Effects of dietary betaine supplementation subjected to heat stress on milk performances and physiology indices in dairy cow

L. Zhang¹, S.J. Ying¹, W.J. An¹, H. Lian¹, G.B. Zhou¹ and Z.Y. Han¹

¹Institute of Dairy Science, College of Animal Science and Technology, Nanjing Agricultural University, Nanjing, China
²Institute of Animal Science, Jiangsu Academy of Agricultural Sciences, Jiangsu, China

Corresponding author: Z.Y. Han
E-mail: zyhan6708@njau.edu.cn

Received May 28, 2013
Accepted July 27, 2014
Published September 12, 2014
DOI http://dx.doi.org/10.4238/2014.September.12.25

ABSTRACT. This study aimed to determine whether feeding betaine to cows elevates their production performance during summer heat stress. Thirty-two lactating Holstein cows were randomly divided into 4 groups: the control group, which received a total mixed ration (TMR), and 3 experimental groups that received TMR blended with 10 g/day (group I), 15 g/day (group II), and 20 g/day (group III) betaine for 8 weeks. Milk and blood were sampled throughout the experimental period. The average maximum and minimum air temperatures were 28.3 and 24.1°C, respectively. The average temperature-humidity index was 78.6 units. The results showed that feeding betaine to cows increased feed intake, milk yield, milk lactose, milk protein, plasma cortisol, glutathione peroxidase, superoxide dismutase, and malondialdehyde levels (P < 0.05); however, it caused HSP70 levels to decrease (P < 0.05). The milk performance of group II was significantly affected. These results indicate that supplementing betaine to the diet of dairy cows increases...
their milk performance and improves their antioxidant capacity; these processes help relieve the cow from heat stress. In conclusion, supplementing dairy cows with 15 g/day betaine generated the most positive influence on performance and productivity, and hence caused the greatest reduction in heat stress.

**Key words:** Dairy cow; Heat stress; Betaine