

# Physiological variation in hair levels of elements analyzed by PIXE in dairy cattle

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## Abstract

The experiment was carried out to investigate the physiological variation in hair levels of elements analyzed using PIXE in dairy cows. Twelve lactating cows and four dry, pregnant cows were used. They were received sufficient nutrition and were healthy clinically. Hair samples were collected from back and were analyzed by standard-free, direct method of PIXE analysis. Sixteen elements were detected for all samples; K , Ca , Mn , Fe , Cu , Zn , Se , Pb , Sr , Rb , Na , Mg , Al , P , S and Cl. Hair contents of S and Ca were stable while those of several elements were varied remarkably. For 12 lactating cows, the effects of calving number, days after calving, milk production levels and body weights on hair contents of every elements were tested and hair contents of Cu and Sr were varied by these factors significantly ( $p < 0.01$ ). Comparing the hair levels before and after calving, several elements seemed to be changed after calving, although no significant differences were observed. Changes in hair contents of elements with hair 'gloss' were also investigated for all cows. The contents of Se was significantly ( $p < 0.05$ ) higher in hair with sufficient gloss compared with hair with less gloss. From these facts, hair levels of several elements detected by PIXE might be varied physiologically, although the extent of the variation was less compared with variation with nutritional treatments.