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### Ingredients and additives

### EFFECT OF TOASTED SOYBEAN ON SOME QUALITY CHARACTERISTICS OF PORK MEAT

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### NTRODUCTION

Cooked soybeans have been shown to be an excellent source of protein for growing - finishing pig. Although <sup>leeding</sup> cooked soybeans reduced carcass firmness, the carcasses were acceptable and the eating qualities of the pork <sup>were</sup> not adversely affected (WAHLSTROM et al., 1971).

In previous work with pigs fed with toasted soybean at different periods of time and as a substitute to soybean meals, MOURA et al. (1991 a,b) found the best performance and carcass characteristics (daily gain, feed intake, sed/gain, dressing percentage, back fat, *Longissimus dorsi* area, cm<sup>2</sup>) for toasting conditions to be 115°C for 35 minutes. Increasing dietary soybean levels showed no significance for production and carcass characteristics, but a lendency of a less lean carcass was observed.

The aim of this work was to evaluate toasted soybean as a substitute to soybean meal and its effect on pH, <sup>colour</sup>, water holding capacity (WHC) and drip loss in porcine muscles as well as melting point and fatty acid content of <sup>backfat</sup>.

## MATERIAL AND METHODS

Thirty crossbred pigs (Landrace X Large White) initially averaging 23,52 kg were randomly alloted in individual <sup>Cages</sup> based on weight and sex to three treatments with five animals (gilts and barrows) per treatment. The three <sup>Sonitro</sup>genous diets varied in their source of supplemental protein as follows: **A** - soybean meal; **B** - 50% from soybean <sup>Theal</sup> and 50% from toasted whole soybean; **C** - toasted whole soybean. The toasted conditions and composition of the diets is given in previous work (MOURA et al. 1991 a,b). Feed and water were provided *ad libitum*.

The animals were removed at weekly intervals when they weighed at least 88 kg. Gilts and barrows were <sup>slaughtered</sup> for carcass and pork muscle evaluation weighing 88.05 - 91.32 kg in the same abattoir by electrical stunning <sup>(150</sup> - 180 V; 0.5 - 0.8 A; 10 s).

Meat quality was evaluated on the *Semispinalis capits* (SC), *Longissimus dorsi* (LD) and *Semimembranosus* (SM). <sup>NH</sup> was measured after sticking rigor development 1 and 24 hours for SM (central portion) and 2 and 24 hours for SC <sup>(central portion)</sup> respectively, using a pH - meter with a combination electrode, Ingold WTW 91. 24 hours after slaughter <sup>colour</sup> (L\*, a\*, b\* values) was measured in the above 2 muscles and LD (lumbar region). WHC in SM and drip loss in LD <sup>were</sup> determined according to SILVEIRA et al. (1995). Melting point and fatty acid composition of back fat was <sup>determined</sup> using the procedures described by FIRESTONE (1990). The results were subjected to analysis of variance <sup>and</sup> treatment diferences were tested with the Tukey test for significance at the 5% level.

# RESULTS AND DISCUSSION

The influence of feeding toasted soybean on the meat quality measurements (pH, colour, WHC and drip loss) is <sup>shown</sup> in Table 1. Although there were no significant differences in these data, treatment C reduced WHC and increased <sup>drip loss</sup> to values closer than PSE meat (G=0.40 and 5%, respectively, WALL et al., 1988).

Table 1. Average values for the meat quality measurements.

Variable	A		В		С	
	Gilt	Barrow	Gilt	Barrow	Gilt	Barrow
I'I, SM	6.32ª	6.46ª	6.08ª	6.34ª	6.48ª	6.37ª
124, SM	5.50ª	5.56ª	5.48 <sup>a</sup>	5.52ª	5.55ª	5.57ª
<sup>1</sup> <sup>2</sup> , SC	6.40 <sup>a</sup>	6.39ª	6.44ª	6.10 <sup>a</sup>	6.38ª	6.21ª
124, SC	5.99ª	6.01ª	5.95ª	5.97ª	6.00ª	6.04ª
nolta L*. SC	42.80ª	42.60 <sup>a</sup>	42.85ª	45.83ª	43.53ª	43.75ª
Inolta L* LD	47 70 <sup>a</sup>	49.00ª	49.25°	47.20ª	48.83 <sup>a</sup>	49.80 <sup>a</sup>
nolta L* SM	46.20ª	49.65°	46.85ª	46.43ª	49.77 <sup>a</sup>	48.05ª
, SM. G value	0.48ª	$0.44^{a}$	0 47ª	0.56ª	0.40 <sup>a</sup>	0.42ª
PLOSS ID %	3.05ª	4 97ª	4 54 <sup>a</sup>	5.98ª	5.69ª	6.09 <sup>a</sup>

The reduction of the melting point (Table 2) and the higher contents of linoleic acid (C18:2) of the backfat (Table 3) from the pigs fed with treatment C suggest that the level of whole soybean in the pig diet affected the fat softness. The total saturated fatty acid in this experiment was somewhat higher for barrows. It has been reported that backfat of barrows contains more total saturated fatty acids than that from gilts (WAHLSTROM, 1971).

Table 2. Melting point means from backfat.

Means (°C)	Α		В		С	
	Gilt	Barrow	Gilt	Barrow	Gilt	Barrow
Upper layer	33.9	36.4	28.3	33.2	29.0	31.5
Lower layer	38.8	39.8	39.2	38.8	36.5	38.1

Table 3. Fatty acid composition from backfat. Means of principal fatty acids.

Fatty acid	Α		В		С	
	Gilt	Barrow	Gilt	Barrow	Gilt	Barrow
C14:0	1.1	1.1	1.0	1.7	0.8	1.1
C16:0	26.3	26.1	24.4	25.8	24.8	25.3
C16:1	1.8	1.6	1.4	1.6	1.5	1.4
C18:0	14.8	16.6	15.7	15.5	14.0	14.7
C18:1	43.0	40.7	40.4	41.2	39.0	39.2
C18:2	10.4	11.3	14.5	12.3	16.8	15.7
C18:3	0.2	0.3	0.5	0.7	0.9	0.9
C20:2	0.3	0.3	0.4	0.2	0.2	0.4

#### CONCLUSION

Feeding toasted soybean reduced backfat quality measured as melting point and fatty acid composition. In addition meat quality characteristics evaluated as WHC and drip loss was affected negatively. However, more extensive research is needed in order to generate more knowledge about the impact of nutrition programs on pig meat quality.

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