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Affects of Ascorbic acid on health

VIMI SINGH* AND MAMTA KUMARI[1]
Department of Home Science, [1]P.G. Department of Home Science,
S.M. College, Tilka Manjhi Bhagalpur University, Bhagalpur (Bihar) India

ABSTRACT

Ascorbic acid is an essential nutrient for everyone. As man lacks the capacity to synthesize it,like many other animals do. Ascorbic acid or Vitamin C is a strong reducing agent. It is involved in collagen synthesis, bone and teeth calcification and many other reactions in the body as reducing agent. As it has the characteristic properties of intense reducing action and hence is oxidised rapidly in the air. Because of this property when Vegetables and Fruits are cut or exposed in the air or becomes dry or stale, the most Vitamin C is destroyed. We all know that Human beings must get Vitamin C from food sources only, because, Vitamin C is likely effective for- increased iron absorption and possibly effective for- such as in combination with many other vitamins and micronutrients it seems to prevent vision loss, decreases hardening of arteries, reduces the risk of kidney problem in Angiography, and many other diseases. Ascorbic acid is vital for maintaining proper immune function. A genetic disorder called Tyrosinemia can be improved by administering vitamin C in the prenatal diet. Deficiency of Vitamin C in pregnancy can affect the Fetus brain and stunt the fetal hippocampus. Thus during prenatal stage nutritional intake of vitamin C for women should rise until the baby is born .How much vitamin C one requires depends on age and gender.So it can be concluded that ascorbic acid plays a major role in one's health and wellbeing with the help of several other micro-nutrients vitamin C prevents or cures many diseases as discussed.

Key Words : Ascorbic acid, Diseases, Health, Cure, Pregnancy, Fetal, Brain

INTRODUCTION

This is an article written with the view to create awareness among people about need for Vitamin C for woman in this world. Author has mode an effort to present the current information regarding the importance, sources, deficiency, affects on health and preventive measures, RDA in brief.It is hoped that the information brought together in this article would be found useful.

Role of ascorbic acid on human's health:

The Scientific era of Vitamin C or Ascorbic acid began in 1907 and the isolation and chemical nature of Ascorbic acid was accomplished by Dr Charls G King and his co workers at the University of Pittsbergh and by Dr. Szent-Gyorgyi of Hungary in early 1030s.Ascorbic acid or Vitamin C is essential nutrient for man as he lacks the capacity to synthesize it like many other animals do. It is a strong reducing agent. It is involved in Collagen synthesis, Bone and teeth calcification, and many other reactions in the body as reducing agent. Due to this characteristic properties of intense reducing action it is oxidized rapidly in the air.

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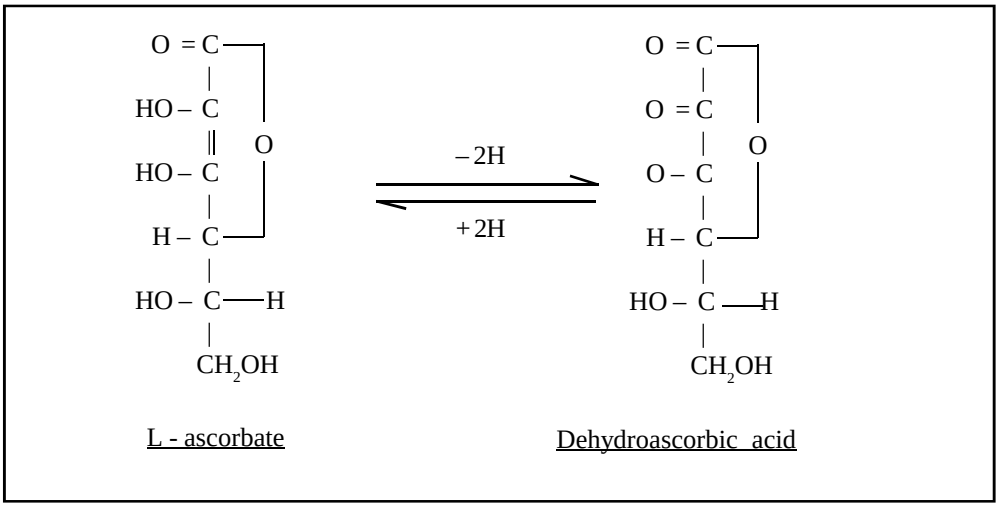
Chemical characteristic of ascorbic acid:

It is a white crystalline compound of relatively simple structure, and closely related to monosaccharide sugar

Chemical structure :



Ascorbic acid is synthesized from glucose and other simple sugar by plants and by most animal species.It also can be prepared synthetically by glucose at low cost.The formula of Ascorbic acid is $C_6H_8O_6$ of all vitamins,Ascorbic acid is most easily destroyed. It is highly soluble in water.The oxidation of ascorbic acid is accelerated by heat,light,alkalis,oxidation can be inhibited when the temperature is reduced.The measurement of ascorbic acid in food expressed in milligrams (mg).Study shows that only five species are known to require a dietary source of ascorbic acid that is man,monkeys,guinea pigs, Indian fruit bats and red vented bulbul birds, all native of India.Ascorbic acid is rapidly absorbed from the intestine,and passes through the portal vein to general circulation and to all tissues of the body .The adrenal gland and the Retina of the Eye contains especially high concentration of vitamin C. The kidney controls the excretion of ascorbic acid as, if tissues are saturated, most of the large dose of Vitamin c, Will excrete, and if tissues are depleted, only small amount of Vitamin C will be excreted.The body utilizes both either synthetic L-ascorbic acid or the vitamin in its natural form.

Physiological and Biochemical functions of vitamin C or ascorbic acid :

– The formation of collagen and is essential for intercellular cement substance in cartilage, bone matrix,dentine, and vascular epithelium for the synthesis of collagen ascorbic acid brings about the HYDROXYLATION (Introduction of - OH groups) of proline and lysine to hydroxyl proline and hydroxy lysine.These hydroxyl amino acid is important constituents of collagen.This helps in wound healing and the ability to with stand stresses of injury and infections.

– Ascorbic acid is helpful for the metabolism of Tyrosine because when tyrosine is fed in small quantity that is 0.5 g some of the metabolites ceases.

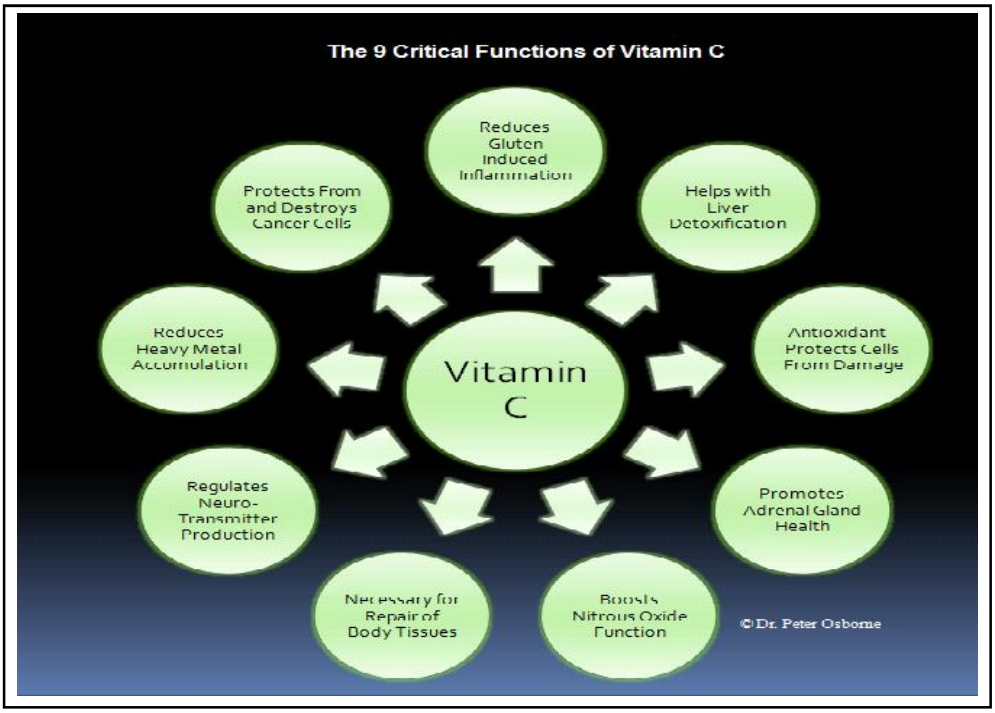
– Ascorbic acid helps to reduce the ferric iron to ferrous state in the intestines and thus helps in the absorption of iron or increases the absorption of iron.

– Vitamin C has an important role in hydroxylation reaction that occurs in the conversion of tryptophan to serotonin a compound that elevates blood pressure through vasoconstrictor action.The Conversation of cholesterol to bile acid also requires hydroxylation reactions.Through this conversion

the cholesterol content of the blood is reduced to same extent.There is some evidence that ascorbic acid have some effect on lipid metabolism.

– Ascorbic acid is an important antioxidant and thus has a role in the protection of Vitamin A and E and the poly unsaturated fatty acids (PUFA) from excessive oxidation.

– Based on animal study, ascorbic acid together with ATP and magnesium chloride has role in the deactivation of adipose tissue lipase.



– Vitamin C is important for the bone formation.

Ascorbic acid or Vitamin C has been called the “Fresh-food vitamin”. It is found in highest concentration in fresh from the plants. The active parts of the plant contain appreciable amounts and mature or resting seeds are devoid of the Vitamin C. It can also be made in the laboratory but good and

Fruits	Vitamin C content
Apple (one medium)	9mg
Banana (one medium)	11mg
Grapes (One cup)	3.7mg
Lemon (nimboo)	4mg
Lime (one)	19mg
Mango (one)	57.34mg
Orange (one)	70mg
Tomatoes (one medium)	25mg
Watermelon (one medium slice)	27mg

rich sources of Vitamin C is fresh fruits and vegetable.

Almost all of the daily intake of ascorbic acid is obtained from the vegetable and fruit groups or citrus fruit groups milk, egg, meat, fish and poultry are practically devoid of vitamin C.but if mother's diet has been adequate in vitamin C, human milk contains 4 to 6 times as much ascorbic acid to protect their infants from infantile scurvy and other diseases,raw,frozen or canned citrus fruits such as oranges, grapes,lemons are excellent sources of this vitamin.orange sections including the thin white peel contains more vitamin C than juice fresh alma, strawberries, raspberries, mango, papaya,kiwi,watermelon, cantaloupe,pineapple ,guavas are excellent sources.some non-acid fruits like apples, bananas, pears, peaches, blueberries,contribute small amounts of vitamin C. Some leafy vegetables and other vegetable are rich and easily available sources of Vitamin C.

Leafy vegetables	Ascorbic acid content
Agathi	169 mg/100grams/day
Amaranth tender	99
Bathua leaves	35
Betal leaves	70
Brussel sprout	72
Cabbage	124
Carrot leaves	79
Colocasia leaves	63
Coriander leaves	135
Drumstick leaves	220
Raddish leaves	106
Spinach leaves	28
Turnip greens	180

Roots and tubers	Ascorbic acid content
Beet roots	10
Potato	17
Sweet potato	24
Tapioca	25
Turnip	43

Other vegetables	Ascorbic acid content
Bitter gourd (small Karela)	96
Cauliflower/broccoli	56
Drumstick	120
Cluster beans (guarfali)	49
Capsicum (chillies)	137
Green chillies	111

Among them are Broccoli, Brussels sprouts, cauliflower , cabbage, green and red pepper, capsicum, turnip, spinach, leafy vegetables, carrot greens, ripe tomatoes, (small Karela) bitter gourd etc. some cereals and pulses has appreciable amounts of Vitamin C but it can fortified and sprouted to enhance the Vitamin c content. Sprouted orgerminated grains and pulse gains about 85% of Vitamin C content or 3 times more Vitamin C. A warm environment, exposure to air, solubility in water, heat , alkali (use of

Fruits	Ascorbic acid content
Amla	600
Guava	212
Lemon	39
Lemon sweet	45
Lime	63
Lime (sweet malta)	54
Sweet musambi	50
Orange juice	64
Papya ripe	57
Seethaphal	37
Strawberry	52
Tomato ripe	27

soda) and dehydration are detrimental loss to the retention of ascorbic acid in food stuff. The cutting of vegetable and fruits release oxidative enzymes and increases the surfaces exposed to leaching by water, since this Vitamin is highly water soluble, losses are considerable when large amounts of water are used for high retention of vitamin C vegetables should be added in small quantity of boiling water, covered tightly, cooked until just tender therefore pressure cooking is advisable and practice of adding baking soda should be avoided because it enhances the green color of vegetables, but reduces the flavor, texture of the vegetables. Although all either fruits or juices when kept in tight container retain some of the Vitamin C value for some days. Life without adequate nourishment hampers the nutritional status of a person. Therefore it is essential to make people aware of all nutrients so as to maintain their health. Health is not maintain if the nutrient like proteins , fats, carbohydrates ,minerals and protective food like vitamins are not introduced. Among all vitamin ascorbic acid plays a very important role in health and development of a person.

The deficiency of Ascorbic acid results in many deficiency diseases. It is essential to make aware not only to a healthy persons but also to women who are pregnant and mother who are lactating. Severe deficiency of ascorbic acid results in the development of disease like scurvy, which is characterized by general weakness, spongy bleeding gums, loose teeth, swollen tender joints and hemorrhages in various tissues. Sometimes Infantile scurvy occurs in infants who are Vitamin C deficient when weaned. the symptoms are pain, tenderness of limbs, baby cries when moved, swelling in limbs, thighs and knees. Gums are swollen and purplish due to hemorrhage etc. for the treatment of scurvy (does of 500 to 1000 mg) of ascorbic acid should be given by mouth. In severe cases 1000 mg should be administered by intravenous drip. for a week, followed by 500 daily orally for 10 days.

Generally Vitamin C is affective and are used for treating common cold, bronchitis, HIV, stomach ulcers caused by bacteria, dysentery, infections of bladder and prostate, depression, dementia, Alzheimer's disease, heart attack, high blood pressure, high cholesterol, back pain, and also osteoporosis. Ascorbic acid works for the immune system of the body and is important for maintaining proper immune function Deficiency of ascorbic acid results in the defective formation of intercellular cement substance, Irritability, retardation of growth in children, anemia, shortness of breath etc. bone calcification becomes faculty because of degeneration or lack of proper development of the bone matrix. The cartilage supporting the bone is weak and sometimes displacement takes place. In the adult scurvy as the disease progresses large hemorrhage may be seen underneath the skin and degeneration of muscle and cartilage is seen.

A woman has to cope during the pregnancy term from conception onwards because fetus and the baby is going to count on her for everything along with her growing nutritional needs. During

prenatal stage the body volume of women increases to accommodate the pregnancy and to store the calories in preparation for nursing her baby. The ascorbic acid or Vitamin C Works for the immune system of the body. Ascorbic acid is vital for iron absorption and improves the genetic disorder in new born's. A genetic disorder in new born's are called Tyrosinemia in which in take of Vitamin C or Ascorbic acid as shot improves genetic disorder in the baby,in this condition the amino acid Tyrosine in blood levels are too high. Tyrosinemia is a genetic disorder characterized by disruption in the multi step process that breaks down the amino acid Tyrosine, a building block of most protein. If an treated it can lead to serious consequences.

There are three type of Tyrosinemia.

1. Type I Tyrosinemia
2. Type II Tyrosinemia
3. Type III Tyrosinemia

1. Most severe form of disorder is type I Tyrosinemia. This begins in the first stage of life,that is in first few month, affects infants to gain weight and fail to grow at expected rate due to poor food tolerance because high protein food leads to diarrhea and vomiting. Affected infants may also have yellowish of skin (jaundice),cabbage like odour, nose bleeding tendency, liver and kidney failure, softening and weakening on bones (rickets) and increased risk of liver cancer. Some children may have reduce sensation In arms and legs, abdominal pain ,and respiratory failure.

This crisis can last for 1 to 7 days. Untreated children can survive 10 years of life only.

2. Type II Tyrosinemia can affect eyes, skin, mental development, photophobia (abnormal light sensation), thick and pain full palm and sole of the feet.About 50 % of the individual have some degree of intellectual disability.

3. Type III Tyrosinemia is the rarest of of 3 type . This include intellectual disability, seizures, periodic loss of balanceand coordination (Ataxia).

Study shows that consuming Vitamin C during pregnancy and lactation along with Vitamin B and E reduces the risk of transmitting the HIV to infants. VitaminC reduces the LDL (Low density lipoprotein) in persons. Early evidence shows thatvitamin C benefits in infertility. During pregnancy proper consumption of Vitamin C does not cause birth defects and is safe for a pregnant women. Deficiency of ascorbic acid result in serious healthcomplications especially in the fetus' brain. Although women can make a conscious effortsto take vitamin c supplements, but if damage is already done to the baby's brain, it cannot be fixed, according to a new study conducted by a researcher at the University ofCopenhagen . According to recent study 10-20% who do not get Vitamin C amongadults are affected.

Thus pregnant womenshould make sure to get enough Vitamin C for better health of her fetus. According to Professor Jens Lykkesfeidt "even marginal Vitamin C deficiency in mother stunts thefetal 'hippocampus', the important memory center by 10-15%, preventing the brain from optimal development. " The recent finding indicates the importance of pregnant women getting enough Vitamin C or ascorbic acid while in prenatal stage, and shows that when fetal brain damage is already in effect, it is impossibleto reverse it, even if ascorbic acid is given to new born after he or she is born. Therefore it is extremely important to draw attention to this problem, which can have serious consequences for children affected. Vitamin C deficiency in pregnant women affects the development of fetus brain.Study shows that this damage is done in early stage of the pregnancy.

According to Lykkesfeidt "people with low economic status who eats poorly and perhaps smoke, often suffers from Vitamin C deficiency and their children are at risk being born with a poorly developed memory potential."Thus the study shows that ascorbic acid is likely and possibly affective for, such as in combination of other vitamins or micronutrients it seems as :-

Likely affective for :

– Administrating vitamin C with, Iron can increase the Iron absorption.

– Taking Vitamins C improve genetic disorders in new born called Tyrosinemia in which amino acid tyrosine in blood levels are too high (also known as protein imbalance in new borns).

Possibly affect for :

– Taking Ascorbic acid in combination with Zinc,Vitamins E and Beta Carotene daily seems to help prevent vision loss.

– Consumption of vitamin c with Vitamin E can reduce Protein in the urine in persons suffering from diabetes (Albuminuria).

– Vitamin C decrease the risk of Artery hardening (Atherosclerosis).

– Some research suggests that increasing vitamins C intake through vegetable and fruits reduce the risk of cancers. However taking Vitamins c Supplements does not appear to reduce cancer risk.

– Majority of evidence shows that intake of high dose of Vitamins c might shorten the course –of cold.

– The risk of developing a chronic pain conditions called complex regional pain syndrome decreases after administration of vitamin C.

– Uses of Ascorbic acid before and after angiography' seems to reduce the risk of developing kidney Problems.

– Vitamin C appears to decrease the developments of pre-Cancerous lesions in the stomach.

– Treatment of vitamin c can improve haemolytic anemia (abnormal break down of RBC).

– Taking Vitamin C Along With Conventional blood pressure lowering medication appears to decrease systolic blood pressure.

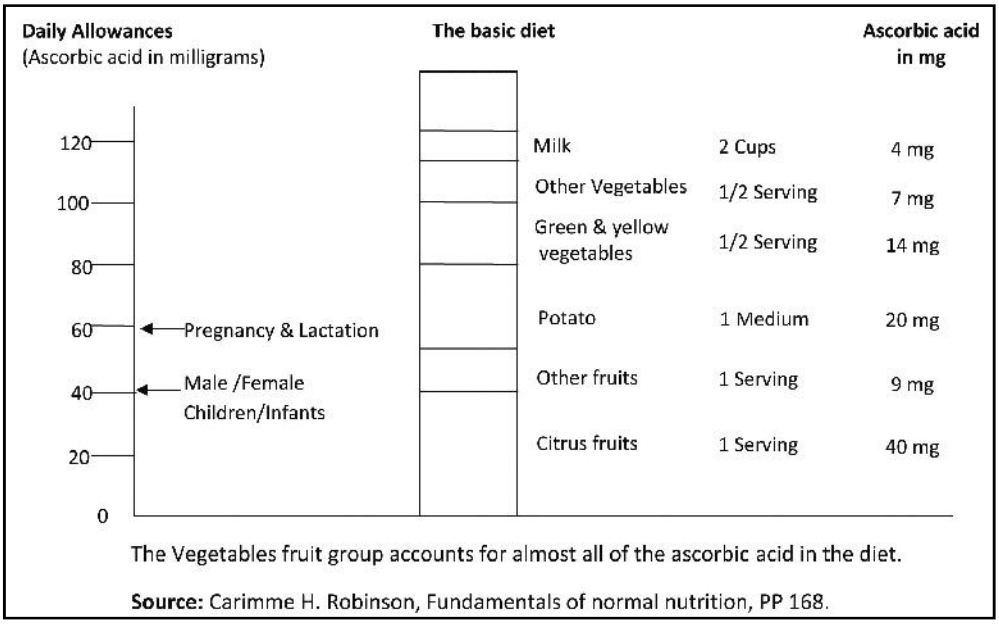
– Consuming vitamin c in diet seems to lower the level of lead in blood (lead poisoning) .

– Taking Vitamin C from Dietary sources or from calcium acerbate supplements seems to prevent cartilage loss and worsening of symptoms in people with Osteoarthritis.

Therefore women who are pregnant and eat a diet high in variety, refrain smoking, and take daily vitamins are not at risk for Vitamin c deficiency. During this period nutritional intakehas to continue and rise until the baby is born. The recommended daily allowances (RDA) for Vitaminsreflect how much each vitamin most people each day. How much Vitamin C one needs depends on age and gender. Vitamin C is serious issue, and should be caught early and treated with natural food or dietary supplements that contains plenty of this critical nutrient according to philological need RDA of Vitamin C is as

Adolescent girls (14 to 18 years)	65mg/day
Pregnant teens	80mg/day
Breastfeeding teens	115mg/day
Women aged	19 years 75mg/day
Pregnant women	85mg/day
Women (Pregnant and Lactating) smoker	120mg/day plus 35mg
Men adult (above 19 years)	90mg/day.

RDA for Indian (ICMR) Women	Vitamin C/ Ascorbic acid
Sedentary work	40mg/day
Moderate work	40mg/day
Heavy work	40mg/day
Pregnant and Lactating	40mg/day
Infants (0 to 1 years)	80mg/day
Children	80mg/day



Recommended Daily Allowances according to Physiological needs of Vitamin C

Above mention dietary recommended allowances can be fulfilled by fresh vegetable, fruits along with germinated or sprouted grains or pulses which have more Vitamin C.

Conclusion:

So it can be concluded that ascorbic acid plays a major role in one's health and wellbeing with the help of several other micro-nutrients Vitamin C prevents or cures many diseases as discussed.

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