

RECENT DEVELOPMENTS IN THE BRITISH NATIONAL PROGRAMME ON PIGMEAT QUALITY

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INTRODUCTION

The background and objectives of the British national programme to improve pigmeat quality were described by Kempster and Wood (1986). In earlier work the effects of fat thickness and sex on visual, handling (butchery) and eating qualities showed that P2 values of 10 mm or below were associated with a higher incidence of unfavourable comments from butchers and consumers than values above 12mm. (Kempster *et al*, 1986; Wood *et al*, 1986). Subsequent work has aimed to raise quality in lean pigmeat since consumers clearly select the leaner product on retail display. Use of the Duroc breed was found to increase marbling fat (ether extract in *m.longissimus*) to above 1% but this had no marked effects on eating quality (Edwards *et al*, 1989). The results discussed here are from the recently published trial at MLC's Pig Development Unit at Stotfold (Meat and Livestock Commission, 1989). The trial examined several factors including genotype (progeny of white-type and meat-type sires) and level of feed intake.

MATERIALS AND METHODS

Ten intakes of breeding stock were involved in the trial. Intakes consisted of 12 hybrid gilts, 2 white-type and 2 meat-type boars from each of 4 breeding companies. From each of two litters per gilt, pairs of pigs of the 3 sexes were reared from 20 to an average of 80 kg live weight on *ad lib* or restricted feeding regimes from 20 to 80 kg. The restricted scale was set at 82.5% of *ad lib* which was approximately the difference in growth rate between the

two regimes from 20 to 80 kg. Assessments of sow productivity, performance, and carcass and meat quality traits were made. The present report deals with the effects of sire type and feeding level on tissue chemical composition and eating quality of fresh pork as assessed by taste panellists.

Nine hundred loin chops were subjected to chemical analysis of muscle and backfat lipid (ether extract), backfat fatty acid composition and fat firmness using the portable penetrometer described by Dransfield and Kempster (1988). Four hundred and twenty loin joints were assessed for eating quality by a trained taste panel following roasting to an internal temperature of 80°C. The following scores were given:

Tenderness:

- 1 (extremely tough) to
- 8 (extremely tender)

Juiciness:

- 1 (extremely dry) to
- 8 (extremely juicy)

Pork flavour intensity:

- 1 (extremely weak) to
- 8 (extremely strong)

Pork odour intensity:

- 1 (extremely weak) to
- 8 (extremely strong)

RESULTS

The effects of sire type and feeding regime on the chemical composition of *m.longissimus* and backfat samples (both layers) from the last rib region (dorsal) are shown in Table 1.

There were significant interactions between sire types and companies for many characteristics (see MLC, 1989). On average, progeny of meat-type sires had slightly thicker fat than those of white-types although this did not reflect differences in lean content, which was higher in meat-type carcasses. Tissue chemical composition was similar between the two types. Pigs fed restrictedly had thinner fat and leaner carcasses than those fed *ad lib*. There were also differences in the chemical

Table 1. Effects of sire type and feeding regime on chemical composition of tissues at last rib

	Sire type		Feeding regime	
	White	Meat	Ad lib	Restr.
Hot P2 (mm)	11.7	12.2*	12.8	11.1*
Lean in carcass (%)	56.4	56.8*	55.5	57.5*
Muscle lipid (%)	0.78	0.82	0.85	0.75*
Backfat lipid (%)	76.8	77.3	77.7	76.3*
Fat firmness ⁺	606	599	615	590*
C18:0 (% of lipid)	14.8	15.0	15.0	14.8
C18:2 (% of lipid)	15.2	14.9	14.6	15.5*

+ Higher values indicate firmer fat

* Indicates significant difference at 5% level or greater.

composition of tissues, with ad lib-fed pigs having more lipid in muscle and backfat, firmer fat and a lower concentration of linoleic acid (C18:2) in backfat lipid.

The effects of sire type and feeding regime on eating quality as assessed by taste panellists are shown in Table 2. Tenderness was rated more highly in meat-type than white-type pigs but other aspects of eating quality were similar in the two types. There were larger differences between feeding regimes, pigs fed ad

lib having more tender and juicy meat than those fed restrictedly. Similar results were recorded for bacon.

Drip loss from m.longissimus was slightly higher in meat-type pigs i.e. 4.35 vs 4.16 % of muscle weight. There was no detectable difference in paleness.

DISCUSSION

Speculation concerning the benefits and disadvantages of meat-type sires has existed since these were

Table 2. Effects of sire type and feeding regime on eating quality of m.longissimus

	Sire type		Feeding regime	
	White	Meat	Ad lib	Restr.
Tenderness	4.86	5.07*	5.20	4.73*
Juiciness	4.30	4.39	4.44	4.25*
Pork flavour intensity	4.56	4.53	4.52	4.57
Pork odour intensity	3.79	3.70	3.76	3.74

introduced in significant numbers into the UK a few years ago (the present level is around 10% of sires). The present study found surprisingly few differences between them and the more common Large White-Landrace types in either meat yield or quality. In general meat-type pigs had slightly thicker fat but leaner carcasses, a slightly higher level of PSE (not marked) and slightly more tender meat.

More important differences were found between the feeding regimes. Ad lib-fed pigs, which grew approximately 20% faster than scale-fed pigs, were fatter, had higher concentrations of lipid in muscle and backfat and, correspondingly, firmer fat with a lower concentration of C18:2. These changes would be expected to make carcasses and cuts of meat more acceptable to butchers according to earlier work (Kempster *et al*, 1986; Wood *et al*, 1986). In addition the meat from pigs fed at the higher level was more tender and juicy. This was probably associated with the higher concentration of marbling fat (extractable lipid) and younger age of the pigs. Similar trends in composition and quality as the result of high level feeding and fast growth were shown for bacon by Wood and Enser (1982) and Mottram *et al* (1982).

Previous work has shown the importance of marbling fat in eating quality, with levels around 0.5% ether extractable lipid causing a depression, particularly in juiciness, compared with higher levels. The suggestion from the present work is that levels of around 0.8% are associated with a high level of eating quality. In consumer tests on the present samples, 93% of loin chops received favourable responses for overall acceptability (83% for tenderness). High level feeding can therefore be suggested as a way of positively improving eating quality although advantages have to be set against the greater costs of production.

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