Minerals Bio-availability in Soil, Water, Forage and Dairy Cattle at High Altitude

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Abstract

In nature, a complex relationship between soil, water, plant and animal has been found due to specific characteristics of the plants and interaction between different minerals. In India where dietary concentrations of fodder fed to the animals are unknown or highly variable due to availability, season, location, forage, species and animal potentials, it is important to determine mineral concentrations in animals region-wise, to estimate needs of livestock so as to obtain optimum productivity and to assess the effect of mineral deficiencies on dairy cattle physiology. Limited information is available on the feeding practices and mineral status of soil, water, forage, and animal's blood in this high altitude region. Keeping this in view, the present study was conducted in Leh valley; situated at the 3327-3575 meter altitude above mean sea level, to establish the relationship for different minerals among soil, water, forage and dairy cattle in order to suggest dietary supplementation of area specific mineral mixture. Total 105 (soil), 210 (hand pump water, irrigation water, river water), 315 (forage- *Spinacia oleracea*, *Triticum aestivum*, *Brassica oleracea var. capitata*) and 70 (blood sample of lactating cattle) were collected from seven different sites in the Leh valley. All the minerals (Fe, Mg, Mn, Zn, Cu, Co and B) were estimated in the digested water samples by Inductively Coupled Plasma Optical Emission Spectroscopy (ICP-OES). The result showed that the levels of studied essential minerals are available in sufficient amount in the various soil ecosystems and the mineral elements were below the optimum level, under the maximum permissible limit in water sources. In the case of plants and in cattle body, most of the minerals showed the lower level. On the basis of present findings, it was concluded that availability and the dynamics of mineral elements in plants and dairy cattle from less to higher concentration in plants, and animals over the studied region. Therefore, further studies should elucidate the bioavailability and strategic dietary supplementation of minerals for livestock.

Keywords: Cattle, Forage, High Altitude, Mineral, Soil, Water.

**Biography:**

Presently, Arup Giri is pursuing as a PhD research scholar since 2012 at Defence Institute of High Altitude Research (DIHAR), Defence Research and Development Organization (DRDO), Jammu & Kashmir; a high altitude region located in the Trans-Himalayan range of India (3327-3575 meter altitude above mean sea level). He has the expertise on several instrument like HACH Spectrophotometer for Water Analysis, Haematology Auto-Analyzer, Biochemistry Auto-Analyzer, Serum Semi-Auto-Analyzer, Urine Analyzer, Ion-Analyzer, UV-Visible Spectrophotometer, Multimode ELISA Plate Reader, Gradient Thermal Cycler (PCR), Gel Electrophoresis, Inductively Coupled Plasma Optical Emission of Spectroscopy (ICP-OES), Real Time PCR, Flow Cytometry, Ion Chromatography, High Performance Liquid Chromatography (HPLC) etc. He is working on certain DRDO project related to improvement in animal health and productivity under high-altitude stress condition. His current research work is now going on the studies on some heavy metals and trace minerals in drinking water of different sources and animal blood at high altitude and development of remedial measures to ameliorate their effects on animal health. Now, he has been developed on technique to ameliorate the excess level of fluoride from drinking water at high altitude region.

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