

## QUALITATIVE ASPECTS OF THE CARCASS AND MEAT OF INTACT MALE PIGS AND CASTRATED AT DIFFERENT AGES

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### INTRODUCTION

There is an increase interest in the world concerning the use of intact males for meat production. Intact boars generally present better feed efficiency (Waltra and Kroeske, 1968) when compared with barrows, but the difference in growth rates is not as great as the difference between rams and wethers or between bulls and steers (Field, 1971).

With respect carcass merit, Siers (1975) reported that boars had significantly larger loin eye areas and higher ham and loin percentages than barrows. Martin (1969) and Turton (1969) reported that boars were leaner than barrows at same market weight. Waltra and Kroeske (1969) concluded that boars presented greater carcass length, less back fat and higher percentage of ham.

In palatability studies, Shelly et al. (1970) reported that sex is not significantly related to meat tenderness in swine. Field (1971) in a review concluded that the data collected concerning tenderness is contradictory and most researchers have considered tenderness in boar meat of minor consequences and have concentrated on differences in odour and flavour of the cooked meat. The compound primarily responsible for boar odour is  $5\alpha$ -androst-16-ene-3-one ( $5\alpha$ -androstenone) which has been isolated from the fat of boars but not from barrows and gilts, Patterson (1968). The pheromone,  $5\alpha$ -androstenone which is believed most closely associated with boar taint, seems to be produced in the tests, Gower and Ahmad (1967) and a positive relationship exists between the secretion of  $5\alpha$ -androstenone and testosterone. The later may be converted to  $5\alpha$ -androstenone as well as induce the production of other odors that may make the carcass unacceptable. Martin (1968) considered the stage of maturity to be an extremely important factor in boar odour. He stated that the incidence of boar odour is high among mature boars and is virtually nil among boars slaughtered at 20 kg live weight. Jonsson and Wismer-Pedersen (1974) observed no significant differences in sex odour between Danish Landrace swine ranging from 60-90 kg, whilst Staunt (as cited by Wismer-Pedersen, 1968) observed sex odour in late-maturing Danish Landrace boars slaughtered at weights as low as 55 kg.

The aim of this work was to verify the effect of castration on carcass parameters and meat quality.

### MATERIAL AND METHODS

The work was conducted with 32 male pigs Landrace x L. White x Duroc that were randomly distributed into 4 treatments: T1 - castration at 14 days, T2 - castration at 60 days, T3 - castration and 120 days and T4 - non castrated. The animals were slaughtered at 90 kg live weight. After a 24h chill, several carcass measurements were taken. A portion of the loin with the adjacent backfat was removed from the carcass and use for palatability and odour studies. The 3 cm thick steaks, without the fat, were roasted wrapped in aluminium foil to an internal temperature of 75°C. The boar odour in the fat was evaluated using a scale from 1 to 6, were 1 = unacceptable and 6 = very acceptable. The test was conducted by two methods: hot iron and by heating 10 g of diced fat in a sealed flask. The odour test was also done in the roasted meat.

### RESULTS AND DISCUSSION

Table 1 shows the data obtained in several carcass measurements.

There were no significant differences (P)0.05 for carcass weight, carcass and leg length although there was a tendency for boars to present longer carcass and legs with more length. Veloso (1983) also found no difference for carcass length when comparing boars x barrows/gilts, what is in contrast with the results found by Waltra and Kroeske (1969) were boars presented longer carcasses. Loin eye area presented a nonsignificant lower value (28.10) for boars in comparison with the other treatments. This result contradicts the data found by Siers (1975) where boars displayed larger loin eye areas. Veloso (1983) also found that boars had better loin eye (33 cm<sup>2</sup>) than barrows (30 cm<sup>2</sup>). Intact males presented

TABLE 1. OBJECTIVE MEASUREMENTS IN THE CARCASSES OF CASTRATED AND INTACT SWINE

		T1	T2	T3	T4
Cold carcass weight	kg	69.25	69.10	66.75	66.35
Carcass lenght	cm	95.29	95.78	96.21	97.72
Leg lenght	cm	55.56	56.27	57.62	57.80
Loin eye area	cm <sup>2</sup>	29.75	30.25	30.25	28.10
Backfat thickness	cm	3.53 <sup>a</sup>	3.59 <sup>a</sup>	3.24 <sup>ab</sup>	2.89 <sup>b</sup>
Lean/fat		.89	.81	.78	.71

T1 = castration at 14 days, T2 = at 60, T3 = at 120, T4 = intact.

TABLE 2. HAM DATA OF CASTRATED AND INTACT SWINE

		T1	T2	T3	T4
Total ham weight	kg	10.75	10.90	10.29	10.34
% relation to carcass	%	31.12	31.58	30.72	31.19
Trimmed ham weight <sup>a</sup>	kg	7.76	7.93	7.60	7.96
% relation to carcass	%	22.48	22.95	22.77	24.51

T1 = castration at 14 days, T2 = at 60, T3 = at 120, T4 = intact

<sup>a</sup> Means removal of all external fat

TABLE 3. QUALITATIVE PARAMETERS OF THE MEAT OF CASTRATED AND INTACT SWINE

	T1	T2	T3	T4
Marbling <sup>a</sup>	9.51	9.30	11.20	13.90
Lean texture <sup>b</sup>	4.50	4.40	4.20	4.40
Color of lean <sup>c</sup>	4.30	4.90	4.40	4.80
Thawing losses %	3.40	2.70	2.30	2.70
Cooking losses %	27.90	25.40	27.40	25.00

T1 = castration at 14 days, T2 = at 60, T3 = at 120, T4 = intact

<sup>a</sup> 7-9 = Small 10-12 = Medium 13-15 = Moderate

<sup>b</sup> 1 = Extremely coarse 5 = Very fine

<sup>c</sup> 1 = Dark 5 = Pink red

TABLE 4. PALATABILITY OF THE MEAT OF CASTRATED AND INTACT SWINE

	T1	T2	T3	T4
Tenderness <sup>a</sup>	5.25	4.88	5.60	5.86
Juiciness <sup>a</sup>	5.75	5.38	5.20	5.58
Palatability <sup>a</sup>	6.12 <sup>a</sup>	5.88 <sup>a</sup>	5.20 <sup>ab</sup>	4.00 <sup>b</sup>
Shear force kg	5.50	5.77	5.31	5.68

T1 = castration at 14 days, T2 = at 60, T3 = at 120, T4 = intact

<sup>a</sup> 1 = Ext. tough, dry, undesirable; 9 = very tender, juicy, desirable.

TABLE 5. DETECTION OF BOAR ODOR IN CASTRATED AND INTACT SWINE

	T1	T2	T3	T4
Hot iron (fat) <sup>a</sup>	5.75 <sup>a</sup>	5.75 <sup>a</sup>	5.60 <sup>a</sup>	4.14 <sup>b</sup>
Sealed flask (fat) <sup>a</sup>	5.63 <sup>a</sup>	5.50 <sup>a</sup>	5.40 <sup>a</sup>	4.00 <sup>b</sup>
Roasted lean <sup>a</sup>	5.63 <sup>a</sup>	5.50 <sup>a</sup>	5.00 <sup>ab</sup>	4.14 <sup>b</sup>

T1 = castration at 14 days, T2 = at 60, T3 = at 120, T4 = intact

<sup>a</sup> 1 = unacceptable 6 = very acceptable

less backfat (2.89) than castrates. This result is in agreement with the work of Martin (1968), Turton (1969), Waltra and Kroeske (1969) and Veloso (1983). In the later work a value of 2.50 was found for boars and 3.26 for barrows/gilts. The ration of lean to fat also favored the non castrated animals. In table 2, it can be seen the effect of different treatments on ham weight and proportion.

Castrated at different ages and non castrated animals, presented similar proportion of total ham, around 31%. When the ham was trimmed of the external fat, however, intact males presented a superiority of about 2% in relation to castrated. This results partially agrees with the conclusions of Waltra and Kroeske (1969), Siers (1975) and Veloso (1983) that reported better ham percentage

for boars in comparison with barrows. Some qualitative aspects of the meat can be observed in table 3.

Early castration produced carcasses with an significant lower amount of marbling and higher cooking losses than intact males. Palatability test of the meat is displayed on table 4.

Intact and castrated males did not show any significant difference in tenderness either by panel or mechanical test, what agrees with the findings of Shelly et al. (1970) and Fields (1971). Intact animals, however, rated significantly ( $P < 0.05$ ) lower in palatability being the higher value obtained with early castration (14 days). Veloso (1983) also reported in a consumer panel that barrows and gilts had better acceptability than boars. The results of the boar odour test is shown in table 5.

The test conducted in the fat and in the roasted meat demonstrated that intact swine had a less desirable odour than castrated. Although the difference was not great, was of significant magnitude to be detected by the panel. This results agrees with the findings of Bonneau et al. (1980) and Desmoulin and Bonneau (1982) when comparing boars and barrows. They also stated that the differences were reduced significantly by processing. It can be concluded from the results of the present work, that non castrated pigs produce carcass with less finish, better percentage of trimmed ham, but that the meat has a lower palatability rating and it could be noticed the presence of sex odour in the fat and in the meat to a certain degree.

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