



Short Communication

Comparative Analysis of Meat Quality in Different Parts of Small-Tailed Han Sheep

Junyan Bai*, Zhihao Dong, Youbing Yang, Ziheng Li, Xiaoning Lu and Huirong Gong

College of Animal Science and Technology, Henan University of Science and Technology, Luoyang 471003, China

ABSTRACT

A comparative analysis of meat quality traits at different segmented parts of small-tailed Han sheep was conducted. The results showed that drip losses of back and tendon were obviously lower than those at other parts ($P<0.05$). Cooking loss of tendon was significantly lower than that at other parts ($P<0.05$). The shearing force of hind leg was obviously lower than that at other parts ($P<0.05$). The flesh color of waist was significantly lower than that at other parts ($P<0.05$). Crude protein contents in forelegs, hind leg and back were remarkably higher than that in waist ($P<0.05$). The crude fat content of the waist was significantly higher than that of other parts ($P<0.05$). To sum up, due to low shearing force, meat quality of hind leg was tender just with slightly low crude fat content; crude fat content of waist was high, so flavor of waist was good. The correlation coefficients of flesh color with crude fat and shearing force were -0.425 and 0.176, respectively, and the correlation coefficients of cooking loss with crude protein and drip loss were 0.272 and 0.179, respectively.

Article Information

Received 22 January 2020

Revised 02 March 2020

Accepted 09 March 2020

Available online 04 September 2020

Authors' Contributions

JB conceived and designed the study and conducted the lab work. ZD analyzed the data and wrote the article. YY and ZL helped in sampling. HG and XL helped in analysis of data.

Key words

Small-tailed han sheep, Meat quality traits, Shearing force, Cooking loss, Crude protein.

Small-tailed han sheep was a famous fur and meat-type breed in China and even all over the world, featured by its early-maturing, multiplerts, multi-lamb, fast growth, big physique, large meat production, superior fur quality, genetic stability and strong adaptability, etc. (Bai *et al.*, 2015, 2016, 2017, 2019, 2020). Small-tailed Han sheep originated in Heze, Jining and other places in the west of Shandong Province, and has become a key breed of mutton sheep breeding in the north of China, distributed in Henan, Hebei, Jiangsu, Anhui, Inner Mongolia, Qinghai and other places (Guo and Li, 2008). In this study, small-tailed Han sheep in Henan Province were used as experimental materials. Through the comparative study of mutton quality of different parts and sexes, it can lay a foundation for the production of high-grade mutton products.

Materials and methods

Small-tailed Han sheep ($n=60$) from Taiqian County, Puyang City, Henan Province, then brought to the lab to measure meat quality traits, mainly including drip loss, shearing force, water content, cooking loss and flesh color. The determination method of growth traits and meat quality traits referred to the determination part of production

performance in *Animal Breeding Experimentation* by editor-in-chief Liu (2007).

SPSS17.0 software was used to analyze the influence of different parts and sex on the quality of small-tailed Han sheep.

Results and discussion

It could be seen from Figure 1 that drip losses of back and tendon were significantly lower than those at other parts, ($P<0.05$) but that of forelegs was significantly lower than that of waist ($P<0.05$). The cooking loss of tendon was notably lower than those at other parts ($P<0.05$), those of waist and rib were notably lower than those of forelegs, hind leg and rid ($P<0.05$), and that of back was notably lower than those of forelegs and hind leg ($P<0.05$). Abdelrahman *et al.* (2018) research shows that the cooking loss of male Naemi lamb is 20-35.2%, while the cooking loss of Small Tail Han sheep (25-36.803%) in this study is slightly higher than that of Abdelrahman *et al.* (2018).

The shearing force of hind leg was obviously lower than those at other parts ($P<0.05$), while that of forelegs was remarkably lower than that of back ($P<0.05$). The flesh color of waist was obviously lower than those at other parts, and that of hind leg was obviously higher than those of forelegs, back, tendon and rib ($P<0.05$). The crude protein contents of forelegs, hind leg and back were significantly higher than that of waist ($P<0.05$). The

* Corresponding author: byezi@163.com

0030-9923/2021/0001-0001 \$ 9.00/0

Copyright 2021 Zoological Society of Pakistan

crude fat content of waist was notably higher than those at other parts ($P<0.05$). Different parts of sheep meat had no significant difference in water content ($P>0.05$).

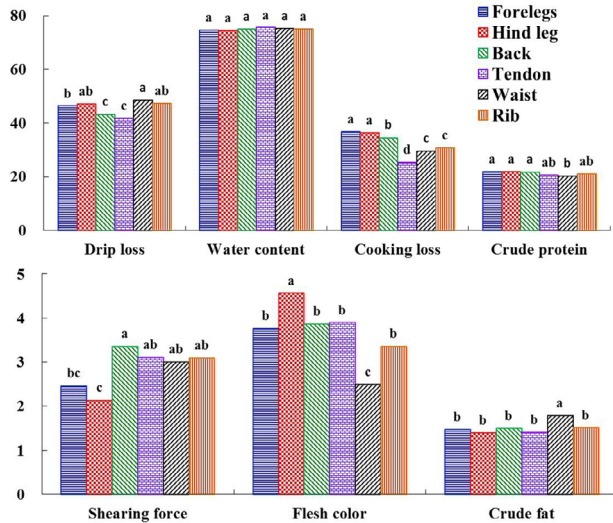


Fig. 1. Comparison of meat quality in different parts of small-tailed Han sheep.

To sum up, due to low shearing force, meat quality of hind leg was tender just with slightly low crude fat

content. Crude fat content of waist was high, so its flavor was good, and this study result was slightly different from that of Guo and Li (2008) which indicated that sheep meat at rib and waist had favorable edible qualities.

It can be seen from Figure 2 that both shearing force and crude protein of ram meat were slightly higher than those of ewe meat, but the difference was insignificant ($P>0.05$). Besides, ram and ewe had no significant differences in the aspects of drip loss, cooking loss, water content, flesh color and crude fat ($P>0.05$). Ullah *et al.* (2019) showed that the fat content of ewe was significantly higher than that of ram. The results of this study are not consistent with those of Ullah *et al.* (2019) which may be the reason for the different characteristics of different sheep breeds.

As shown in Table I crude fat and flesh color presented extremely significant negative correlation with correlation coefficient of -0.425 ($P<0.01$). Crude protein had a significant negative correlation with water content with correlation coefficient of -0.234 ($P<0.05$). Significant positive correlation existed between crude protein and cooking loss with correlation coefficient of 0.272 ($P<0.05$). Shearing force had significant negative correlation with flesh color with correlation coefficient of -0.176 ($P<0.05$). Drip loss presented significant positive correlation with cooking loss with correlation coefficient of 0.179 ($P<0.05$).

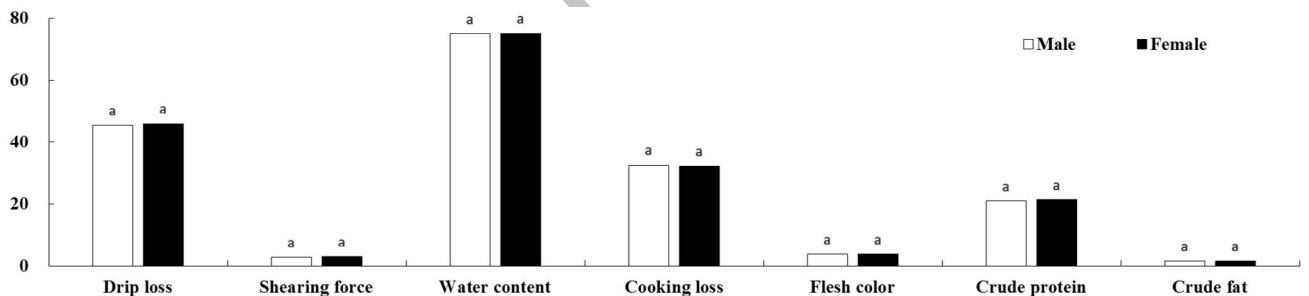


Fig. 2. Comparison of meat quality characters between different genders of small-tailed Han sheep.

Table I.- Correlation coefficient between meat quality traits.

Meat quality traits	Drip loss	Shearing force	Water content	Cooking loss	Flesh color	Crude protein	Crude fat
Drip loss	1	-0.041	-0.041	0.179*	-0.137	0.060	0.077
Shearing force	-0.041	1	0.019	-0.101	-0.176*	-0.065	0.029
Water content	-0.041	0.019	1	-0.103	-0.091	-0.234*	0.193
Cooking loss	0.179*	-0.101	-0.103	1	0.101	0.272*	-0.116
Flesh color	-0.137	-0.176*	-0.091	0.101	1	0.201	-0.425**
Crude protein	0.060	-0.065	-0.234*	0.272*	0.201	1	-0.216*
Crude fat	0.077	0.029	0.193	-0.116	-0.425**	-0.216*	1

Acknowledgements

Sincere gratitude goes to the sponsor of National Natural Science Foundation (31201777).

Statement of conflict of interest

The authors declare no conflict of interest.

References

- Abdelrahman, M.M., Alhidary, I.A., Suliman, G.M., Alyemni, A.H., Al-Saiad, M.Y., Alshamiry, F.A., Alobre, M.M. and Aljumaah, R.S., 2018. *Pakistan J. Zool.*, **50**: 2129-2134. <https://doi.org/10.17582/journal.pjz/2018.50.6.2129.2134>
- Bai, J.Y., Yang, Y.B., Wang, Y.Q., Zhang, X.H. and Pang, Y.Z., 2015. *Indian J. Anim. Res.*, **49**: 855-590.
- Bai, J.Y., Wang, X., Yang, Y.B., Zhang, X.H., Pang, Y.Z., Li, H.W., 2016. *R. Bras. Zootec.*, **45**: 604-607. <https://doi.org/10.1590/S1806-92902016001000004>
- Bai, J.Y., Jia, X.P., Yang, Y.B., Pang, Y.Z. and Wang, Y.Q., 2017. *Indian J. Anim. Res.*, **51**: 856-859.
- Bai, J.Y., Zhao, Y.G., Li, G.L., Yang, Y.B., Wang, Y.Q., Wang, X. and Yang, S., 2019. *Indian J. Anim. Res.*, **53**: 856-859.
- Bai, J.Y., Wu, R.T.D., Zhou, J.W., Zhang, W.B., Fan, H.D., Cao, H. and Fu, X.Y., 2020. *Indian J. Anim. Res.*, **54**: 138-142. <https://doi.org/10.18805/ijar.B-1132>
- Guo, Y. and Li, B., 2008. *Fd. Sci.*, **29**: 143-147. <https://doi.org/10.1057/palgrave.jphp.3200164>
- Liu, W.Z., 2007. *Experimental course of animal breeding*. China Agricultural University Press, Beijing, China.
- Ullah, H., Rahman, A., Khan, R.U., Ahmad, S., Tariq, A. and Naz, S., 2019. *Pakistan J. Zool.*, **51**: 1705-1710. <https://doi.org/10.17582/journal.pjz/2019.51.5.1705.1710>