

# CHARACTERISTICS AND COMPOSITION OF LEAN AND FAT IN PORK CARCASSES

Ma D. GARRIDO, E. MARIA DOLORES, Ma B. LOPEZ, A. MUÑOZ, J. LAENCINA

Tecnología Alimentos-Genética y Mejora Animal. Fac. Veterinaria.

Campus Universitario Espinardo, 30071 MURCIA, Spain.

## SUMMARY

It has been estimated the composition of lean meat and fat of 255 pig carcasses, using Fat-o-meat'er (FOM) and doing others experimental measurements on carcasses, treating to study the relationship between both parameters. We have investigated the influence that holding water capacity and moisture can have over all the parameters consider, and also the possible differences due to sex and breed.

## INTRODUCTION

The classification of carcasses supposes a tool for carcass trading and inducement to produce the type of the pig demanded by consumer. Nowadays it supposes to produce lean meat pigs.

The system of pig carcass clasification have developed quicker with pigs than with bovino and sheep because the measurements subcutaneous fat thickness in pigs can be measured more accurately and they have got a closer relationship with the composition of carcasses. The need for unifying criterions in E.E.C has carried on to set up a comun system for classifying pig carcasses being several the devices which allow us to do it. Three automatical probes have been passed in Spain for classification after the studies performed by Diestre et al. (1988): Fat-o-Meat'er (FOM), Hennessy grading probe (HGP) and Destran PG-100.

The object of this study is doing an evaluation of lean and fat component of pig carcasses using FOM relating meausurement to others parameters experimentaly calculated (fat back, weight of carcass, HWC,...), observing possible differences between sex and breed.

## MATERIAL AND METHODS

The study has been carried out on 255 pig carcasses belonging to two different breeds, L:F1 (Landrace x Large White) x Dalland and D: Dalland. The measurements of lean and fat have been performed with FOM immediately after slaughter. FOM measures at two

points in the loin back region beside the midline two fat depths and the muscle thickness besides the lean meat percentage related to the weight of the carcass.

During the first post mortem 45 minutes they were taken on carcass, with a rule, the fat thickness over the gluteus med., and over the first rib.

It was determined meat moisture and holding water capacity by two different methods over muscle semimembranosus: protein solubility (Barton-Gade, 1984) and Grau et al., 1957 with Voloviskaya modification method.

In order to study the correlation between the parameters considered, regression analysis simple and multiple has been used. Variance analysis has let us to estimate the differences due to sex and breed.

## RESULTS AND DISCUSSION

Average and S.D. of each one of the studied parameters, along with the mean applicable to every sex and breed can be observed at table 1.

Table 1. Morphological parameters and the carcass traits.

	Total		L	Breed		D	M		Sex		F	S.D
	X	S.D		X	S.D		X	S.D	X	S.D		
% Lean	49.7	2.68	49.71	0.29	49.69	0.99	49.86	0.39	49.61	0.38		
sl	13.4	3.11	13.24	0.35	14.2	0.94	12.68	0.48	*13.88	0.43		
sr	17.3	4.42	17.24	0.49	17.7	1.15	17.41	0.74	17.22	0.59		
rw	28.8	7.66	28.21	0.62	*33.5	5.29	29.12	1.11	28.58	1.07		
Weight carc.	86.5	12.39	84.03	0.89	89.3	1.44	86.93	1.07	86.00	1.11		
Length carc.	80.5	4.47	80.57	0.33	80.34	0.58	**81.08	0.41	79.79	0.38		
Fat gluteus	1.86	0.85	1.80	0.06	*2.11	0.12	1.84	0.07	1.89	0.08		
Fat 1-rib	3.62	0.71	3.62	0.05	3.67	0.09	3.54	0.06	**3.75	0.06		
Intram. fat	1.4	0.56	1.36	0.037	*1.6	0.11	1.40	0.04	1.42	0.07		
Moisture	73.7	5.75	73.65	0.46	73.86	0.5	74.2	0.50	72.95	0.55		
WHC	71.70	8.66	72.31	0.64	69.24	1.82	69.29	0.77	***75.04	0.95		
WHCI	180	3	180	3	180	7	180	3	190	4		

\*  $P < 0.05$  \*\*  $P < 0.01$  \*\*\*  $P < 0.001$

Respective to the sex parameter it has been observed significant differences in fat thickness over last rib (sl), in length of carcass and fat thickness over first rib, and WHC. Likewise it was observed significant differences in breed, fat gluteus and loin thickness and intramuscle fat.

The correlation between the lean percentage and the fat thickness measures, both experimentally taken with FOM is very big and with a negative character. It wasn't found



any correlation between lean percentage of meat and the loin thickness, being the results the same obtained by Branschid et al. 1989.

We can also watch the relationship between weight of carcass and percentage of lean meat with a lightly negative character. These results seem to agree with others (Diestre et al. 1989; Allen, 1989; Chizzolini et al. 1992), the increase of weight of carcass involves an increase of fat and a decrease of bone percentage.

Fat measurements taken with FOM don't behave the same way if relate to studies parameters; while sl shows a high correlation coefficient in relation with experimental fat measurements, gluteus fat, and fat over the first rib. Therefore it's a good measures of fat grading of the carcass. With sr doesn't happen the same according to what regression analyses show. (Table 2).

The results show that the percentage of intramuscle fat cannot be predicted either with every fat thickness measurement of carcass or with HWC and moisture parameters. These last don't show significative correlation with rest studied parameters. So we have been able to observe that the lenght the caracass could be predicted by means of fat thickness measurements of the carcass. sl, sr, gluteus fat, and fat over the first rib. It also, seems to be a relationship between the prediction of lenght of carcass and the lean meat percentage and loin thickness. (Table 2).

Table 2. Values of regression analysis (R-SQ).

	% lean	weight carcass	lenght carcass	intram. fat	sr	sl	rw
sl, sr, intra.fat							
fat gluteus, fat 1-rib	0.71						
% lean, rw		0.15	0.12				
sl, sr, fat gluteus, fat 1-rib		0.38					
WHC, WHCI, moisture	0.00			0.0031			
fat gluteus, fat 1-rib, intram.fat					0.00	0.59	0.08
sl, sr, intram.fat, fat gluteus, fat 1-rib						0.70	
fat gluteus	-0.54				0.58		
fat 1-rib	-0.47				0.47	0.63	
sr		0.46					
sl		0.56					

## CONCLUSIONS

The percentage of lean meat of the carcass can be predicted by measuring the fat thickness of the carcass (sr, sl, fat gluteaus, fat over the first rib).

Fat measurement taken with FOM (sr, sl) and the experimental measurement don't let us to predicted the percentage of intramuscle fat.

HWC and moisture parameters, don't render any further information about the fat and lean meat components of the carcass.

#### REFERENCES

- Allen, P. (1988). Clasificación de canales porcinas de la CEE. Presente y futuro. Jornadas internacionales de producción porcina. Madrid.
- Branscheid, M; Sack, E; Gründl, E; Dempfle, L. (1989). Breed influences on the validity of grading results and the effect of different systems on meat quality. Proceedings of the EAAP-symposium of the Commission on pig production. Helsinki, Finland.
- Chizzolini, R; Novelli, E; Badiani, R; Delbono, G; Rosa, P. (1992). Objective evaluation of pork quality: results of on line measures.
- Diestra, A; Arpa, I. (1984). La investigación aplicada en la calidad de la canal y de la carne en el porcino. Med. Vet. Vol. 1 nº 2.
- Diestre, A; Gispert, M; Oliver, M<sup>a</sup> A. (1989). Pig carcass classification using automatic probes in Spain. Proceedings of the EAAP-symposium of the Commission on pig production. Helsinki, Finland.