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Effect of castration on carcass traits and meat production in crossbred pigs

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Abstract

Castration in males consists of the removal of the testes or the inhibition of testicular function. Although the prevalence of castration in pigs varies from country to country, it is generally a routine practice that is performed surgically. Surgical castration is an acute stressor that can affect the behaviour, endocrine and immune responses of pigs. Therefore, it may impair the health and welfare of these animals. This could be of particular concern at weaning, which constitutes a severe nutritional, physical and psychological stressor often associated with increased disease susceptibility. The present investigation was undertaken to elucidate the effect of castration on the performance of crossbred pigs. Total 20 weaned male piglets of 2 months age pertaining to Large White Yorkshire crosses with desi pigs were procured and randomly allotted to two groups (Castrated and uncastrated) containing 10 pigs each. Pigs were kept at piggery unit from 15 December 2009 to May 2010 of Livestock farm, Adhartal, Jabalpur. Growth parameters were taken at fortnight intervals. The carcass weight and dressing percentage for the castrated and uncastrated groups are given is found to be significantly ($P < 0.05$) higher in castrated (48.69 ± 0.36) than the uncastrated (47.91 ± 0.31). Similarly, the dressing percentage was also found to be higher in the castrated groups (71.09 ± 0.25) than the uncastrated groups (68.21 ± 0.39) respectively. The mean \pm S.E. of height in castrated and uncastrated groups of pigs at different fortnight intervals 6.5 months $27.81a \pm 0.09$, 26.01 ± 0.18 respectively. The chest girth (Inc.) from 56 to 195 days of age in castrated and uncastrated groups are 6.5 months $38.70a \pm 0.16$, $37.24b \pm 0.12$ respectively.

Keywords: Body length, chest girth, height at withers, feed intake, feed efficiency

Introduction

Castration can greatly influences growth rate in meat producing animals and is considered as important tool in enhancing meat production. So an attempt was made to ascertain the effect of castration on growth and carcass characteristics of pigs. However in general, the pig husbandry remains still primitive in India and the annual production of pork is much below the real production potential. The major problems perceived are the retarded growth rate and piglet mortality due to poor feeding and managerial practices. The aim in any swine enterprise is to recognize the various management factors, which influence the growth performance. Hence suitable management practices should be adopted to improve the growth of pigs. Among the various management practices, castration seem to influence the growth and there is varied opinion pertaining to the effect of castration on growth performance of pigs. The objective of this study was to compare various variables of growth performance, carcass and meat quality, as well as carcass fat characteristic traits in boars and barrows, in order to provide data for the detailed evaluation of the advantages and constraints of boar fattening. The present investigation was carried out with the following objectives:

1. Effect of castration on performance of body weight gain, body measurement, feed intake and feed efficiency of pigs.
2. Effect of castration on carcass quality traits *i.e.* carcass yield and processing losses.

Materials and Methods

Experimental location

The study was carried out in piggery unit at Livestock farm, College of Veterinary Science, Madhya Pradesh Pashu Chikista Vigyan Vishwa Vidyalaya, Jabalpur. The farm is located at Adhartal 8 km away from Jabalpur city on the National Highway No. 7.

Experimental design

Twenty weaned male piglets of the age of 2 months pertaining to Large White Yorkshire crosses with desi pigs were procured and randomly allotted to two treatment groups *i.e.* castrated and non-castrated. Each treatment was consisting of two replicates and each replicate has five piglets of identical body weights. One group of animal was castrated by open method of castration as described by Tyagi and Singh (1991) [3]. Under the supervision of veterinary surgical specialist. Pigs were fed ad libitum dry mash with the following composition

- Maize: 45 Parts
- Ground nut cake: 17 Parts
- Wheat bran: 30 Parts
- Fish meal: 6.0 Parts
- Mineral mixture: 1.50 Parts
- Common salt: 0.5 Parts

The pigs also had free access to water in individual pens. The pigs were reared up to 195 days of age and all the experiment animals were slaughtered.

Growth parameters

Body weight

Pigs were weighed individually before feeding at fortnight intervals by using standard weighing balance with platform to determine the body weight in kilograms.

Average daily weight gain

The daily weight gain of each piglet for various stages of growth were calculated as (Pandey, 1996) [1]:

$$\text{Weight gain} = (w_2 - w_1) / (t_2 - t_1)$$

$w_2 - w_1$ = Initial and final body weights of piglets for a particular period

$t_2 - t_1$ = Corresponding time units

Daily feed intake Known quantity of feed was given in the morning and the leftover feed on the next day morning was collected and weighed to determine the daily feed intake.

Feed efficiency

Feed efficiency was calculated by using the formula (Banerjee, 1998) [2]:

$$\text{Feed efficiency} = (\text{Feed consumed (Kg)}) / (\text{Body weight gain (Kg)})$$

Linear body measurements

Linear body measurements like body length, chest girth and height at withers were measured in inches by using the standard measuring tape in the morning before offering feed to the pigs at fortnightly interval.

Body length

Body length was measured from top of the head in between the ears to the base of the tail.

Chest girth

Chest girth was measured around the body just behind the front legs and over the shoulder area.

Height at withers

Height was measured from the top of the withers to the

bottom of the foreleg.

Slaughter studies

Carcass weight

After halved, the weight of each half of dressed carcass after removal of head and shanks was recorded while warm. Thereafter following carcass measurements were taken as per the procedure followed by Amusana Singh *et al.* (1983) [4].

Dressing percentage

The dressing percentage was calculated by using the following formula

$$\text{Dressing percentage} = \frac{\text{Dressed warm carcass weight (kg)}}{\text{Pre - slaughter live weight (kg)}} \times 100$$

Carcass length

Carcass length was measured in centimeters with a measuring tape (cloth) from the anterior edge of the 1st rib up to the anterior edge of the aitch bone (pubic bone) of the same side of each split half and the mean of the two halves were recorded as carcass length.

Back fat thickness

Back fat thickness was measured along the vertebral column against the first rib, last rib and last lumbar vertebra with a back fat thickness gauge. Thickness of the skin was also included in each measurement. The average of three readings in each carcass was taken as the average back fat thickness for that carcass.

Loin eye area

Loin eye area was taken as the circumference of the longissimus dorsi muscle at 10th and 11th intercostal space. The area was traced on an oil paper by placing it against the cut surface of the loin eye muscle. The traced area was then measured with a compensating polar planimeter and expressed in square centimeter. The measurements were taken on both sides of the split carcass and the mean value was recorded.

Weight of edible component

Like kidney, liver, heart lungs, spleen, head and legs.

Result and Discussion

The uncastrated and castrated groups of pigs have recorded carcass length of 72.81 ± 0.17 and 73.92 ± 0.36 cm respectively and it was found to be significantly ($P < 0.05$) different. The back fat thickness was 1.29 ± 0.01 and 1.21 ± 0.008 inches in uncastrated and castrated pigs respectively and the difference was significant ($P < 0.01$). The loin eye area was significantly ($P < 0.05$) higher in castrated ($24.72 \pm 0.32 \text{ cm}^2$) than the uncastrated groups ($23.99 \pm 0.31 \text{ cm}^2$) respectively. The carcass weight and dressing percentage for the castrated and uncastrated groups are given is found to be significantly ($P < 0.05$) higher in castrated (48.69 ± 0.36) than the uncastrated (47.91 ± 0.31). Similarly the dressing percentage was also found to be higher in the castrated groups (71.09 ± 0.25) than the uncastrated groups (68.21 ± 0.39) respectively. The mean \pm S.E. of height in castrated and uncastrated groups of pigs at different fortnight intervals 6.5 months $27.81a \pm 0.09$, 26.01 ± 0.18 respectively. The chest girth (Inc.) from 56 to 195 days of age in castrated and uncastrated groups are 6.5 months $38.70a \pm 0.16$, $37.24b \pm$

0.12 respectively. The mean \pm S.E. of body length (inches) from 56 to 195 days in castrated and uncastrated groups are 6.5 months 44.80 ± 0.08 , 43.90 ± 0.08 respectively. The mean \pm S.E of feed efficiency in pigs of castrated and uncastrated groups at different fortnightly intervals are 6.5 months $5.801a \pm 0.46$, $3.857b \pm 0.27$. The mean \pm S.E. of fortnightly body weight (kg) of castrated and uncastrated pigs are 6.5 months $71.32a \pm 0.57$, $70.19b \pm 0.41$ respectively. The mean \pm S.E. of daily weight gain (g) on fortnightly basis in castrated and uncastrated are 6.5 months $538.00a \pm 0.45$, $609.00b \pm 0.32$ respectively. The mean \pm S.E. of daily feed intake (kg) from 56 to 195 days of age in castrated and uncastrated groups are 6.5 months $2.97a \pm 0.002$, $2.03b \pm 0.001$ respectively.

Body weight

The fortnightly body weight of castrated and uncastrated pigs from 56 to 180 days of age indicated significantly ($P < 0.01$) higher final body weight in castrated groups. The difference was not noticed for the first two fortnights of experiment. From the third fortnight onwards consistently a superior growth rate was noticed in castrated group, but from seventh fortnights onwards superior growth rate was noticed in uncastrated group even though the final body weight was lower.

Daily weight gain

It was found that there was no significant difference in the final daily weight gain between the two groups. Castrated groups gained higher daily weight gain up to sixth fortnight.

Daily feed intake

The average daily feed intake was significantly ($PO.01$) lower in uncastrated groups (1.53 ± 0.01 kg) when compared to castrated group (1.99 ± 0.05 kg). This might be due to the energy requirements to produce a unit of body weight was also more in castrates, especially so, when the fat accretion is increased in castrates, which requires more energy compared to protein accretion.

Feed efficiency

Highly significant ($P < 0.01$) feed efficiency of 3.28 ± 0.17 was recorded in uncastrated pigs compared to 4.00 ± 0.19 in the castrated pigs

Feed cost per kg gain

The feed cost per kg gain from 56 to 180 days of age was significantly ($PO.05$) lower in uncastrated (Rs. $24.76 + 1.24$) than the castrated groups (Rs. 31.30 ± 2.65).

Body length

The body length (inches) from the 56 to 180 days of age in castrated and uncastrated pigs are presented.

Chest girth

Significantly ($PO.01$) higher chest girth was observed in castrated group of pigs. This might be due to the final body weight of castrated pigs which was higher than the uncastrated pigs.

Height

The height at wither from the 56 to 180 days of age in castrated and uncastrated groups of pigs was found that there was highly significant ($PO.01$) difference between castrated and uncastrated group. Castrated group was taller than the

uncastrated group.

Carcass characteristics

Carcass weight and Dressing percentage in castrated and uncastrated group of pigs were furnished. In castrated pigs, the carcass weight was 49.70 ± 0.36 kg as against 48.45 ± 0.31 kg in uncastrated group. The dressing percentage of 70.25 ± 0.25 in castrated pigs was significantly ($PO.05$) higher than the uncastrated pigs (69.31 ± 0.39). This might be due to higher slaughter weight in castrated groups and also with fatter, pigs tend to dress better than lean pigs.

Carcass length, back fat thickness and loin eye area

The carcass length was significantly ($P < 0.05$) higher in uncastrated group of pigs Castration had brought about a highly significant ($PO.01$) influence on back fat thickness as seen The back fat thickness was significantly ($P < 0.01$) lower in uncastrated pigs ($1.24 + 0.008$ inches) as compared with (1.32 ± 0.01 inches) castrated pigs. The higher value in castrated pigs might be due to higher fat accretion in the body The loin eye area was also significantly ($PO.05$) higher in uncastrated ($25.63 \pm 0.32\text{cm}^2$) than the castrated ($24.55 \pm 0.31\text{cm}^2$) pigs.

Conclusion

From the results of the study it was inferred that the uncastrated group performed better than that of castrated group in terms of efficient average daily feed intake, better feed efficiency, lean meat production and lower feed cost per kg gain in body weight. Besides, eating qualities such as tenderness, juiciness and flavours of the uncastrated pigs did not differ significantly with that of castrated group. From these findings, it may be inferred that the castration may not be required if the pigs were slaughtered at 6 months of age and also the production of uncastrated pigs may be an advantage than the castrated pigs as it avoids labour cost of castration and stress to the piglets. Further study is to be conducted to assess the effect of castration if any beyond six months of age.

Research category: Feed efficiency

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Sample collection: Animals brought for slaughterhouse.

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