Effect of feruloylated arabinoxylans on physicochemical properties of York-type ham

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Objectives: The objective of this research was to determine the effect of feruloylated arabinoxylans (FAXs) on the physicochemical properties of York-type ham.

Materials and Methods: The cooked cured ham was prepared with pork meat, using standard formulation and procedure. The used carrageenan (CAR) was acquired from a local supplier, whilst FAXs were procured from the Biopolymers Laboratory (CIAD). The experiment consisted of the following treatments: control (T0), CAR 1% (T1), and FAXs 1% (T2). Three replications of the experiment conducted at separate times with three hams per replication. All samples were analyzed for proximate chemical composition and stored at 4 °C for 9 days. At the initial and end of the storage period, the pH was measured using a potentiometer. The water holding capacity (WHC) was determined by weight difference after applying a centrifuge force. CIE (L*, a*, b*) system method was used to measure color. In addition, Texture Profile Analysis (TPA) was evaluated with a Texture Analyzer. For proximate chemical analysis, a one-way analysis of variance (ANOVA) and the Tukey- Kramer test were performed to detect differences ($p<0.05$) between treatments using the statistical software NCSSv11. Afterward, a two-way ANOVA was used to analyze physico-chemical data.

Results and Discussion: Regarding the T0, T1, and T2 hams showed higher ($p<0.05$) values for moisture and protein (>70% and

>15%, respectively), as well as lower ($p<0.05$) fat and ash, contents (<4% of both components). In this context, T1 = T2 showed the highest moisture content (approximately 74.5%), respect T0 (73%), lowest protein content (T1 = T2, approx. 16%) respect T0 (17.4%), as well as lowest ash content (T1 = T2, approx. 3.0%) respect T0 (3.3%). In addition, no showed differences ($p>0.05$) among treatments in fat and carbohydrates content (3.5% and 2%, , respectively).

Moreover, at day 0 of storage, pH and WHC values showed an increase ($p<0.05$) in samples from T2 > T1 respect to T0. These values decreased during the storage time, and at the end of storage; samples from T2 showed the highest pH values (6.2) in comparison to T0 (6.1), while T1 = T2 samples showed the highest WHC (29% for both) respect to T0 (25%). Regarding color parameters, at day 0, samples from T2 showed the highest ($p<0.05$) a* and b* values (6.4 and 12.3, respectively) in comparison to T0 (6.0 and 9.0, respectively); without differences ($p>0.05$) in L* values among treatments. At the end of storage, the higher a* value ($p<0.05$)was found in T1 (6.6) respect to T2 and T0 (6.2 and 6.0, respectively); without differences ($p>0.05$) in L* and b* values among treatments (69 and 9.5).

Furthermore, on day 0, TPA indicated that hardness, adhesiveness, cohesiveness, gumminess, and chewiness did not differ ($p>0.05$) among treatments (2.0 kg, -3.5 g.s., 0.65, 13 kg, and 11 kg, respectively). At the end of storage, T2 samples showed the highest adhesiveness (-2.5 g.s.) in comparison to T0 (-4.4 g.s.) and T1 (-4.1 g.s.), as well as the lowest gumminess (11.5 kg) and chewiness (8.5 kg) in comparison to T0 (13.6 and 11.4 kg, respectively) and T1 (11.8 and 9.1 kg, respectively). No differences ($p>0.05$) were observed in hardness and cohesiveness among treatments (average value of 1.8 kg and 0.65, respectively).

FAXs are the major non-starch polysaccharides of the cereal walls and considered an important source of functional dietary fiber for humans. Also, in other studies demonstrated that FAXs can form gels with neutral characteristics regarding sensory attributes (taste and smell); they present pH stability and a macroporous structure for use as a potential ingredient in the food industry. In re- cent years, consumer perception of meat products has changed due to aspects related to health. One of the strategies by the meat industry is incorporating new ingredients rich in dietary fiber with functional properties in the formulation of meat products. In this context, cereal polysaccharides, including starch, cellulose, hemicellulose, and β-glucose types have been used in meat products (i.e., sausages, meat blocks, meat batters, patties, meatballs, and meat emulsions) to improve physicochemical characteristics.

Conclusions: The obtained results support the potential usage of FAXs as a functional additive for ham and could be used in other processed meat products.

Key words: Polysaccharides, Arabinoxylans, Functional ingredient, Meat product