

SUMMARY
AND
CONCLUSIONS

Nutraceutical evaluation of some wild edible tuberous plants.

The focus of this study was to investigate the nutritional value of three wild edible tuberous plants from Asclepiadaceae family viz. *Brachystelma edulis*, *Ceropegia bulbosa* and *Ceropegia hirsuta* that are considered as famine plants. These plants are utilized as supplementary food and used to cure various ailments.

Some of the significant findings of the present investigation are summarized as follows.

I. Ethnobotanical studies:

1. Among two tribes Ramoshi and Kaikaris and other inhabitants of adjoining areas of Satara district keeps most valuable ethnobotanical information of the plants growing around them.
2. People in Kolhapur district have limited ethnobotanical information.
3. The fresh tubers of *Brachystelma edulis* are eaten as a salad where as tubers of *Ceropegia bulbosa* and *Ceropegia hirsuta* are first cooked and then consumed.
4. Tubers of *Ceropegia bulbosa* and *Ceropegia hirsuta* are ethnobotanically important but this information varies at different places.

From above summary it was concluded that the *B.edulis*, *C.bulbosa* and *C.hirsuta* are eaten as a food and used as medicine to cure various ailments. These plants will be the potential famine food in rural areas.

II. Proximate nutrient analysis:

Moisture:

The high moisture content is recorded in tubers of *Brachystelma edulis* and leaves of *Ceropegia bulbosa*. On the basis of whole plant, tubers observed lower moisture level than the leaves. The leaves of *C. bulbosa* high moisture level indicates that lower energy value and in tubers observed ultimately higher energy value.

Dry matter:

The dry matter content in plants indicates its nutritive value. The higher level of dry matter found in tuber *Ceropegia hirsuta* tuber and in leaves of *Brachystelma edulis*. Tuber contained higher dry matter than the leaves.

Ash:

The highest ash level is observed in tubers of *Brachystelma edulis* and in leaves of *Ceropegia hirsuta*. The high ash value is good indicators of rich source of minerals.

Crude fiber:

The tubers and leaves of *Ceropegia hirsuta* contained higher crude fiber. Leaves contained higher crude fibers than the tubers. So ultimately the leaves were rich source of fibers.

Crude fat:

The crude fat content is highest in tuber of *Brachystelma edulis* and in leaves of *Ceropegia hirsuta*. Tubers showed higher crude fat than the leaves.

Crude protein:

In present work highest crude protein content was in tubers and leaves of *Ceropegia hirsuta*. Leaves contained higher crude protein than the tubers.

Carbohydrate:

In present work, reducing sugar found highest in *Brachystelma edulis* tuber and in *Ceropegia hirsuta* leaves. Similarly total sugars observed highest in tuber of *B.edulis* and in leaves of *C.bulbosa*. However, highest starch found in *B.edulis* tuber

and leaves of *C. hirsuta*. Tubers contained higher reducing sugar, total sugar and starch than the leaves.

Energy:

In present work higher energy observed in tubers of *Brachystelma. edulis* and in leaves of *Ceropegia bulbosa*. Tubers contained higher energy than the leaves

III. Mineral Analysis:

The mineral concentrations exceed 2% of the dry weight and generally are much higher than typical mineral concentration in conventional edible vegetables.

Nitrogen (N):

The highest nitrogen content observed in tubers of *Ceropegia bulbosa* and in leaves *C.hirsuta*. Leaves contained higher nitrogen than the tubers.

Potassium (K):

The highest potassium observed in tubers of *Ceropegia hiruta* and in leaves of *Ceropegia bulbosa*. Leaves contained higher potassium than the tubers. Thus maintaining a high potassium intake may be achieved by consuming the leaves of wild edible tuberous plants.

Calcium (Ca):

The highest calcium observed in tubers of *Brachystelma edulis* and leaves of *Ceropegia bulbosa*. Leaves contained higher calcium than the tubers.

Magnesium (Mg) :

The highest magnesium content found in tubers of *Brachystelma edulis* and leaves *Ceropegia hirsuta*. On the basis of whole plant leaves contained higher

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magnesium than the tubers. The present work all wild edible plants showed satisfied amount of recommended dietary allowances of magnesium.

Sodium (Na):

In present study highest sodium content found in tubers and leaves of *Ceropegia bulbosa*.

Iron (Fe):

The highest iron content observed in tubers and leaves of *Ceropegia bulbosa*.

Manganese (Mn) :

The highest manganese content observed in tuber of *Ceropegia hirsuta* and leaves of *Brachystelma edulis*.

Zinc (Zn) :

In present work higher zinc content found in tubers of *Ceropegia bulbosa* and in leaves of *Brachystelma edulis*

Copper (Cu) :

The highest copper recorded in tubers and leaves of *Brachystelma edulis*. The present wild edible tuberous plants contained sufficient quantities of copper.

Phosphorus (P):

The highest phosphorus content found in tubers and leaves of *Ceropegia bulbosa*.

IV. Antioxidant analysis:

Currently there is growing interest globally to identify antioxidant compound and its role in human health therefore it has promoted research in the field of food science to access the antioxidant.

Polyphenols:

The highest polyphenol content observed in the tubers of *Brachystelma edulis* and in leaves of *Ceropegia bulbosa*. On the basis of whole plant, leaves contained higher polyphenols than the tubers. The highest polyphenols in leaves of *C.bulbosa* showed its high antioxidative properties.

Ascorbic acid:

The higher ascorbic acid found in tubers and leaves of *Ceropegia hirsuta*. Leaves contained higher ascorbic acid than the tubers.

Antioxidant enzymes:

The highest peroxidase enzyme activity observed in tubers of *Brachystelma edulis* and in leaves of *Ceropegia hirsuta*. on the basis of whole plant, tubers showed higher peroxidase activity than the leaves. The highest catalase activity found in tubers and leaves of *B.edulis*. The tuber and leaves *C.bulbosa* showed highest superoxide dismutase enzyme activity. The high enzyme activity is directly related to the high antioxidant activity.

Carotenoid:

In present work carotenoid content is highest in leaves of *Ceropegia bulbosa*. These wild edible tuberous plants possess effective antioxidant properties indicating their possible nutritional and medicinal value.

V. Qualitative analysis of free amino acids:

The amino acid composition found various proportional in tubers and leaves of *Brachystelma edulis*, *Ceropegia bulbosa* and *Ceropegia hirsuta*. In wild edible tuberous plants were significant amount of leucine, isoleucine with smaller amount of valine, lysine and tyrosine present. Similarly in leaves of *B.edulis* and *C.hirsuta* found essential amino acid leucine, isoleucine prominent with methionine, tyrosine and alanine in low quantity. Glycine is found medium to high concentration in all tubers however totally absent in leaves of B.edulis, *C.bulbosa* and *C.hirsuta*. In *C.bulbosa* leaves have only non essential amino acids alanine and proline was observed. Wild edible tuberous plants observed high essential amino acid which implies that essential amino acids present in these tubers have high biological value.

The nutritional composition of wild edible tuberous plants indicates that these neglected plants can be a valuable source of nutrients under famine conditions and the high level of some vitamins and minerals can be used to prevent diseases.