

Trial to Study Possible Effect of Acorns Source (Green Oaks vs Cork Oaks) on Traditional Pork Products

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SUMMARY - One farm with green oaks and another with cork oaks were chosen. Aiming to minimize weather effects and to provide swine equivalent pastures, under oak canopy, density of trees was similar and geographic area limited within Ourique County. Alentejano hogs, born and raised inside the region and recorded in the breed herd book, were fattened exclusively under oaks. Chemical composition of acorns from green oaks (AG) and from cork oaks (AC) were analysed including on fatty acids profile. Pigs were weighted 3 times during fattening period and ecographies were performed to evaluate back fat thickness (BF) and loin depth (LD). After slaughter samples of back fat were taken and analysed on chemical crude composition and fatty acids. Weight losses of hams were recorded along ripening period. Chemical composition of AG and AC were different. Considering percent of DM, we got for AG vs AC: NDF 24.9 vs 29.8 ($p < 0.001$); CP 3.67 vs 5.57 ($p < 0.05$); Lipids 8.00 vs 6.20 ($p < 0.05$). Fatty acids profile have shown higher percentage of saturated on AG ($p < 0.001$) and exhibit higher percentage of unsaturated on AC ($p < 0.001$). Acorns type, AG vs AC, didn't affect significantly ADG neither the BF, but LD was deeper in hogs fattened with AC. Fatty acids of pigs fattened with AG vs pigs fattened with AC reflected the feed influence (C16:0, AG 19.53 vs AC 18.62 $p < 0.001$; C18:0, AG 8.91 vs AC 8.43 $p < 0.05$; C18:1, AG 56.09 vs AC 55.17 $p < 0.001$; C18:2 AG 8.23 vs AC 10.42 $p < 0.001$). Total hams losses during ripening period were not significant affected by feed intake.

Key words: Acorns, Alentejano pigs, fatty acids, sylvo-pastoral.

INTRODUCTION

Green oak (*Quercus rotundifolia*) and cork oak (*Quercus suber*) together with other *Quercus* are the base of Mediterranean forests in Southwest Iberian Peninsula (about 5 million ha). This agrosylvo-pastoral system, used time along, established a sustainable ecosystem (Tirapicos Nunes, 1993). Alentejano swine breed is considered the best animal user of natural feedstuffs under oak canopy, between November and February. Little information has been published about the effect of acorns origin (green vs cork) on pig performance, meat and traditional products characteristics. Quality of dry cured products has been related with feed intake, during last finishing period (Freitas, 1998 and Neves, 1998). This trail main goal was just to contribute for a better knowledge on: (i) acorn type influence on final characteristics of PDO Portuguese pork products, besides (ii) growth of pigs during “montanheira” period.

MATERIAL AND METHODS

System

Two pig farms within same region were chosen to perform fattening of Alentejano pigs. Livestock density was identical and it was in accordance with PDO rules (1 to 1.5 animals per ha). Each farm was different considering oak types of trees present, farm B exclusively with green acorns and the farm L exclusively with cork acorns *Proceedings of 6th International Symposium on the Mediterranean Pig* 135

Animals

Seventy three hogs, sex neutralized, were engaged in this research, thirty four in farm B and thirty nine in farm L. Pigs ages were about 15 months at beginning of fattening period under oaks. Hogs were raised under rangeland conditions on an acorn plus grass diet during three months, without extra feed supply.

Procedures

Both acorn type fruits were sampled twice (1st - beginning December; 2nd – beginning January) in each farm. Laboratory analyzes of acorns were performed on: protein; lipids (as % of DM); fatty acid composition. Pigs were weighted at beginning middle and end of fattening period. Inside the scale, 30% of animal were submitted to ultrasound measure of back fat thickness (BFT) and *Longissimus dorsi* depth (LDD). After slaughtered, back fat samples were picked (same place, last lumbar vertebra level) from pigs in order to process later analyzes to determine fatty acids profile (Campaniço e Nunes, 2006). Hams were weighted 4 times during ripening period to determine hams losses time along.

Statistics

Data were analyzed by ANOVA, according to the mathematic model:

$$Y_{ij} = \mu + \text{Farm}_i + \varepsilon_{ij}$$

RESULTS

Table 1 shows chemical composition of both acorn types, considering the amount of acorns eaten per swine each day (7 kg to 10 kg) these slight differences can be important in meat characteristics. Regarding the influence of feed intake we can see that in average there are no differences in ADG between farms, if total period is considered, but as can be seen in table 2, pigs grown faster in L farms during first half period perhaps because L acorns ripened and fall early (Almeida *et al*, 1992). Protein content, higher in L acorns, can explain the difference in *Longissimus dorsi* depth as shown in fig 1.

Table 1. Acorns chemical composition (least square means±sem)

	Green acorns	Cork acorns	SL
Protein (%DM)	3.67 ± 0.78	5.57 ± 0.8	*
Lipids (%DM)	8.00 ± 0.58	6.20 ± 0.58	*
<i>Fatty acids (1)</i>			
Palmitic (C16:0)	15.28 ± 0.43	14.68 ± 0.43	NS
Stearic (C18:0)	3.27 ± 0.43	1.77 ± 0.43	*
Oleic (C18:1)	63.25 ± 0.56	59.10 ± 0.56	***
Linoleic (C18:2)	15.63 ± 0.47	20.42 ± 0.47	***
Linolenic (C18:3)	0.82 ± 0.18	1.73 ± 0.18	**
Saturated	19.01 ± 0.22	17.06 ± 0.22	***
Unsaturated	81.14 ± 0.22	83.17 ± 0.22	***
Monounsaturated	64.11 ± 0.58	60.37 ± 0.58	***
Polyunsaturated	17.04 ± 0.69	22.80 ± 0.69	***

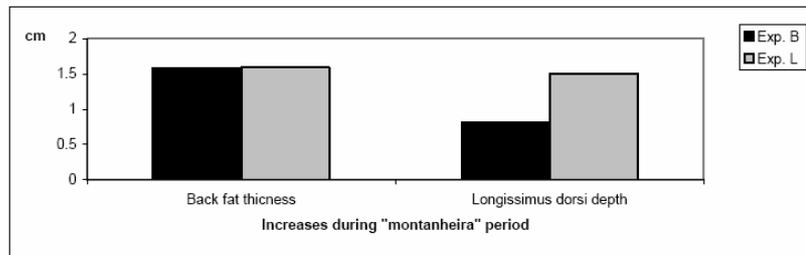
(1) As % of identified methyl esters; *- p<0,05; ** - p<0,01; *** - p<0,001; NS - No Significant

Table 2. Pigs growth performance

ADG	Exp. B	Exp. L	Sig
ADG I (g)	936.56 ± 36.76	1046.88 ± 43.63	***
ADG II (g)	930.64 ± 32.25	778.28 ± 38.28	***
ADG III (g)	933.35 ± 27.88	912.13 ± 33.09	NS

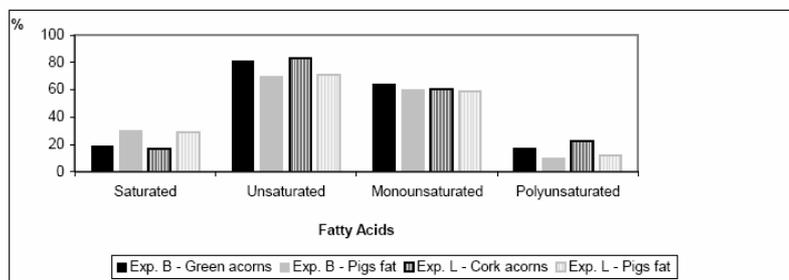
ADG I : average daily gain from beginning to half trial; ADG II: average daily gain from half to trial end; ADG III: average daily gain from beginning to trial end; *** - p< 0,001; NS - No Significant

Figure 1 Graphics based on ecographies



Fatty acids profile is considered to be very important to compare “montanheira” dry cured hams. Regarding the results obtained in this trial we can observe (fig. 2): (i) hogs raised in both farms presented adequate fatty acid profile considering PDO recommendations; (ii) differences in acorns seem to affect in same way fatty acids profile of raw material.

Figure.2 Fatty acids composition of acorns and fat.



CONCLUSIONS

- Comparing chemical composition of acorns, cork acorns were different from green acorns.
- Differences on acorns were reflected on meat and fat characteristics.

- Ham yield seem to be slightly affected by the type of fruits intake.
- Both acorns drive to obtain raw material and products within parameters established by certification official authorities for PDO Portuguese pork products.

REFERENCES

Almeida, J. A. A.; Marinho, A. A. M.; Batista, M. E. S. (1992). Valor Nutritivo da Bolota e Lande. In: *II Coloquios Sobre el Cerdo Mediterraneo – Ponencias y Comunicaciones*. Servicio de Investigación Agraria de la Dirección General de Investigación, Extensión y Capacitación Agrarias; Junta de Extremadura. Badajoz. pp 9-10.

Campaniço, L. E Tirapicos Nunes, J.L. (2006). Influencia dos frutos de *Quercus rotundifolia* e *Quercus suber* sobre as Performances Produtivas e Perfil de Ácidos Gordos da Gordura Subcutânea em Suínos Raça Alentejana. Solo Cerdo Ibérico, 2006 ABR; (15) pp. 25-31

Freitas, A. A. G. B. de (1998). Influência do Nível e Regime Alimentar em Pré-acabamento Sobre o Crescimento e Desenvolvimento do Porco Alentejano e Suas Repercussões Sobre o Acabamento em Montanheira e com Alimento Comercial. Tese de Doutoramento. Universidade de Évora

Neves, J.A.F.M.(1998). Influência da Engorda em Montanheira Sobre as Características Bioquímicas e Tecnológicas da Matéria-Prima e do Presunto Curado de Porco Alentejano. Tese de Doutoramento. Universidade de Évora.

Tirapicos Nunes, J. L. (1993). Contributo Para a Reintegração do Porco Alentejano no Montado. Tese de Doutoramento. Universidade de Évora.