

Effect of Zn and Cu and Mn supplementation on milk composition and blood traits of Holstein cows ⁽¹⁾

Chun-Ta Chang ⁽²⁾ Tzong-Faa Shiao ⁽²⁾ Ling-Tsai Wu ⁽³⁾⁽⁷⁾ Yi-Hsuan Chen ⁽⁴⁾
Churng-Faung Lee ⁽⁵⁾ and Yih-Fwu Lin ⁽⁶⁾

Received: Mar. 4, 2019; Accepted: May 21, 2019

Abstract

The purpose of this study was to evaluate the effects of dietary supplementation of Zn, Cu and Mn on milk composition and blood traits of Holstein lactating cows. A total of 24 Holstein lactating cows were randomly divided into two groups according to their body weight, milk yield, parity and days in milk. Cows received diets adding 0 (control) or 360 mg organic zinc, 125 mg organic copper and 200 mg organic manganese (head/day). The raw milk and blood were analyzed and collected every 30 days and the trial was carried out for 120 days. The results showed that dietary supplementation of organic zinc, copper and manganese for 30 days had a tendency to increase milk lactose percentage and total solids percentage. After 60 days of supplementation, there was a tendency of increase in milk fat percentage, total solids rate, and milk urea nitrogen rate. The milk composition at 90 days and 120 days after feeding were not affected by treatment. The dietary supplementation of organic zinc, copper and manganese reduced in a tendency of decrease in blood alanine aminotransferase and lactate dehydrogenase 30 days after feeding, and also significantly increased cholesterol content. However, 60 days after feeding, there was a decrease in alanine aminotransferase, creatine kinase, lactate dehydrogenase, and an increase in superoxide dismutase contents. Supplementation of organic zinc, copper and manganese for 90 days and 120 days after feeding significantly increased blood cholesterol levels, but there was no significant difference in other blood traits. In conclusion, it was known that supplementation of organic zinc, copper and manganese in diet could have no significant effect on the milk component, but it could improve alanine aminotransferase, lactate dehydrogenase, creatine kinase and superoxide dismutase contents in antioxidant function.

Key words: Blood trait, Holstein lactating cows, Organic copper, Organic manganese, Organic Zinc, Temperature-humidity index.

(1) Contribution No. 2611 from Livestock Research Institute, Council of Agriculture, Executive Yuan.

(2) Animal Industry Division, COA-LRI, Tainan 71246, Taiwan, R. O. C.

(3) Animal Products Processing Division, COA-LRI, Tainan 71246, Taiwan, R. O. C.

(4) Hsinchu Branch, COA-LRI, Miaoli 36841, Taiwan, R. O. C.

(5) Deputy Director Office, COA-LRI, Tainan 71246, Taiwan, R. O. C.

(6) Nutrition Division, COA-LRI, Tainan 71246, Taiwan, R. O. C.

(7) Corresponding author, E-mail: wlt@mail.tlri.gov.tw.