Videncenter for Svineproduktion

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ECONOMY IN PRODUCTION OF ENTIRE MALES

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The largest profit from production of entire males vs castrates was found when the pigs were fed dry feed ad lib. FCR improved by 0.24 and 0.14 FUgp/kg, lean meat % by 1.3 and 1.2 percentage points, but only a small effect was seen on daily gain.

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Abstract

The potential profit from production of entire males compared with castrates and female pigs was investigated on two farms with two different feeding strategies (dry feed and liquid feed). On the farm practicing dry feeding ad lib, results showed that feed conversion ratio among entire males was 0.24 FUgp/kg lower than that of castrates; daily gain of entire males was 34 g/day lower compared with castrates; but lean meat percentage was 1.3 percentage points higher for entire males. On another farm where pigs were fed liquid feed according to a feed curve (max. 3.2 FUgp/pig/day), results showed that, compared with castrates, feed conversion improved by 0.14 FUgp/kg and lean meat

percentage improved by 1.2 percentage points among entire males. Results showed no significant differences in daily gain. When rejection is based on skatole levels above 0.25 ppm, rejection rates reached 2.5% for pigs fed liquid feed and 4.8% for pigs fed dry feed. The profit from producing entire males amounted to DKK 2.4 (€ 0.32) (liquid feed) and DKK 17.4 (€ 2.32) (dry feed) according to prices and settlement regulations of September 2013.This includes a deduction of DKK 25/entire male (€ 3.33) and a price reduction of DKK 2/kg (€ 0.27) at the actual rejection.

The profit from production of entire males will primarily depend on feed prices, value of lean meat percentage, slaughter weight, rejection limits and costs for analysis, handling and sorting at the slaughterhouse. The market for and thereby the sales price of pork from entire males will suffer unless an efficient and agreed analysis method is implemented and unless the industry and consumers agree on a rejection limit.

At a slaughter weight of 83 kg, the profit from producing entire males is lost when rejection rates reach 9% and 19%, respectively, as a change of +/÷ 1 percentage point changes gross margin per pig by DKK1.66. A changes in feed prices by +/÷ DKK 0.10 per feed unit will change GM/entire male compared with GM/castrate by DKK 1.1 (€ 0.15) or DKK 1.9 (€ 0.25) per pig for liquid feed and dry feed, respectively.

The largest profit from production of entire males was obtained when pigs were fed ad lib, which is attributed to a large difference in FCR between entire males and castrates. No differences were found in lean meat percentage between the two feeding strategies/farms. The female pigs in the trial performed at the same level as the entire males.

Background

Productivity trials and cost-benefit analyses including entire males, castrates and female pigs have not been performed since the 1990s when production of entire males in Denmark came to a stop after the German authorities introduced a de facto ban on pork from entire males. Twenty years have passed, and with genetic progress, lean meat percentage and feed conversion ratios have improved. In addition, the nutrient content of the diets used for pigs has undergone development. In terms of animal welfare, a ban on castration is also in the works: in the EU a declaration of intent proposes a stop for castration at the end of 2018.

This has renewed the interest in production of entire males. It is therefore relevant to analyse whether the advantages previously seen in the production entire males are still present with the pigs and feed used today.

This trial was conducted on two farms: one where male pigs, castrates and gilts are fed liquid feed according to feed curves, and one where these three categories of pigs are fed dry feed ad lib. The trial is conducted on two types of farms to investigate whether there may be different effects on productivity with the two production methods. Greater differences in lean meat percentage and FCR between entire males and castrates are expected when the pigs are fed ad lib as entire males generally have a greater potential for meat production. Pig producers are generally advised to feed castrates restricted to obtain the best production economy possible [1], [2].

The aim of the trial was to compare the productivity of entire males, female pigs and castrates fed either liquid feed according to a curve or dry feed ad lib in the period from approx. 30 kg to slaughter.

Materials and method

The trial was conducted on two farms: one where pigs are fed liquid feed according to feed curves, and one where pigs are fed dry feed ad lib. Production parametres for entire males, castrates and female pigs were recorded in the finisher period from approx. 30 kg to 110 kg on both farms.

Farm 1: Liquid feeding

Farm 1 was a blue SPF herd. Pigs were selected for the trial at the time of castration when they were approx. four days old: half of the entire males in a litter were castrated and the other half stayed intact. In addition, half of the female pigs in the litter were selected for the trial. The pigs were ear tagged in different colours depending on gender and ID number. In the weaner unit, the pigs were sorted penwise according to size and gender. Mortality and treatments for disease were recorded in the farrowing unit and the weaner unit. Recording of mortality started at the time of castration and does therefore not cover the first four days of the pigs' lives.

In the finisher unit, the trial comprised 35 blocks/pens of each of the three genders; 15 pens were discarded from the data analysis due to recording errors. Data analyses include 29 pens with 928 castrates; 31 pens with 992 entire males; and 39 pens with 960 female pigs. Feed conversion ratios were recorded at twin-pen level with approx. 32 pigs per feed valve. At transfer to the trial, castrates weighed 30.8 kg; entire males weighed 29.3 kg; and female pigs weighed 31.1 kg.

Not all pigs included in the recordings in the farrowing unit and the weaner unit continued in the trial as finishers. Upon transfer to the finisher unit, the pigs were accommodated according to gender and size, and weighed. The trial comprised a total of 2,880 pigs.

Feeding

All pigs were fed the same diet formulated according to the current standards [4]. In the course of the trial, ingredients changed several times due to unstable supplies of brewer's yeast and due to a desire to use rapeseed cake. Halfway through the trial, the farmer switched from a unity mix (one diet 30-110 kg) to a grower and finisher mix. Pigs switched to this diet when they were visually estimated to weigh approx. 50 kg. The subsequent analyses are based on the calculated energy content as the time when the pigs switched diets was not recorded sufficiently accurate. As an average of the entire trial period, results showed a good correlation between the calculated and the declared nutritional content in the feed.

At trial start, a feed curve was prepared for all pens. The procedure for subsequent regulation of the curves is described in appendix 1.

Farm 2: Dry feeding

The trial comprised 33 blocks/pens of each of the three genders in the finisher unit. Data analyses include 30 pens with 449 castrates; 31 pens with 478 entire males; and 33 pens with 495 female pigs, totalling 1,442 pigs. Three pens in group 1 and two pens in group 2 were discarded from the data analysis due to recording errors. Feed conversion ratio was recorded at pen level. At transfer to the finisher unit, castrates weighed 28.6 kg; entire males weighed 28.7 kg; and female pigs weighed 29.6 kg.

The pigs were assigned to groups as on farm 1 (liquid feeding) in the farrowing unit, but recordings did not start until the pigs were transferred to the finisher unit. Upon transfer to the finisher unit, the pigs were accommodated according to gender and size, and weighed. Feed allocation, weight at transfer to the finisher unit, treatments for disease and mortality were recorded at pen level.

Feeding

All pigs were fed the same pelleted dry feed in the entire growth period. Feed was supplied ad libitum in feeders with water. Nutrient content is shown in appendix 2. Analysed feed units are included in the calculation of productivity.

Slaughter

All pigs were slaughtered at Danish Crown's slaughterhouse in Ringsted where lean meat percentage, skatole (entire males) and slaughter weight were recorded. Skatole level was analysed at the slaughterhouse with the calorimetric method [7], which is an indicator of skatole and indole levels in neck fat. When delivering entire males for slaughter, a deduction of DKK 25 is imposed that covers costs for sampling, analyses and additional sorting. Currently (2013), DKK 2.00 are deducted per kg meat from entire males rejected at slaughter with a skatole level above 0.25.

Statistics and calculations

The trial was designed as a comparison of the three genders (three groups). Data were tested for normal distribution, reciprocal effect and prevalence of outliers to ensure that no pens deviated significantly. Results are shown as corrected average for each group. Significant differences are shown at 5 per cent level. Productivity data were analysed as primary parameter, and disease recordings and mortality were analysed as secondary parameters.

Daily gain and feed conversion ratio were calculated on the basis of an average for each pen. Slaughter weight, lean meat percentage and skatole were recorded for each pig at slaughter. Slaughter weight was converted to live weight (factor 1.31 [5]) and is included as an average of each pen. Lean meat percentage and skatole were analysed as single observations. When analysing skatole levels, data were subject to transformation with logarithm to obtain normal distribution. The corrected averages shown were subsequently retransformed. Mortality in the farrowing unit and in the weaner unit were recorded on farm 1 (liquid feeding) only.

Data were subject to gradual regression with group is systematic effect; weight at transfer as co-variate; and block as random effect. Weight at transfer varied between genders (and thereby between groups), but as analyses are based on daily gain from 30 to 100 kg, weigh at transfer was therefore corrected to make it identical for all genders.

Discrete data (mortality and treatments for disease) were described with logistic regression with group as explanatory variable.

Two sets of economic calculations were made: one concerning herd data and a model of the economy in production of entire males at different slaughter weight and different feed prices.

The first calculation is based on actual figures from the two farms. Pig prices and feed prices etc. are based on an average of five weeks and are shown in table 1.

Table 1. Average prices, wks 31-35, 2013 (converted to Euro in parenthesis: € 1 = DKK 7.50).

Finisher feed, DKK/feed unit	1.95 (€ 0.26)
Pig price, incl. all corrections, DKK/kg	12.37 (€ 1.65)
Average lean mean % deduction, DKK/kg	-0.07 (€ 0.01)
Pig price incl. bonus payment, before correction for lean meat %, DKK/kg	12.44 (€ 1.66)
30 kg, DKK/weaner	415 (€ 55)
Kg correction at 30 kg, DKK/kg	6.65 (€ 0.89)

The pig price is approx. DKK 0.38 (€ 0.05) per kg below the break-even price when calculated with these particular prices.

Model calculations

The advantage (or disadvantage) of producing entire males compared with castrates measured on gross margin per pig may be influenced by feed prices, average slaughter weight and pig price. Additional calculations were therefore made with feed prices of DKK 1.4; 1.7; and 2.1 (€ 0.19; 0.23; 0.28))per feed unit (FUgp) and with a pig price that depends on and is determined from these feed prices, ie. long-term the costs of producing pigs in Denmark are assumed to be equal to the pig price.

The break-even pig price per kg carcass is calculated with the Software program used for calculating the pig price in August 2013 [5].

The prerequisites used in the calculated pig price were the following: a start weight of 30 kg; a slaughter weight of 83 kg; and a lean meat percentage of 60. Feed conversion per kg gain was 2.85 FUgp/kg and daily gain 905 g/day. Castrate productivity data are equal to the above prerequisites in a given calculated pig price. Entire male productivity data are then equal to this plus the marginal difference found on the two farms. In this calculation, weight at transfer and end weight are identical.

With an average slaughter weight of 83 kg, slaughter weight is expected to vary from 75 to 91 kg. The model assumes that the marginal differences in productivity found between entire males and castrates will not be affected and that rejection rates remain unchanged (based on skatole) with a slaughter weight from 75 increasing to 91 kg.

Table 2. Break-even pig prices as a function of the price of finisher feed, August 2013 [6].

Price, finisher feed (DKK/FUgp)	**1.4** (€ 0.19)	**1.7** (€ 0.23)	**2.1** (€ 0.28)
Break-even pig price, DKK/kg	10.53 (€ 1.40)	11.77 (€ 1.57)	13.03 (€ 1.74)
Weaner price at 30 kg, DKK/pig	376 (€ 50.1)	409 (€ 54.5)	443 (€ 59.1)

The result is expressed as gross margin difference per pig (gross margin entire males ÷ gross margin castrates). As gain may vary, rent per day is included as unit cost.

Housing days per pig = (feeding days per pig) + 3 days for cleaning and 4-day correction due to more pick-ups for slaughter.

Rent per pig sold = housing days per pig multiplied by DKK 0.68 (€ 0.09) a day in “rent”.

Cost for mortality = mortality rate (weaner price + feed costs per pig delivered for slaughter * 0.5 + rent per pig delivered for slaughter).

Results and discussion

Health on Farm 1 (liquid feeding)

Mortality in the three groups (genders) was recorded in the farrowing unit from the time of castration approx. four days after farrowing. The lowest mortality rates were found among female pigs, and no significant differences were found in mortality between entire males and castrates. There was a numeric difference in mortality of 0.7 percentage points more dead castrates in the farrowing unit compared with entire males (cf table 3). Research previously found 1.5 percentage points more dead castrates compared with entire males [3].

Results showed no differences in health and mortality between genders in the weaner period (7-30 kg) when mortality averaged 1.7%. In the finisher period, no difference was found in mortality between the genders: mortality averaged 2.2% and 4.0% were moved to a hospital pen. Significantly more treatments for diarrhoea were administered to castrates than to female pigs, but there were no differences between entire males and castrates or between female pigs and entire males (cf table 3).

Table 3. Mortality in farrowing and weaner periods & treatments for diarrhoea in finisher period.

Group	Castrates	Entire males	Female pigs
Mortality rates, farrowing period	6.2^{a}	5.5^{a}	3.2^{b}
Mortality rates, weaner period	1.6	1.9	1.5
Treatments for diarrhoea, finisher period, days/pig	1.2^{a}	1.1^{ab}	1.0^{b}

a,b: Different superscripts within row = significant differences $P<0.05$.

Productivity on Farm 1

Castrates had the highest feed intake and the poorest FCR compared with female pigs and entire males. Castrates and entire males had a higher daily gain than female pigs. Lean meat percentage was identical among female pigs and entire males, but significantly lower among castrates.

Due to capacity problems, the pigs were fed a fairly high feed ratio towards the end of the growth period (3.2 feed units per kg), which may have resulted in a lower productivity among castrates than entire meals compared with restricted feeding (2.8 feed units per kg). However, the pigs were delivered for slaughter at a fairly low weight where the “advantage” of entire males is smaller than if the pigs were delivered at optimum slaughter weight of 80-82 kg.

Table 4. Results – farm 1, liquid feeding.

Group	Castrates	Entire males	Female pigs
Pigs	928	960	960
Start weight, kg	30.8	29.5	31.1
Slaughter weight, kg	77.6	76.2	76.6
Daily gain, g/dag	929[a]	920[ab]	900[b]
FCR, FUgp/kg	2.95[a]	2.81[b]	2.86[b]
Feed intake, FUgp/dag	2.72[a]	2.56[b]	2.56[b]
Lean meat %	59.3[a]	60.5[b]	60.6[b]

a,b: Different superscripts within row = significant differences P<0.05.

Skatole was recorded in all entire males and in random samples of female pigs and castrates. Entire males had significantly higher skatole levels compared with female pigs and castrates (cf table 5). 2.5% entire males were rejected (22 pigs) and one female pig was rejected.

Table 5. Skatole, ppm – farm 1, liquid feeding.

Group	Castrates	Entire males	Female pigs
Pigs recorded	136	888	148
Skatole, ppm	0,04[a]	0,11[b]	0,04[a]

a,b: Different superscripts within row = significant differences P<0.05.

Health on Farm 2 (dry feeding)

Analyses revealed no differences in health and mortality between the genders. No pigs died in the trial pens and 6.5% were moved to a hospital pen.

Productivity on Farm 2

The highest feed intake and the poorest FCR and lean meat percentage were found among castrates. However, castrates grew faster than both female pigs and entire males (cf table 6).

Table 6. Results – farm 2, dry feeding.

Group	Castrates	Entire males	Female pigs
Pigs	449	478	495
Start weight, kg	28,6	28,7	29,6
Slaughter weight, kg	80,8	80,3	81,0
Daily gain, g/dag	942[a]	908[b]	900[b]
FCR, FUgp/kg	2,77[a]	2,53[c]	2,63[b]
Feed intake, FUgp/day *	2,61[a]	2,30[b]	2,37[b]
Lean meat % **	59,2[a]	60,5[b]	60,8[b]

a,b: Different superscripts within row = significant differences P<0.05.

* Tendency to difference between female pigs and entire males, P=0.051.

** Tendency to difference between female pigs and entire males, P=0.051

On farm 2, skatole was only recorded on entire males: 4.8% were rejected.

Table 7. Skatole, ppm – farm 2, dry feeding.

Group	Entire males
Pigs recorded	395
Skatole, ppm	0.08

Overall evaluation of production results – entire males vs castrates

The largest difference in FCR between entire males and castrates was observed on farm 2 (ad lib dry feeding). This may be explained by the fact that the high potential for growth seen in entire males is fully exploited when they are fed ad lib. When feed prices are high, the result is a significantly greater advantage in producing entire males when ad lib feeding is an option. Castrates fed dry feed ad lib had a higher daily gain than entire males compared with farm 1 (liquid feeding according to feed curves) where no differences were found in daily gain despite a high feed ratio towards the end of the growth period. The difference in lean meat percentage between genders was identical on both farms, and did not differ depending on feeding strategy (dry feed ad lib vs liquid feeding according to a feed curve).

Female pigs fed dry feed ad lib had a better FCR than castrates, but poorer than entire males, but the same FCR as entire males when fed liquid feed according to a curve. Lean meat percentage did not differ between entire males and female pigs on the two farms.

The trial was conducted on two farms, and it was therefore not possible to dissociate factors such as breeding stock and management from feeding strategy. The effect of producing entire males on one farm with two different feeding principles was investigated in another trial in 2013 (results not yet published).

Cost-benefit – entire males vs castrates

In addition to the abovementioned prerequisites, the calculations also include the following prerequisites:

- Castration costs (labour, tools etc.): DKK 2.00 (€ 0.27) per castrate
- Increased mortality among castrated pigs: DKK 2.00 (€ 0.27) per castrate
- Pain relief: DKK 2.00 (€ 0.27) per castrate
  The price of a weaner ought to be DKK 6 lower (€ 0.8) per pig if buying entire males rather than castrates.
- Deduction, entire males: DKK 25 (€ 3.33) per pig
- Price of boars/rejected entire males: DKK ÷2.00 (€ 0.27) per kg

Feed prices are shown in the section “materials and method”. The marginal differences are shown in table 8.

Table 8. Marginal differences between entire males and castrates.

Herd		Farm 1- Liquid feed	Farm 2 - Dry feed
Productivity Marginal differences between entire males and castrates	Gain, g/day	÷9 (ns)	÷34
	FUgp/kg	÷0.14	÷0.24
	Lean meat %	+1.2	+1.3
	Rejection, skatole %	+2.5	+4.8

Herd data – economy

The economic advantage in producing entire males compared with castrates differs on the two farms. On farm 1 (liquid feeding) the profit from producing entire males is DKK 2.4/pig (€ 0.32) lower than on farm 2 using dry feed (DKK 17.4/pig (€ 2.32)). The explanation is partly the fact that restricted feeding may minimize the loss of castrates as it is possible to restrain daily gain. The result is a better FCR and a better lean meat percentage. On farm 1, kg gain per pig delivered for slaughter was lower than on farm 2 and thereby the saving obtained when producing entire males was lower.

Table 9. Economy and GM per pig delivered for slaughter. M-C is the difference between male pigs and castrates at herd level. ( ) = Euro.

Herd	Farm 1 - Liquid feed			Farm 2 - Dry feed		
	Castrates	Entire males	*M-C*	Castra-tes	Entire males	*M-C*
Paid per pig, before lean meat % and male pig deduction, DKK	965.3 (127.7)	947.9 (126.4)	*-17.4 (-2.3)*	1005.2 (134.0)	998.9 (133.2)	*-6.2 (-0.8)*
Male pig deduction, DKK/pig	0.0	25.0 (3.3)	*25.0 (3.3)*	0.0	25.0 (3.3)	*25.0 (3.3)*
Deduction for rejection, DKK/pig	0.0	3.8 (0.5)	*3.8 (0.5)*	0.0	7.7 (1.0)	*7.7 (1.0)*
Lean meat % deduction, DKK/pig	15.8 (2.1)	4.6 (0.6)	*-11.3 (-1,5)*	17.5 (2.3)	4.8 (0.6)	*-12.6 (-1.68)*
Paid per pig, DKK	949.5 (126.6)	914.5 (121.9)	*-35.0 (-4.6)*	987.7 (131.4)	961.4 (128.2)	*-26.3 (-3.5)*
Paid per kg carcass, DKK/kg	12.24 (1.6)	12.00 (1.6)	*-0.23 (0)*	12.22 (1.6)	11.97 (1.6)	*-0.25 (0)*
Weaner price	420 (56.0)	406 (54.1)	*-14.6 (-1.9)*	406 (54.1)	400 (53.3)	*-5.3 (-0.7)*
Feed costs, DKK/pig	408 (54.4)	385 (51.3)	*-22.3 (- 3.0)*	417 (55.6)	377 (50.2)	*-39.9 (-5.3)*
Rent, DKK/pig	56.6 (7.5)	56.7 (7.6)	*0.1 (0.1)*	60.5 (8.1)	62.0 (8.3)	*1.5 (0.2)*
Costs - mortality, per pig delivered for slaughter	15.0 (2.0)	14.4 (1.9)	*-0.6 (0)*	0.0	0.0	*0.0*
GM/pig	50.0 (6.7)	52.4 (7.0)	*2.4 (0.3)*	104.2 (13.9)	121.6 (16.2)	*17.4 (2.3)*

The economic benefit of producing entire males remains until rejection rates reach 6.2% on farm 1, and 15.6% on farm 2. The benefit would be even greater if costs for analysis or for rejected entire males were eliminated, as shown in table 10.

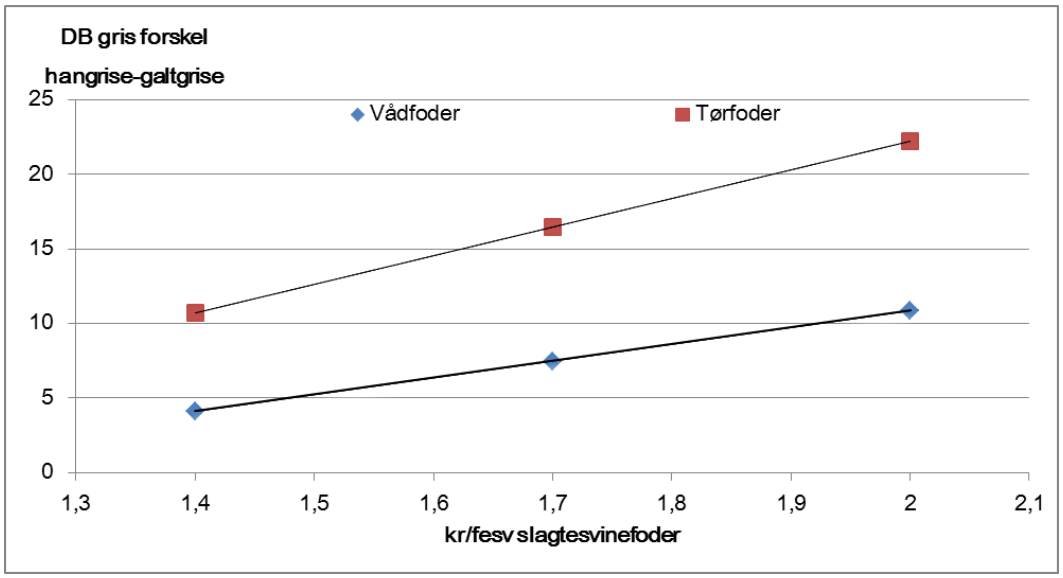
Table 10. Sensitivity tabel, herd data.

Herd	Farm 1 - Liquid feed	Farm 2 - Dry feed
GM difference, entire males vs castrates	2.4 (€ 0.32)	17.4 (€ 2.3)
No male pig deduction, GM difference entire males vs castrates	27.4 (€ 3.7)	42.4 (€ 5.7)
No rejected, GM difference entire males vs castrates	6.2 (€ 0.8)	25.4 (€ 3.4)
Break-even at % rejected	4.1 (€ 0.5)	15.6 (€ 2.1)

Model calculation

The advantage of production of entire males on farm 1 would be approx. DKK 10.3 (€ 1.37) per pig if slaughter weight increased to 83 kg. On farm 2, the advantage would be approx. DKK 21.3 (€ 2.84) per

pig assuming a feed price of DKK 1.95 (€ 0.26) per feed unit and assuming that the break-even price is obtained.



The correlation between feed price and marginal gross margin (GM) per pig between entire males and castrates can be described with the below model:

Difference GM/pig (entire males-castrates) = DKK per feed unit * B+A

Where A = DKK/feed unit and B = herd dependent constant.

Table 11. Constants for lines in Figure 1.

	B **Slope** **DKK/Fugp**	**A** **Constant**
Farm 1 - Liquid feed	11.2 (€ 1.49)	-11.6 (€ 1.55)
Farm 2 - Dry feed	19.2 (€ 2.56)	-16.2 (€ 2.16)

When the feed price changes by DKK +/÷ 0.10 (€ 0.013) per feed unit, the difference in GM/pig changes by DKK 1.1 (€ 0.15) and DKK 1.9 (€ 0.25) per pig on farm 1 and 2, respectively (cf table 11).

According to sensitivity analyses, a change of +/÷ 1 percentage point in rejection rates changes GM by DKK 1.66 (€ 0.22) per pig.

The excess GM in production of entire males is lost if rejection rates reach 9% or 18% on farm 1 and 2, respectively, according to the model calculations.

Rejection

If only skatole forms the basis for rejection of entire males with boar taint, unchanged rejection rates at increasing slaughter weight is assumed.

If, at some point in the future, both skatole and androstenone will form the basis of rejection, rejection rates will increase with increasing slaughter weight [8] as the importance of androstenone will increase.

Conclusion

Results showed a profit from producing entire males compared with castrates both when the pigs are fed liquid feed according to a curve (semi ad lib) and dry feed ad lib. Profits ranged from DKK 2.5 (€ 0.3) (liquid feed) to DKK 17.4 (€ 2.3) (dry feed) per entire male (basis: 5-week pig prices, September 2013). The profit was lost when rejection rates reached 4.1% (liquid feed) and 15.6% (dry feed), respectively.

Model calculations, where start weight was identical (30 kg) and slaughter weight was raised to 83 kg, demonstrated an economic benefit in producing entire males of DKK 10.3 (€ 1.4) (liquid feed) and DKK 21.3 (€ 2.8) (dry feed) per entire male compared with castrates when analysed with identical feed prices.

The profit obtained in the model calculation is lost when rejection rates reach 9% and 19%, respectively. Sensitivity analyses demonstrate that a change of +/÷ 1 percentage point in rejection rates will change gross margin by DKK 1.64 (€ 0.22) per pig. If the price per feed unit changes by +/÷ DKK 0.10, gross margin per pig will change by DKK 1.1 (€ 0.15) and 1.9 (€ 0.25) for liquid feed and dry feed, respectively.

The largest profit from production of entire males was found with dry feeding ad lib where there was a large difference in FCR between entire males and castrates, but there was no difference in lean meat percentage between the two feeding principles. Female pigs performed at the same level as entire males. A high slaughter weight will increase the profit of entire male production provided that the basis for rejection of entire males remains the same.

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Trials no. 1042 & 1116
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//NJK & FU//

Appendix 1

Regulation of feed curves

Thirty minutes after feeding, the troughs in **all pens** that have yet to reach maximum feed dose must be checked.

A round of feeding should be monitored once day during which the pigs in all pens are inspected and it is assessed which pens need a reduction in feed. To ensure that the pigs are fed the right amount of feed towards the end of the growth period, downregulation should always be handled by regulating in per cent in relation to the feed curve and not by regulating pig weight or number of pigs in the pen. Pigs must return to the curve gradually over 2-10 days – this is done automatically in most feeding systems. Examples of downregulation:

- 50% downregulation day 1 after transfer and return to the feed curve gradually over 2-10 days.
- 20% downregulation if more than 20% of the feed is left in the trough 30 minutes after feeding. Return to the curve over 4 days.
- 10% downregulation if the pigs in the pen have eaten more than 80% of the feed, but there is still feed left in the trough 30 minutes after feeding. Return to the curve over 2 days.
- 10% downregulation and return to the curve over 10 days if - having been downregulated by 10% or 20% for 2-4 days - the pigs fail to eat up 30 minutes after feeding.

Normally, the morning feeding is monitored, but once a week another feeding is monitored. The same guidelines for regulation are observed. The feed curve must be so high that minimum 30% of the pigs up to 60 kg always need downregulation and no pigs need upregulating. If fewer than 30% of the pigs up to 60 kg are downregulated, the curve is too low and all points on the curve must be increased by 0.1 FUgp a day until the feed dose for the final part of the growth period is reached. Every time the feed curve is changed, downregulation in per cent must be noted for a month for each feed valve with pigs below 60 kg. It is then analysed if minimum 30% of the pigs are always downregulated compared with the curve.

Appendix 2

Analysis of nutrient content in unity mix in liquid feed herd. Average of 15 rounds of sampling.

	In dry matter
Fugp/kg	125
Crude protein, %	20.0
Lysine, g/kg	11.2
Methionine, g/kg	3.2
Cystine, g/kg	3.3
Threonine, g/kg	6.5
Calcium, g/kg	8.7
Phosphorus, g/kg	5.4

Analysis of nutrient content in feed, dry feed herd, 8 batches.

	Declared	Analysed
FUgp/kg	-	1.02
Crude protein, %	15.3	15.2
Lysine, g/kg	0.84	9.1
Methionine, g/kg	0.26	2.6
Cystine, g/kg	-	2.9
Threonine, g/kg	-	6.0
Calcium, g/kg	7.3	7.5
Phosphorus, g/kg	5.4	5.5

Economic break-even pig prices as a function of the price of finisher feed.

Group	Castrates	Entire males	Young females
Finisher feed, DKK/kg	1.8	2.1	2.4
Break-even, DKK/kg	12.3	13.52	14.72
30 kg pig, DKK	428	458	488
Kg adjustment	6.15	6.43	6.71

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