

# YIELD AND MARKET QUALITY IN PIGS IN RELATION TO SEX, SLAUGHTER WEIGHT AND MEAT CONTENT

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## SUMMARY

The aim of this research was to investigate the influence of sex, slaughter weight and meat content on the yield and market quality in pig production. The experimental material consisted of 12 groups of 30 pigs selected at a Danish slaughterhouse during the course of one week. The groups were composed of pigs from 3 groups with different slaughter weight, viz. Low (66 kg), Medium (73 kg), and High (77.5 kg). In each group pigs were chosen with meat percentages: Medium ( $x = 59$ ) and High ( $x = 63$ ). Half the pigs chosen from each group were entire male pigs. The carcasses were split in the following primary cuts: picnic ham, picnic shoulder, loin and belly for the Japanese market, loin and belly for the U.K. market. The weight of the primary cuts was registered individually, and the market quality of the bellies was evaluated. The results show that for primary cuts the yield was influenced by the meat percentage. There was no difference in results from the 3 groups. Entire male pigs had a significantly larger foreend and smaller loin and ham than gilts. There was no interaction between slaughter weight and meat content. The evaluation of quality requirements showed that bellies from pigs with a high meat content were more suitable for the U.K. market than for the Japanese market, where bellies from heavy pigs were preferred.

## DISCUSSION

With the analysis equipment developed by the Danish Meat Research Institute it is now possible in the Danish pig production to sort out and reject the about 5% of entire male pigs with boar taint. The production of entire male pigs will improve production economy because of the lower feed consumption and the higher meat percentage compared to castrates. And for the slaughterhouses it is important to know the yield and the meat quality of the products that sell best in order that they may optimise their production planning.

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## MATERIALS

The pigs for this research had been selected from a Danish slaughterhouse during one week and grouped as follows:

	Low Weight		Medium Weight		High Weight	
	Medium Meat %	High Meat %	Medium Meat %	High Meat %	Medium Meat %	High Meat %
Entire Males	30	30	30	30	30	30
	30	30	30	30	30	30

Average weight of each group: Low: 65.9 kg; Medium: 72.9 kg; High: 77.6 kg

Average meat percentage of each group: Medium: 59.0%; High: 62.9%

Each carcass was split into picnic ham, picnic shoulder, loin and belly for the UK market (backs and streaky) and loin and belly for the Japanese market. To minimize the side effect, the Japan products and the UK products were cut from the right and the left side of the carcasses alternately.

All products from a carcass were weighed individually.

Yield percentage for each individual has been calculated as follows:

$$\frac{\text{kg product}}{\text{kg "hot" carcass}} \times 100$$

The statistical analyses have been made according to the GLM procedure (SAS User Guide, 1987) based on following model:

$$\text{Yield}_{ijk} = \text{Sex}_{i=1,2} + \text{Group}_{j=1,\dots,6} + \epsilon_{ijk}$$

Evaluation of quality of the belly has been carried out as follows:

#### Japan Belly:

Weight of finished product too light.

Length too short.

Product being without fat thus exposing first layer of meat.

Varying coherence between the meat layers (over leanness).

#### UK Belly:

Weight of finished product either too light or too heavy.

First layer of fat to be <16 mm.

The quality parameters "without fat" and "varying coherence" were evaluated subjectively by the quality controller at the slaughterhouse.

## RESULTS

Product yield of each primary cut for gilts and male pigs respectively is shown in Table 1.

There was no interaction between sex, weight and meat content. The figures in Table 1 have therefore been analysed irrespective of weight and meat content.

Table 1 - Comparison of Gilts and Entire Males

	Gilt	Entire Male	p	Difference
Pct. shoulder	8.98	9.29	<0.001	-0.31
Pct. collar	6.36	6.52	<0.001	-0.16
Pct. backs	12.26	12.02	<0.01	+0.20
Pct. streaky	9.00	8.50	<0.001	+0.50
Pct. loin	8.25	8.02	<0.001	+0.23
Pct. belly	10.00	9.70	<0.001	+0.30
Pct. ham w/o fat and bone	14.52	14.22	<0.001	+0.30

It has been statistically proved that the sex influences all main products. Male pigs have a larger foreend with bigger shoulder and collar while the yield of both the back and the ham is biggest in gilts.

In a literature review it was also found (Walstra, P. and Kroeske, D. (1968)) that male pigs have a higher shoulder yield than ordinary boars (castrates and gilts), whereas Wood and Riley (1982) in research comparing entire male pigs and castrates found that in general the differences in weight and lean distribution were small, and not disadvantageous to the boar.

Yield percentage of the primary cuts was not influenced by the weight but by the meat percentage. Results are shown in Table 2:

Table 2 - Yield in relation to Meat Percentage Groups

	Medium	High	p	Difference
Pct. shoulder	8.86	9.42	<0.001	0.56
Pct. collar	6.32	6.58	<0.01	0.26
Pct. backs	12.02	12.26	<0.05	0.24
Pct. streaky	8.90	8.60	<0.05	-0.30
Pct. loin	7.90	8.40	<0.001	0.50
Pct. belly	10.00	9.70	<0.01	-0.30
Pct. ham w/o fat and bone	13.80	14.94	<0.001	1.14

Products with a high meat content there is a positive relation between yield and meat percentage, the two belly products, however, have a lower yield in the group with the high lean meat content. This may be due to less intramuscular fat between m. obliquus abdominis internus, m. obliquus abdominis internus and m. rectus abdominis.

(1992) showed that intermuscular fat normally comprises 5.7% of the belly joint vs 2.2% of the loin joint and 3.1% of the ham joint.

Frequency of deviations from acceptable quality for the 12 experimental groups is shown in Table 3.

Table 3 - Frequency of Varying Quality Groups

Varying Quality	Low Weight				Medium Weight				High Weight			
	Med. Meat %		High Meat %		Med. Meat %		High Meat %		Med. Meat %		High Meat %	
	Gilt	E.Male	Gilt	E.Male	Gilt	E.Male	Gilt	E.Male	Gilt	E.Male	Gilt	E.Male
Japan Belly												
too light	0	5.9	0	23.5	0	0	0	0	0	0	0	3.4
too short	0	0	0	2.9	0	0	0	0	0	0	0	0
meat layer exposed	0	0	11.1	47.1	0	0	6.7	30.8	0	3.1	0	10.7
fatness	3.6	11.8	3.7	20.6	0	0	3.3	7.7	0	0	0	0
total w/shortcomings	3.6	14.7	14.8	55.9	0	0	10.0	30.8	0	3.1	0	13.8
UK Belly												
fat thickness >16 mm	28.6	47.1	7.4	11.8	60.7	80.0	13.3	17.9	67.9	84.4	17.6	31.0
weight: too light	0	0	0	20.6	0	0	0	3.6	0	0	0	0
weight: too heavy	0	0	0	0	10.7	0	10.0	0	21.4	6.2	20.6	0
total w/shortcomings	28.6	47.1	7.4	29.4	60.7	80.0	20.0	21.4	67.9	84.4	29.4	31.0

Frequency of shortcomings in UK and Japan bellies varied according to sex, weight and meat percentage.

Occurrence of at least one shortcoming in UK bellies was:

increasing at weight increase

decreasing at meat percent increase

for pigs with medium meat percentage the frequency was bigger in entire males than in gilts

The occurrence of at least one shortcoming in Japan bellies was:

- decreasing at weight increase
- increasing at meat percent increase
- more frequent in entire males than in gilts

### CONCLUSION

The meat is distributed a little differently in male pigs than with gilts, thus in a live weight of <100 kg the sexual characteristic of a large foreend in male pigs can be registered as a difference in yield.

In this research there were found no interaction between sex, weight, meat percentage.

It is the meat content only that will influence the yield percentage, whereas there is no difference between the weight groups.

The evaluation of quality of belly fat showed that pigs with a high meat content were best suitable for the UK products, while belly fat from heavy pigs was more suitable for the Japanese market.

### REFERENCES

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