

Proceedings

Faculty of Agriculture Undergraduate Research Symposium

FAuRS - 2018



Faculty of Agriculture
University of Peradeniya
Sri Lanka
21st February 2019

Accumulation of Heavy Metals in Bovine Milk and Blood in Human CKDu Identified Areas in Sri Lanka

Randika W.A.T., Deshapriya R.M.C.* and Liyanage R.¹

Department of Animal Science,
Faculty of Agriculture, University of Peradeniya, Peradeniya

The objective of this study was to determine the concentration of five heavy metals (Cd, Pb, As, Ni and Cr) and five trace elements (Zn, Mn, Cu, Co, and Fe) in lactating cows reared in human CKDu prevalent areas of the country. The samples were collected from cows from farmer families where at least one person was diagnosed and/or undergoing treatment for CKDu. The milk (n=20) and blood (n=20) samples from same cows were collected from Thambuththegama veterinary range. As a control, a total of 16 samples (Milk, n=8 and Blood, n=8) were collected from Kandy area where CKDu has not identified. Samples were analyzed through Inductively Coupled Plasma Optical Emission Spectrophotometry (ICP-OES). The mean heavy metal concentrations ($\mu\text{g/mL}$) in blood serum and milk in Thambuththegama were [As] 0.03728 ± 0.0052 and 0.0266 ± 0.0065 , [Cd] 0.0079 ± 0.0010 and 0.0440 ± 0.0130 , [Pb] 0.0391 ± 0.0027 and 0.1770 ± 0.0262 . In Kandy area, it was [As] 0.0283 ± 0.0041 and 0.0079 ± 0.0052 , [Cd] 0.0033 ± 0.0002 and 0.00470 ± 0.0004 and [Pb] 0.0248 ± 0.0010 and 0.0385 ± 0.0027 . The heavy metal concentration in cattle milk were significantly ($P < 0.05$) different in two locations. The As, Cd, and Pb concentration were two, eight, and four times higher in milk from Thambuththegama than that of Kandy. The As and Cd concentrations in cattle blood collected from Thambuththegama, were not significantly ($P > 0.05$) different from Kandy. The Pb concentration in blood from Thambuththegama was 57.3% higher than that of Kandy. Furthermore, milk had four times Pb and five times Cd more than that of blood. Ten, eighty-nine and ninety-six percent cows showed higher concentration of As, Cd, and Pb metals in milk than blood respectively. This investigation revealed that there is higher tendency of accumulation of heavy metals in bovine blood and milk in human CKDu identified areas.

Keywords: Bovine milk, Blood, Heavy metals, CKDu, ICP-OES

¹Division of Nutritional Biochemistry, National Institute of Fundamental Studies, Hanthana Road, Kandy

* desha1018@yahoo.com