

# Effect of traditional feeding in Celta pigs on fatty acid profile and cholesterol content of “chorizo criollo” sausage

Jose M. Lorenzo, Beatriz Curros, Noemi Echegaray, Ruben Agregan, Roberto Bermudez, Daniel Franco

*Centro Tecnológico de la Carne de Galicia, Spain*

**Objectives:** Meat and meat products generally represent the main source of protein in the human diet. Consequently, improving the lipid profile of these nourishments may provide a way to enhance the human health. Considering that the lipid composition of pigs is influenced by their diet, the purpose of this study was to analyze the effect of a traditional feeding on the fatty acid profile and cholesterol content of “*chorizo criollo*” sausage.

**Materials and Methods:** The *chorizo criollo* sausages utilized in the present work were elaborated according to the traditional recipe collected by Carballo et al. (2012). The ingredients used in the formulation were pork lean (70%), fat (26%), water (5%), red and green pepper and carrot (4%), NaCl (20 g/ kg), dextrose (5 g/ kg), garlic (1 g/ kg), marjoram (0,5 g/ kg), sodium ascorbate (0,5 g/ kg), white pepper (0, 5 g/ kg), and cumin (0, 5 g/kg). Two batches were prepared (commercial and traditional). The only difference between them was the pork lean and fat employed in the elaboration. Thus, the commercial batch corresponds to pork lean and fat from pigs fed with commercial feeding, meanwhile the traditional batch corresponding with pigs fed with natural resources (fruits, potatoes, wheat, etc.) The fatty acid profile was analyzed using a gas chromatograph (GC) couple to a flame ionization detector (FID) following the procedure described by Domínguez et al., 2022. The total cholesterol was separated and identified according to López-Fernández et al. (2022), using highperformance liquid chromatography (HPLC). One-way ANOVA was employed for statistical analysis and differences were considered significant if  $P < 0.05$ .

**Results and Discussion:** The fatty acids composition in the “*chorizo criollo*” from both diets were predominantly monounsaturated fatty acids (MUFA), being oleic acid (C18:1n-9) the most abundant. In the same line, saturated fatty acids (SFA) followed in importance in both treatments, with palmitic acid (C16:0) as the majority SFA. Regarding polyunsaturated fatty acids (PUFA) the predominant in both diets was linoleic acid (C18:2n-6). Despite these similarities in terms of the prevalence of fatty acids, it was observed that the traditional diet significantly decreased ( $P < 0.001$ ) the MUFA and PUFA present in the “*chorizo criollo*” compared to the commercial diet. Along the same lines, the omega-3 (n3) and omega-6 (n6) fatty acids was significantly ( $P < 0.001$ ) decreased in “*chorizo criollo*” from traditionally fed pigs. Conversely, the cholesterol concentration was significantly ( $P < 0.01$ ) higher in the “*chorizo criollo*” elaborated with traditionally fed pigs. This fact negatively influences the nutritional quality of the traditional “*chorizo criollo*”, since the high amounts of cholesterol are one of the main concerns linked to processed meat products (de Carvalho et al., 2020). At the same time, the traditional diet had a negative influence on the PUFA/ SFA nutritional index, since it was significantly ( $P < 0.001$ ) lower in the traditional “*chorizo criollo*”. However, the n6/ n3 ratio present in this meat product was not significantly ( $P > 0.05$ ) affected by diet.

**Conclusions:** The use of natural resources in pig feeding represents an improvement in terms of sustainability since it permits reducing food waste. Moreover, the employ of natural resources reduces the issues associated with large areas of cultivation destined to produce commercial feed (land overexploitation, pesticides, carbon footprint, etc.). However, as observed in this work, the use of natural resources in the pig diet must be balanced to obtain meat products with good nutritional indices, since in this case the traditional diet did not achieve to improve the nutritional characteristics (ratio n6/ n3) of the “*chorizo criollo*”, in addition to increasing the cholesterol content and decreasing the percentage of MUFA and PUFA.

## References:

- Carballo, J., Fernández, M., & Lorenzo, J. M. (2012). Otros productos de elaboración tradicional derivados del cerdo Celta. In CE-TECA (Ed.), *Manual del cerdo Celta* (pp. 45-53).
- de Carvalho, F. A. L., Munekata, P. E., Pateiro, M., Campagnol, P. C. B., Domínguez, R., Trindade, M. A., & Lorenzo, J. M. (2020). Effect of replacing backfat with vegetable oils during the shelf-life of cooked lamb sausages. *LWT*, 122, 109052.
- Domínguez, R., Purriños, L., Pateiro, M., Campagnol, P. C. B., Reyes, J. F., Munekata, P. E. S. & Lorenzo, J.M. (2022). Fatty acids. In J. M. Lorenzo, R. Domínguez, M. Pateiro, & P. E. S. Munekata (Eds.), *Methods and Protocols in Food Science* (pp. 41-52). Humana.
- López-Fernández, O., Domínguez, R., Ruiz-Capillas, C., Pateiro, M., Sosa-Morales, M. E., Munekata, P. E. S., Sant’Ana, A. S., Lorenzo, J. M. & Herrero, A. M. (2022). Cholesterol. In J. M. Lorenzo, R. Domínguez, M. Pateiro, & P. E. S. Munekata (Eds.), *Methods and Protocols in Food Science* (pp. 41-52). Humana.

**Key words:** Pig diet, Traditional feed, Commercial feed, Fatty acid profile, Cholesterol, “Chorizo criollo”