

The importance of mineral elements for humans, domestic animals and plants - A review

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Abstract

Minerals are inorganic nutrients, usually required in small amounts from less than 1 to 2500 mg per day, depending on the mineral. As with vitamins and other essential food nutrients, mineral requirements vary with animal species. For example, humans and other vertebrates need large amounts of calcium for construction and maintenance of bone and normal function of nerves and muscles. Phosphorus is an important constituent of adenosine triphosphate (ATP) and nucleic acid and is also essential for acid-base balance, bone and tooth formation. Red blood cells can not function properly without iron in haemoglobin, the oxygen-carrying pigment of red blood cells. Iron is also an important component of the cytochromes that function in cellular respiration. Magnesium, copper, selenium, zinc, iron, manganese and molybdenum are important co-factors found in the structure of certain enzymes and are indispensable in numerous biochemical pathways. Vertebrates need iodine to make thyroid hormones. Sodium, potassium and chlorine are important in the maintenance of osmotic balance between cells and the interstitial fluid. Magnesium is an important component of chlorophyll in plants. The interactions between nutrition and diseases, nutrition and drug metabolism have been reported. Excessive intake of some minerals can upset homeostatic balance and cause toxic side effects. For example, excess sodium intake is associated with high blood pressure and excess iron can cause liver damage. Also, severe shortages or self-prescribed minerals can alter the delicate balance in body functions that promotes health. The knowledge of the biochemistry of the mineral elements is also essential because individuals suffering from a chronic illness or taking medications that affect the body's use of specific nutrients need to be enlightened. The aim of this paper is to review the biochemical functions and the importance of the mineral elements in health and disease conditions of humans, animals and plants as this will assist in the prevention of nutrition-related diseases and maintenance of good health for humans and animals that depend on plants for food. This paper could also serve as a ready source of literature review for researchers involved in nutritional sciences.