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Research Paper

EVALUATION OF ASCORBIC ACID (VITAMIN- C) FROM SOME MEDICINAL PLANTS OF MELGHAT REGION

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Abstract

Medicinal plants are source for a wide variety of free radical scavenging molecules, such as phenolic compounds like nitrogen compounds, vitamins which are rich in antioxidant activity. Collection of plant material were done from Melghat forest region, Dist. - Amravati, Maharashtra. Plants were identified with the help of the standard floras.1gm of plant material powder were used for spectrophotometric estimation of Ascorbic acid (Vitamin C). Highest values of ascorbic acid were recorded from *Colocasia esculenta* tuber, leaves of *Abrus precatorious, Begonia crenata* and *Boerhavia diffusa*, legume of *Mucuna pruriens*, flowers of *Hibiscus sabdariffa* and fruit of *Cordia dichotoma*.

Key words: Ascorbic acid (vit. C), *Colocasia esculenta*, *Abrus precatorious, Begonia crenata*, *Boerhavia diffusa*, *Mucuna pruriens*, *Hibiscus sabdariffa*, *Cordia dichotoma*.

INTRODUCTION

Reactive oxygen species (ROS) are class of highly reactive molecules derived from the metabolism of oxygen. Rapid production of free radicals may lead to oxidative damage to biomolecules and results in disorders, cancer, diabetes, neural disorders and ageing. These free radicals occur in the body during an imbalance between ROS and antioxidants such as Vitamin C, Vitamin E, polyphenols etc. Primary sources of naturally occurring antioxidants are grains, vegetables and fruits. Plant sourced food antioxidants like vitamin C, vitamin E, carotenes, phenolic acids have been recognized as having the potential to reduce disease risk.(Prior and Cao 2000).

Free radicals (Superoxide, hydroxyl radicals and nitric oxide, and other reactive oxygen species (hydrogen peroxide, hypochloric acid and proxynitrite) produced during aerobic metabolism in the body, can cause oxidative damage of amino acids, lipids proteins and DNA (Gutteridge and Halliwell 1995). Vitamin C is a water soluble nutrient and fairly stable in acid solution. It is normally the least stable of vitamins and is very sensitive to oxygen. Vitamin C converts the inactive form of folic acid to the active form, Folinic acid and may have role in calcium metabolism. In addition to vitamin C thiamine, riboflavin, Folic acid, pantothenic acid, vitamins A and E protects living cell against oxidation. It protects the brain and spinal cord from destruction by

free radicals. The intestinal absorption of iron is greatly increased by adequate Vitamin C. Vitamin C is present in most fresh fruits and vegetables (Dunne, 1990).
It has been established that oxidative stress is among the major causative factors in the induction of many chronic and degenerative diseases including atherosclerosis, ischemic heart disease, ageing, diabetes mellitus, cancer, neuro degenerative diseases, immuno suppression and others. (Squadriato and Pelora 1998; Shahidi and Wansundhara 1992)
Vitamin C is essential for humans because it has several critical functions as an enzyme Co factor; Vitamin C is involved with collagen synthesis, carnitine synthesis, converting dopamine to noradrenalin, Cholesterol metabolism. Vitamin C is a potent electron donor and reducing agent and also acts as water soluble antioxidant; Vitamin C helps to maintain DNA, proteins, lipids, enzymes and other antioxidants in their normal form. It does this by scavenging oxygen and nitrogen radicals and reducing metal ions. (Carr A.C. and Feri B. 1999).

MATERIAL AND METHODS:

Plant material

The extensive survey, identification and collection of plant from Melghat region was carried out. Plant identification was carried out with the help of floras (Cook,1957; Dhore,1986;1998; Naik , 1998).

Preparation of plant material

Tuber of *Colocasia esculanta* L. Leaves of *Abrus precatorius* and *Begonia crenata , Boerhavia diffusa,* Legume of *Mucuna pruriens* , flowers of *Hibiscus sabdariffa* and fruits of *Cordia dichotoma* were collected and dried in sunlight. After them powdered with mechanical grinder and stored in airtight container. Samples were powdered separately. 1gm each of samples was taken for estimation of Ascorbic acid gram/ µgm.

Colocasia esculanta L.
A genus belonging to the family Araceae is an herbaceous perennial plant cultivated as annuals. **Uses**- The leaves used as vegetable, its edible corns and leaves are traditionally used for hepatic ailments, tuberculosis, ulcers, pulmonary congestion, crippled extremities, fungal abscesses in animals, and as an anthelmintic.

Abrus precatorius L.
A genus belonging to fabaceae family, is an glabeorus,perennial twiners.The plant reporte are antitumor, immunomodulating, antiplatate, anti-inflammatory, insecticidal, molluscicidal, antioxidant, antibacterial, antifertility activity in male and abortifacient activity in female.

Begonia crenata L.
A genus belonging to Begoniaceae family,is an annual succulent herb, growing up to 25 cm. it is quite common among forested hilly regions of western ghats.

Boerhavia diffusa L.
A genus of herb belonging to Nyctaginaceae family, it grows as a common weed. It is diffusely branched and creeping perennial herb. Entire plant used as in Ayurvedic medicine. Used to treat different aliments like wound healing, inflammations, hypertension and anti-diarrheal, ant diabetic, antitumor, analgesic and antibacterial activity.

Mucuna pruriens (L.) DC
A genus belonging to Papilionaceae family, is an annual twining herb, found in bushes and scrub jungles throughout the tropical region. Seeds increase the sexual activity, roots according to the Ayurveda, are bitter, thermo genic, anthelmintic, diuretic, emollient, stimulant aphrodisiac, ulcers, fever.

Hibiscus sabdariffa L.
A genus belonging to Malvaceae family , is annual herbaceous shrub, In Indian language it is called Lal ambary. The plant has been used as antiseptic, astringent, cholagogue, aphrodisiac, demulcent, emollient, purgative, stomachic, ant nociceptive, antimflamatory, sedative, tonic and also used for high blood pressure, liver diseases, fever, ulcers, abscesses and anemia .

Cordia dichotoma Forst.
A genus belonging to Boraginaceae family, it is a medium sized tree with short crooked trunk, distributed throughout the tropical and sub tropical regions. The fruits are used as cooling, astringent, emollient, expectorant, anthelmintic, purgative and diuretic. Fruits are used for made pickle.
METHOD:

Estimation of Ascorbic Acid (Vitamin C):-
Colorimetric method was used.
Extraction
1gm of sample was grind with the help of mortar and pestle with 4% oxalic acid. The supernatant was collected by centrifugation. Transfer the aliquot in to conical flask and one to two drops of Bromine water was added and volume was making up with 10 ml of 4% oxalic acid.

Estimation:
1ml of sample extract was pipette out in flask and 3ml volume was make up with distilled water, 1 ml DNPH reagent and one to two drops of thiourea was added and kept it overnight. After overnight 7 ml of 80% sulphuric acid was added in aliquot.
Absorbance was measured at 540 nm against a reagent blank lacking only sample extract.
Standard curve was prepared using different concentrations (0.1, 0.2, 0.3, 0.4, 0.5, 0.6, 0.7, 0.8, 0.9, and 1 ml) from 100 µgm/ml standard ascorbic acid solution. (Thimmaiah S. R. 1999)

RESULT AND DISCUSSION:

Sr.no.	Plant Material	Part used for estimation	Absorbance (at 540nm)	µgm per gram
1	*Colocasia esculenta*	Tubers	0.07	5100
2	*Abrus precatorious*	Leaves	0.24	1730
3	*Begonia crenata*	Leaves	0.24	1730
4	*Boerhavia diffusa*	Leaves	0.19	1370
5	*Mucuna pruriens*	Legumes	0.19	1370
6	*Hibiscus sabdariffa*	Flowers	0.21	1510
7	*Cordia dichotoma*	Fruits	0.13	930

The highest content of Ascorbic acid was found in tubers of *C. esculenta* (51,00 µgm/gm), leaves of *A. precatorius* and *B. crenata* i.e. (1,730 µgm/gm) as well as in *M. pruriens* legume and *B. diffusa* (1,370 µgm/gm). In flowers *H. sabdariffa* (1,510 µgm/gm) of Ascorbic acid was found Among all these significant amount of Vitamin C was found in fruit of *C. dichotoma* (930 µgm/gm).

The antioxidants α tocopherol (Vitamin A), Ascorbic acid (VitaminC), and the rotenoids (Vitamin A) are all potent scavengers of reactive Oxygen species. Many studies have investigated the rule of these antioxidants in improving sperm parameters.(John C Kefer *et al.,* 2009).

(Mahadevan *et al.,*2009) reported Physiochemical constituents of the fresh Calyces of *Hibiscus sabdariffa* contain 6.7 mg of Ascorbic acid (Vitamin C.), Riboflavin 0.277 mg, Thiamine 0.117 mg and 8.98 mg iron per 100 g resp. (Wang Yu SoF *et al.,* 2002) observed the rich vitamin C in calayces of *Hibiscus sabdariffa* (141 mg/100 g), anthocyanins (2.52 mg / 100 g.), β-carotene (1.88 mg / 100 g.)

(Duke and Atchley 1984) reported the chemistry of the calyx of *H. Sabodriffa* revealed that per 100g. it contained 49 calories, 14 mg ascorbic acid, Ca 1.77 mg, 1.9 protein and Fe 300 ug, B carotene equivalent.

Vitamin C is transported from blood plasma into cells either as ascorbic acid through sodium dependent transported through glucose transport. Dehydroascobic acid is then reduced to ascorbic acid within the cell. When cells are stressed, they increase the concentration of Vitamin C inside the cells to protect them from damage when the cell has been depleted, cells do not function and immune responses are also impaired. A regular intake of Vitamin C is needed to replenishing the cells so that they can perform essential functions and repair cellular damage. (Agus *et al.*,1999).

(Rolf *et al.,* 1999) examined therapeutic efficacy of high dose of antioxidant in oral treatment with Vitamin C and E increases the male fertility.

CONCLUSION:

The present study showed the both leafy and tuberous plants has significant amount of Vitamin C. Highest values of ascorbic acid were recorded from *Colocasia esculenta*, *Abrus precatorious, Begonia crenata*, *Boerhavia diffusa*, *Mucuna pruriens*, *Hibiscus sabdariffa* and *Cordia dichotoma*.

Looking to the problem of deficiency of Vitamin C, this is an attempt towards that these plants can be used as additional supplement to overcome deficiency of Vitamin C and deficiency related diseases.

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