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**Assignment**

**Question**

Outline the Toxicity values and Deficiency Manifestation of the following Minerals:

1. Potassium
2. Calcium
3. Magnesium
4. Chloride
5. Iron

**Answer**

Toxicity is the degree to which a chemical substance or a particular mixture of substances can damage an organism.

1. **Potassium**

**Deficiency Manifestation**

The deficiency manifestation of Potassium is Hypokalemia. This is described as a person having too little potassium in their blood. If it is severe, it can lead to muscle weakness, which can have many health consequences. The cause is usually a person’s body excreting too much potassium.

**Toxicity value of Potassium**

The normal level of potassium in the bloodstream is in the range of 3.5–5.0 mM, while levels of 6.3–8.0 mM (severe hyperkalemia) result in cardiac arrhythmias or even death due to cardiac arrest. Potassium is potentially quite toxic; however, potassium poisoning is usually prevented because of the vomiting reflex.

1. **Calcium**

**Deficiency Manifestation**

The deficiency manifestation of calcium is Hypocalcemia. This occurs when calcium levels in the blood are low. A long-term deficiency can lead to dental changes, cataracts, alterations in the brain, and osteoporosis, which causes the bones to become brittle.

**Toxicity value of Calcium**

Calcium toxicity is rare, but overconsumption of calcium supplements may lead to deposits of calcium phosphate in the soft tissues of the body.

1. **Magnesium**

**Deficiency Manifestation**

The deficiency manifestation of magnesium is hypomagnesaemia. This can cause tiredness, generalized weakness, muscle cramps, abnormal heart rhythms, increased irritability of the nervous system with tremors, paresthesias, palpitations, low potassium levels in the blood, hypoparathyroidism which might result in low calcium levels in the blood, chondrocalcinosis, spasticity and tetany, migraines, epileptic seizures, basal ganglia calcifications and in extreme and prolonged cases coma, intellectual disability or death. Magnesium plays an important role in carbohydrate metabolism and its deficiency may worsen insulin resistance, a condition that often precedes diabetes, or may be a consequence of insulin resistance.

**Toxicity value of Magnesium**

The diagnosis is typically based on finding low blood magnesium levels (hypomagnesemia). Normal magnesium levels are between 0.6-1.1 mmol/L (1.46–2.68 mg/dL) with levels less than 0.6 mmol/L (1.46 mg/dL) defining hypomagnesemia.

1. **Chloride**

**Deficiency Manifestation**

The deficiency Manifestation of chloride is Hypochloremia. This is an electrolyte imbalance that occurs when there’s a low amount of chloride in your body. Chloride is an electrolyte. It functions with other electrolytes in your system, such as sodium and potassium, to regulate the amount of fluid and the pH balance in your body. Chloride is most commonly consumed as table salt (sodium chloride).

**Toxicity value of Chloride**

The normal serum range for chloride is 96 to 106 mEq/L, therefore chloride levels at or above 110 mEq/L usually indicate kidney dysfunction as it is a regulator of chloride concentration.

1. **Iron**

**Deficiency Manifestation**

The deficiency Manifestation of iron is called Iron-deficiency anaemia. This is caused by blood loss, insufficient dietary intake, or poor absorption of iron from food. Sources of blood loss can include heavy periods, childbirth, uterine fibroids, stomach ulcers, colon cancer, and urinary tract bleeding. Poor absorption of iron from food may occur as a result of an intestinal disorder such as inflammatory bowel disease or celiac disease, or surgery such as a gastric bypass. In the developing world, parasitic worms, malaria, and HIV/AIDS increase the risk of iron deficiency anaemia. Diagnosis is confirmed by blood tests.

**Toxicity Value of Iron**

Iron toxicity is not unusual in small children due to the wide distribution of dietary supplements containing iron. A lethal dose of iron is in the range of 200—250 mg iron/kg body weight, meaning that a child who accidentally eats 20 or more iron tablets may die as a result of iron poisoning.