

EVALUATION OF ASCORBIC ACID FROM SOME HERBAL PLANTS OF SHEKHAWATI REGION OF RAJASTHAN

B.B.S. KAPOOR and RAHUL GAUR

Herbal Plant Physiology and Biochemistry Laboratory, P.G. Department of Botany, Dungar College, Bikaner-334001, India.

Three herbal plant species of Shekhawati region of Rajasthan namely *Boerhavia diffusa*, *Petalium murex* and *Tephrosia purpurea* have been selected for the evaluation of ascorbic acid contents. Maximum ascorbic acid contents was found in the fruits of *Petalium murex* (110.00%) while minimum in roots of *Tephrosia purpurea* (42.00%).

Keywords: Ascorbic acid; Electron donor; Herbal plants; Livestock feed; Shekhawati region.

Ascorbic acid is also called anti-scorbutic. Vitamin C is an important primary plant product and well known for its property as an electron donor in photosynthetic photophosphorylation. The role of ascorbic acid in plant growth and metabolism have been worked out by various workers¹⁻⁴

Free endogenous ascorbic acid has been reproted from *Argemone mexicana*⁵ and some arid zone tree species⁶⁻⁸. Some newly introduced plant species growing in canal irrigated areas of north-western Rajasthan have been recently studied for their ascorbic acid status⁹. In the present study, attempts have been made to investigate the quantitative production of free endogenous ascorbic acid in the roots, shoots and fruits of *Boerhavia diffusa*, *Petalium murex* and *Tephrosia purpurea*.

Fresh and healthy roots, shoots and fruits collected from Churu district were dried and homogenised in a mortar with 2% Metaphosphoric acid (MPA) (10 mg powder : 1 ml MPA) and allowed to macerate for one hour. The mixtures were centrifuged at low speed (2500 rpm) and supernatants were used for estimation of ascorbic acid following the colorimetric method¹⁰. Absorbancy of each of the samples were measured on a spectroni-20

colorimeter (Bausch & Lomb) set at 546 nm against blank. Five replicates were taken and values were expressed in mg/100 g.d.w. \pm SE.

Roots, shoots and fruits of all the selected three herbal plant species showed much variation in the ascorbic acid contents, it was found maximum in the fruits of *Petalium murex* (110.00 mg/100 g.d.w) while minimum in roots of *Tephrosia purpurea* (42.00 mg/100 g.d.w.) in Table 1.

The foregoing studies thus indicate that herbal plant species growing in Shekhawati region of Rajasthan are not only useful as forages for cattle from the nutritive point of view but these are also important as they contain appreciable amount of ascorbic acid (Vitamin C) which is considered as one of the essential constituents of the livestock feed.

References

1. Aberg B 1958, Ascorbic acid formation, storage, mobilisation and transformation of carbohydrates. In : *Encyclopedia of plant physiology*, Spinger Verlag, Berlin, 6479-499.
2. Amon D I, Whatley F R and Allen M B 1954, Photosynthesis by isolated chloroplast II,

Table 1. Ascorbic acid concentration in the roots, shoots and fruits of selected herbal plant species. (Values in mg/100 g.d.w. \pm SE)

Plant speices	Roots	Shoots	Fruits
<i>Boerhavia diffusa</i>	82.12 \pm 0.161	90.21 \pm 0.161	83.00 \pm 0.708
<i>Petalium murex</i>	72.00 \pm 0.775	75.72 \pm 0.551	110.00 \pm 0.775
<i>Tephrosia purpurea</i>	42.00 \pm 0.549	90.58 \pm 0.865	95.21 \pm 0.836

Photosynthetic phosphorylation, the conversion of light into phosphate bound energy. *J. Amer. Chem. Soc.* 76 6324-6329.

3. Isherwood F A and Mapson L W 1962, Ascorbic acid metabolism in plants : Part II. Biosynthesis. *Ann. Rev. Plant Physiol.* 13 329-350.
4. Mitsui A and Oi Y 1961, Endogenous changes of photochemical activities of Spinach leaves. *Plant Cell Physiol.* Tokyo, 2 45-50.
5. Kapoor B B S 1989, Free endogenous ascorbic acid from *Argemone mexicana* growing in Arid Zone of Rajasthan. *Oikoassary* 6 2-83.
6. Harsh M L and Ahmed S 1994, *Maytenus emarginata*, *Parkinsonia aculeate* and *Tecomella undulata* : New Sources of ascorbic acid. *Oikoassary* 11 5.
7. Kapoor B B S and Ritu 1996, Comparative evaluation of ascorbic acid from some tree growing in arid zone of Rajasthan. *Oikoassary* 13 (1&2) 29
8. Kapoor BBS and N P Kalla 2003, Evaluation of ascorbic acid from some tree species of canal irrigated area of Rajasthan, *J. Phytol. Res.* 16(1) 115-116.
9. Ritu 2001, Ecological and phytochemical studies on some newly introduced plant species growing in Indira Gandhi Canal irrigated area of Bikaner district. Ph.D. Thesis, M.D.S. Univ., Ajmer (Rajasthan).
10. Jensen W A 1962, *Botanical Histochemistry- Principles and Practice*. W.H. Free and Co., San Fransisco, 201.

Ascorbic acid is also called anti-scorbutic Vitamin C is an important primary plant product and well known for its property as an electron donor in photosynthetic photophosphorylation. The role of ascorbic acid in plant growth and metabolism have been worked out by various workers. Free endogenous ascorbic acid has been reported from *Argemone mexicana* and some arid zone tree species. Some newly introduced plant species growing in canal irrigated areas of north-western Rajasthan have been recently studied for their ascorbic acid status. In the present study, attempts have been made to investigate the quantitative production of free endogenous ascorbic acid in the roots, shoots and fruits of *Boerhavia diffusa*, *Pedalium murex* and *Tephrosia purpurea*. Fresh and healthy roots, shoots and fruits collected from Churu district were dried and homogenised in a mortar with 2% Metaphosphoric acid (MPA) (10 mg powder / 1 ml MPA) and allowed to macerate for one hour. The mixtures were centrifuged at low speed (2500 rpm) and supernatants were used for estimation of ascorbic acid following the colorimetric method. Accuracy of each of the samples were measured on a spectromin-20

Table I. Ascorbic acid concentration in the roots, shoots and fruits of selected plants (Values in mg/100 g.d.w ± SE)

Plant species	Roots	Shoots
<i>Boerhavia diffusa</i>	82.12 ± 0.161	90.21 ± 0.161
<i>Pedalium murex</i>	72.00 ± 0.772	72.72 ± 0.221
<i>Tephrosia purpurea</i>	42.00 ± 0.249	90.28 ± 0.862