

## VITAMINS

Vitamins are organic essential nutrients required in small amounts to perform specific functions of body such as regulation, maintenance, growth and protection. The term vitamin is coined from the word “vital amine” meaning that these are “vital for life”. They are the micronutrients. Vitamins are categorized on the basis of their solubility.

1. Fat soluble vitamins- these require fat for their absorption. Excess amount is stored in liver and fatty tissues. For this reason excessive intake of these can prove toxic. They are vitamin A, D,E and K.
2. Water soluble vitamins- being water soluble they are easily absorbed and if in excess they are not accumulated in the body and is easily excreted out through urine. They are vitamin B complex and C.

### FAT SOLUBLE VITAMINS

#### VITAMIN A

It is a generic name given to a group of organic compounds having vitamin A activity. These compounds are Retinol, Retinal and Retinoic acid. They are found only in the fatty phases of food of animal origin

In plant foods it is present as beta ( $\beta$ ) carotene which is a provitamin or precursor of vitamin A. It needs to be converted to vitamin A then only it can be utilized. 8 $\mu$ g of beta carotene is equal to 1 retinol.

#### Functions

- It maintains normal vision in dim light.
- It is required to keep the integrity of epithelial tissues.
- Boosts immune system
- Beta carotene and other carotenoids have an important role as an antioxidant and reduces the risk of cancer.

Deficiency – nightblindness, the individual is unable to see well in dim light. Epithelial changes also occur; it becomes dry, scaly and rough, vulnerability to infection increases.

Food sources- Animal foods like whole milk and its products namely curd, yogurt, cheese, khoa, butter, ghee, egg yolk, liver (especially beef, fish and chicken), organ meats, fish liver oil.

Rich sources of beta carotene are green leafy vegetables like spinach, amaranth, coriander, drumstick leaves, ripe yellow fruits like mango, papaya, tomato, carrots and other vegetables like carrot, pumpkin are good sources.

Requirement – RDA for adults- retinol 600µg, beta carotene 4800µg

## **VITAMIN D**

It is also referred as sunshine vitamin. Body can synthesize it with help of sunlight and a prohormone because it can be produced in the skin.

The two forms are vitamin D2 and D3. D2 is Ergocalciferol derived from ergosterol. It is of plant origin. D3 is cholecalciferol derived from 7 dehydrocholesterol which is present in mammalian skin. Conversion occurs on exposure to sunlight.

### Functions

- It is required for absorption of calcium and phosphorous from small intestine in the presence of hormones of the parathyroid and thyroid gland.
- It is required for mineralization of bones and teeth.
- Helps in regulating calcium and phosphorous levels in blood.

Deficiency- rickets in children and osteomalacia(bones become soft, brittle and deformed) and osteoporosis(low bone mineral density, chronic stage of vit D deficiency) in adults.

Sources – sunlight is the main source as on exposure to sunlight it is activated. 5-30 mins exposure to sun.

Marine fishes, cod liver oil, fatty fish, milk, butter, egg yolk, cheese.

## **VITAMIN E- Tocopherol**

### Functions

- It possesses antioxidant property and thus prevents oxidation of vitamin A in the intestine.
- Prevents oxidation of PUFA in the cell membrane.
- Maintains integrity of cell membranes by preventing oxidative changes.
- Prevents degenerative diseases, reduces risk of cancer.

Deficiency is accompanied almost always by the deficiency of other fat soluble vitamins. A symptom that has been described in new born infants especially pre mature infants is irritability, odema and haemolytic anaemia.

Sources- present in high concentration in vegetable oils and whole grains. Wheat germ oil, green leafy vegetables like spinach, turnip greens, broccoli, whole grains, whole grains, nuts and oilseeds.

## **VITAMIN K**

K<sub>1</sub>- Phylloquinone (plants), K<sub>2</sub> – Menaquinone(animals), K<sub>3</sub>- Menadione(commmercially)

Functions

- Blood clot formation. Helps in activation of prothrombin which leads to formation of thrombin.
- Synthesis of bone proteins- bone formation and improve bone mineral density.

Sources- bacteria in our intestine, dark GLV's, legumes, oils, fish, spinach, broccoli, cucumber, peas.



## **B.MINERALS**

They are inorganic substances present in our body; they do not provide energy and cannot destroy during food preparation.

### GENERAL FUNCTIONS OF MINERALS

Maintain acid base balance Helps in muscle contraction Control water balance Clotting of blood

- Helps in digestion
- Helps in respiration.

MINERALS	FOOD SOURCES	FUNCTION	DEFITIENCY
Calcium (major element)	Milk & milk products, nuts,ragi	99% in bone and teeth, helps in blood clotting, helps in contracting heart muscles.	Rickets in children and otemalacia in adults.
Sodium (major element)	Common salt, nuts, guava, papaya	Regulates acid base balance, helps in the absorption of carbodhydrates	Hyponatria (Below normal level), hypernatria (higher plasma sodium content)
IRON (minor element)	Pulses, leafy vegetables, egg, liver, meat etc	Present in haemoglobin carry O2 from the lungs, carry back some CO2 from lungs, helps in detoxification of liver	Anemia
Iodine(minor element)	Salt,marine fish	Iodine stimulate the thyroid gland and secrete thyroxin	Goitore, cretinisam in children (stunted growth)
Flourine(minor element)	Tea, drinking	Helps in the formation formation of bone & teeth, it resist tooth decay & bone fractures.	