**Influence of Celta pig diet on cholesterol and fatty acid profile of two traditional products**

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ABSTRACT

The autochthonous Celta pig breed, (Galicia, NW Spain), has an adipogenic metabolism that leads to the deposition of a large amount of fat in its body tissues.

The aim of this research was the valorization of subcutaneous fat from the Celta pig, obtained as a by-product, to elaborated foodstuffs, apart from dry-cured and fermented meat products, evaluating the influence of the pig diet on the fatty acid profile and cholesterol content on two traditional products. For this purpose, 4 pigs were fed with natural resources harvested from the farm (traditional) meanwhile 6 pigs were fed with commercial feeding based on concentrates (conventional). After pigs were slaughtered, the subcutaneous fat was removed to elaborate the traditional products: cake (“bica”) and cracklings (“chicharróns”) following homemade recipes. After elaboration, the fatty acid profile was analyzed using a gas chromatograph (GC) with a flame ionization detector (FID), meanwhile, total cholesterol was separated and identified using high-performance liquid chromatography (HPLC). One-way ANOVA was employed for statistical analysis and differences were considered significant if *P < 0.05*. The results obtained in this work showed that the pig diet significantly affected the fatty acid profile for the “chicharróns” but not for “bica”. Thus, conventional feeding produced a significant (*P < 0.05*)decrease in saturated fatty acids (SFA) and a significantly (*P < 0.01*) increase in polyunsaturated fatty acids (PUFA), as well as omega-3 (n-3) and omega-6 (n-6) for the “chicharróns”. The prevalence of monounsaturated fatty acids (MUFA; 31.12-41.23 g/ 100 g of fat), followed by saturated fatty acids (21.25-32.92 g/ 100 g of fat) and polyunsaturated fatty acids (7.38-21.19 g/ 100 g of fat) was the same on the two products for both pig diets. Moreover, the predominant fatty acid for each group was the same. Specifically, oleic acid (C18:1n-9), palmitic acid (C16:0) and linoleic acid (C18:2n-6) were the majority fatty acids for MUFA, SFA and PUFA, respectively. Regarding cholesterol content, values obtained ranged between 53.19 to 80.80 mg/ 100 g. Our results indicated that cholesterol content was not significantly (*P* > 0.05) influenced by the pig diet. On the other hand, not only does the diet provided to Celta pigs modified the fatty acid profile and cholesterol content, at least in “chicharróns”, but our findings demonstrated that the type of product had a significant influence on the total amounts of SFA, MUFA and PUFA and cholesterol. As expected variations in the recipes in terms of ingredients and amounts explain these differences, especially because “chicharróns”, is composed of one main raw ingredient, meanwhile, “bica” is elaborated with different ingredients, diluting the effect of the pig diet in the final product. The MUFA and PUFA contents were significantly (*P* < 0.01) higher in “chicharróns” than in “bica”, meanwhile SFA and cholesterol were significantly (*P* < 0.01) lower. In conclusion, the subcutaneous fat from Celta pig could be used for the recovery of traditional products in contrast to industrialized ones, but given the findings, more effort has to be done to improve the finishing diet, to enhance the nutritional profile.

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Keywords: animal feed, foodstuff, lipid profile, cracklings, cake.

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| --- | --- | --- | --- | --- |
| **FATTY ACID** | **CRACKLINGS “CHICHARRÓNS”** | **CAKE “BICA”** |  |  |
| **TYPE OF FEED** | **SEM** | **F** | **TYPE OF FEED** | **SEM** | **F** |  | **P** |
| **CONVENTIONAL** | **TRADITIONAL** | **CONVENTIONAL** | **TRADITIONAL** |  |
| **Cholesterol (mg/ 100 g)** |  |  |
| **Cholesterol**  | 65.74 | 53.19 | 3.95 | **ns.** | 78.56 | 80.8 | 1.634 | **ns.** |  | **\*\*** |
| **Fatty acid profile (g/ 100 g of fat)** |  |  |
| **C14:0** | 0.75 | 0.70 | 0.014 | **ns.** | 2.45 | 2.44 | 0.078 | **ns.** |  | **\*\*\*** |
| **C16:0** | 14.33 | 14.12 | 0.104 | **ns.** | 19.91 | 18.82 | 0.729 | **ns.** |  | **\*\*\*** |
| **C16:1n-7** | 1.91 | 1.38 | 0.497 | **\*\*** | 1.76 | 1.32 | 0.141 | **ns.** |  | **ns.** |
| **C18:0** | 5.54 | 7.26 | 0.497 | **\*\*** | 7.76 | 8.92 | 0.432 | **ns.** |  | **\*** |
| **C18:1n-9** | 35.89 | 34.72 | 0.384 | **ns.** | 29.57 | 26.69 | 1.318 | **ns.** |  | **\*\*** |
| **C18:1n-7** | 2.52 | 2.08 | 0.221 | **ns.** | 2.28 | 1.83 | 0.158 | **ns.** |  | **ns.** |
| **C18:2n-6** | 19.94 | 15.88 | 1.175 | **\*\*** | 7.06 | 5.95 | 0.408 | **ns.** |  | **\*\*\*** |
| **C18:3n-3** | 0.25 | 0.22 | 0.009 | **\*\*\*** | 0.39 | 0.32 | 0.025 | **ns.** |  | **\*\*** |
| **C20:1n-9** | 0.66 | 0.84 | 0.051 | **\*\*\*** | 0.62 | 0.64 | 0.020 | **ns.** |  | **ns.** |
| **SFA** | 21.25 | 22.75 | 0.447 | **\*** | 32.76 | 32.92 | 1.097 | **ns.** |  | **\*\*\*** |
| **MUFA** | 41.23 | 39.28 | 0.650 | **ns.** | 34.85 | 31.12 | 1.594 | **ns.** |  | **\*\*** |
| **PUFA**  | 21.19 | 17.07 | 1.193 | **\*\*** | 8.67 | 7.38 | 0.482 | **ns.** |  | **\*\*** |
| **n-3** | 0.66 | 0.58 | 0.023 | **\*\*** | 0.71 | 0.60 | 0.040 | **ns.** |  | **ns.** |
| **n-6** | 20.41 | 16.39 | 1.17 | **\*\*** | 7.76 | 6.59 | 0.437 | **ns.** |  | **\*\*\*** |
|  |  |  |  |  |  |  |  |  |  |  |
| **SEM:** Standard error of mean. **F**: Significantly different values as influenced by feeding (ns: no significant difference; \* P<0.05; \*\* P<0.01; \*\*\* P<0.001). **P:** Significantly different values as influenced by type of product (ns: no significant difference; \* P<0.05; \*\* P<0.01; \*\*\* P<0.001). |
| **SFA**: Saturated fatty acids; **MUFA**: Monounsaturated fatty acids; **PUFA**: Polyunsaturated fatty acids. **n-3**: Omega-3: **n-6**: Omega-6. |