

Influences of several factors on mineral contents analyzed using PIXE in hair of healthy dairy cattle

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Abstract

The experiment was carried out to investigate the physiological variation in minerals contents in hair of dairy cows, and to demonstrate the factors which influence on the variations. From totally forty-eight Holstein lactating cows, hair samples were collected in May 2002 (12 cows), November 2002 (16 cows) and September 2003 (20 cows). They were received sufficient nutrition and were healthy clinically. Hair samples were analyzed by standard-free, direct method of PIXE. The influences of such factors were examined statistically as season, parity, days after calving, body weight (BW), body condition score (BCS) and fat corrected milk (FCM) yield. The elements detected from most of samples were S, K, Ca, Na and Mg as essential macro-minerals, and Zn, Br, Fe and Cu as essential trace elements. Hair mineral levels were not always within those reported previously on grazing beef cattle, probably due to differences of general feeding management and amount of feed intake. On hair K and Fe contents, any factors did not influence significantly. Except for these two elements, hair contents were lower in September compared with those in May and November. Additionally, Ca and Zn contents decreased ($p<0.05$) with increase in FCM yield, Na contents decreased ($p<0.05$) with increase in BW, and Mg contents decreased ($p<0.05$) with parity and increased with increment of BCS. These results suggest that PIXE analysis for hair of cows can provide useful information for improvement of feeding management in dairy farm.