Effect of use of bread in fattening of Cinta Senese pig

F. Sirtori, A. Acciaioli, L. Pianaccioli

Dipartimento di Scienze Zootecniche. Università di Firenze, Italy

Corresponding author: Francesco Sirtori. Dipartimento di Scienze Zootecniche. Università di Firenze. Via delle Cascine 5, 50144 Firenze, Italy - Tel. +39 055 3288353 - Fax: 039 055 321216 - Email: Francesco.sirtori@unifi.it

ABSTRACT: Effect of use of bakery by-products in substitution of part of a mixture of corn and seed on performance and meat traits of Cinta Senese pigs was tested. Seventeen pigs were employed: 6 pigs were fed mixture (diet M) and 11 pigs were fed mixture and bread (diet B). Each group was reared outdoors. The trial was carried out during the fattening period. Diet B showed higher average daily gain (ADG) (0.395 vs. 0.239 kg), higher backfat thickness (GM: 6.48 vs. 5.09 cm; LT: 5.67 vs. 4.28 cm) and higher inner fat deposition (31.42 vs. 29.09% on sample cut). As regard the physical traits of *Longissimus lumborum* muscle, cooking loss resulted higher in diet M than diet B (21.0 vs 17.3%).

Key words: Pigs**,** Bread, Cinta Senese, Meat quality.

INTRODUCTION – Residual products of bakeries (almost bread) are often available on market. The use of bread for feeding pigs is a practice seldom used because it is suspected to worsen carcass and meat quality. The diet of outdoor pigs is often supplemented by feedstuffs based on maize, barley, soybean (or other protein sources) and the use of by-products of bakeries could allow to cut down feed cost. Cinta Senese, an autochthonous breed of Tuscan region mainly reared outdoors, could positively exploit alternative feedstuffs such as by-products of bakeries. Cinta Senese in vivo performance (Acciaioli *et al.*, 2002), carcass composition (Franci *et al.*, 2003) and products quality (Pugliese *et al.*, 2005) were recently studied. The aim of this trial was to verify the feasibility to use bread for Cinta Senese fattening. However, few information are available regarding the effect of including bread in the diet of pig.

MATERIAL AND METHODS – Seventeen Cinta Senese barrows were allotted in two dietary groups: 6 pigs fed mixture (diet M) and 11 pigs fed mixture and bread that replaced the maize (diet B).

Table 1. Composition of rations (as fed basis).

		Diet	
		M	B
Daily intake	g/d	2500	2600
Maize	g/d	500	-
Barley	g/d	1125	830
Faba-bean	g/d	550	560
Bran	g/d	300	192
Mineral integrator	g/d	25	16
Bread	g/d	-	1000
Crude protein	g/d	353	351
Digestible Energy[1]	Mj/d	31.8	31.8

[1] *Calculated on tabulated values.*

Animals were reared outdoors (about 10,000 m^2 per group) and the diets were distributed twice a day. Table 1 reports the composition of the rations. The trial was carried out in the fattening period of pigs from August to October (70 days). At slaughter, pH45 and backfat thickness (at last thoracic vertebra – LT - and at *Gluteus medius* – GM) were measured.

A portion of the loin, from the second to fifth lumbar vertebra inclusive, was removed as a sample joint. The sample joint was dissected into the main tissues. The following analyses were carried out on *Longissimus lumborum* (Ll): colour parameters L*, a* and b* according to Boccard *et al*. (1981); moisture, ether extract, crude protein, ash (AOAC, 1990); water-holding capacity calculated as drip loss, cooking loss (ASPA, 1996) and free water (Grau and Hamm 1952); shear force by Warner–Bratzler Instron 1011 apparatus (WB) on raw meat and cooked meat. Data were analysed by GLM procedure (SAS, 2003) following the model: $Y_{ij} = \mu + D_i + b(X_{ij}) + E_{ij}$ where μ = mean; D = diet; b = regression coefficient on initial weight (X); E = error.

RESULTS AND CONCLUSIONS – Table 2 shows in vivo performance. Animals fed bread ration had higher ADG and backfat thickness than the control ones, even if the two diets has been formulated as isoenergetic using the value available on literature (Leus and Morgan, 1995). The results of this trial are probably related to the digestible energy of the bread (Kwak and Kang, 2005), that is higher than the tabulated value. In effect, processing technique in bread production (heat treatment) increases digestibility of starch (Medel *et al*., 2004).

Table 2. Effect of diets on in vivo and slaughter traits.

		Diet		RSD
		M	B	
Initial live weight[1]	kg	138.7	132.6	10.7
Final live weight	kg	151^B	161.6^A	5.34
ADG	kg	0.239^B	0.395^A	0.08
Dressing percentage	%	82.4	83.9	1.81
pH45		6.41	6.47	0.28
Backfat thickness (LT)	cm	4.28^B	5.67^A	0.50
Backfat thickness (GM)	cm	5.09^B	6.48^A	0.60

^{A,B}= P<0.05; [1]Not covaried.

Table 3 reports the sample joint composition. Group B showed heavier sample joint than group M due to their higher final live weight. Differences in subcutaneous fat appeared only on the inner layer that had higher incidence in

Table 3. Effect of diets on sample joint composition.

		Diet		RSD
		M	B	
Sample joint	kg	2.28^B	2.55^A	0.21
Subcutaneous fat				
- Outer layer	%	20.10	19.73	2.33
- Inner layer	%	29.09^B	31.42^A	2.01
Intramuscular fat	%	5.48	5.27	1.35
Psoas major	%	7.17	7.18	0.85
Longissimus lumborum	%	24.17	23.22	1.97
Other lean	%	5.36	5.60	0.98
Bone	%	8.62	7.59	1.49

^{A,B}= P<0.05.

group B. This result could be ascribed to the later deposition of this layer and to the fact that differentiation between diets was practiced during the fattening period.
As regards the characteristics of *Longissimus lumborum* muscle (table 4), comparison between diets showed significant difference in cooking loss, higher in group M.
The same trend, even though not significant, was observed also for the other water-holding capacity parameters. The other quality traits were not affected by bread supplementation in the diet, including the intramuscular fat content. This latter result is in agreement with that obtained on intermuscular fat (table3). The higher energy intake of bread ration should affected only the subcutaneous depot.

Table 4. Effect of diets on Longissimus lumborum physical and chemical traits.

		Diet		RSD
		M	B	
Drip loss	%	2.79	1.52	1.62
Cooking loss	%	21.0^{A}	17.3^{B}	3.08
Free water	mm^2	124.9	120.6	13.6
Shear force on raw meat	kg	7.53	7.53	1.58
Shear force on cooked meat	kg	8.70	7.02	2.02
L*		45.7	43.6	2.22
a*		11.6	11.7	1.55
b*		3.48	2.92	0.52
Moisture	%	71.12	71.13	0.64
Crude protein	%	21.8	22.3	0.64
Ether extract	%	5.85	5.51	0.97
Ash	%	1.13	1.07	0.08

^{A,B}= *P<0.05.*

In conclusion, use of bread improved growth and fatness. No negative effect on meat quality was found. This work should demonstrate that tabulated energy values for bread are underestimated.

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