



University of Kentucky
UKnowledge

International Grassland Congress Proceedings

21st International Grassland Congress / 8th
International Rangeland Congress

Methane Emissions from Inner Mongolian Cashmere Goats at Different Dietary Nutrient Levels

Xuefeng Guo

Inner Mongolia Agriculture University, China

Huawei Li

Inner Mongolia Agriculture University, China

Hai Jin

Inner Mongolia Academy of Animal Science, China

Dexun Lu

Inner Mongolian Academy of Animal Sciences, China

Osamu Enishi

National Institute of Livestock and Grassland Science, Japan

See next page for additional authors

Follow this and additional works at: <https://uknowledge.uky.edu/igc>



Part of the [Plant Sciences Commons](#), and the [Soil Science Commons](#)

This document is available at <https://uknowledge.uky.edu/igc/21/3-2/17>

The 21st International Grassland Congress / 8th International Rangeland Congress took place in Hohhot, China from June 29 through July 5, 2008.

Proceedings edited by Organizing Committee of 2008 IGC/IRC Conference

Published by Guangdong People's Publishing House

This Event is brought to you for free and open access by the Plant and Soil Sciences at UKnowledge. It has been accepted for inclusion in International Grassland Congress Proceedings by an authorized administrator of UKnowledge. For more information, please contact UKnowledge@lsv.uky.edu.

Presenter Information

Xuefeng Guo, Huawei Li, Hai Jin, Dexun Lu, Osamu Enishi, and Mitsunori Kurihara

Methane emissions from Inner Mongolian Cashmere goats at different dietary nutrient levels

Guo Xuefeng¹, Li Huawei¹, Jin Hai², Lu Dexun², Osamu Enishi³, Mitsunori Kurihara³

¹College of Animal Science and Animal Medicine, Inner Mongolia Agriculture University, Huhhot 010018, P.R. China E-mail: guoxuefeng807@163.com. ²Inner Mongolia Academy of Animal Science, Huhhot 010030, P.R. China. ³National Institute of Livestock and Grassland Science, Tsukuba, Ibaraki 305-0901, Japan

Key words maintenance level, Ad libitum, Inner Mongolian Cashmere goat, Methane, SF₆ tracer technique(SF₆)

Introduction Inner Mongolian is a dominating breeding base of Cashmere goats in China. According to the statistics yearbook, the population of total Cashmere goats was 28.087 million and 38% of the goats are in Inner Mongolia(2005), which exist on desert grassland with poor biogeocoenosis, where the Ash, crude fiber and lignin contents of pastures is higher than that of other grassland, so the special breed of Cashmere goat was acclimated. Inner Mongolian Cashmere was named the best inartificial fiber and economic value is considerable. So the numbers of Cashmere goats were increasing year by year, but the methane emission of Cashmere goats was still evaluated by models in China and the data of in vivo had not been reported by now. So the objective of this study was to measure methane emission of Cashmere goats on maintenance level and at ad libitum intake using SF₆ tracer gas technique, in order to obtain methane emission exactly to provided datum for programming methane emission list and feasible Mitigation Strategies.

Materials and method 8 Cashmere goats were 1.5 years old and weighed 30±1 kg(mean SEM). The experiment was designed as a randomized complete block with two treatments, i.e. on maintenance level and at ad libitum intake, with four goats in each block individually. The experiment consisted of a 21-d pre-experiment stage and a 15-d experiment stage; The diets consisted of 20% Alfalfa +80% Chinese Leymus and Licking brick (containing minerals, and vitamins), the residual pastures of ad libitum should be more than 15% of total dry matter intake. The diet was offered twice daily at 5:30 am and 5:30 pm respectively and free to water. Quantities of feed offered and refusals were recorded daily for each animal and Samples of diets and refusals were retained weekly for determination of DM content. Methane emission was measured by SF₆ trace technique according to Kristen Johnson (1994). The concentration of methane was determined by Gas Chromatography(GC-9A), Det(FID), 200°C; Inj, 120°C; Col, 65°C; Standard, 20.36 ppm; the sample (0.02ml) was injected onto the GC column via a dead volume gas Micro liter Syringe. The concentration of SF₆ was determined by Gas Chromatography(GC-2014), Det(ECD), 300°C; Inj, 100°C; Col, 60°C; Standard, 97.00ppt; the sample (1ml) was injected onto the GC column via a dead volume gas Micro liter Syringe.

Results Methane emission of Cashmere goats at different dietary nutrient levels showed in table 1, Daily CH₄ emissions per animal was fed Alfalfa /Chinese Leymus pastures were greater at ad libitum intake than on maintenance level (P<0.05), but methane emission expressed every kilogram DMI is not significant different (P>0.05) and MCR is higher on maintenance level than at ad libitum intake(P<0.05).

Table 1 Methane emission of Cashmere goats at different dietary nutrient levels.

Item	Maintenance level	Ad libitum	Significant
DMI, kg/d	0.581±0.107	0.839±0.088	P<0.05
g/(goat·d)	10.43±1.67	15.07±2.62	P<0.05
g/kg of DMI	18.06±1.44	17.71±1.48	NS
MCR, %	8.98±0.42	6.28±0.17	P<0.05

Conclusions Methane emission of Cashmere goats increased with increasing of DMI; when Cashmere goats were fed Alfalfa / Chinese Leymus pastures, the methane emission was 10.43g/d (maintenance level) and 15.07g/d (ad libitum), which were indexes of methane emission list for Cashmere goat in China.

Reference

Johnson, K.A., Huyler, M.T., Westberg, H.H., et al. (1994). Measurement of methane emission from ruminant livestock using SF₆ tracer technique. *Environment Sci. & Technol* 28:359.