



CODEN [USA]: IAJPB

ISSN: 2349-7750

**INDO AMERICAN JOURNAL OF
PHARMACEUTICAL SCIENCES**<http://doi.org/10.5281/zenodo.1296979>Available online at: <http://www.iajps.com>

Review Article

A BRIEF REVIEW ON MICRONUTRIENTSCh. Shilpa*¹, Mr. V.P.Mahesh Kumar², A. Madhukar³

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Abstract:

Vitamins and minerals which are referred collectively as micronutrients have an important influence on health. Vitamins are a group of organic nutrients, required in small quantities for a variety of biochemical functions that generally, cannot be synthesized by the body and must therefore be supplied through the diet. The main aim of this study is to find the level of micronutrients in conditions of pregnant women, anemic people, low birth weight condition, any protein deficiency condition. Many countries have developed recommendations for intake of micronutrients in the normal diet especially seen in pregnant women, the lack of essential vitamins and minerals can be catastrophic, increasing the risk of low birth weight, birth defects and even death.

Key Words: *Micronutrients, Vitamins, Minerals, Catastrophic.*

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Please cite this article in press Ch. Shilpa et al., **A Brief Review on Micronutrients**, Indo Am. J. P. Sci, 2018; 05(06).

INTRODUCTION:

Certain substances are required by the body for growth, reproduction, maintenance of body structure, physiologic processes and repair of damaged tissues. These substances are nutrients. Nutrition is the study of the overall intake of nutrients the effect of specific nutrients and the mechanisms of nutrient utilization. This focuses primarily on the role of nutrients in the maintenance of normal tissue and cell function and on the mechanisms of nutrient utilization. Nutrients that can be synthesized by the body from other substances are non essential nutrients. Nutrients that cannot be synthesized endogenously in sufficient amounts are essential nutrients.

There are three general types of nutrients. The energy yielding nutrients (proteins, carbohydrates and lipids), the vitamins and the minerals. The vitamins are a heterogeneous collection of small organic molecules that usually function in enhancing the utilization of other nutrients and in the maintenance of tissue structures. They are essential nutrients. The vitamins are traditionally divided into water soluble vitamins and fat soluble vitamins. Water soluble vitamins generally function as coenzyme precursors, whereas fat soluble vitamins play various roles. The minerals include the various inorganic ions that play a role in body chemistry. They can be divided into two groups the major minerals which are present in the body in fairly large quantities and the trace minerals which are present in minute amounts and mostly serve as prosthetic groups of specific enzymes. The major minerals can serve various functions, including the regulation of water balance and bone development and maintenance.

MAJOR MINERALS**CALCIUM :**

It is the major mineral cation of bone, the body contains a very large calcium pools. The body contains 2% of calcium, 99% of this is in the bones. Daily body requirement of calcium is about 450mg. During pregnancy and lactation there is a greater depletion of calcium from the. A six month old baby

consuming about one litre per day depletes the mother of about 0.4 gm of calcium.

Generally, sufficient calcium gets ingested through the normal diet. It gets absorbed from upper intestinal tract and is excreted through urine and faeces. As in the upper portion of intestine the condition is acidic, It tends to favor absorption of calcium as calcium salts have better solubility. Alkaline conditions bring about the precipitation of calcium salts and thus the absorption is retarded. Higher fattyacids contains also decreases the absorption due to formation of calcium of fatty acids which are insoluble.

MAIN ROLES OF CALCIUM:

- 1) Keep bones and teeth strong (99% of our calcium intake contributes to this)
- 2) Helps to maintain skeletal structure and function
- 3) Maintain a regular heartbeat
- 4) Contributes to stuff like nerve function, muscle contraction and blood clotting
- 5) Cells use it for transporting ions, activating enzymes , and for communicating with other cells

TOP 10 FOODS HIGH IN CALCIUM:

1. Dark leafy greens, example: Watercress (100 g = 120 mg)
2. Low fat cheese, example: Mozzarella Nonfat (100 g = 961 mg)
3. Low fat milk and yogurt (100g = 183 mg)
4. Chinese cabbage, examples: Pak choi, Bok Choy (100 g = 105 mg)
5. Fortified soy products, example: Tofu (100 g = 350 mg)
6. Okra (100 g = 77 mg)
7. Broccoli (100 g = 47 mg)
8. Green Snap Beans (100 g = 37 mg)
9. Almonds (100 g = 264 mg)
10. Canned fish, example: Sardines (100 g = 383 mg)

DAILY RECOMMENDED RANGE OF CALCIUM

AGE	MALE	FEMALE	PREGNANT	LACTATING
0-6 months	200mg	200mg	-	-
7-12 months	260mg	260mg	-	-
1-3 years	700mg	700mg	-	-
4-8 years	1000mg	1000mg	-	-
9-13 years	1300mg	1300mg	-	-
14-18 years	1300mg	1300mg	1300mg	1300mg
19-50 years	1000mg	1000mg	1000mg	1000mg
51-70 years	1000mg	1200mg	-	-
71+ years	1200mg	1200mg	-	-

2. ZINC

Several enzymes require zinc as an essential cofactor. Zinc is also necessary for the normal development and functioning of the sense of taste and one of the symptoms of zinc deficiency is decreased acuity of taste and smell. This diminished ability to taste and smell is probably responsible for the loss of appetite and poor growth observed in children with zinc deficiency. In adolescents, zinc deficiency is associated with impaired sexual development. Most of the zinc in the body is bound to the transport /storage protein metallothionein. Cereal diets that are high in phytic acid may cause zinc deficiency because phytic acid impairs zinc absorption. Zinc deficiency has also been associated with alcoholism, chronic renal failure, proteinuria and severe trauma.

FUNCTIONS OF ZINC

Zinc is an essential mineral that stimulates the activity of about 100 enzymes in the body.

- 1) Supports your immune system
- 2) It's necessary to synthesize DNA
- 3) It's essential for wound healing.
- 4) It supports the healthy growth and development of the body during adolescence, childhood and pregnancy.

Though the actual amount of zinc necessary to support the human body is quite small, its effects on the body are astronomical.

Sources of Zinc

Zinc is present in a variety of foods that many people consume daily. The food with the most zinc per serving is oysters, but most Americans receive the

greatest portion of their zinc intake from red meat and poultry. Some other food sources that contain zinc are some seafood, whole grains, fortified cereals, beans, nuts and dairy products.

The absorption of zinc tends to be higher in diets high in animal protein, as opposed to those rich in plant protein. An element present in whole grains, breads, cereals and legumes called phytate can also work to decrease zinc absorption.

Zinc Recommendations

An average adult woman should consume about 7 milligrams of zinc daily, while an average male should be consuming 9.5 milligrams daily. The risk for women to have a zinc deficiency is much greater than a man, especially if they are malnourished because of an eating disorder or when they are breastfeeding.

If you are concerned about your zinc intake, taking a good multivitamin should be sufficient. Be sure to only take the recommended daily dose, as zinc overdoses can also occur, which can be toxic to the body. Consuming too much zinc can cause nausea, vomiting and fever because too much of the mineral can interfere with how the body processes other minerals.

3. MAGNESIUM

Magnesium plays a role in over 300 enzymatic reactions within the body, including the metabolism of food, synthesis of fatty acids and proteins, and the transmission of nerve impulses. The human body contains around 25 gram (g) of magnesium, 50 to 60 percent of which is stored in the skeletal system. The rest is present in muscle, soft tissues, and bodily fluids. Magnesium is one of seven essential macrominerals. These are minerals that need to be consumed in relatively large amounts; at least 100 milligrams (mg) per day. An adequate intake can help

prevent problems with bones, the cardiovascular system, diabetes, and other functions.

Recommended intake

The Recommended Daily Allowance (RDA) for magnesium depends on age and gender

- 1) From 1 to 3 years of age: 80 mg a day
- 2) From 4 to 8 years: 130 mg a day
- 3) from 9 to 13 years: 240 mg a day
- 4) From 14 years, the requirements are different for men and women.
- 5) Males aged 14 to 18 years: 410 mg a day
- 6) Males aged 19 years and over: 400 to 420 mg a day
- 7) Females aged 14 to 18 years: 360 mg a day
- 8) Females aged 19 years and over: 310 to 320 mg a day
- 9) During pregnancy: 350 to 400 mg a day
- 10) During breast feeding: 310 to 360 mg a day

Sources The best sources of magnesium are nuts and seeds, dark green vegetables, whole grains, and legumes. Magnesium is also added to some breakfast cereals and other fortified foods. Here are some good sources of magnesium:

- 1) Sunflower seeds, dry roasted, 1 cup: 512 mg
- 2) Almonds, dry-roasted, 1 cup: 420 mg
- 3) Sesame seeds, roasted whole, 1 ounce: 101 mg
- 4) Spinach, boiled, 1 cup: 78 mg
- 5) Cashews, dry-roasted, 1 ounce: 74 mg
- 6) Shredded wheat cereal, two large biscuits: 61 mg
- 7) Soy milk, plain, 1 cup: 61 mg
- 8) Black beans, cooked, 1 cup: 120 mg
- 9) Oatmeal, cooked, 1 cup: 58 mg
- 10) Broccoli, cooked, 1 cup: 51 mg
- 11) shelled, cooked, 1 cup: 100 mg
- 12) Peanut butter, smooth, 2 tablespoons: 49 mg
- 13) Shrimp, raw, 4 ounces: 48 mg
- 14) Black-eyed peas, cooked, 1 cup: 92 mg
- 15) Brown rice, cooked, 1 cup: 84 mg
- 16) Kidney beans, canned, 1 cup: 70 mg
- 17) Cow's milk, whole, 1 cup: 33 mg
- 18) banana, one medium: 33 mg
- 19) Bread, whole-wheat, one slice: 23 mg

Magnesium is lost as wheat is refined, so it is best to choose cereals and bread products made with whole grains. Most common fruits, meat, and fish, are low in magnesium.

4. COPPER

Copper is incorporated into a variety of proteins and metalloenzymes which perform essential

metabolic functions; the micronutrient is necessary for the proper growth, development, and maintenance of bone, connective tissue, brain, heart, and many other body organs. Copper (CU) is a mineral which can easily be taken in excess, although it is essential for normal functioning. The average adult has 60 - 110 mg of copper in the body. The liver controls copper storage and any excess is excreted via the bile, though if your copper intake increases so does the amount that you store.

FUNCTIONS OF COPPER

Copper is a trace mineral that

- 1) Works with iron in the manufacture of red blood cells,
- 2) It is also important for the production of collagen which is responsible for the health of our bones, cartilage and skin,
- 3) It is one of the antioxidant minerals which protects against free radical damage,
- 4) It is necessary for the production of adrenal hormones,
- 5) It helps in the absorption of iron,
- 6) It maintains nerve fibers,
- 7) It is essential for the utilization of vitamin C,
- 8) It makes tyrosine usable which promotes skin and hair color,
- 9) It Regulates cholesterol, and
- 10) It Inactivates histamine.

Top 10 Copper Rich Foods List

- 1) Beef liver. 3 oz: 14 mg (over 100% DV)
- 2) Sunflower seeds. ¼ cup: 0.63 mg (31% DV)
- 3) Lentils. 1 cup: 0.5mg (25% DV)
- 4) Almonds. ¼ cup: 0.4 mg (20% DV)
- 5) Dried apricots. 1 cup: 0.69mg (34% DV)
- 6) Dark chocolate. 1 square: 0.9 mg (45% DV)
- 7) Blackstrap molasses. ...& Asparagus.

Future directions:

The findings of the binary logistic regression test showed that hemoglobin levels, calcium intake, protein intake, iron intake and energy intake of women considered as "prediction factors". These studies would be enable the appropriate intervention strategies to be developed, implemented and evaluated. Such efforts will require the collaboration and commitment of government agencies, health care providers, nutritionists, research institutions and the community. Our findings may help the government agencies to concentrate on efficient performance education workshops on nutritional status.

CONCLUSION:

Serum microminerals play an important role in human life. In this study we highlight the importance of monitoring the nutritional status of micronutrients. Studies have confirmed that micronutrient supplementation can redress insufficient micronutrient levels and help to improve the health. The poor micronutrient intake and status increase the risk of small for gestational age births in pregnant women. In recent studies adolescents in industrialized countries have typically micronutrient poor, energy dense diets with dietary intakes of folate, iron and vitamin D.

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