

AFCAT SCIENCE

VITAMINS

(DETAILED ONE LINE APPROACH)

Classification of Vitamins

Type	Vitamins Included	Solubility Property	Storage / Notes
Fat-Soluble Vitamins	A, D, E, K	Soluble in fats and oils, not in water	Stored in liver and adipose tissue
Water-Soluble Vitamins	B-Complex group, C	Soluble in water	Not stored, need daily intake

Fat-Soluble Vitamins

Vitamin	Chemical Name	Major Sources	Main Function	Deficiency Disease / Effect
A	Retinol / Carotene	Carrot, butter, fish liver oil, milk, papaya, spinach	Vision, skin health, growth	Night blindness, xerophthalmia
D	Calciferol / Cholecalciferol	Cod liver oil, egg yolk, sunlight	Calcium absorption, bone formation	Rickets, osteomalacia
E	Tocopherol	Vegetable oils, green vegetables, nuts, eggs	Antioxidant, protects cells	Sterility, muscle weakness
K	Phylloquinone	Green leafy vegetables, cabbage, spinach	Blood clotting (prothrombin synthesis)	Delayed clotting, bleeding

Water-Soluble Vitamins (B-Complex Group + Vitamin C)

Vitamin	Chemical Name	Sources	Function	Deficiency Disease / Effect
B ₁	Thiamine	Whole grains, pulses, milk, yeast	Carbohydrate metabolism, nerve function	Beri-Beri
B ₂	Riboflavin	Milk, egg, green leafy vegetables	Oxidation of food, healthy skin	Cracked lips, glossitis
B ₃	Niacin / Nicotinic acid	Meat, liver, peanuts, cereals	Cellular respiration	Pellagra (3 D's – dermatitis, diarrhoea, dementia)
B ₅	Pantothenic acid	Meat, eggs, cereals, yeast	Coenzyme A, fat metabolism	Fatigue, muscle cramps
B ₆	Pyridoxine	Legumes,	Protein	Anaemia, convulsions

		cereals, banana, milk	metabolism, RBC production	
B ₇	Biotin	Egg yolk, nuts, liver, yeast	Fatty acid synthesis	Hair loss, dermatitis
B ₉	Folic acid	Green vegetables, liver, yeast	RBC formation, DNA synthesis	Megaloblastic anaemia, birth defects
B ₁₂	Cobalamin	Meat, fish, milk, eggs	RBC maturation, nerve function	Pernicious anaemia
C	Ascorbic acid	Amla, citrus fruits, guava, lemon, tomato	Collagen synthesis, immunity, healing	Scurvy (bleeding gums)

Summary Table – Vitamins, Sources, and Deficiency Diseases

Vitamin	Sources (Rich in)	Deficiency Disease
A	Carrot, papaya, butter	Night blindness
B ₁	Whole grain, yeast	Beri-Beri
B ₂	Milk, egg	Cracked lips, sore tongue
B ₃	Meat, groundnut	Pellagra
B ₅	Eggs, cereals	Fatigue
B ₆	Banana, legumes	Anaemia
B ₇	Liver, nuts	Hair loss
B ₉	Spinach, beans	Anaemia, neural tube defect
B ₁₂	Meat, fish	Pernicious anaemia
C	Citrus fruits, amla	Scurvy
D	Sunlight, milk, fish oil	Rickets, osteomalacia
E	Vegetable oil, nuts	Sterility, muscle weakness
K	Spinach, cabbage	Excessive bleeding

Key Notes for AFCAT / CDS Exams

- Fat-soluble vitamins are stored in liver; water-soluble vitamins are excreted in urine.
- Vitamin B₁₂ (Cobalamin) contains cobalt.
- Vitamin C is destroyed by heat and cooking.
- Vitamin D is synthesized in the skin by UV rays – called 'sunshine vitamin'.
- Vitamin A is called 'anti-infective vitamin'.
- Vitamin K is called 'antihaemorrhagic vitamin'.
- Deficiency of B-complex causes general weakness, anaemia, nervous disorders.
- Excess of Vitamin D causes hypercalcemia (bone calcification).
- Vitamin E acts as antioxidant and prevents oxidation of Vitamin A and fats.