



SNS COLLEGE OF TECHNOLOGY

**An Autonomous Institution
Coimbatore - 35**

Accredited by NBA – AICTE and Accredited by NACC – UGC with 'A+ Grade
Approved by AICTE, New Delhi and Affiliated to Anna University, Chennai.

DEPARTMENT OF FOOD TECHNOLOGY

19FTO302 FOOD NUTRITION

III – YEAR VI SEMESTER

UNIT 4- VITAMINS AND MINERAL NUTRITION

TOPIC 1 & 2 - VITAMINS AND MINERALS



INTRODUCTION

What are Minerals and Vitamins





INTRODUCTION

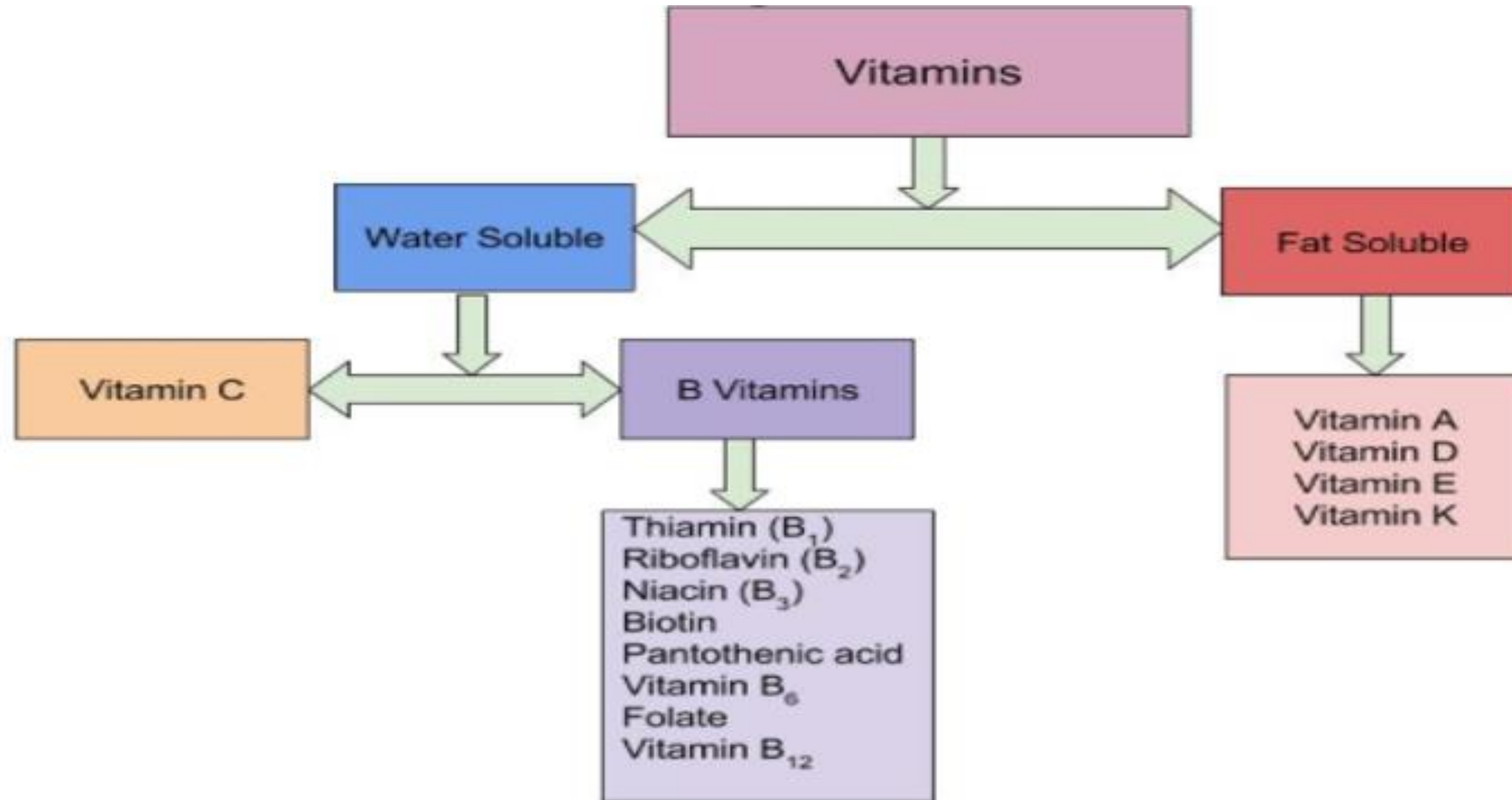


Vitamins:

Vitamins are organic compounds, found in natural foods which are required for normal growth and maintenance of the body. Both humans and animals require vitamins for their growth.

Minerals:

Minerals are also organic compounds found in nature, which helps in the growth of the human body. Minerals are essential for the human body to work properly. Deficiency of minerals leads to several disorders.





Vitamins

Vitamins act as a catalyst in the generation of energy by utilizing carbohydrates and fats properly. Humans cannot live without vitamins and the human body cannot produce it on its own (except vitamin D and Vitamin B3). So it should be taken in required quantities through other sources such as the food we take, vitamin capsules etc. Vitamins can be found in major foods like meat, leafy vegetables, fruits etc.





Water soluble Vitamins

Vitamin B1 (Thiamine)

It is also known as Thiamine and is a white crystalline substance, soluble in water and heat-stable. It enables the body to use carbohydrates as energy. It plays an important role in heart, nerve and muscle function. It is also essential for the metabolism of glucose.

Vitamin B₁ Sources: Brown rice, Cereal grains, sunflower seeds, whole-grain rye, asparagus, kale, cauliflower, Legumes (dried beans), Peas, beans, nuts, yeast, potatoes, oranges, Dried milk, liver, beef, eggs, egg yolk, pork, etc.



Deficiencies:
Beri Beri



Water soluble Vitamins

Vitamin B2

It is also known as Riboflavin, is a yellowish crystalline solid substance and soluble in water. It is heat-stable. It is involved in the release of energy in the electron transport system. It helps the production of RBC (red blood cells) and is important for body growth.

Vitamin B2 Sources: Green beans, asparagus, bananas, peas, persimmons, okra, chard, cottage cheese, milk, yogurt, meat, eggs, egg albumin, fish, liver etc.



Deficiencies:
Slow growth, sore eyes



Water soluble Vitamins

Vitamin B3

It is also known as niacin, is a white crystalline and soluble in water. It helps to maintain different bodily functions. It also converts fats to energy and synthesises cholesterol.

Vitamin B₃ Sources: Nuts, Eggs, Potato, Pea, Tomato, Avocado, wheat, Legumes, broccoli, carrots Meat, Fish (such as tuna and salt-water fish), liver, kidney, heart, chicken, beef, bread, cereals, whole grains, mushrooms, and brewer's yeast etc

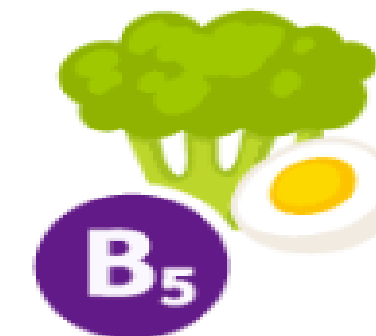
Deficiencies:
Pellagra



Water soluble Vitamins

Vitamin B₅: It is also known as pantothenic acid, is a solid crystalline substance. It is water soluble and acts as a precursor of coenzyme A. It is an essential element which is needed to metabolize many molecules

Vitamin B₅ Sources: Whole-grain cereals, broccoli, avocados, royal jelly, fish ovaries, meats, Milk, Eggs, Mushroom, sweet potatoes, kale, and other vegetables in the cabbage



Deficiencies:

- ✚ Fatigue;
- ✚ Depression;

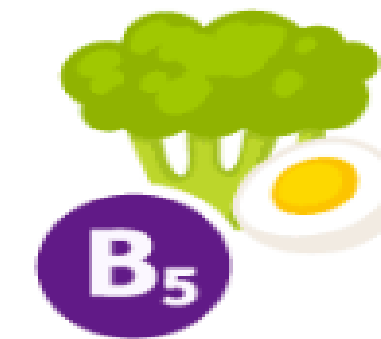


Water soluble Vitamins

Vitamin B₆

It is also known as Pyridoxine. It is white crystal and soluble in water. It is heat-stable. It helps to create RBC (red blood cells) and releases sugar from stored carbohydrate to get energy.

Vitamin B₆ Sources: Liver, egg yolk, yeast, kidney, Meats, bananas, dried beans, Peas, soybeans, cereals, vegetables, and nuts, Avocado.



Deficiencies:

An autoimmune disorder, such as rheumatoid arthritis



Water soluble Vitamins

Vitamin B₁₂

Cobalamin: Necessary for red blood cell formation and proper nervous system and brain function



Vitamin B₁₂ Sources: Clams, fish, meat

Deficiencies:

An autoimmune disorder, such as rheumatoid arthritis



Water soluble Vitamins

Vitamin C

Ascorbic acid: Required for the creation of neurotransmitters and collagen, the main protein in your skin



Deficiencies:

Scurvy

Vitamin C

Fresh fruits, black currant, broccoli, goat milk and chestnuts.

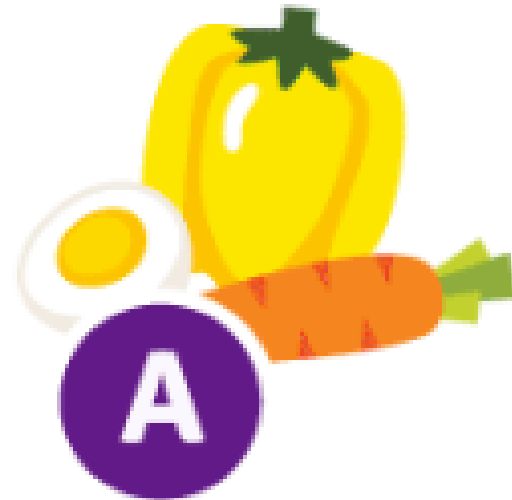


Water soluble Vitamins

Nutrient	Sources	RDA or AI (adults > 19 years)
Vitamin B1 (thiamine)	Whole grains, meat, fish	1.1-1.2 mg
Vitamin B2 (riboflavin)	Organ meats, eggs, milk	1.1-1.3 mg
Vitamin B3 (niacin)	Meat, salmon, leafy greens, beans	14-16 mg
Vitamin B5 (pantothenic acid)	Organ meats, mushrooms, tuna, avocado	5 mg
Vitamin B6 (pyroxidine)	Fish, milk, carrots, potatoes	1.3-1.7 mg
Vitamin B7 (biotin)	Eggs, almonds, spinach, sweet potatoes	30 mcg
Vitamin B9 (folate)	Beef, liver, black-eyed peas, spinach, asparagus	400 mcg
Vitamin B12 (cobalamin)	Clams, fish, meat	2.4 mcg
Vitamin C (ascorbic acid)	Citrus fruits, bell peppers, Brussels sprouts	75-90 mg



Fat soluble Vitamins



Vitamin A

Green leafy vegetables, ripe yellow fruits, guava, milk, liver, nuts, tomatoes, oranges, carrots, broccoli, watermelon etc.

Vitamin A

Necessary for proper vision and organ function

Deficiencies:

Hyperkeratosis, night blindness, and keratomalacia



Fat soluble Vitamins

Vitamin D

Fish, egg, liver, beef, cod, chicken breast etc.

Vitamin D

Promotes proper immune function and assists in calcium absorption and bone growth.



Deficiencies:

Rickets and Osteomalacia



Fat soluble Vitamins

Vitamin E: Assists immune function and acts as an antioxidant that protects cells from damage

Vitamin E

Potatoes, pumpkin, guava, mango, milk, nuts, seeds etc.



Deficiencies:

Heart problems, Haemolysis and sterility



Fat soluble Vitamins

Vitamin K

Tomatoes, broccoli, chestnuts, cashew nuts, beef, lamb, mangoes, grapes etc.

Vitamin K

Tomatoes, broccoli, chestnuts, cashew nuts, beef, lamb, mangoes, grapes etc.



Deficiencies:
Haemorrhage



Fat soluble Vitamins

Nutrient	Sources	RDA or AI (adults > 19 years)
Vitamin A	Retinol (liver, dairy, fish), carotenoids (sweet potatoes, carrots, spinach)	700-900 mcg
Vitamin D	Sunlight, fish oil, milk	15-20 mcg
Vitamin E	Sunflower seeds, wheat germ, almonds	15 mg
Vitamin K	Leafy greens, soybeans, pumpkin	90-120 mcg



Macrominerals:

Macrominerals are needed in larger amounts than trace minerals in order to perform their specific roles in your body.

The macrominerals and some of their functions are:

1. **Calcium:** Necessary for proper structure and function of bones and teeth. Assists in muscle function and blood vessel contraction
2. **Phosphorus:** Part of bone and cell membrane structure
3. **Magnesium:** Assists with over 300 enzyme reactions, including regulation of blood pressure



Macrominerals:

The macrominerals and some of their functions are:

- **Sodium:** Electrolyte that aids fluid balance and maintenance of blood pressure.
- **Chloride:** Often found in combination with sodium. Helps maintain fluid balance and is used to make digestive juices
- **Potassium:** Electrolyte that maintains fluid status in cells and helps with nerve transmission and muscle function
- **Sulfur:** Part of every living tissue and contained in the amino acids methionine and cysteine



Macrominerals:

Nutrient	Sources	RDA or AI (adults > 19 years)
Calcium	Milk products, leafy greens, broccoli	1000-1200 mg
Phosphorus	Salmon, yogurt, turkey	700 mg
Magnesium	Almonds, cashews, black beans	310-420 mg
Sodium	Salt, processed foods, canned soup	1500 mg
Chloride	Seaweed, salt, celery	1800-2300 mg
Potassium	Lentils, acorn squash, bananas	2600-3400 mg
Sulfur	Garlic, onions, Brussels sprouts, eggs, mineral water	None established



Trace minerals:

Trace minerals are needed in smaller amounts than macrominerals but still enable important functions in your body.

- **Iodine:** Assists in thyroid regulation
- **Fluoride:** Necessary for the development of bones and teeth
- **Selenium:** Important for thyroid health, reproduction and defense against oxidative damage



Trace minerals:

Trace minerals are needed in smaller amounts than macrominerals but still enable important functions in your body.

- **Iron:** Helps provide oxygen to muscles and assists in the creation of certain hormones
- **Manganese:** Assists in carbohydrate, amino acid and cholesterol metabolism
- **Copper:** Required for connective tissue formation, as well as normal brain and nervous system function
- **Zinc:** Necessary for normal growth, immune function and wound healing
- **Iodine:** Assists in thyroid regulation



Macrominerals:

Nutrient	Sources	RDA or AI (adults > 19 years)
Iron	Oysters, white beans, spinach	8-18 mg
Manganese	Pineapple, pecans, peanuts	1.8-2.3 mg
Copper	Liver, crabs, cashews	900 mcg
Zinc	Oysters, crab, chickpeas	8-11 mg
Iodine	Seaweed, cod, yogurt	150 mcg
Fluoride	Fruit juice, water, crab	3-4 mg
Selenium	Brazil nuts, sardines, ham	55 mcg