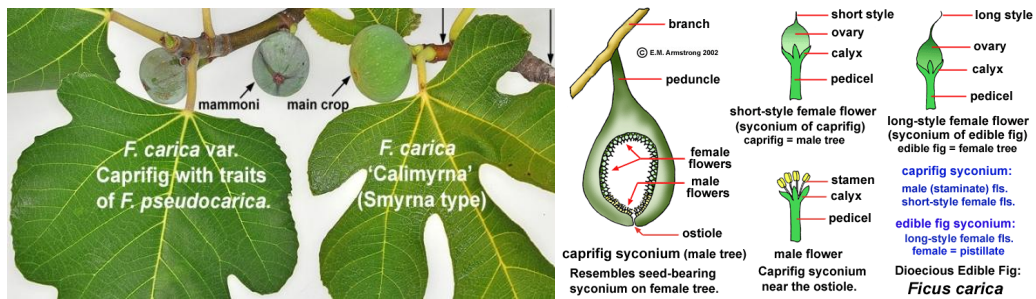


Lesson no. 5 Fig.



It is called as *Ficus carica* in latin; its botanical family is Moraceae (mulberry family); it is a flowering plant famous for its fruit, its fruit has many health benefits, its fruit is called as fig; please read lesson no. 28 Fig page no. 12 in my part 2 book; it is mentioned in Holy Quran chapter no. 95 Teen verse no. 1 the chapter is named as Teen which means Fig. It is also mentioned in Hadith of Ibn Abu Bakr Al Jauzi, Kanzul-ummal, Riyad As-sulihin, Bukhari; please refer my part 2 lesson no. 28 Fig.

Fig is a false fruit or multiple fruit in which the flower & seeds grow together to form a single mass; depending on the type of fig-each fig can contain thousands of seeds in it; in Hadith it is mentioned as fruit of Paradise & cure for arthritis, piles.

- **Fig tree: -**



It is grown since ancient time; it is native to Middle East & western Asia, nowadays grown throughout the world to obtain its fruit & as an ornament plant; its tree is called as *Ficus carica* (common fig) & belongs to Moraceae family, it is a flowering plant & a deciduous; it grows to a height of 7-10 meters (23-33 feet) with smooth white bark. It is gynodioecious shrub (female flowers are present on one plant & hermaphrodite flower on other plant of the same species). (Hermaphrodite is part of plant that has complete or partial reproductive organs & produces gametes). It grows in dry & sunny region, in rocky area in deep & fresh soil, can also be grown on nutritional soil; it produces two crops each year, 1st is eaten fresh (fig) & 2nd crop is dried in winter (fig) but many types of fig tree produce fruit once a year only. Its branches are muscular & twisted, widely spread & are multiple branched; its wood is weak & decays rapidly; the trunk often has large nodal tumours; the twigs are terete (slender & smooth) & pithy rather than woody. The sap contains milk latex & is irritating to human skin.

- **Leaves: -**



Leaves are bright green, single, alternative & large (up to 1 foot), they are more less deep lobed with 1-5 sinuses, rough hairy on upper side & soft hairy on the underside.

- **Flowers: -**



The tiny flowers are out of sight, clustered inside the green fruit (technically called syconium). Pollinating insects gain access in the flower through an opening at the apex of the syconium. Its flowers are mainly female & need pollination.

- **Fruit (fig): -**



Its fruit is called as Fig, figs crop twice a year; 1st crop is called as breba crop, it occurs at spring. In cold climate the breba crop is often destroyed by spring-frost, it mainly sold fresh & eaten fresh; the 2nd crop is called as main crop, is borne in the fall on the new growth. The fruiting cycle is of 120-150days.

The matured fig has tough skin (peel) of pure green or green suffused with brown or brown purple colour; the skin often cracks upon ripen & inside pulp is exposed. The interior of fig is white inner rind containing many seeds, mass bound with jelly like flesh. The whole fruit is edible including the

seeds; the fruit is delicious & many health benefits & vitamins, minerals & etc; the fruits can be eaten fresh or dried.

- **Harvesting of figs: -**

Figs must be allowed to ripe fully on tree then picked up; it will not ripe if picked up when immature. A ripen fruit will be soft & start to bend at its neck part. Harvesting should be done gently; fresh figs do not keep well & so can be stored in refrigerator only 2 to 3 days only. It is more delicious when eaten dried; it takes 4 to 5 days in sun to get dried (also 10 to 12 hours in dehydrator process & 2 to 3 days on top of car dash board); dried figs can be stored for more than 6 to 8 months.

- **Calories: -**

100 grams of dried fig contain 209 calories & fresh contain only 43 calories.

- **Contents of dry & fresh figs: -**

It contains soluble fibre, potassium, calcium (fresh 35 mg & dried 162 mg), magnesium, iron, copper, vitamin A, K, C, prebiotic, oxalates, natural sugar (dried has 48 grams of sugar in 100 gram, fresh fig has 16 gram of sugar in 100 grams), sodium, protein, iron, vitamin B1, B2, B5, B6, folate, choline, magnesium, phosphorus, zinc, carbohydrate etc.

The above ingredients are based on scientific study, means these has been indentified, known & learnt by modern science, it does not means that it contains only these ingredients, there may be many more ingredients which are yet to be discover, learnt & known by modern science.

- **Natural basic pharmacology of figs based on human intake in natural form: -**
- **Natural oxalate: -**

It is present in many types plant, it is an organic compound found in leafy vegetables, fruits, nuts, seeds etc. In plants it usually bounds to minerals forming oxalate. The term oxalic acid & oxalate are used interchangeable in nutritional science.

Main sources of natural oxalate: -

It is present in beetroot leaves (chard leaves), beetroot, carrot, spinach, sweet potato, turnip leaves, potato, apple, strawberry, green beans, broccoli, apricots, fig etc.

Basic pharmacokinetics of oxalate (bases on human intake in natural food products): -

In the human body some of the eaten oxalate is broken down by bacteria before it combines (mainly) with calcium & iron in colon & in kidneys (also in urinary tract) to form crystals & is excreted in urine as minute crystals (little is excreted in stool also) if taken in large quantity can cause kidney stones.

Also when fat is not absorbed properly, the fats binds with calcium and leaves oxalate behind, this oxalate is taken up by kidneys to excrete it; it also prevents absorption of calcium & other minerals; Presence of prebiotic can effect oxalic acid excretion, fig contains prebiotic & oxalates both. Our body makes oxalates as an end product of protein, vitamin c etc metabolism. It is excreted in urine & stool. Oxalate present in food is soluble & insoluble, insoluble bind with calcium or other molecules that makes it much harder to absorb; soluble do not bind with other molecules & is easily absorbed. Absorption of it differs among people, for some, oxalate is largely broken down in the intestines & eliminate without causing issues; in some, large amount of oxalate is absorbed; & in some, leaky gut can increase the absorption of it & the needle shaped oxalate crystals can perforate the mucus membrane damaging the cells of intestine & cause more leakiness.

Leaky gut is also called as increased intestinal permeability, it is a condition in which many things can pass through the intestinal wall, and this occurs due to breach in intestinal wall or damaged cells, things can pass through their gaps (breach).

Excessive oxalate accumulates in crystal form in many parts of the body like joints, muscles, kidneys etc.

Basic clinical pharmacology of oxalate: -

It reduces absorption of some minerals because it binds with some mineral in the intestine, if taken in larger amount causes kidney stones, autism, vaginal pain etc; we should drink lot of water to avoid excessive oxalate collection in the body & to flush out; its benefits in human body is under research.

- **Prebiotic: -**

It is non digestible (fibre or carbohydrate) food ingredient that promotes the growth of beneficial bacterias & fungus in the intestines. It induces the growth & activities of helpful bacterias & fungus (the probiotics) which help the digestive process. Naturally found prebiotics are not broken down nor absorbed in the intestines; beneficial bacterias & fungus use this fibre in fermentation. It is mainly of 3 types 1) inulin 2) oligosaccharides 3) arabinogalactans.

Inulin & oligosaccharides are short-chain polysaccharides or chain of carbs, which act at different location in the colon ensuring complete intestinal health by increasing & maintaining the population of good bacterias, fungus & yeast; & arabinogalactans are class of long, densely branched high-molecular polysaccharides.

Main sources of prebiotics: -

Garlic, onions, leeks, banana, chicory root, skin of apple, beans, radish, carrots, tomato, coconut, bark of larch tree etc.

Basic clinical pharmacology of prebiotics: -

It is helpful for immune system throughout the life, helpful in fetus health, reduces risk of eczema, inhibit allergies, helpful in milk tolerance in infants, promote T helper cells which are vital for immune system, controls increased permeability of intestine, controls leaky gut, reduces inflammation of intestine, maintain health of intestines, prevent obesity, balance energy level, enhance activity of vitamins, inhibit growth of bad bacterias, help the digestive process etc.

- **Potassium: -**

It is a mineral with symbol K & atomic number 19, it is an essential mineral which body cannot prepare; it is necessary for heart, kidney & other organs to function, its low level in body is called as hypokalemia & high level is called as hyperkalemia; it is mostly present inside the cells (intracellular); normal blood range is 3.5 to 5.0 milli equivalents per/liter (mEq/L).

Main sources of potassium: -

Potassium is naturally present in figs, banana, orange, dates, raisin, broccoli, milk, chicken, sweet potato, pumpkin, spinach, watermelon, coconut water, white & black beans, potato, dried apricot, beetroot, pomegranate, almond etc.

Basic pharmacokinetics of potassium (bases on human intake in natural food products): -

It is absorbed in small intestines by passive diffusion; it is stored mostly inside the cell, little in liver, bones & red blood cells. 80 to 90% potassium is excreted in urine & 5 to 20% is excreted in stools, sweat.

Basic clinical pharmacology of potassium: -

It is a mineral belongs to electrolytes of the body; it conducts electrical impulses throughout the body & assists blood pressure, normal water balance, muscle contraction, nerves impulse, digestion, heart rhythm, maintain pH balance. It is not produced in our body so we need to consume it through eating; Kidneys maintain normal level of it in the body by excreting excessive amount of it in urine or reabsorb it if the amount is less in the body so that the body may reuse it. Its deficiency may cause weakness, low blood pressure, constipation, nausea, vomiting etc.

Its normal amount in body keeps blood pressure normal; water balance in body normal; prevents heart disease, stroke, osteoporosis, kidney stone etc.

- **Vitamin C: -**

It is also called as Ascorbic acid; it is an essential water soluble vitamin, very much needed by the body for many functions & absorption etc.

Main sources of vitamin C: -

It is present in watermelon, citrus fruit, fig, beetroot, broccoli, cauliflower, sprouts, capsicums, papaya, strawberries, spinach, green & red chillies, cabbage, leafy vegetables, tomato, cereals etc.

Basic pharmacokinetic of vitamin C (based on human intake in natural food products): -

It does not need to undergo digestion, 80 to 90% of it eaten is absorbed by intestine cell border by active transport & passive diffusion & through ion channels it enters the plasma via capillaries. It is very little stored in adrenal glands, pituitary gland, brain, eyes, ovaries, testes, liver, spleen, heart, kidneys, lungs, pancreas & muscles. All together body can store 5 grams of it & we need 200mg/day in order to maintain its normal level & uses, but old, disease person, smokers & alcoholic need more daily value. It is excreted in urine in the form of dehydroascorbic acid changed by liver & kidneys both, but unused vitamin C is excreted intact.

Basic clinical pharmacology of vitamin C: -

It prevent cough & cold, repairs tissue, acts as an enzyme for curtain neurotransmitter, important for immune function, it is a powerful antioxidant (donates electron to various enzymatic & non-enzymatic reactions); body prepares collagen with the help of vitamin c; it is also helpful in Alzheimer's, dementia, acts on iron absorption, it protects the body from oxidative damages, reduces stiffness of arteries, reduces tendency of platelets to clump each other, improves nitric oxide activity (dilatation of blood vessels) thus prevents high blood pressure & heart disease, also prevent eye disease, reduces risk of cataract, prevents the lining of lungs & prevents lung disease, it is a natural antihistamine (anti allergy), eliminates toxins from the body etc. Deficiency of it causes Scurvy disease (brown spots on skin occurs, swelling of gums, bleeding from all mucous membrane, spots are more on thighs & legs, the person looks pale, feel depressed, cannot move, loss of teeth, suppurative wounds occur.

- **Vitamin A: -**

It is a fat soluble vitamin; it is group of unsaturated organic compound that includes retinol, retinal, retinoic acid & several provitamin A carotenoid. There are 2 types of vitamin A, 1) Vitamin A: - found in meat, poultry, fish & dairy products; 2) Provitamin A: - found in fruits, vegetables, plants; beta carotene is common type of provitamin A; it is an antioxidant, reduces wrinkles & repairs the skin damages; it is available in the market as tretinoin in tablets & creams to heal acne.

Main sources of vitamin A: -

It is present in watermelon, beetroot, fig, fish oil, carrot, green leafy vegetables, citrus fruit, sweet potato, spinach, kale etc.

Basic pharmacokinetic of vitamin A (based on human intake in natural food products): -

It is absorbed in jejunum mainly, little through skin; metabolism is in liver & excreted in urine & stools, it is conjugated with glucuronic acid & then changed into retinal & retinoic acid; retinoic acid is excreted in stool, mainly. It is stored primarily as palmitate in Kupffer's cells of liver, normal adult liver stores sufficient amount of it which is enough for 2 years for the body, little is stored in kidneys, lungs, adrenal glands, fats, retina; it is excreted in urine & stools.

Clinical pharmacology of vitamin A: -

it is needed by the body for vision and maintains eye health specially retina; it prevents night blindness; it helps in normal reproduction of cells thus prevents cancer; it is required for proper growth & development of embryo throughout the pregnancy period, it is good for skin, supports immune function; helps the heart, kidneys & lungs to work properly.

- **Vitamin B1 (Thiamin): -**

It is called as Thiamin also; it is a water soluble vitamin, it belongs to B-complex family, it is an essential micro nutrient which cannot be made by our body.

Main sources of vitamin B1: -

It is present in watermelon, spinach, legumes, fig, beetroot, banana, wheat germ, liver, egg, meat, dairy products, nuts, peas, fruits, vegetables, cereals, rice, breads, oats etc.

Basic pharmacokinetic of vitamin B1 (based on human intake in natural food products): -

Intestinal phosphatases hydrolyze thiamin to make it free & absorbed in duodenum, jejunum mainly through active transport in nutritional doses & passive diffusion in pharmacological doses, very little is known about its absorption; it is metabolized in liver; it is excreted in urine & stored little in liver, heart, kidney, brain, muscles.

Clinical pharmacology of vitamin B1: -

It is needed for metabolism of glucose, amino acids (proteins), lipids (fats) etc; every cell of the body require it to form ATP (adenosine triphosphate) as a fuel for energy, also it enables the body to use carbohydrates as sources of energy; also nerve cells, heart cells, muscles cell require it to function normally; its deficiency causes beri-beri heart disease, weight loss, confusion, malaise, optic neuropathy, irritability, memory loss, delirium, muscles weakness, loss of appetite, tingling sensation in arms & legs, blurry vision, nausea, vomiting, reduce refluxes, shortness of breath etc; it is helpful to immune system; excessive intake of carbohydrates, protein, glucose (specially in body builders, athletes etc) increases the need of vitamin B1.

- **Vitamin B2: -**

It is also called as Riboflavin, it is a water soluble vitamin, it is an essential micro nutrient, it helps many systems of the body; it is not synthesized in human body.

Main sources of vitamin B2: -

It is present in watermelon, liver, milk, fig, dairy products, nuts, egg, fish, leafy vegetables, almonds, mushroom, lean meat and beetroot.

Basic pharmacokinetic of vitamin B2 (based on human intake in natural food products): -

It is phosphorylated in the intestinal mucosa during absorption; mainly absorbed in upper gastrointestinal tract; the body absorbs little from a single dose beyond of 27mg; when excessive amount is eaten it is not absorbed; very little is known about its absorption. The conversion of it into its coenzymes takes place mainly in cells of small intestines, heart, liver, kidneys & throughout the body in many cells; it is excreted in urine & stored little in liver, heart, kidneys & in tissues of the body.

Basic clinical pharmacology of vitamin B2: -

It is needed by the body to keep skin, eyes, nerves, red blood cells healthy, it also helps adrenal gland, nerve cells, heart, brain to function; it also act in metabolism of food, amino acids (protein), fats, helps to convert carbohydrate into energy (Adenosine triphosphate formation- the energy body runs on). It plays an important role in functioning of mitochondria.

Its deficiency is called as Ariboflavinosis & causes weakness, throat swelling, soreness of mouth & tongue, cracks on skin, dermatitis, anemia, weak vision, itching & irritation in eyes, migraine.

- **Vitamin B3: -**

It is called as Niacin or Nicotinic acid; it is in 2 forms niacin & nicotinamide acid; it is water soluble vitamin; it is an essential micro nutrient; it plays a role in over 200 enzymatic reactions in the body; It is produced in the body in small amount from tryptophan which is found in protein containing food & sufficient amount of magnesium, vitamin B6 & B2 (are needed to produce it).

Main sources of vitamin B3: -

It is present in watermelon, figs, green peas, peanuts, mushroom, avocados, meat, egg, fish, milk, cereal, green vegetables, liver, chicken, coffee, potato, corn, pumpkin, tomato, almonds, spinach, enriched bread, carrots, beetroot etc.

Basic pharmacokinetic of vitamin B3 (based on human intake in natural food products): -

If eaten in natural form it is absorbed in stomach & small intestines by the process of sodium-dependent carrier-mediated diffusion in 5 to 20 minutes; if taken in therapeutic doses get absorbed by passive diffusion in small intestines. Its uptake in brain requires energy, in kidneys & red blood cells requires a carrier. It is metabolized in liver in 2 ways either is conjugated with glycine or niacin is form into nicotinamide; it is stored little in liver unbounded to enzymes. It is excreted in urine.

Basic clinical pharmacology of vitamin B3: -

It regulates lipid level in the body; it acts on carbohydrate to form energy sources for the body, it ease arthritis, boost brain function, every part of body needs it to function properly, it helps convert food into energy by aiding enzymes & cellular metabolism, it acts as an antioxidant. It prevents heart disease. Deficiency of it causes pellagra, high blood cholesterol, memory loss, fatigue, depression, diarrhea, headache, skin problems, lesion in mouth, tiredness etc.

- **Vitamin B5 (pantothenic acid): -**

It is also called as pantothenic acid, it is water soluble vitamin, it is a micro nutrient, it is necessary for making blood cells; acts to convert eaten proteins, carbohydrate, fats into energy; it is a component of coenzyme A; it is used in synthesis of coenzyme A. (coenzyme A acts on transport of carbon atoms within the cell).

Main sources of vitamin B5: -

It is present in watermelon, beetroot, fig, meat, chicken, liver, kidney, fish, grains, milk, dairy products, legumes etc.

Basic pharmacokinetic of vitamin B5 (based on human intake in natural food products): -

It is converted into free form by intestinal enzymes & in nutritional doses it is absorbed in intestinal cells via sodium dependent active transport system in jejunum & pharmacological doses are absorbed by passive diffusion; after absorption the free form of it is now transported to erythrocytes via plasma, in cells pantothenic acid is converted into CoA, all the body tissues can convert it into CoA & ACP (acyl carrier protein), after these two complete their jobs they are degraded to form free pantothenic acid & other metabolites. It is excreted in urine & stools & little in exhaled in carbon dioxide.

Basic clinical pharmacology of vitamin B5: -

It promotes skin, hair & eyes health, proper functioning of nervous system & liver, formation of red blood cells, making of adrenal hormones, sex hormones; it is very helpful in constipation, rheumatoid arthritis, acne, allergies, asthma, baldness, colitis etc.

Its deficiency causes fatigue, nausea, vomiting, irritability, neurological weakness, numbness, abdominal cramps, sleep disturbances, hypoglycemia etc.

- **Vitamin B6: -**

It is also called as pyridoxine; it is involved in many aspects of macronutrients metabolism; it is present in many food products naturally.

Main sources of vitamin B6: -

It is present in watermelon, fig, chicken, bread, egg, vegetable, soyabean, whole grain cereals, brown rice, fish, legumes, beef, nuts, beans, liver, citrus fruits, starchy vegetables, potato, beetroot etc.

Basic pharmacokinetic of vitamin B6 (based on human intake in natural food products): -

It is absorbed in small intestines, but before absorption a phosphate group has to be removed making vitamin B 6 in free form & absorbed by passive transport, now reaches liver via portal vein,

in liver to get metabolized & flown into the blood stream it is bound with albumin & some are taken up by red blood cells, once getting in blood it can function & promote health & it is excreted mainly in urine & little is excreted in stools, it is very little stored in tissues, muscle tissues, liver, brain, kidneys, spleen.

Basic clinical pharmacology of vitamin B6: -

It is needed for proper development & function of brain in children; it is needed for neurotransmitter, histamine, haemoglobin synthesis & function. It serves as coenzyme (cofactor) for many reactions in the body, it is the master vitamin for processing amino acids & some hormones, it is needed by the body to prepare serotonin, melatonin & dopamine, it is better to intake it during treatment of tuberculosis. It supports adrenal glands to function; it acts as a coenzyme in the breakdown & utilization of fats, carbohydrates, protein, it is important for immune system, it helps in treatment of nerve compression like carpal tunnel syndrome, premenstrual syndrome, depression, arthritis, high homocysteine level, diabetes, asthma, kidney stones etc.

Its deficiency causes seborrheic dermatitis (eruption on skin), atrophic glossitis with ulceration, conjunctivitis, neuropathy, anaemia etc.

- **Folate (vitamin B9): -**

Folate is an essential micro nutrient, it is a natural form of vitamin B9, it serves many important functions of the body, it plays an important role in cell growth & formation of DNA, RNA & other genetic material & helps in treating many diseases; its name is derived from Latin word Folium, which means leaf, leafy vegetables have it in good amount; Folic acid is a synthetic form of vitamin B9.

Main sources of folate: -

It is present in watermelon, fig, dark green leafy vegetables, fruits, nuts, beans, dates, seafood, egg, dairy products, meat, chicken, legumes, beetroot, citrus fruits, broccoli, spinach, cereals etc.

Basic pharmacokinetic of folate (based on human intake in natural food products): -

Its absorption is complicated because folate present in food are of many different forms, some of which cannot be absorbed until broken down by intestinal enzymes; it is not absorbed more than 50%; dietary folate contains glutamate that need to separate it from glutamate before absorption starts; It is absorbed in duodenum & jejunum, after absorption it is converted into tetrahydrofolate (the active form of folate), then a methyl group is added to it to form methyltetrahydrofolate; now the body uses it for various functions & metabolism; the body can store folate 20-70mg in liver which is enough for 3 -6 months for the body; it gets excreted in urine & little in stools & bile.

Basic clinical pharmacology of folate: -

It is needed by the body to make DNA, RNA & other genetic material; it prevents many disease & conditions like anaemia, stroke, cardiac diseases, cancers, neurological diseases, macular degeneration (eye disease), palpitation, sores in mouth & tongue, hair fall, graying of hair. It is important in fertilization in male & female, essential during pregnancy to prevent neural tube defect in embryo (it is needed more), it protect us from free radicals & oxidation thus prevent cancers, it is essential in red blood cells formation, reduces high levels of homocysteine.

Its deficiency may cause anaemia, tiredness, palpitation, breathlessness, hairfall, neural tube defect in baby during pregnancy etc.

- **Sodium: -**

Here we are learning natural sodium, its symbol is Na & atomic no. 11; it is not produced in the body we need to take it in food sources; it is an important & essential mineral on which our body functions; it regulates blood pressure, blood volume etc.

Main sources of sodium: -

Excessive intake of sodium should be avoided; fig has very less amount of sodium in it; also vegetables & fruits have less sodium in them which is good for the body. It is present in beans, meat, fish, chicken, chilli, bread, rolls, milk, celery, beetroot, fig etc.

Basic pharmacokinetic of sodium (based on human intake in natural food products): -

It is absorbed in ileum by active sodium transport because it is impermeable & in jejunum absorption takes place via mediated active transport & depends on levels of water, bicarbonate, glucose, amino acids etc; its absorption plays an important role in the absorption of chloride, amino acids, glucose & water; similar mechanism are involved in the reabsorption of it in kidneys when its level in the body falls. It is excreted mainly in urine, little in sweat & stools. It is stores in bones & dissolved in various body fluids.

Basic clinical pharmacology of sodium: -

It is amongst the essential electrolyte within the body, it remains in extracellular fluid (outside the cell) mainly, it carries electrical charges within the body, kidney maintain its normal level in the body, normal level is 135-145 milli-equivalent per liter (mEq/L), it is not produce in the body, it acts on muscles contraction, nerve cells, regulates blood pressure, blood volume; it takes part in every function of the body mostly, its low level in body is called as hyponatremia, it is found more in older aged, kidney disease, heart disease, hospitalized patient, this condition may cause brain edema, low blood pressure, fatigue, tiredness etc; its high level in the body is called as hypernatremia may cause increase in blood pressure, thirst, confusion, muscle twitching or spasm, seizures, weakness, nausea, loss of appetite, swelling in body etc.

- **Calcium: -**

It is natural essential mineral for the body, it is among the electrolytes of the body; its symbol is Ca & atomic no. 20.

Main sources of calcium: -

It is present in watermelon, milk, banana, cheese, fig, green leafy vegetables, soya beans, nuts, fish, meat, egg, bread, flour, yogurt, almonds, kale, soybean, spinach, beetroot etc.

Basic pharmacokinetics of calcium (based on human intake in natural food products): -

Calcium is absorbed in duodenum & upper jejunum (when calcium intake is low) by transcellular active transport process, this depends on action of calcitriol & intestinal vitamin D receptors & when calcium intake is high, absorbed by paracellular passive process throughout the length of small intestine by 3 major steps, entry across the brush border, intracellular diffusion via calcium-binding protein & extrusion; Vitamin D is necessary for absorption of calcium, also vitamin C, E, k, magnesium & exercise increases the absorption of calcium. Also the level of calcium is regulated by calcitonin released by thyroid gland it reduces calcium level in blood when it is excessive & increases the excretion of calcium via kidneys; Parathyroid hormones (PTH) released by parathyroid gland increases the blood level of calcium when body need it or calcium is less in blood & promotes reabsorption of it in kidneys (calcitonin & PTH both have opposite function). Intestines can absorb 500 to 600 mg of calcium at a time; it is mostly stored in bone tissues & teeth & excreted in stool & sweat & little in urine depended upon the level of it in blood. Also estrogen act on transport of blood calcium in bones thus women mostly suffer from osteoporosis after menopause.

Basic clinical pharmacology of calcium: -

Calcium acts on bone health, communication between brain & other parts of the body, muscles contraction, blood clotting; it is a co-factor for many enzymes, it relaxes the smooth muscles & blood vessels; it maintains heart rhythm, muscles function; it is more needed in childhood & deficiency of it in childhood may cause convulsions (seizure); Excessive level of it in blood is called as hypercalcemia & may lead to kidney stone formation, heart attack, stroke, loss of appetite, excessive urination, memory loss etc; its low level in blood is called as hypocalcemia & may lead to cramps in the body, weak bones, weak teeth, numbness, tingling etc.

Contraindication: -

Sarcoidosis, excessive level of calcium in blood, very severe constipation, kidney stones, increased activity of parathyroid gland etc. Hypersensitivity of calcium, severe cardiac diseases, hypercalcemia, hypercalciuria, severe kidney stones etc.

- **Iron: -**

It is an essential mineral for our body; its symbol is Fe & atomic no. 26; it is an important component of haemoglobin (haemoglobin binds oxygen in lungs & supply it to whole body, it is oxygen carrier).

Main sources of iron: -

It is present in watermelon, meat, dates, spinach, egg, nuts, dark leafy green vegetables, broccoli, pumpkin seeds, chicken, legumes, fish, banana, cabbage, kidney, almonds, beetroot, fig etc.

Meat is the best source of iron, it provides Fe⁺² directly which can be transported from intestine to blood stream through Fe⁺² transporter ferroportin (this binds with transferrin & delivered into tissues).

Basic pharmacokinetics of iron (based on human intake in natural food products): -

The absorption of iron is not known fully; about only 10% of iron taken in food is absorbed; it is absorbed in duodenum & upper jejunum mainly & at the end part of ileum; low pH is needed for its absorption, after absorption it get bind to transferrin (each transferrin can carry 2 atoms of iron); ceruloplasmin (protein) also helps in binding of iron; Heparin a hormone produced by liver is released when iron stores are full & inhibits iron transport & binding, thus reduces the absorption of iron; vitamin C & copper enhances iron absorption.

Storage of iron: -

Iron is stored in liver (in hepatocytes & kupffer's cells) kupffer's cells play an important role in recycling body iron, they ingest aged RBC liberate iron for it & reuse by breaking down haemoglobin. Little iron is stored in liver, heart, & kidneys in form of ferritin also little in bone marrow, spleen.

Excretion of iron: -

The body does not possess a physiological mechanism for regularly eliminating iron from the body because most of it is recycled by liver cells; iron is lost within cells, from skin & interior surface of the body (intestines, urine, breathe).

Basic clinical pharmacology of iron: -

It is an important component of Haemoglobin (haemoglobin bind oxygen in lungs & supply it to whole body); iron is beneficial for nails, hair, skin etc; it acts on blood production, its deficiency causes Anaemia (low haemoglobin level in blood) (this causes reduced in oxygen carrying capacity & supply of it); most of the iron is present in haemoglobin, it consist of one heme (iron), one protein chain (globin) this allows it to bind & load oxygen from the lungs & supply it to whole body.

Unbounded or free iron is highly destructive & dangerous it can trigger free radical activity which can cause cell death & destroy DNA.

- **Magnesium: -**

It is an important essential mineral; its symbol is Mg & atomic no. 12; it is a co-factor for more than 300 enzymes that regulates functions in the body. Its normal range in blood is 0.75 to 0.95 millimoles (mmol)/L.

Main sources of magnesium: -

It is present in watermelon, spinach, beetroot, meat, egg, nuts, dark leafy green vegetables, broccoli, pumpkin seeds, dates, chicken, fish, legumes, fig etc.

Basic pharmacokinetics of magnesium (based on human intake in natural food products): -

It is absorbed about 20 to 50% only; it is absorbed about 40% in distal intestine when the level of it is low via passive paracellular transport & about 5% in descending colon when the level of it is high via active transcellular transport. Vitamin D increases its absorption & also acts on its excretion in urine. It is excreted in urine & stool; it is stored in bones.

Basic clinical pharmacology of magnesium: -

It is a co-factor for more than 300 enzymes that regulates functions in the body. It act on protein synthesis, muscles & nerve function, blood glucose, control blood pressure, it is required for energy production, bone development, synthesis of DNA & RNA. It also plays a role in active transport of calcium & potassium ions, muscles contraction, normal heart rhythm etc.

- **Phosphorus: -**

It is an essential mineral; its symbol is P & atomic no. 15, it is needed for many parts & functions of the body.

Main sources of phosphorus: -

It is present in watermelon, beetroot, meat, nuts, beans, fish, chicken, dairy products, soy, grains, lentils, fig etc.

Basic pharmacokinetics of phosphorus (based on human intake in natural food products): -

It is absorbed 70-85%, it is absorbed 30% in duodenum, 20% in jejunum, 35% in ileum; it is absorbed in inorganic phosphate form by 2 separate process first when the phosphorus intake is high mainly after meals by paracellular sodium independent passive diffusion pathway & second is transcellular sodium dependant carrier-mediated pathway this falls under the control of vitamin D & etc. When calcium level is too high in the body phosphorus is less absorbed, optimum calcium : phosphorus ratio is helpful in its absorption (excess of anyone decreases the absorption of both). It is stored in bones 85% & rest in tissues; it is excreted 80% in urine & rest in stools (excretion of it is a regulatory action of parathyroid hormone (PTH), vitamin D, and fibroblast).

Basic clinical pharmacology of phosphorus: -

It is present in nature combined with oxygen as phosphate. It acts on growth of teeth, bones, repairs of cells & tissues. It plays an important role in metabolism of carbohydrate, fats, protein & ATP. It works with B-complex vitamins & helps kidney function, muscles contraction, normal heart beats, nerve impulse etc.

- **Zinc: -**

It is a trace mineral; symbol is Zn & atomic no. 30; it is necessary for human body as it plays vital role in health.

Main sources of zinc: -

It is present in watermelon, meat, fish, legumes, beans, egg, dairy products, seeds, nuts, whole grains, beetroot, fig etc.

Basic pharmacokinetics of zinc (based on human intake in natural food products): -

It is absorbed 20 to 40%, its absorption depends on its concentration & is absorbed in whole intestines (jejunum has high rate of its absorption) via carrier-mediated mechanism, it is released from food as free ions during digestion. Zinc from animal sources is easily absorbed comparing to plants sources. It is present in bile & pancreatic juices which is released in duodenum & is reused by the body this is called as endogenous zinc & zinc present in food sources is called as exogenous zinc. Its absorption depends on 2 proteins- Albumin & metallophilonein. Albumin enables zinc to be transported from plasma into enterocytes. It is stored in muscles, bones mainly & little in prostate, liver, kidneys, skin, brain, lungs, heart & pancreas. It is excreted in stools 80% & rest in urine & sweat. Metallophilonein binds to zinc to make it unavailable & excrete it in stools when zinc is excess in the body, & production of metallophilonein is reduced when zinc is less in the body to make zinc available for the body.

Basic clinical pharmacology of zinc: -

It is necessary for immune system, prevents skin diseases, heal skin diseases, helps stimulate activity of at least 100 different enzymes in the body; it is required in little amount in the body, but children, pregnant & old aged need it more. It promotes growth in children, synthesize DNA & acts on wound healing, it is best in treating initial diarrhea & cold cough. It improves learning, memory, fertility etc. It heals acne, attention deficit hyper activity disorder (ADHD), osteoporosis, pneumonia etc.

- **Carbohydrate: -**

It is a macronutrient needed by the body, the body receives 4 calories per 1 gram of it; carbohydrates includes sugar, glycogen, starch, dextrin, fibre & cellulose that contain only oxygen,

carbon & hydrogen. It is classified in simple & complex; simple carbs are sugar & complex carbs are fibre & starch which take longer to digest. It is basic source of energy for our body.

Main sources of carbohydrates: -

It is present in watermelon (little), potato, sweet potato, bread, oats, butter, white rice, whole grain rice, pasta, lentils, banana, pineapple, beetroot etc.

Basic pharmacokinetic of carbohydrate (based on human intake in natural food products): -

Its digestion begins in mouth; salivary glands releases saliva & salivary amylase (enzyme) which begins the process of breaking down the polysaccharides (carbohydrates) while chewing the food; now the chewed food bolus is passed in stomach through food pipe (esophagus); gastric juice like HCL, rennin etc & eaten material are churned to form chyme in the stomach; the chyme now is passed little by little down into duodenum, pancreatic amylase are released which break the polysaccharides down into disaccharide (chain of only sugars linked together); now the chyme passes to small intestine, in it enzymes called lactase, sucrase, maltase etc breakdown disaccharides into monosaccharide (single sugar) & absorbed in upper & lower intestines, through villi present in small intestine & send into liver through venous blood present into portal veins, as per bodies need it is releases in the blood stream & pancreas release insulin to use it as source of energy for the body, & extra is stored is converted into glycogen by liver & stored in liver & little is stored in muscles & tissues. Liver can reconverts glycogen in to sources of energy if body lacks for other source of energy, the undigested carbohydrates reaches the large intestine (colon) where it is partly broken down & digested by intestinal bacterias, the remains is excreted in stools.

Clinical pharmacology of carbohydrates: -

Carbohydrates are main sources of body energy, it helps brain, kidney, heart, muscles, central nervous system to function, it also regulates blood glucose, it acts on uses of protein as energy, breakdown of fatty acids & prevent ketosis. So it is an instant energy provider for the body & best for pre & post workout. If we eat less carbohydrate it may lead to hypoglycemia, ketosis, frequent urination, fatigue, dizziness, headache, constipation, bad breath, dehydration etc.

Excessive intake of carbohydrates may lead to vascular disease, atherosclerosis (leads to narrowing of arteries, stroke, diabetes, obesity, fatty liver, blood pressure etc.

- **Sugar (fructose): -**

Sugar present in fig is mainly fructose; (but diabetic patients should not eat much of it).

Main sources of fructose: -

It is present in watermelon, honey, banana, apple, mango, cherry, strawberry, orange, kiwi, pears, pomegranate, apricots, carrots, yogurt, bread, lemon, lime, green beans, beetroot etc.

Basic pharmacokinetics of fructose (based on human intake in natural fruit & food products): -

Fructose digestion begins in the small intestine (more in upper jejunum) via active transport or facilitated transport (not known properly). Our body cannot absorb intact polysaccharide molecules. Therefore, if fructose is present in the form of sucrose, sucrase, an enzyme, must first break up sucrose into separate glucose and fructose components. Single fructose molecules then enter the lining of the small intestine through a special channel and exit out the other side into the bloodstream, once in the bloodstream, fructose travels with all other absorbed nutrients to the liver for metabolism and processing.

Metabolism: -

Fructose metabolism occurs entirely in the liver. Through a complicated process called fructolysis, fructose undergoes several chemical and structural changes with the help of aldolase B (an enzyme in the liver).

Extra fructose needs to be changed into glycogen by liver & stored in liver, once the storage is full in liver then liver convert it into triglycerides & triglycerides are further converted by liver into very low-density lipoprotein (VLDL) & stored in fat cells & muscles. Excessive fructose is excreted in urine.

Basic clinical pharmacology of fructose: -

Fructose has low glycemic index & results in moderate release of insulin in the blood stream relative to glucose & sucrose; fructose gives the least dental caries among other types of sugars, fructose is more sweeter than other types of sugar; it does not raises blood sugar much as glucose does, it is used as sources of energy in the body, excessive intake of it may cause fatty liver, metabolic disorder, blood pressure, increase lipids, increase in uric acid level, increase in free radicals etc.

- **Choline: -**

It is water soluble vitamin & essential nutrient, it is a constituent of lecithin; it helps in many functions of the body.

Main sources of choline: -

It is present in watermelon, egg, peanut, fish, dairy products, wheat, beetroot, spinach, beans, whole grains, fig etc.

Basic pharmacokinetics of choline (based on human intake in natural food products): -

Choline is mostly present in food in free form; it is absorbed in small intestine via transporter proteins & metabolized in liver; excessive choline is not stored but converted into phospholipids; it is changed into Trimethylamine in liver & is excreted in urine.

Basic clinical pharmacology of choline: -

It helps the nerves to develop signals. Our body makes some amount of choline, but should be consumed to avoid deficiency; it helps liver function, brain development, muscles movement, cell

messenger system, DNA synthesis, nervous system, gall bladder function; it can be taken in pregnancy because it prevents neural tube defect. It aids in fats & cholesterol metabolism & prevent excessive fat building in liver.

- **Copper: -**

It is an essential micronutrient mineral; its symbol is Cu & atomic no. 29; there are lot of health benefits of it; it is needed in little amount in the body.

Main sources of copper: -

It is present in beetroot leaves, watermelon, spirulina (water-plant), nuts, seeds, lobster, leafy green vegetables, guava, grapes, green olive, kiwi, mango, pineapple, pomegranate, egg each.

Basic pharmacokinetics of copper (based on human intake in natural food products): -

It is absorbed 30 to 50%; it is absorbed easily than other minerals, its absorption depends on the copper present in the body, when the intake of it is less, absorption is increased & when intake is more absorption is less, it is mainly absorbed in small intestines & little in stomach via carrier-mediated process; its absorption is influenced by amino acids, vitamin C & other dietary factors. After absorption it is bound primarily to albumin, peptide & amino acids & transported to liver. Copper is secreted into plasma as a complex with ceruloplasmin. It is mainly stored in liver little in brain, heart & kidneys; it is excreted mainly in bile & little in urine.

Basic clinical pharmacology of copper: -

Together with iron it enables the body to form RBC; it helps to maintain health of bones, blood vessels, nerves & immune system; it also acts on iron absorption, protein metabolism, growth of body, it acts also on development of brain, heart & other organ; it is needed by the body for making ATP, collagen. Excessive of it may cause Wilson's disease.

Deficiency of copper: -

It is very rare; but may cause cardiovascular disease, genetic defects, inflammation of optic nerve etc.

- **Dietary fibre: -**

It is an eatable part of vegetables & fruit; our body cannot digest it just passes the small intestines & colon & excrete in stools; it is of two types 1) soluble fibre 2) insoluble fibre.

Soluble fibre dissolve in water & form a gel like material & helps in controlling blood cholesterol & blood glucose; it is found in apple, carrot, barley, oats, peas, beans, watermelon, fig etc.

Insoluble fibre do not dissolve & promotes excretion & increase bulk of the stool thus relief constipation & helps in elimination of toxins also. It is found in wheat flour, beans, cauliflower, potato, green beans, watermelon etc.

Watermelon & fig has both types of fibres in it, this is the reason it is helpful in constipation conditions, it can eaten in pregnancy to relief constipation and get other benefits of it also.

Basic pharmacokinetics of dietary fibre (based on human intake in natural food products): -

Soluble fibres get dissolve in water & become a gelatinous substance; do not get digested; it helps to slow the digestion & help the body to absorb vital nutrient from eaten food.

Insoluble fibres do not dissolve in water but remain in fibrous form, and do not get digested; it helps the food pass through the digestive sytem and increase the bulk of stool & eliminate toxins also.

Basic clinical pharmacology of dietary fibre: -

It helps in slow down the digestive process thus gives a good control in blood glucose, improves insulin sensitivity, reduces risk of diabetes, maintains weight, helpful in obesity, reduces blood pressure, reduces cholesterol, reduces inflammation, reduces risk of heart disease, relieves constipation thus helpful in piles, fistula & other rectal disorders & disease, improves bowel movement thus improves bowel health, slowdowns the digestion thus improves quality of digestion, reduces risk of many types of cancer.

Its uses: -

It is used as a medicine, in milk shake, sweets, juices, custard, cooked in food items, ice creams, jams, pudding, eaten raw (fresh or dried), good for patients suffering from typhoid, dengue, malaria, cold cough, weakness, recovery stage, body building, piles, arthritis etc.

Gross health benefit & indications of dried & fresh figs: -

It is very helpful in piles, constipation, controls blood pressure, boost health, beneficial in recovery from malaria, dengue, typhoid, weakness; controls weight because it is low in calories, strengthen the bone, joints, muscles etc; very beneficial in osteoarthritis, skin, complex, nails, hair, it is an antioxidant, present cancer, free radicals, removes harmful effect of UV sun rays, improves digestion, prevents colon, breast & many types of cancers, reduces risk of heart diseases & cardio vascular disease, helps liver to function, reduces cholesterol & triglycerides; helpful in anaemia, reduces blood sugar, increases libido in both male & female, helpful in treating asthma; prevents venereal diseases, reduces throat pain, prevent eye & eye sight, good for complexion & skin health, prevents ageing etc.

- **Modern uses of fig:** -please note it is Sunnah to eat two opposite quality stuff together, one of hot potency (acidic) & other cold potency (alkaline).

For complexion: -

Take one fresh or dried fig soak it overnight in one glass water or cow milk, filter & drink the water early morning empty stomach & take the pulp of fig and apply on face, keep it for 20 minutes & wash the face with warm water, do it once or twice a week; by it acne reduces & heals, tightens the facial skin, clears the pores, reduces sebum & oil, improves fairness.

For constipation: -

Take 1 dried fig, soak in 1 glass of water overnight, drink & eat the pulp early morning empty stomach daily for 40 days & eat 1 teaspoon of senna powder at night & drink 1 glass water on it for 40 days then alternative days for 40 days then twice a week for 7 weeks.

For irritable bowel syndrome (IBS) or other gastric problem: -

Take 1 dried or fresh fig, 1 small size cucumber, 1 carrot, half beetroot, 3 dates, one teaspoon of barley flour roasted, 1 cup warm water, 7 seeds of black caraway (kalonji)-prepare juice out of these & drink it in breakfast for 21 days & alternative days till complete relief after relief twice a week for 21 weeks followed by once a week for 21 days.

For general health: -

Take 1 dried fig, 3 pieces of watermelon, 3 dates, 1 small cucumber, 3 almonds, 1 cup cow milk eat these at breakfast twice a week for 11 weeks followed by off for 3 weeks & again start, repeat the cycle regularly.

For heart health: -

Take 1 dried or fresh fig, 3 dates, 1 beetroot, 1 teaspoon of extra virgin olive oil, 1 small tomato, 3 pieces of watermelon prepare juice out of these & drink at breakfast 2 times a week regularly.

For bones health & to prevent cancer: -

Take 1 dried fig soak it in 1 table spoon of extra virgin olive oil overnight, put 1 table spoon of pure honey, take 3 pieces of watermelon, 3 dates, half orange eat these at breakfast for 3 times a week for 40 weeks.

For malaria, dengue & typhoid: -

Eat fresh or dried fig 3, watermelon 3 slice each time for 2 to 3 times a day for 5 days.

For piles: -

Eat 3 dried fig or fresh fig, 7 pieces of watermelon, 3 dates daily at night for 11 days followed by 11 alternative days followed by once a week for life long.

For arthritis: -

Eat 1 dried fig, 1 date, lick 1 spoon pure honey & 1 spoon aloe vera gel daily morning for 40 days & 1 cup cow milk with 1 teaspoon of turmeric powder at night for 40 days.

FIG			NUTRITION FACTS			Dr. A FOOD IS MEDICINE		
PRINCIPLE			NUTRIENT VALUE			PERCENT OF RDA		
CALORIES	47 Kcal	2%						
CARBOHYDRATES	12.3 g	4%						
PROTEIN	0.5 g	1%						
TOTAL FAT	0.2 g	0%						
CHOLESTEROL	0 mg	0%						
DIETARY FIBER	1.9 g	7%						
SUGARS	10.4 g							
SODIUM	1MG	0%						
POTASSIUM	149 MG	4%						
			MINERALS					
			CALCIUM	22.4MG	2%			
			IRON	0.2MG	1%			
			MAGNESIUM	10.9MG	3%			
			PHOSPHORUS	9.0MG	1%			
			POTASSIUM	149MG	4%			
			SODIUM	0.6MG	0%			
			ZINC	0.1MG	1%			
			COPPER	0.0MG	2%			
			MANGANESE	0.1MG	4%			
			SELENIUM	0.1MCG	0%			
VITAMINS								
VITAMIN A		90.9IU	2%	FOLATE	3.8MCG	1%		
VITAMIN C		1.3MG	2%	VITAMIN B	0.0MCG	0%		
VITAMIN E (ALPHA TOCOPHEROL)		0.1MG	0%	PANTOTHENIC ACID	0.2MG	2%		
VITAMIN K		3.0MCG	4%	CHOLINE	3.0MG			
VITAMIN B6		0.1MG	4%					