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RESEARCH ARTICLE

BIOCHEMICAL STUDIES OF SOME WILD EDIBLE PLANTS OF MANIPUR

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ABSTRACT

Some biochemical parameters were studied in the leaves/shoots of seven wildy occurring vegetables viz, *Amaranthus viridis* L. (Chengkruk), *Chenopodium album* L. (Monsaobi), *Polygonum perfoliatum* L. (Linha-maton), *Stellaria aquatica* L.(Yerum-keirum), *Cissus javanica* DC. (Kongouyen), *Zanthoxylum acanthopodium* DC. (Mukthruhi) and *Antidesma acidum* Retz. (Ching-yensin). The parameters included determination of percentage of total soluble sugars reducing sugars, total free amino acids and proteins on moisture free basis, in addition to moisture content. The level of total sugars, reducing sugars and total free amino acids are maximum in *Antidesma acidum* and in this species the moisture content is least next to *Zanthoxylum acanthopodium*. The protein level is highest in *Stellaria aquatica* and minimum level is observed in *Zanthoxylum acanthopodium*. The lowest content of total soluble sugars and reducing sugars are found in *Polygonum perfoliatum* and in case of total free amino acids, *Cissus javanica* have the minimum content.

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INTRODUCTION

Wild plants play a vital role in human beings since prehistoric times. A quarter of million species of plants are grown on the earth, however a few have been used so far in agriculture for human consumption (Mas Yamaguchi, 1983). The use of wild plants as food is an integral part of various communities around the world. A large section of the rural population meets their nutritional requirements by consuming various wild plants and can generate income from wild plant products (Kathleen Klotzbach, 2001; Shalini Misra, 2008). Manipur, NE India lies in the indo-Burma hotspot biodiversity region and are rich in flora and fauna (Meyers, 2000). About 230 species under 189 genera are used as food in the state. Among these, about 96 species are reported to be used as edible food with the leaves or leaf parts, and 45 with tender shoots. The wild vegetables used by Manipuris include 218 species out of edible 280 species (Sinha, 1986). The accumulation of wild or uncultivated plant species in the markets of Manipur in terms of number and quantity was several times more than the number of horticultural crops locally cultivated or imported from other states (Bisheshowri, 2016; Devi *et al.*, 2010). Fresh leafy vegetables alone are not enough to satisfy the daily requirements. They are high in water and low in dry matter so that large amounts must be ingested to supply the daily requirement of many nutrients (Akmal Khan, 1986).

However, people who eat nothing but food from plant sources do live and grow just as well as those who eat meat. They can achieve this by eating foods from plant sources containing high amount of proteins (Grivetti, 2000). These vegetables not only contain the high amount of proteins but also provide vitamins, minerals, carbohydrates and fats. A proper balance of all nutrients can be achieved from plant sources alone but people in the depressed areas and in many developing countries are not informed on how to obtain this balance (Prescott Allen, 1990). Proper scientific investigation on wild plants have been undertaken in many countries by many researchers (Vainio-Mattila, 2000; Odhav *et al.*, 2007). The present investigation however, have been taken up to study the biochemical parameters of seven selected wild edible plants which have been used as vegetables by the local people of Manipur.

MATERIALS AND METHODS

Sources of materials: Seven wildy occurring species viz, *Amaranthus tricolor* L. (Amaranthaceae) Local name Chengkruk *Chenopodium album* L. (Chenopodiaceae) Local name Monsaobi. *Polygonum perfoliatum* L. (Polygonaceae) Local name Linha-maton. *Stellaria aquatica* L. (Caryophyllaceae) Local name Yerum keirum. *Cissus javanica* DC. (Vitaceae) Local name Kongouyen *Zanthoxylum acanthopodium* DC. (Rutaceae) Local name Mukthruhi. *Antidesma acidum* Retz. (Euphorbiaceae) Local name Ching-yensin are collected from their natural habitats during April to June 2016.

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Table 1. Biochemical constituents of seven selected wild plants of Manipur

Sl.No.	Name of the Species	Moisture content (%)	Total soluble Sugar (%)	Reducing (%)	Sugar	Total free amino acid (%)	Protein (%)
1.	<i>A. viridis</i>	82.20	2.30±0.35*	0.8±0.3 ⁻²		1.3±0.3	11.1±0.3
2.	<i>Che album</i>	85.68	1.38±0.07	0.6±0.1 ⁻²		1.6±0.08	9.0±0.03
3.	<i>P. perfoliatum</i>	89.38	0.82±0.02	0.42±0.1 ⁻²		1.5±0.04	15.7±0.18
4.	<i>S.aquatica</i>	85.42	1.23±0.01	0.81±0.01 ⁻²		1.1±0.03	17.6±0.38
5.	<i>C.javanica</i>	84.00	1.69±0.17	0.78±0.4 ⁻²		0.6±0.07	5.4±0.24
6.	<i>Z. acanthopodium</i>	70.75	4.87±0.01	0.24±0.6 ⁻²		1.4±0.02	6.4±0.13
7.	<i>A. acidum</i>	72.38	5.12±0.06	1.9±0.1		4.8±0.05	12.5±0.2

* Standard error of the mean (n = 3)

The plants are authenticated in Life Sciences Deptt. Manipur University. For, *Amaranthus*, *Chenopodium*, *Polygonum* and *Stellaria*, the tender shoots upto three nodes are taken and for *Cissus*, *Zanthoxylum* and *Antidesmna*, the mature leaves are taken for study on moisture free basis.

Biochemical Analysis

Determination of Moisture: Moisture in plants sample were determined by measuring loss in weight due to oven drying the plant sample till constant weight and estimated the difference between fresh weight to dry weight.

Analysis of total Soluble Sugar: Total Soluble sugars content were determined by Anthrone method (Dubois, 1951) using Anthrone in 20% conc. H₂SO₄. The samples were prepared in 50% ethanol. The samples and the standard glucose solutions were measured at wavelength 620 nm in a spectrophotometer. Total Soluble sugars were calculated & expressed in mg/g using a standard curve prepared from glucose.

Analysis of reducing Sugar: Nelson's method, modified by Somogyi (14) was used for the estimation of reducing sugars, 50 mg of the powder sample is crushed with 10 ml of distilled water with a pinch of activated charcoal to remove the coloured pigment. The content is centrifugated at 5000 rpm for 10 mins. Then the supernatants are made up 10 ml volume in a measuring cylinder and it is used for the estimation of reducing sugars. 2 ml of this extract is added in a test tube containing 2 ml of solution of Somogyi reagent. The mixture is incubated at 100°C for 10 minutes in water bath. After cooling the contents, 4 ml of arsenomolybdate reagent is added. The blue green colour develops and its O.D. is measured at 640nm. The value are calculated by a standard curve prepared from glucose.

Analysis of free amino acids: Ninhydrin method (Yemm, 1955) was used for the estimation of total free amino acids. 1 ml of plant extract is mixed with 2.5 ml of ninhydrin solution and 2.5 ml of acetate buffer pH 5.4. Then the solution is heated on hot plate for 30 minutes. The violet or purple colour develops and cooled at room temperature. This colour complex is measured O.D. at 570 nm against blank solution. The value of total free Amino-acid is calculated by comparing the value of O.D. found in the measurement of colour complex to the O.D. of standard curve prepared from glycine.

Analysis of Protein: Nitrogen was determined through Micro-Kjeldahl's method (Doneen, 1932). by digesting a known weight of plant sample & treated with alkali. The liberated ammonia is collected in boric acid and titrated with HCL. Protein estimation was done by multiplying a factor (6.25) to insoluble nitrogen (Jones, 1931).

RESULTS AND DISCUSSION

From the result it was observed that moisture content is maximum in *P. perfoliatum* and minimum in *Z.*

acanthopodium. *A. acidum* has the highest content of total soluble sugars (5.12±0.06mg/g dry wt.) reducing sugars 1.9±0.1mg/g dry wt.) & total free amino acids (4.8±0.05 mg/g fresh wt.). However in protein content *S. aquatica* gets maximum value (17.6±0.38 mg/g dry wt.). In the present study it was found that the leaves of *A. acidum* contain significant amount of total soluble sugars, reducing sugars & total free amino acids. The present findings provide new data concerning chemical characterization of wild plants.

REFERENCES

- Akmal Khan M. and Tabassumi Hamid, 1986. *Role of vegetables in human diet*. Progressive farming Vol. 6. No.4.,
- Bisheshowri Th. et al. 2016. *Assessment of wild leafy vegetables traditionally consumed by the ethnic communities of Manipur, N.E. India*. J. Ethnobiol. Ethnomed.; 12:9.
- Devi O.S., Kumar P. and Das, D. 2010. *A checklist of traditional bioresources from Ima markets of Imphal Valley Manipur, India*. J. of Threatened taxa. 2(11); 1291-1296.
- Doneen L.D. 1932. *A micro method for nitrogen in plant material*. Plant Physiol. 7(4);717-720.
- Dubois et al. 1951. *Colorimetric method for determination of sugars and related substances*. Division of Biochemistry, University of Minnesota, St. Paul, Minn.
- Grivetti LE., Ogle BM. 2000. Value of traditional foods in meeting macro and micro-nutrient needs : the wild plant connection. Nutrition Research Reviews. 13:31-46.
- Jones D.B. 1931. *Factors for converting percentages of nitrogen in foods and feeds into percentages of proteins*. Circular 183, U.S. Department of Agriculture, Washington D.C.
- Kathleen Klotzbach, Shimomura M.Ed., DTR. 2001. *Herbs and Health, Safety and Effectiveness*. Journal of Nutrition Education Vol.133, issue 6, Nov-Dec., P 354-355.
- Mas Yamaguchi, 1983. *World vegetables*, AVI Publishing Company, Inc.
- Meyers et al. (2000), *Biodiversity hotspot for conservation priorities*. Nature 403, 853-858.
- Odhav B., Beekrum S., Akulu VS., Baijnath H. 2007. *Preliminary assessment of nutritional value of traditional leafy consumed in Cameroon*. Pakistan journal of Nutrition /6:712-717.
- Prescott Allen OC., Prescott-Allen R. 1990. How many plants feed the world? Conservation Biology, 4:365-374.
- Shalini Misra, W., Maikhuri, RK. 2008. *Wild leafy vegetables: A study of their subsistence dietetic support to the inhabitants of Nanda Devi Biosphere Reserve, India*. Journal of Ethnobiology & Ethnomedicine, 4:15.
- Sinha S.C. 1986. *Ethnobotanical study of Manipur*. Thesis Ph.D.
- Somogyi 1952. *Preparation of Somogyi's solution*. J. Biol. Chem.. 195(1):19-23.
- Vainio-Mattila K 2000. *Wild vegetables used by the Sambea in the Usmbara mountains, NE.Tanzania*. Annales Botanici Fennici.37:57-67.
- Yemm, E.W. and Cocking, E.C. (1955): *The determination of amino acids with ninhydrin*. Analyst. 80:209-213.