



Centurion
UNIVERSITY
Shaping Lives...
Empowering Communities...

Micro - Minerals and Food Pigments



Centurion
UNIVERSITY

*Shaping Lives...
Empowering Communities...*

<u>Mineral</u>	<u>Function</u>	<u>Sources</u>
* Se	Antioxidant, maintain integrity of liver cells	Meat, sea food, grains
* Cu	Required for iron metabolism	Legumes, nuts Seeds, whole grains
* Mn	Part of enzymes	Present in plant foods
* F1	Formation of bones & teeth	Drinking water , fish
* Cr	Close association with insulin to regulate blood sugar	Brewers yeast, unrefined foods



Centurion
UNIVERSITY

Shaping Lives...
Empowering Communities...

Iodine

- Essential constituent of thyroid hormone
- Occurs as free iodine ions or as protein bound iodine in our body
- About 15-23 mg of iodine is present in our body (thyroid gland, salivary gland, mammary gland and gastric glands ,kidneys)
- Essential for the synthesis of the thyroid gland hormone-T3 &T4
- **Sources** –sea foods,common salt From sea water , vegetables, fruits,and cereals (based on the type of soil)



Centurion
UNIVERSITY

Shaping Lives...
Empowering Communities...

- **Requirements of Iodine**
- ICMR_recommendation-150micro_gram/day
- **Deficiency-** causes enlargement of the thyroid gland-Goitre
- Common in hilly regions in India
- Severe deficiency leads to hypothyroidism (retarded physical and mental growth-cretinism)
- Goitrogens are substances (react with iodine present in the food (cabbage, cauliflower, radish) making it unavailable for absorption) which cause goitre



Centurion
UNIVERSITY
*Shaping Lives...
Empowering Communities...*

Zinc

- Primarily intracellular substance (2.3g)
- Largest store if zinc present in the bones
- Forms a constituent of the blood
- Cofactor for a no. Of enzymes –Carbonic anhydrase, alkaline phosphatase , and lactic dehydrogenase
- Constituent of the hormone Insulin
- Major role in the synthesis of DNA and proteins
- **Sources** – meat , unprocessed cereals and legumes
- **Requirement-** Adults-15.5mg/day



Centurion
UNIVERSITY

*Shaping Lives...
Empowering Communities...*

Food Pigments

- **Chlorophyll**- green pigment of green colored vegetables
- **Carotenoids**- Yellow , orange ,red fat soluble pigments are of three groups:
 1. Carotenes present in carrot , green leafy vegetables and other fruit
 2. Lycopenes present in tomatoes
 3. Xanthophylls present in yellow fruits
- Pigments that contain phenol group include:
 - Anthocyanins- group of reddish water –soluble pigments occurring in cherries ,red apples,
 - pomoegranates



Centurion
UNIVERSITY

*Shaping Lives...
Empowering Communities...*

Food pigments

- **Anthoxanthins-** colourless white to yellow pigments that give colour to cauliflower , onions, spinach- colour is masked
- **Leucoanthoxanthins-** colourless but contribute to the astringency of apple and olives, have an important role in the enzymatic browning of fruits
- **Catechins-** pigments that are involved in enzymatic browning
- **Betalins-** red water soluble pigments found in beetroot and berries



Centurion
UNIVERSITY
*Shaping Lives...
Empowering Communities...*

Food Pigments

- **Quinone-** Yellow pigment juglone present in walnut
- **Mangiferin-** yellow pigment belonging to xanthone group and found in mangoes
- **Tannins -.** Complex mixtures of polymeric polyphenols whose appearance ranges from colourless to yellow or brown.
- They contribute to astringency of foods and also to enzymatic browning



Centurion
UNIVERSITY

Shaping Lives...
Empowering Communities...

- **Flavour Compounds**
- Flavour is the result of the tastes perceived by the buds in the mouth and the aromatic compounds detected by the epithelium in the olfactory organ in the nose
- All fruits and vegetables are mixture of aldehydes ,alcohols,ketones,organic acids ,sulfur compounds



Centurion
UNIVERSITY

Shaping Lives...
Empowering Communities...

- **Flavour Compounds**
- Astringency is due to phenolic compounds or tannins
- Vegetables belonging to allium and cruciferae families have strong flavours
- Cruciferous vegetables also contain sulfur compounds and are relatively mild when raw but develop strong flavours when over cooked



Centurion
UNIVERSITY

Shaping Lives...
Empowering Communities...

• Flavour Compounds

- Allium includes onions and garlic and onion contain sulphur compounds that are acted upon by enzymes in the tissues when cut and they are strong flavoured in raw state and tend to lose the property when cooked
- Amino acid s-methyl l- cysteine sulphoxide is present in raw cabbage and acts as a precursor of cooked cabbage flavour