# INCLUSION OF POTATO IN THE FINISHIG DIET OF PIGS: EFFECT ON PHYSICOCHEMICAL PARAMETERS

Pateiro, M.[1], Bermúdez, R.[1], González, P.[1], Seoane, S.[2], Franco, D.[1] and Lorenzo, J.M.[1*]

[1]Centro Tecnológico de la Carne. Parque Tecnológico de Galicia. San Cibrao das Viñas, 32900 Ourense, Spain, [2]COREN, Sociedad Cooperativa Galega, 32003 Ourense, Spain

[*]Corresponding author email: jmlorenzo@ceteca.net

**Abstract – The influence of finishing diet (concentrate *vs.* potato) on physicochemical parameters on *longissimus dorsi* muscle was studied. The results suggested that the inclusion of potato in the pig diet had slightly effect on proximate composition, color parameters and texture traits, since only significant differences ($P$<0.05) were found in ash content (1.33% *vs.* 1.26%) and redness values (1.51 *vs.* 2.37). The partial substitution of feed by potato in the finishing diet of pigs provides a good alternative for the reduction of production costs and allow to put in the market products of differentiated quality by a high added value, without affecting to a great extent the proximate composition and texture parameters of pork meat.**

**Key Words – Proximate composition, texture parameters, supplemented feeding**

## I. INTRODUCTION

Quality is an important factor in consumer's decision to purchase the meat. The supplementation of finishing pork diets would allow to obtained high dietetic and health values [1, 2]. The most desired attributes of meat quality taken into account by the customer include the overall appearance, color, as well as sensory properties such as flavor, juiciness, and tenderness [3]. The inclusion of vegetables such as potatoes may have beneficial effects on both animals health and meat quality. Potato (*Solanum tuberosum L.*) is one of the most commonly consumed vegetables throughout the world, ranking fifth in global agricultural production behind crops such as wheat and maize [4]. This product had led to a Geographically Protected Identity (GPI) "Patata de Galicia" in the NW of Spain [5], since Galicia is one of the main production area in Spain. Potatoes are a dietary ingredient characterized by high moisture and starch contents and relatively low level of protein that offer high biological value and good digestibility [6]. The use of potatoes in the pig fattening feed, in an intensive management system, would allow the reduction of production costs and put in the market products of differentiated quality by a high added value. Thus, the aim of this work was to study the effect of the introduction of potato in the finishing diet on physicochemical characteristics of meat.

## II. MATERIALS AND METHODS

The experiment was conducted with twenty five pigs from an industrial breed. Pigs were reared at the same time in an intensive system and were feed with compound feed. Three months before slaughter, the diet of thirteen animals were supplemented with potato in order to complete their feeding. Potato was gradually introduced and accounted for 30% of the diet. The day before slaughter, the animals were weighed and transported to the abattoir, trying to minimize stress to the animals. The day after slaughter, dissection of the left half-carcass was carried out and the muscle *longissimus dorsi* (LD) was extracted from the left half of each carcass. The LD was cut into four steaks of 2.5 cm thickness. The first two steaks were used to determine pH, color and proximate composition. The third and fourth steaks were used to determine water holding capacity (WHC) and texture traits, respectively. The aforementioned physicochemical parameters were conducted following the methodology proposed by Pateiro *et al.* [7]. ANOVA of one way using SPSS package (SPSS 19.0) was performed and LSM were separated using Duncan's t-test ($P$<0.05).

## III. RESULTS AND DISCUSSION

Proximate composition and physicochemical parameters of LD muscle from pigs fed with the two different diets are shown in Table 1. The mean pH value obtained in samples was 5.73, which is within the normal values for fresh pork meat. Colour parameters showed significant differences ($P$<0.01) between both types of samples in redness index (a*) (1.51 *vs*. 2.37, for control and potato, respectively). These values were lower than those found by other authors in pigs finished with chestnuts in the fattening period [8-9]. Regarding to the chemical composition, only ash content showed significant differences ($P$<0.001) between meat from animals fed with both diets, with values of 1.33% and 1.26% for control and potato groups, respectively. Although no significant differences were found, moisture and protein contents were higher in the samples of the animals supplemented with potato. On the contrary, fat contents were higher in

control samples (3.84 *vs*. 3.43%). A similar behavior was observed by other authors in pigs supplemented with potato [1]. The WHC obtained were higher than 20%. These values were similar to those found by Turyk *et al*. [1]. Among texture parameters, no significant differences ($P>0.05$) were observed between the two types of diet. Animals finished with potato presented lower shear force values (20.00 *vs*. 20.35 N). These values were lower than those noticed by other authors [8, 9].

**Table 1.** Proximate composition and physicochemical parameters of *longissimus dorsi* muscle

| | Control | Potato | SEM | SIG |
|---|---|---|---|---|
| pH | 5.75 | 5.71 | 0.03 | n.s. |
| **Colour parameters** | | | | |
| Lightness (L*) | 56.61 | 57.50 | 0.57 | n.s. |
| Redness (a*) | 1.51 | 2.37 | 0.17 | ** |
| Yellowness (b*) | 11.89 | 12.60 | 0.20 | n.s. |
| **Chemical composition (%)** | | | | |
| Moisture | 72.25 | 72.91 | 0.21 | n.s. |
| IMF | 3.84 | 3.43 | 0.24 | n.s. |
| Protein | 22.45 | 22.69 | 0.15 | n.s. |
| Ashes | 1.33 | 1.26 | 0.01 | *** |
| **WHC** | | | | |
| Cooking loss (%) | 22.44 | 25.24 | 0.77 | n.s. |
| **Texture parameters** | | | | |
| Firmness ($N \cdot s^{-1}$) | 5.56 | 5.96 | 0.27 | n.s. |
| Total work (N·mm) | 95.50 | 97.89 | 4.27 | n.s. |
| Shear force ($N \cdot cm^{-2}$) | 20.35 | 20.00 | 0.74 | n.s. |

SEM: Standard error of the mean; SIG: Significance: *** (P<0.001), ** (P<0.01), n.s. (not significant)

## IV. CONCLUSION

The effect of the inclusion of potato in the finishing diet on the physicochemical parameters of meat was negligible. This fact could be due to the fact that the amount of potato introduced in the finishing diet was very low or the finishing period was not large enough to observe greater differences. Thereby, the partial substitution of feed by potato provides an alternative for the reduction of production costs without affecting to a great extent the proximate composition and texture parameters of pork meat.

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