Effects of the Supplementation of Brewers' Grain Silage or Wheat Bran with and without Urea on Meat Quantity and Quality in Mongolian Grazing Lambs

Gantumur Chuluunbat
Mongolian University of Life Sciences, Mongolia

Seishi Yamasaki
Japan International Research Center for Agricultural Sciences, Japan

Bayaraa Baasanjalbuu
Mongolian University of Life Sciences, Mongolia

Puruv Tsedevdorj
Mongolian University of Life Sciences, Mongolia

The 23rd International Grassland Congress (Sustainable use of Grassland Resources for Forage Production, Biodiversity and Environmental Protection) took place in New Delhi, India from November 20 through November 24, 2015.

Proceedings Editors: M. M. Roy, D. R. Malaviya, V. K. Yadav, Tejveer Singh, R. P. Sah, D. Vijay, and A. Radhakrishna

Published by Range Management Society of India

Paper ID: 1489
Theme 2. Grassland production and utilization
Sub-theme 2.1. Quality, production, conservation and utilisation

Effects of the supplementation of brewers' grain silage or wheat bran with and without urea on meat quantity and quality in Mongolian grazing lambs

Gantumur Chuluunbat[1], Yamasaki Seishi[2], Bayaraa Baasanjalbuu[1], Puruv Tsedevdorj[1]
[1]Mongolian University of Life Sciences, Ulaanbaatar, Mongolia
[2]Japan International Research Center for Agricultural Sciences, Tsukuba, Japan
Corresponding author e-mail: sshymsk@jircas.affrc.go.jp

Keywords: Carrying capacity, Market economy, Nitrogen source, Pasture degradation, Risk management

Introduction

Natural open pastures occupy approximately 80% of the land in Mongolia and have traditionally supported the pastoral livestock production system. After the collapse of socialism and the introduction of a market economy more than two decades ago, the total number of animals, including sheep, goats, cattle, horses, camels, as well as grazing pressure on pastures has increased (National Statistical Office of Mongolia, 2014). Despite this, the number sharply decreased twice during the cold seasons of 2000/2001 and 2010/2011 by a dzud. The dzud is the Mongolian name for an abnormal winter weather condition in northeast Asia, characterized by snowy and cold winters so harsh that livestock are unable to graze through the snow cover, causing starvation and eventually death. The economy of the herder households was strongly affected by these weather events. The reasons for the overall increasing number of animals could be that herders do not want to sell their animals, the need to maintain breeding stock numbers, and the herders have limited access to markets. It is said that there are strong demands for meat in China and western Asian countries. However, actually, animal products occupy only 0.6% of the sum of exports, and most of these are wool, skin, and leather. Meat exports were only 3,000 tons in 2013. Besides sanitation problems such as foot-and-mouth disease, high transportation costs, and meat quality may contribute to low meat export. In addition, early fattening for domestic consumption itself has effects to reduce the grazing pressure on the pastures. It is, therefore, important that a diversified risk management and grassland conservation system together with an increase in herder income are established. We conducted a supplemental feeding experiment during the cold season using brewer grain (BG) silage, wheat bran, and urea and determined the effects on meat quantity and quality.

Materials and Methods

Feeds supplementation with BG silage, wheat bran, and urea was performed. The production of BG has increased every year, but its usage in the country is restricted during the summer because of its high moisture content or the risk of decay and high cost of transportation. To store and conserve its nutritional value, silage was prepared in early September 2014 by mixing BG and wheat bran in a 90% to 10% proportion which was recommended proportion from the aspect of the fermentation quality and the cost (Yamasaki *et al*., 2014). Wheat bran is the most commonly used feed in the country. Urea is presently imported from a neighboring country and available for sale in markets. Eight- to 9-month-old castrated sheep (n = 36) with a body weight (BW) of 30.0 ± 2.0 kg at the start of the experiment on December 03, 2014 were selected from the herder's and neighboring households in the Argalant rural district (sum), Tuv prefecture (aimag), where the vegetation type is classified as steppe. The animals were divided into seven groups. Six control (C) sheep were not fed supplemental feeds, and five sheep in each treatment group were fed different types of feed. The animals in the treatment groups were daily fed the supplemental feeds based on the sheep BW and weight of the feeds on a dry matter (DM) basis as follows: 1) 1.5% BW silage (S1), 2) 3.0% BW (S2), 3) 1.5% BW mixed with urea to be the same nitrogen (N) intake as S2 (S1U), 4) 0.7% BW wheat bran (W1), 5) 1.4% BW wheat bran (W2), and 6) 0.7% BW wheat bran mixed with urea to be same N intake as W2 (S1U). Each animal was individually fed the feed supplement in addition to grazing. The daily amount of feed for individual animals was weighed precisely, put in plastic bags, and stored until feeding, and the feed refused was collected from each animal. The feeding was completed over 155 days before the end date of the experiment in May 2015. A total of 28 animals free of serious disease and of average BW, with four animals in each group, were selected for slaughter using the Mongolian standard method after a day of starvation and carcass study. The data was analyzed by the general linear model of analysis of variance (ANOVA) using statistical software MINITAB ver. 16.

Results and Discussion

The BW immediately prior to starvation was significantly higher in the S2 group than in the other groups ($p < 0.05$) as shown in Fig. 1. Though there were no significant differences ($p > 0.05$) besides the S2 group, the BW in the S1, W1 and W2 groups seemed to be higher, and that in the C group tended to be the lowest of the six groups. The carcass weights were also significantly higher in the S2 group than in the other groups ($p < 0.05$). The same tendencies to that of BW were found in the weight of the other groups. Although there were no significant differences among the groups on the drips at 24, 48, 72, and 96 h ($p > 0.05$), there were tendencies that the amount was smallest in the S2 group; intermediate in the S1, S1U, W1, and W1U groups; and largest in the C and W2 groups. Fig. 2 shows the cooking loss of the loin meat by each group. No significant differences were found in these results ($p > 0.05$). However, the amount of drip tended to be smallest in the S2 group; intermediate in the S1, S1U, W1, and W2 groups; and largest in the C and W1U groups. Therefore, S2 is the most recommended supplemental feed during cold seasons because of the effects on meat quantity and quality relative to supplementation with wheat bran and urea.

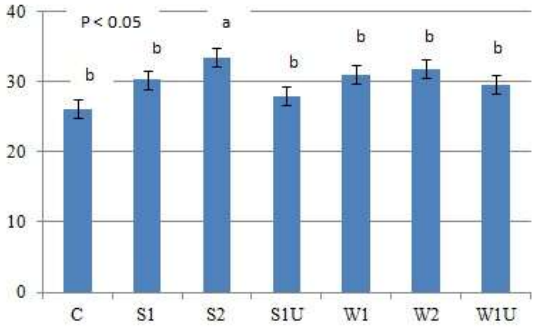

Fig. 1. Body weight of the experimental sheep before starvation and slaughtering, kg (error bar: standard error of the mean, SEM)

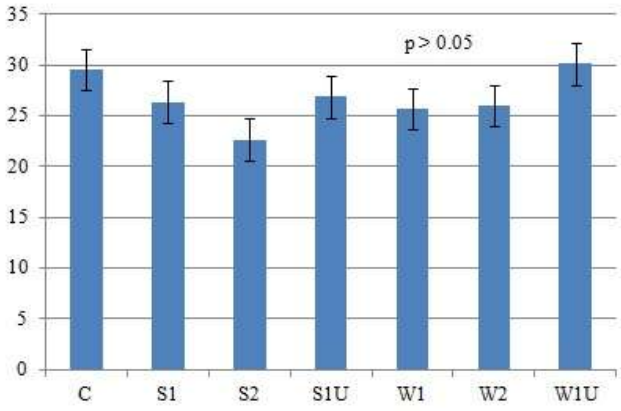

Fig. 2. Cooking loss of the loin meat of the experimental sheep, % on a fresh matter basis (error bar: SEM)

Conclusion

The S_2 is the most recommended supplemental feed during cold seasons because of the effects on meat quantity and quality relative to supplementation with wheat bran and urea.

References

National Statistical Office of Mongolia. 2014. *Statistical Yearbook* - 2013. Ulaanbaatar.

Yamasaki, S., B. Baasanjalbuu, S. O. Zolzaya, K. Yasuo and N. Kazuhisa. 2014. Difference of a process of fermentation by the different period and mixing ratios of brewer's grain and wheat bran or whet residue. In: *Proceedings of the Eleventh International Dryland Development Conference* (March 18-21, 2013). Beijing.

Acknowledgement

The study was conducted under the cooperated research project between Japan International Research Center for Agricultural Sciences and MULS entitled "Development of resilient agro-pastoral systems against the risks of extreme weather events in arid grasslands in Northeast Asia".