PROXIMATE COMPOSITION, PH, WATER HOLDING CAPACITY, AND COOKING LOSS OF JEJUSAN-HORSE MUSCLES

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Abstract – The present work was conducted to determine the physicochemical characteristics of different muscles obtained from Jejusan crossbred horses (Jeju-horse× Thoroughbred). Five different muscles from each of carcass (n=15) were used. Fat content was lowest in the semimembranosus and highest in the biceps femoris. The pH value was lowest in the longissimus dorsi and highest in the supraspinatus muscles (P < 0.05). Regarding water holding capacity, the supraspinatus muscle had the lowest value while the longissimus dorsi presented the highest value (P < 0.05). The longissimus dorsi was the most tender (P < 0.05) muscle whereas no differences in shear values occurred among biceps femoris, semimembranosus, supraspinatus and infraspinatus muscles (P > 0.05). Our results clearly indicate that the physicochemical characteristics of horsemeat were significantly affected by muscle type.

Key Words – horse meat, different muscle, physicochemical traits

I. INTRODUCTION

The consumption of horse meat has been remarkably growing in recent years due to the rise in number of tourists to Jeju, the biggest horse meat production area in Korea. The number of horses slaughtered for meat purpose increased from 359 heads in 2004 to 1031 heads in 2014 [1]. However, little attention has been paid to the investigation of factors affecting the quality characteristics of Jejusan horsemeat (Jeju-horse × Thoroughbred crossbred). To the best of our knowledge; no scientific information regarding meat quality characteristics of this horse breed is available. Thus, the current work aimed to investigate the effect of muscle types on physicochemical quality of Jejusan-horse meat.

II. MATERIALS AND METHODS

A total of 15 Jejusan-horse were used in the present investigation. The animals were in an experimental abattoir of National Institute of Animal Science, republic of Korea. The *M. infraspinatus, M. supraspinatus, M. semimembranosus, M. biceps femoris and longi-ssimus dorsi* were removed from right side of each carcass. The proximate composition was measured using a Foodscan (Food ScanTMLab 78810, Foss Tecator Co., LTD., DK) according to AOAC method [2]. The pH value was measured with a pH meter (Model 340, Mettler-Toledo GmbH, Schwerzenbach, Switzerland). The water-holding capacity was calculated as percentage of water loss after centrifuging. The cooking loss was measured by sample weighing before and after cooking. The results were analyzed using a SAS program (SAS, 1998). Analysis of variance and Duncan's multiple range test were performed to classify significance ($P < 0.05$).

III. RESULTS AND DISCUSSION

The *infraspinatus* and *supraspinatus* presented lower fat content than the *semimembranosus* and *longissimus dorsi*. The *semimembranosus* muscle presented the lowest fat content whereas, the *biceps femoris* showed the highest fat content. The *supraspinatus* and *infraspinatus* muscles presented the lowest pH values whereas, the *longissimus dorsi* showed the highest pH value. The *infraspinatus* and *supraspinatus* muscles had lower water holding capacity than the *semimembranosus* and *longissimus dorsi* muscles. The *infraspinatus* muscle had significantly lower cooking loss than other remaining muscles.

Table 1. Proximate compositions (%) of horse muscles

Muscles[1]	Moisture	Protein	Fat	Collagen (%)
IF	73.86±0.23[a]	19.41±0.13[c]	2.36±0.16[bc]	1.67±0.05[a]
SP	73.82±0.22[a]	19.32±0.12[c]	2.59±0.21[ab]	1.65±0.04[a]
BF	70.66±0.33[c]	20.40±0.10[b]	3.12±0.42[a]	1.66±0.04[a]
SM	71.94±0.21[b]	21.24±0.07[a]	1.70±0.21[c]	1.60±0.04[a]
LD	71.94±0.21[b]	21.46±0.09[a]	2.09±0.19[bc]	1.46±0.03[b]

Mean ± SD.
[a-c]Means in the same column with different letters are significantly differ (P < 0.05).
[1]IF = *M. Infraspinatus*; SP = *M. Supraspinatus*; BF = *M. Biceps femoris*; SM = *M. Semimembranosus*; LD = *M. Longissimus dorsi*

Table 2. pH, water holding capacity and cooking loss of horse muscles

pH	Water holding pacity(%)	Cooking Loss (%)
5.91±0.04[a]	50.47±0.61[c]	25.31±0.72[b]
5.92±0.04[a]	49.09±0.48[c]	27.65±0.99[ab]
5.54±0.04[b]	53.63±0.95[b]	28.82±0.85[a]
5.48±0.03[b]	56.06±0.61[a]	29.55±0.41[a]
5.47±0.03[b]	56.80±0.69[a]	27.34±1.00[ab]

Mean ± SD.
[a-c]Means in the same column with different letters are significantly differ (P < 0.05).
[1]IF = *M. Infraspinatus*; SP = *M. Supraspinatus*; BF = *M. Biceps femoris*; SM = *M. Semimembranosus*; LD = *M. Longissimus dorsi*

IV. CONCLUSION

The physicochemical characteristics of horsemeat were largely affected by the muscle type. The findings of the present study provide the useful information which can improve the production and consumption of this meat type.

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