

# TENDERNESS OF BICEPS FEMORALIS IN DZO

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**Abstract** –The tenderness of *Biceps femoralis* in dzos were measured by Warner–Bratzler Shear Force (WBSF) and sensory analysis. Results showed that the collagen content of meat from dzos was lower than that of yaks ( $P<0.05$ ), so did WBSF values ( $P<0.05$ ), confirming that meat from dzo had better tenderness. Compared with yaks, meat from dzos showed smaller fiber diameter ( $P<0.05$ ), which was positively correlated to WBSF. Tenderness score was in consistent WBSF, which showed meat from dzos rated higher than yaks ( $P<0.05$ ).

**Key Words** – Collagen Content, Meat Quality Characteristics, Sensory Analysis, Tenderness

## I. INTRODUCTION

Dzo is the crossbreed of a female yak and a yellow bull. Yaks (*Bos grunniens*), as the peculiar species in southern central Asia, live in the Qinghai-Tibetan Plateau above 3,000 m of altitude. Meat from yaks has been increasingly popular in China, for its natural pasture feeding system free of environment pollution. Besides, yak meat is also rich in protein (about 20%) and low in fat (about 2% ~ 3%), meeting consumers' demand for healthy diet. However, yak has a low carcass weight [1] and long feeding period (4 ~ 5 years), therefore its meat is relatively tough [2] (WBSF=108.61N). Previous studies reported that dzos had an advantage of the body size obtained [1], indicating that feeding period of dzos can be shortened by 1 ~ 2 years compared with yaks of the same size [3]. The improved meat quality expected has stimulated the breeding and raising of dzos. To our knowledge, however, the tenderness of dzos has not been reported. The objective of this study was to evaluate the tenderness of meat from dzos whose feeding period was shortened by one year compared with yak of the same size, in order to expand our knowledge for the development of dzo meat industry.

## II. MATERIALS AND METHODS

*Biceps femoralis* was obtained from five male dzos (3.5 years old) and five male yaks (4.5 years old) in Hongyuan County. The muscles were kept frozen at -20 °C until use.

*Meat quality characteristics.* The pH of the *Biceps femoralis* was measured at 48 h post mortem. Cooking loss was determined by immersing in water-bath at 80°C till central temperature up to 70°C. After measurement of cooking loss, WBSF analysis was performed [4]. Collagen content was determined according to the AOAC methods. Muscle fiber diameter was studied by paraffin embedding and HE staining, and the result was observed under OLYPUS BX53F microscope, and analyzed through Image-Pro Plus 6.0.

*Sensory analyses.* Sensory analyses were performed according to Cloete *et al* [5].

## III. RESULTS AND DISCUSSION

*Meat quality characteristics.* WBSF of dzos was significantly lower than that in yaks ( $P<0.05$ ). The pH values were lower in dzos than in yaks ( $P<0.05$ ). Collagen mainly contributes to the background hardness of meat, and the result showed that dzos had lower collagen content in comparison with yaks ( $P<0.05$ ). However, the cooking loss was not affected by breed ( $P>0.05$ ). Besides, meat from dzos showed smaller fiber diameter than that from yaks ( $P<0.05$ ). WBSF was positively correlated to muscle fiber diameter based on the correlation coefficients ( $R=0.885$ ,  $P<0.05$ ), suggesting that muscle fiber diameter be a contributor to meat texture. (Table 1)

Table 1 Meat quality characteristics of *Biceps femoralis* from dzos and yaks. (n=5)

Traits	Dzo	Yak
WBSF (kg)	6.07±0.17 <sup>a</sup>	8.80±0.30 <sup>b</sup>
pHu <sub>48</sub>	5.08±0.019 <sup>a</sup>	5.29±0.085 <sup>b</sup>
Cooking loss (%)	35.85±2.05	38.75±1.55
Collagen content (mg/g)	7.33±0.20 <sup>a</sup>	9.33±0.61 <sup>b</sup>
Muscle fiber diameter	25.91±1.04 <sup>a</sup>	32.63±1.47 <sup>b</sup>

<sup>abc</sup>Means in the same row within breeds different superscripts differ ( $P<0.05$ ).

*Sensory analysis.* The sensory scores were in accordance with WBSF, while tenderness was rated higher for meat from dzos ( $P<0.05$ ). No significant differences were found between dzo and yak in terms of aroma, initial juiciness, sustained juiciness, and flavor ( $P>0.05$ ). (Table 2)

Table 2 Mean values for sensory traits scores of *Biceps femoralis* from dzos and yaks (n=5)

Traits	Dzo	Yak
Aroma	5.76±0.20	5.76±0.20
Initial juiciness	4.72±0.27	5.52±0.55
Sustained juiciness	5.04±0.35	5.24±0.17
Tenderness	5.76±0.41 <sup>a</sup>	4.52±0.29 <sup>b</sup>
Flavor	5.36±0.07	5.24±0.12

<sup>abc</sup>Means in the same row within breeds different superscripts differ ( $P<0.05$ ).

#### IV. CONCLUSION

Combining instrumental measurement with sensory analysis, we found that meat from dzos had higher tenderness than that from yaks ( $P<0.05$ ). Chemical and histological results showed that collagen content was lower and muscle fiber also smaller in dzo meat ( $P<0.05$ ). The effect of breed on tenderness manifested that muscle diameter positively related to WBSF, thus the smaller muscle diameter in dzos made contribution to their higher tenderness.

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