**Use of marine collagen peptides to improve the nutritional quality of pork burgers**

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ABSTRACT

The growing concern of consumers for their health is forcing to reformulate meat products. Fish by-products contain a large number of bioactive compounds, including collagen, the most important structural protein present in the skin, cartilage and bones of fish. Collagen peptides, rich in glycine, proline and hydroxyproline, have positive effects on human health. The object of the present study was to evaluate the effect of the incorporation of two levels of fish derived collagen peptides (5 and 10%) on the physicochemical, nutritional and sensory quality of pork burgers. Along with these treatments, a control batch were used to compare the analytical results. The collagen, obtained by enzymatic hydrolysis, was produced according to EU regulations 2016/355. The hydrolysates obtained were spray-dried into a granulated powder using maltodextrin, gelatin and arabic gum. As expected, the incorporation of the encapsulated collagen resulted in a significant (*P*<0.001) increase of protein contents. This effect was most prominent in the burgers that contained the highest level of collagen (26.46% *vs.* 23.0 and 18.19% for burgers with 10% and 5%, and control samples respectively). This increase would be related to the high content of protein present in collagen peptides (>90%). A significant effect was also observed in moisture (67.88 to 63.99%) and fat (11.56 to 7.59%) contents, which decreased with the addition of collagen peptides. On the contrary, no effect was observed in the case of pH and color parameters. The effect on water holding capacity was also evaluated, since it has a great importance on burger properties such as appearance, tenderness and juiciness, what could condition consumer acceptance. The obtained results (measured as cooking loss) were above 24%, being the samples elaborated with 5% collagen the ones that showed the lowest values, while there were no significant differences between the control and the samples treated with the highest level of collagen (30.5% *vs.* 29.0%). In the case of texture, evaluated using TPA test (hardness, springiness, cohesiveness, gumminess and chewiness), the mean values obtained for all the mentioned parameters showed significant (*P*<0.05) differences among batches. Regarding hardness, treated burgers were significantly different from the control, which showed significantly higher values (195 N *vs.* 146 N and 155 N for control and burgers with 5 and 10%, respectively). Finally, the incorporation of fish collagen peptides exhibited a significant effect on the amino acid profile. The samples with collagen were those that showed the highest amino acid content, being the non-essential amino acids the predominant ones. Glutamic acid, aspartic acid, and glycine were the most abundant in this fraction, representing together around 62% of non-essential amino acids and 35% of TAAs. Regarding the essential amino acids fraction, lysine was the most abundant, followed by arginine and leucine, representing together about 50% of essential amino acids and 22% of TAAs. The positive effects observed with the incorporation of collagen were corroborated with the sensory analysis, which showed that all samples were considered acceptable by consumers, showing even better global acceptance and preference results than those observed in control samples.

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