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Effect of split weaning and different feeding regime on back fat thickness in live pigs

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Abstract
The present study on split waning and different feeding regime on back fat thickness (BFT) in live barrows and carcass was carried out at Swine production farm, at Indian Veterinary Research Institute, Izatnagar. A total of thirty-six (62.5% Landrace and 37.5% Desi) barrows were selected for the present study. The average BFT in live barrows was done by using back fat scanner (Dramniski) one day before the schedule of slaughter. In live barrows BFT were measured at locations are midpoint of shoulder above elbow, middle of back where last rib joins the vertebrae and rump, straight above the stifle joint and average was calculated. The results showed that there was no significant difference of BFT on live barrows and carcass were observed among the treatment groups. However, in dietary group had significantly highest BFT measurement were observed both live barrows and carcass. The overall mean of BFT of live barrow was 18.08±0.44 mm and in carcass 21.2±0.08 mm. However, in dietary group had significantly highest BFT was observed both live barrows and carcass BFT. The values were in dietary group D_3 (22.36±1.23), D_2 (16.36±0.65) and in D_1 (15.5±0.058) and in carcass D_3 (25.9±0.12), D_2 (19.2±0.10) and in D_1 (18.5±0.07), respectively. The higher BFT in live barrows and carcass of D_3 might be due to the high content of ether extract in the kitchen waste. Treatment and diet interaction also had significant ($P<0.01$) difference of BFT in live barrows and carcass. Based on our study, it can be concluded, that split weaning had no positive effect on BFT but, feeding of kitchen waste for growing and finishing pigs has increase the BFT which in turn enhance the meat quality.

Keywords: Split weaning, barrows, back fat thickness, dramniski scanner, diet

Introduction

Weaning influences, the physiological, nutritional, and even behavioural conditions of piglets. These could be important factors for productivity and safety on pig farms. Early weaning is one of such managemental tool which helps to improve the pig productivity. Split-weaning is an alternative technological option for the weaning of piglets. It helps to minimize body weight loss of sow during lactation and also in early rebreeding of the sow. Back fat layer thickness is an important parameter at all stages of pig production. It is used as a tool for the evaluation of dietary requirements in order to optimize growth and determine the price (McEvoy *et al*., 2007) [8]. Measurements of thickness of subcutaneous adipose tissue are useful for monitoring the production process in order to optimize growth and carcass composition. These measurements can be obtained using ultrasound techniques, the use of which has become widespread for the pigs in recent decades either for descriptive studies or to predict carcass composition (Ayuso *et al*., 2013) [1]. Likewise, these measurements can be very useful in improving the response of genetic selection in economic traits (Moeller *et al*., 1998) [10]. It has been proved that back fat thickness, loin area and intramuscular fat content are good features to predict pig carcass characteristics (Ayuso *et al*., 2014) [2]. Hence, the present study was planned to measure the back fat thickness in live barrows as well as in the carcass under split weaning and different feeding regime.

Materials and Methods

The experiment was conducted at Swine Production Farm, Indian Veterinary Research Institute, Izatnagar, and Utter Pradesh (U.P). A total of thirty-six (62.5% Landrace and 37.5% Desi) piglets were selected for the study. They were divided into three groups (T_1, T_2, T_3) having 12 numbers in each and each treatment was subdivided into three subgroups (D_1, D_2, D_3) having 4 number in each. In control group (T_1) piglets were weaned at age of 56 days. Whereas in T_2 (Split weaning lighter half) weaned at 42 days of age. After weaning each treatment group were fed with concentrate feed (D_1), 50% concentrate and 50% kitchen waste

(D_2) and 100% kitchen waste (D_3). The selected animals were reared under standard hygienic and uniform management conditions throughout the experimental period.

The average back fat thickness in live barrows was done by using back fat scanner (Dramniski, Plate1) one day before the schedule of slaughter. Before measurement of back fat thickness each barrow was brought to restraint cage and was shaved at three locations without causing any wound. Back fat thickness were measured at locations are midpoint of shoulder above elbow, middle of back where last rib joins the vertebrae and rump, straight above the stifle joint and average was calculated. Four barrows from each group were slaughtered at the division of Livestock Products Technology for carcass study at the body weight of 60±5 kg. The carcass was scalded with hot water at a temperature of about 65° to 70 °C followed by scrapping. Thereafter the carcass was hanged upright on gambrel and subjected to singeing with the help of a blower. The average of the three measurements with a skewer at the levels of the first rib, last rib and last lumbar vertebra was taken as back fat thickness in carcass. The data obtained from experiment was analysed as per the standard method of statistical analysis (Snedecor and Cochran, 1985) [15].

Results and Discussion

Analysis of variance of ultrasonically measured back fat thickness in live animals and carcass back fat thickness of different experimental groups was done and the mean of the BFT on live barrows and carcass BFT is presented in the Table1. Four barrows from each treatment group were measured for BFD on live barrows Overall mean of BFT of live barrows and carcass were 18.08±0.44 mm and 21.2±0.08 mm, respectively. No significant difference of back fat thickness on live barrows and carcass were observed among the treatment groups.

However, in dietary group significantly (P<0.01) highest back fat thickness measurement were observed both live barrows and carcass BFT. The BFT in live barrows values were in D_3 (22.36±1.23), D_2 (16.36±0.65) and in D_1 (15.50±0.058), respectively. Where as in carcass BFT in D_3 (25.90±0.12) followed by D_2 (19.20±0.10) and D_1 (18.50±0.07). The higher BFT in both D_3 group might be due to feeding of kitchen waste, which is highly nutritious and high in protein and fat content. Similar observation has been reported by Ravindra Kumar *et al.* 2009 [12]. Treatment and diet interaction had significant (P<0.01) difference on BFT in both live and carcass BFT. The present findings are in agreement with Saikia (2004) [13] and Jha *et al*., (1999) that pig reared on Kitchen waste had higher economic value due to higher dressing percentage at the finishing stage. Contrary to above finding, Santana and Dieguez (1985) [14] consulted that pig fed swill had less fat than those fed concentrates.

Treatment and diet interaction also had significant (P<0.01) difference of BFT on live barrows. The values were 16.00±0.98 mm in D_1-T_1, 17.33±0.56 mm in D_2-T_1, 18.50±0.83 mm in D_3-T_1, 14.50±1.13 mm in D_1-T_2, 14.58±1.20 mm in D_2-T_2, 24.91±1.67 mm in D_3-T_2, 16.00±01.00 mm in D_1-T_3, 17.16±1.17 mm in D_2-T_3 and 23.66±2.34 mm in D_3-T_3. In T_1 and T_3 had almost similar BFT, which were fed on D_3. In carcass the values are 18.40±0.15 mm in D_1-T_1, 21.20±0.11 mm in D_2-T_1, 23.40±0.18 mm in D_3-T_1, 19.70±0.13 mm in D_1-T_2, 15.90±0.07 mm in D_2-T_2, 28.60±0.12 mm in D_3-T_2, 17.4±0.10 mm in D_1-T_3, 20.07±0.19 mm in D_2-T_3 and 25.80±0.29 mm in D_3-T_3. It might be due to due to the high content of EE in the kitchen waste. Whereas, Irie and Nishimura (1986) [5] reported that the fat from pigs fed on kitchen waste in Japan was higher in proportions of unsaturated fatty acid than fat from pigs fed on grain. It was also suggested that pigs fed on kitchen waste had softer fat.

Table 1: Back fat thickness (mm) on live barrows under different treatments

Effects	No. of observations	Back fat thickness live barrows (mm)	Back fat thickness carcass (mm)
Over all mean	36	18.08±0.44	21.20±0.08
Treatments			
C (T1)	12	17.28±0.52	20.90±0.10
SH(T2)	12	18.00±1.63	21.30±0.15
SL(T3)	12	18.95±1.32	21.30±0.15
Diet			
D1	12	$15.50±0.58^{a}$	$18.50±0.07^{A}$
D2	12	$16.36±0.65^{b}$	$19.20±0.10^{A}$
D3	12	$22.36±1.23^{b}$	$25.90±0.12^{B}$
Treatment x Diet Interaction			
T1-D1	4	$16.00±0.98^{a}$	$18.40±0.15^{abc}$
T1-D2	4	$17.33±0.56^{a}$	$21.20±0.11^{cd}$
T1-D3	4	$18.50±0.83^{a}$	$23.40±0.18^{cd}$
T2-D1	4	$14.50±1.13^{a}$	$19.70±0.13^{abc}$
T2-D2	4	$14.58±1.20^{a}$	$15.90±0.07^{a}$
T2-D3	4	24.91±1.67b	$28.60±0.12^{e}$
T3-D1	4	16.00±1.00a	$17.40±0.10^{ab}$
T3-D2	4	17.16±1.17a	$20.70±0.19^{ab}$
T3-D3	4	23.66±2.34b	$25.80±0.29^{cde}$

Where, C= Control group, SH=Split weaning (heavier half) group, SL=Split weaning (Lighter left) group

a, b (P<0.05); A, B (P<0.01) means with different superscripts within a column differ significantly.

Plate 1: Dramniski back fat scanner for measuring BFT on Live animals

Conclusions

Based on the findings of the present study, it may be concluded that, that split weaning had no positive effect on BFT but, feeding of kitchen waste for growing and finishing pigs has increase the BFT which in turn enhance the quality of meat. Therefore, it is economically advantageous for farmers to adopt split weaning practices as well as to feed pigs on kitchen waste wherever it is available to get maximum profit.

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