SUBCUTANEOUS FAT QUALITY OF ONCE BRED GILTS AND NULIPAROUS SUBJECTED TO RESTRICTED FEEDING

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Background.

Highest productivity is reached by the sow between the 4th and 6th delivery, but at this stage, body composition modifications take place which significantly reduce the commercial value of the carcass at the moment of slaughter and replacement by a gilt. Slaughter of sows after their first delivery is therefore feasible, resigning part of the reproductive potential, but obtaining a carcass with characteristics that do not difer from those of pigs with current market weights, either in yield, fattening degree or *Longissimus dorsi* development. Likewise, such carcasses have less fat than those from nuliparous females of the same age, being adequate for the manufacture of high quality products (Basso *et al.*, 2000).

Lipids composition in fatty acids and specifically the degree of insaturation, varies according to adiposity, and is lower in fatty animals (Lebret and Mourot, 1998). Wood *et al.* (1989) and Geri *et al.* (1990) confirmed that increase of weight and subcutaneous fat thickness increased content of 16:0, 18:0 and 18:1, while 18:2 and 18:3 diminuished. On the other hand , Albar *et al.* (1990) and Mourot *et al.* (1995) did not find significant effects on the proportion of fatty acids with the increase of weight at slaughter.

Also, feeding restriction reduces adiposity in the carcass, and consequently acts on the chemical composition of the adipose tissue, increasing its insaturation degree and particularly, the 18:2 acid rate (Wood, 1984). Nevertheless, in heavy Duroc animals, subjected to 15% feeding restriction of voluntary consumption, significant differences that altered the level of fatty acids in subcutaneous adipose tissue were not observed, although the trend was towards a higher insaturation of the fat (García *et al.*, 1995). It is also known that the nature of fats in gestation and lactation diets, affect the animals deposit fats directly (Friend, 1974).

Objective.

Compare the subcutaneous fat composition of nuliparous females with current market weights, fed *ad libitum,* with that of heavy nuliparous and primiparous, slaughtered after their first delivery, subjected to restricted feeding.

Methods.

Forty two gilts originated from crossing PIC MP 405 males with Landrace x Yorkshire females, 97 kg mean weight, 180 days old, were chosen at random from finishing lots of animals destined to market. Gilts were individually identified and distributed as follows: Light nuliparous (LN): fed ad libitum (diet A: 3.24 Mcal/kg EM; 21% PB; 1.25% lysine) up to slaughter, at 189 days of age. Heavy nuliparous (HN): received restricted feeding (2 kg/day) (diet B: 3.21 Mcal/kg EM; 15% PB; 0.61% lysine) and were slaughtered at 330 days of age. Primiparous (P19): were inseminated at 180 days of age and consumed the same ration as HN until 272 days, later, up to delivery they consumed 2.5 kg. During lactation (19 days), ad libitum feed was offered (diet C: 3.21 Mcal/kg EM; 20% PB; 1.08% lysine) and after weaning the young, again they received 2.5 kg of the B diet during nine days, later they were slaughtered at 330 days together with the HNs.

After slaughter, samples of subcutaneous fat (inner and outer layer) were obtained starting from a transversal cut of the carcass at the point of the last rib, on the center line portion, to determine composition in fatty acids. Fatty acids analysis was carried out by chromatography of methylic esters (Hewlett Packard 5890 Series II) using HP23 (cis/trans FAME) semicapillary column (30m x 0.53 mm x µm) and Helium as carrier gas, starting from subcutaneous fat extract obtained by Folch *et al.* (1957) method.

For the variables analysis, GLM (General Linear Model) from SAS (SAS, 1997) statistical program, was used. Tukey Test with a 5% significance (α=0.05) was used to compare mean values by square minimums.

Results and discussion.

Exceptimg the lower age LN carcasses, carcass weights in HN and P19 showed significant differences, due to weight losses through lactation of the latter.

The slaughter weight increase among the nuliparous, determined certain trends that confirm what Wood *et al.* (1989), Geri *et al.* (1990) and Lebret and Mourot (1998) reported, but only a significant decrease in the content of 18:3 was recorded.

Despite the feeding restriction, higher insaturation of lipids was not observed in the HN treatment, specially in 18:2 content compared to LNs, due to the animals high weights, as García *et al.* (1995) had indicated. On the contrary, P19 carcasses, although weighing more than LNs, showed similar fattening, due to restricted diet and body reserves mobilization during lactation. This way, 18:2 present in the diet consumed by the P19 sows during gestation and lactation may have caused the higher level of that fatty acid in subcutaneous fat, keeping in mind what Wood (1984), Wood *et al.* (1989), Geri *et al.* (1990) and Friend (1974), reported.

Subcutaneous fat quality of the P19, and therefore the levels of C18:2 and C18:3, would be more influenced by the feed restriction level, which was important for this test, than by weight at slaughter. According to the fatty acids composition of fat in the different treatments, none could be considered soft, since the 18:2 content is lower than 15% (Arnau *et al.* 1993).

Conclusions.

Subcutaneous fat of primiparous gilts P19 show a comparable technological quality to that of heavy animals of the same genetical type with a similar feeding restriction, with a higher proportion of 18:2 as compared to light weight females fed ad libitum.

Pertinent literature.

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Tables.

Table 1: Least-squares means and residual standard deviation (RSD) of fatty acid composition of subcutaneous backfat (inner+outer layer) in differents treatment.

	LN	HN	P19	RSD
Hot carcass weight (kg)	81.2 ***c***	130.6 ***a***	113.5 ***b***	10.71
C14:0 Miristic	2.98	2.53	2.42	0.57
C16:0 Palmitic	26.39	28.1	25.97	2.13
C16:1 Palmitoleic	2.28	2.23	2.10	0.39
C18:0 Stearic	9.51	10.11	10.76	2.46
C18:1 Oleic	44.32	42.21	42.09	4.24
C18:2 Linoleic	12.19 ***b***	12.99 ***ab***	14.77 ***a***	1.97
C18:3 Linolenic	0.83 ***a***	0.63 ***b***	0.73 ***ab***	0.18
SFA	40.20	41.82	40.24	3.40
UFA	59.77	58.18	59.75	3.40
UFA/SFA	1.49	1.39	1.48	0.21

SFA: saturated fatty acid (14:0; 16:0; 17:0; 18:0); UFA: insaturated fatty acid (16:1; 18:1; 18:2; 18:3). Different letters indicate significant differences ($P<0.05$).