VITAMIN K (Methyl Napthoquinone)

General - oil-soluble; anti-haemorrhagic factor;

- Vitamin K - from the Danish word “koagulation”; its discovery was made by virtue of its role in blood coagulation; several natural forms;
- Synthetic, water-soluble forms used in conditions of impaired fat absorption;
- Yellow, oily pigment abundant in green leafy vegetables, soya beans, peas & tomatoes;
- Normally manufactured by intestinal bacteria; depends on good intestinal health & flora;
- History: discovered 1934; isolated from alfalfa in 1939;

Nutrition

- Sources: widely available; best: alfalfa; dark leafy vegetables, associated with chlorophyll (chloroplasts); 50% of vitamin K produced by bacteria in lower intestine;
- Supplements: alfalfa; medical injections;
- Absorption into lymphatics; requires fats & oils; 40 - 70% absorbed; requires bile & pancreatic secretions;
- Improved by: edible fats & oils; vitamins A, C & E;
- Antagonized by: administration of antibiotics; mineral oil laxatives; bile obstruction;
- Stability: heat & oxygen-stable; destroyed by light, acid, alkali, oxidizing agents, alcohol;
- Storage: exclusively in the liver;
- Excretion: in bile;
- Metabolism: rapidly used up;
- Interactions: anti-coagulants interfere with activity by oxidizing vitamin K; intestinal synthesis is reduced by aspirin, some antibiotics & sulphonamides;

Functions of vitamin K

- Co-enzyme in liver’s synthesis of protein clotting factors in the blood (prothrombin & factors VII, IX & X);
- Converts precursor of prothrombin (glutamic acid) to gamma-carboxy-glutamic acid; prothrombin catalyzes conversion of fibrinogen to fibrin & therefore determines rate that blood clots;
- Required for function of proteins in bone & kidney; vitamin K appears to have function in calcium metabolism, transport & deposition;
- Co-enzyme involved in activation of glucose in liver (phosphorylation); conversion of glycogen to glucose in energy metabolism & respiration;

Quantities

- Measurement: µg or mcg.
- Optimum: (SONA) average 90 to 120 µg/day;
- Minimum: (DRI) Female 90 µg/day; male 120 µg/day
- Deficiency of vitamin K can result from administration of antibiotics & anti-coagulants, including aspirin; poor absorption; liver disease; may affect up to 50% of elderly;
- Can result in haemorrhaging (hypothrombinemia), prolonged clotting time, bruising;
- Toxicity: large doses may produce haemolytic anaemia; bile pigment accumulation in grey matter of nervous system (kernicterus), resulting in mental retardation, jaundice, haemorrhaging & neurological symptoms;

Therapy with vitamin K

- 30 - 100 µg/day used in hospital setting; 600 µg/day may be toxic dose;
- Prevent obstructive jaundice;
- Administered to counteract anti-coagulants during labour;
- Given during surgery to speed clotting & to prevent excessive bleeding;
- Administered to new-born infants to prevent deaths from excessive bleeding;