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Effects of Slaughter Weight on Proximate Composition of Primal Cuts of Large White Yorkshire Pigs

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Abstract

Studies on proximate composition of different primal cuts of pork viz. ham, loin and shoulder procured from 36 Large White Yorkshire pigs slaughtered at 40—50 kg (group I), 50—60 kg (group II), 60—70 kg (group III), 70—80 kg (group IV), 80—90 kg (group V) and 90—100 kg (group VI) slaughter weight groups revealed that the moisture content (72.35 ± 0.12 to 75.11 ± 0.21%) of pork muscle decreased significantly while the ether extract content (2.90 ± 0.05 to 4.50 ± 0.10%) increased significantly along with the increase in body weight of pigs at slaughter. There was a significant decrease in crude protein content (20.82 ± 0.21 to 19.86 ± 0.10%) but the total ash content did not vary much (1.06 ± 0.04 to 1.16 ± 0.01%) in different slaugher weight groups.

Key words : Large White Yorkshire pigs, Slaughter weight, Proximate composition.

Among the meat producing livestock, pig is the only litter bearing animal having the shortest generation interval and faster growth rate. It is one of the most efficient feed converting animal species. These biological advantages give pigs an important role in tiding over the deficiency of animal protein. There is a misconception that pork contains more fat and the fat is totally saturated. The status of saturated fatty acid (SFA), mono unsaturated fatty acid (MUFA) and poly unsaturated fatty acid (PUFA) in pork are better than other meats. The current recommendation for the polyunsaturated : saturated ratio (P : S) is about 0.4. Pork has a positive P : S ratio whereas the P : S ratio of lamb and beef is lower. At present pork is the most consumed muscle food of animal origin on a global basis (1). Some exotic breeds of pigs, viz. Large White Yorkshire (LWY), Hampshire, Landrace and Tamworth were introduced at different pig breeding breeding farms. In West Bengal, LWY is maintained in Regional Pig Breeding Station cum Bacon Factory, Haringhata, Nadia, AICRP on pigs started in 1971. In the mean time numbers of pork processing plants of small and medium sizes are established in the country. Pig meat production has increased at faster rate as compared to meat production from other livestock species in the country. Annual growth rate of meat production in India over two decades (1975—2000) was highest in pig meat (10.6%) compared to other meat like poultry (8.1%),goat meat (2.9%), beef (2.9%), Cara beef (1.9%) and mutton (1.9%) (2).

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Methods

The study was conducted on 36 Large White Yorkshire (LWY) pigs. They were raised under intensive system of management and were provided with similar housing, feeding and managemental care. For the purpose of study the animals were divided in six slaughter weight groups, viz. 40—50 kg (group I), 50—60 kg (group II), 60—70 kg (group III), 70—80 kg (group-IV), 80—90 kg (group V) and 90—100 kg (group VI). The pigs were slaughtered, dressed, eviscerated and split following the method described by Ziegler (3) with certain modifications at Regional Pig Breed-

Table 1. Mean per cent values of moisture, crude protein, ether extract and total ash contents in pork cuts of Large White Yorkshire pigs slaughtered at different slaughter weight groups.

Slaughter weight groups	Pork cuts	Moisture	Crude protein	Ether extract	Total ash
40—50 kg	Ham	75.11 ± 0.21	20.45 ± 0.13	3.18 ± 0.07	1.13 ± 0.03
(group I)	Loin	74.32 ± 0.20	20.65 ± 0.18	2.90 ± 0.05	1.13 ± 0.02
	Shoulder	74.66 ± 0.25	20.82 ± 0.14	3.29 ± 0.07	1.09 ± 0.03
50—60 kg	Ham	74.62 ± 0.17	20.82 ± 0.21	3.47 ± 0.07	1.14 ± 0.04
(group II)	Loin	73.90 ± 0.15	20.79 ± 0.21	3.46 ± 0.07	1.12 ± 0.03
	Shoulder	73.89 ± 0.18	20.16 ± 0.14	3.41 ± 0.06	1.15 ± 0.01
60—70 kg	Ham	74.10 ± 0.16	19.98 ± 0.16	3.61 ± 0.09	1.06 ± 0.05
(group III)	Loin	73.94 ± 0.12	20.76 ± 0.26	3.47 ± 0.06	1.17 ± 0.05
	Shoulder	73.95 ± 0.18	19.90 ± 0.15	3.87 ± 0.05	1.09 ± 0.05
70—80 kg	Ham	73.55 ± 0.09	19.97 ± 0.08	3.91 ± 0.05	1.17 ± 0.00
(group IV)	Loin	73.55 ± 0.07	19.88 ± 0.10	3.71 ± 0.07	1.15 ± 0.02
	Shoulder	73.28 ± 0.09	19.93 ± 0.08	3.97 ± 0.05	1.06 ± 0.04
80—90 kg	Ham	73.16 ± 0.14	19.88 ± 0.10	4.06 ± 0.03	1.13 ± 0.03
(group V)	Loin	72.90 ± 0.09	19.99 ± 0.09	3.91 ± 0.05	1.16 ± 0.00
	Shoulder	72.77 ± 0.05	19.99 ± 0.06	4.02 ± 0.06	1.16 ± 0.01
90—100 kg	Ham	72.51 ± 0.05	19.87 ± 0.06	4.38 ± 0.06	1.10 ± 0.04
(group VI)	Loin	72.35 ± 0.12	19.86 ± 0.10	4.05 ± 0.06	1.09 ± 0.04
	Shoulder	72.52 ± 0.05	19.95 ± 0.13	4.50 ± 0.10	1.08 ± 0.05
Significance		Significant (P<0.01)	Significant (P<0.01)	Significant (P<0.01)	Non-significant

ing Station-Cum-Bacon factory, Haringhata Farm.

Collection of Samples. For proximate analysis pork samples were collected from each of ham, shoulder and loin cuts. The cuts were labeled and packed in the polyethylene bags and stored in deep freezer (-8 to –10 C) till subjected to proximate analysis.

Proximate Composition Analysis. The moisture, crude protein (CP), ether extracts (EE) and total ash (TA) contents of meat samples were determined by the method of AOAC (4).

Statistical Analysis. Statistical analysis of data was carried out by one way ANOVA according to Duncan's multiple range test (5) using SPSS (10.0) software.

Results and Discussion

Moisture

The mean percent moisture content ranged between 72.35 ± 0.12 to 75.11 ± 0.21 in primal cuts of pork obtained from different slaughter weight groups (Table 1). Among the cuts ham cut of group I and loin cut of group VI recorded maximum and minimum moisture content respectively. Significant (P<0.01) differences in moisture content was observed among slaughter weight groups and also in different pork cuts. These findings were in close agreement with that of Pasha and Lone (6) Cisneros et al. (7) and Mili et al. (8). The difference in moisture content might be attributed to increase in content of fat along with the increase in slaughter weight of pigs.

Crude Protein

The crude protein (CP) content was found to vary from 19.86 ± 0.10 to 20.82 ± 0.21. Among the cuts ham cut of group II and loin cut of group VI recorded maximum and minimum CP content respectively. Significant (P<0.01) differences in CP content was observed among slaughter weight groups and also in different pork cuts (Table 1). Mili et al. (8) and Lee et al. (9) found no significant difference in protein content of pork among the slaughter weight groups of pig. In the present study significant difference in protein content might be due to the reason that the range of minimum and maximum slaughter weight is much wider, i.e. from 40 to 100 kg and there are six slaughter weight groups. In most cases, the first two groups did not differ significantly between them and last four groups did not differ significantly among them.

Ether Extract

The mean percent ether extract (EE) content ranged from 2.90 ± 0.05 to 4.50 ± 0.10. Among the cuts, shoulder cut of group VI and loin cut of group I recorded maximum and minimum EE content respectively. A linear and significant ($P<0.01$) rise in EE content along with increase in slaughter weight was observed. Increased deposition of back fat, inter-muscular and intra-muscular fat along with reduction in the moisture content of pork cuts in higher weight groups of pig might be the reasons for these findings. The results of the present study supported well the observations of Pasha and Lone (6) and Mili et al. (8).

Total Ash

Total ash (TA) content ranged from 1.06 ± 0.04 to 1.16 ± 0.01% in different slaughter weight groups. The values were, however, almost similar in all the slaughter weight groups and in all pork cuts. This indicates that the slaughter weight had least influence on TA content. These findings were in agreement with the reports of Pasha and Lone (6) and Mili et al. (8).

Conclusion

The study revealed that an increase in slaughter weight caused decrease in moisture content, reduction in protein content and a steady increase in EE content in different meat cuts of LWY pigs. However, the TA content remained almost unaffected either due to differences in slaughter weight or in meat cuts.

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