, although with no significant differences among the three treatments ($P > 0.05$). However, the highest redness index was achieved in bromelain pork patties, indicating higher protection.

Conclusions: This preliminary study showed that bromelain extracts from hydrolysates of liver could be used as a natural antioxidant in pork patties as they reduced lipid oxidation against control treatments.

Acknowledgements and Financial support statement: This research received external funding by Grant RTA 2017-00024-CO4-04 from INIA (Spain). Thanks to INIA for granting Paula Borrajo with a predoctoral scholarship (grant number CPD2016-0030). The authors are members of the Healthy Meat network, funded by CYTED (ref. 119RT0568). Thanks to GAIN (Axencia Galega de Innovación) for supporting this research (grant number IN607A2019/01).

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