

# Development of healthy dry-fermented sausages (chorizo) from Cachena beef using emulsion hydrogel and turmeric powder

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**Objectives:** Due to the scientific evidence that demonstrates the direct relationship between the fat composition and certain diseases, multiple international agencies recommend limiting the intake of saturated and *trans* fatty acids, and increasing the intake of unsaturated ones. However, taking into account the saturated character of animal fat, complying with this recommendation is a difficult task for the meat industry, since fat has a fundamental role in the development of organoleptic characteristics and also technological implications during meat products manufacture. Therefore, multiple strategies have been designed, with the use of emulsion hydrogels being the most promising [1]. The main objective of this study was to determine the chemical composition of the reformulated beef sausages with canola emulsion hydrogel, as well as the inclusion of turmeric in its formulation, to verify its nutritional quality.

**Materials and Methods:** Three batches of healthy beef sausages (chorizo), reformulated with canola emulsion alginate-based hydrogel and with different turmeric amounts were manufactured: Control, without turmeric and T25 and T75 batches (0.25 and, 0.75% turmeric powder, respectively). After 24h fermentation, the sausages were kept in a dry-cured chamber at 6-8°C and 45-80% relative humidity for 14 days, and at 10-12°C and 70-75% for another 20 days (total of 35 days). The fatty acids were measured using gas chromatography [2] and chemical composition using normalized procedures [3]. Data were examined using a one-way ANOVA analysis. Duncan's test was used for the determination of the differences between least squares means ( $P < 0.05$ ).

**Results and Discussion:** Regarding chemical composition, no differences were observed among samples, showing the average values for moisture, protein, fat, and ash of 34.4%, 17.7%, 31.7%, and 6.4%, respectively. The lack of variations in the chemical composition was expected since the formulation of all the batches was composed of emulsion hydrogel and the same ingredients except for the small amount of turmeric added in the T25 and T75 batches. It is important to highlight the great nutritional improvement in the reformulated sausages, with low fat value (~17%) and high protein value (~32%) compared to those on the market (fat: 45-60% and protein: <28%) [4]. However, not only the fat content but also its composition was improved, since the fatty acid profile showed a high content of MUFAs (~58%) and PUFAs (~19%), and reduced content of SFAs (~22%). Depending on the animal fat, normally the content of SFA in this type of product is higher than 40%, which demonstrates our nutritional improvement in beef sausages formulated with canola emulsion hydrogel. In addition, it is worth highlighting the high contributions of essential fatty acids linoleic and linolenic acids, and a ratio n-6/n-3 of ~2.9, which meets international recommendations (<4). There are differences in the content of some fatty acids between Control or T25 and T75, but in general, these can be attributed to minor variations in the composition of the ingredients during the manufacture, and not to the use of turmeric.

**Conclusions:** The use of turmeric and canola emulsion hydrogel is a promising strategy to manufacture healthy beef sausages. The chemical composition shows that the reformulated sausages in this study have a good nutritional quality, and an improved fatty acid profile with respect to the marketed products.

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**Key words:** Low-fat meat products, Curcuma longa L., Fatty acids, Healthy meat products, PUFA