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MAGNESIUM: AN IMPORTANT ELEMENT OF NATURE

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ABSTRACT

Magnesium is an important element, abundantly found in nature and has important characteristics and properties. It is the most important ingredient of Chlorophyll in plants. It is involved in the activation and synthesis of Vitamin D which helps in regulation of calcium and phosphate. The enzymes involved in metabolism within the body require Mg^{2+} as a cofactor, thus enables in absorption of nutrients. Magnesium is having the significant importance in war, different industries such as automobile, developing sports equipments and lot many aspects. The present review is about the general properties of Magnesium element which is essentially important in life system of the living beings.

KEYWORDS: Magnesium, significant importance, Vitamin D, nutrients absorption, cofactor of enzymes.

INTRODUCTION

General attributes about Magnesium (Mg): The present review is about the importance and use of Magnesium in different applications. Magnesium (Mg) has an atomic number of 12 and an atomic mass of 24.31 amu. It is found primarily in minerals such as dolomite and magnetite, both of which are carbonates and carnallite, a chloride. It is an important component in the health of living organisms. It plays a critical role in chlorophyll synthesis. The chlorophyll is a green pigment in plants that captures energy from sunlight and for this reason it is also used in fertilizers. In human body, Magnesium ions (charged atoms) aids in the digestive process and many people take mineral supplements containing magnesium, sometimes in combination with calcium. It is also used as a laxative. Milk of magnesia is a laxative with far less unpleasant taste. Deficiency of magnesium is implicated in various reproductive events like pregnancy induced hypertension & low birth weight etc. Magnesium deficiency in patients also causes heart failure. At the cell membrane level, magnesium is

known to altering both receptor sites and ion movements across the membrane (Reddy and Edwards, 2017; Nellis *et al*., 2016; Haq *et al*., 2016; Caspi *et al*., 2012; Swaminathan, 2003). It is an essential cation which is critical in protein synthesis, in harmonic secretion neuromuscular excitability and in intermediary – metabolism. It is involved in more than 300 enzymatic metabolic reactions in the body, participating in the metabolism of glucose, lipids, proteins and nucleic acids. Alcohol is known to be more notorious cause of magnesium (Mg) wasting. It affects on intercellular free Mg^{2+} which in turn after cellular and subcellular bioenergetics and promote calcium ion (Ca^{2+}) overload (Noronha and Mtuschak, 2002; Houillier, 2014). Increase in Ca^{2+} and reduction in Mg^{2+}content results in macro vascular and micro vascular complications. Magnesium is found in wide variety of food, but particularly in those close to their neutral, unrefined state. Important sources of magnesium in this population included whole grain bread, milk, breakfast-cereal, bananas and orange juice. Because of the height incidence of sudden death in patient with severe congestive heart failure well designed investigations to determine the importance of magnesium are needed.

Role of Magnesium in war: It is hallmark of magnesium's chemical versatility that the same element, so important in preserving life, has also been widely used in warfare. Just before world war first, Germany was a leading manufacturer of magnesium, when the united state went to war against Germany, American companies began producing magnesium in large quantities. It is such that, magnesium burns with a brilliant white flame, and in the war magnesium was used in flares, tracer bullets, and incendiary bombs, which ignite and burn upon impact. The bright light produced by magnesium has also lead to number of peacetime application for instance in fireworks and for flashes used in photography. Magnesium's principle used in world war first was for its incendiary qualities, but in Second World War, it was primarily used as a structural metal. It has light weight, but stronger per unit of mass than other common structural metal. As a metal for building machines and other equipment magnesium ranks in popularity only behind iron and aluminum (which is about 50% more dense than magnesium).

Role of Magnesium in automobile industry: The automobile industry is one area of manufacturing particularly interested in magnesium's structural qualities. Magnesium is easily cast into complex structures, which could mean a reduction in the number of parts needed for building a car.

Role of Magnesium in developing sports equipments: Among the types of sports equipment employing magnesium alloys are baseball catchers, masks, SK is racecars and even horseshoes. Various brands of ladders, Portable tools, electronic equipment, binoculars, cameras, furniture and luggage also use parts made of this light weight durable metal.

Role of Magnesium in health: The storage of nutrients in the body is dependent on the absorption of nutrients and the renal loss. Around, 30% to 70% of dietary magnesium is readily absorbed by the healthy intestine and the absorption of nutrients is dependent on the negative Mg balance within the body (Chamnongpol and Groisman, 2002).

Role of Magnesium in Vitamin D synthesis: Vitamin D is a lipid-soluble vitamin with a steroidal structure that exerts numerous essential cellular and molecular functions. Other than bone mineralization, vitamin D is also involved in cellular differentiation and regeneration of various organs; it is claimed to influence glucose homeostasis and actively contribute to maintaining the physiologic functions of the musculoskeletal system (Weglicki *et al*., 2010; Kramer *et al*., 2003; deRouffignac *et al*., 1994; Quamme and deRouffignac, 2004). Adequate intake of vitamin D has shown to diminish the risk of some of the skeletal as well as nonskeletal disorders. Vitamin D is mostly synthesized from 7-dehydrocholesterol upon skin exposure to sunlight (>80%) and may also be obtained from dietary sources or supplements as either vitamin D2 or D3. Research has claimed that its dysregulation can lead to the development of numerous diseases, affecting the cardiovascular system, musculoskeletal system, and nervous system (Touyz, 2004; Seo and Park, 2008; Elin, 2010; Welsh, 2017).

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