Nutritive Values of Some Non-Conventional Leafy Vegetables of Ethnic Sources from Nagaland, N.E. India

Dimple Gogoi, Ratul Ch. Rajkhowa, A.K Handique

Abstract*— Major nutritional components as well as calorific values were estimated for nine non- conventional wild leafy vegetables traditionally used by various tribal communities of Nagaland. Different plant types were covered in the study viz herb - Eryngium foetidum, Polygonum microcephalum; shrub - Gentum gnemon, Rhynhotechum ellipticum, Zanthoxylum oxyphylum, Zanthoxylum acanthopodium, Skimmia arborescens, Lycianthus pachypetala and tree - Rhus semialata. Crude protein contents were very impressive in the range of 11.65% in S. arborescens to 28.54% in E. foetidumI. All the species were very rich in total mineral in the form of ash content which varies from 7.0% in P. microcephalum to 19.69% in S. arborescens. Crude fibre were found in apparently highamount and varied from 12.50% in Z. oxyphylum to 26.59% in G. gnemon. Total carbohydrate and lipid content were comparatively low with limited variability. Calorific value exhibited wide variability n the range of 98.21 K cal/100 gm in S. arborescens to 168.44 K cal/100gm in G. gnemon

***Index Terms*— non-conventional food plants, crude protein, carbohydrate, lipid, crude fibre, ash content, calorific value.**

I. INTRODUCTION

Tribal societies are storehouse of valuable information about non-conventional food plants and traditional knowledge associated with them. The North East Indian hilly State of Nagaland is one such whose immense plant genetic resources and traditional knowledge associated with them are not adequately explored, particularly the wild and little known leafy vegetables. In recent times traditional knowledge is gaining importance in view of the realization that such knowledge can be the basis for commercial profit and utility (Mashelkar, 2001). Among all traditional knowledge ethnic knowledge about wild and semi wild edible plants is most resourceful as exemplified by the fact that about 80,000 plant species are known to be edible (Bhagmal, 1990)and used by various ethnic communities since time immemorial. Out of these not more than 150 species are put to major use by way of organized cultivation. Information about nutritive values of thousand others are nonexistent while very limited information is available for some;. which is indicative of a vast knowledge gap for thousand of species. .

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Dimple Gogoi, Department of Zoology, G. U., Gauhati University; Guwahati 781014, Assam, India,

Ratul Ch. Rajkhowa, Department of Zoology, Cotton College, Guwahati, Gauhati University; Guwahati 781014, Assam, India,

A.K Handique, Department of Biotechnology, Gauhati University; Guwahati 781014, Assam, India,

Non-conventional food plants are defined as those edible plants species that come from wild. semi wild sources etc., but other than from organised cultivation (Handique,2003a). If this vast plant wealth are to be put to productive use, the first pre –requisite is to assess them for their nutritive values. This will help to short list the promising non-conventional food plans for future study and use. Limited information available indicate the age old ethnic belief that some non-conventional leafy vegetable are at par and even superior to conventional and cultivated leafy vegetables as shown for some wild leafy vegetable (Handique, 2003a); some wild ferns (Handique,

II. MATERIALS AND METHOD.

Nine species representing different plant type's viz. herb shrub and tree were taken up for the present study. These were collected from plain areas and foot hills up to mid altitude of about 1500ft. The species are Gentum gnemon (smalll shrub, a rare gymnosperm) Rhynhotechum ellipticum (shrub, family Gesneriaceae) Zanthoxylum oxyphylum Edgew (Aromatic shrub with characteristic spine on leaf undersurface, Rutaceae) Eryngium foetidum (herb, Umbellifereae), Zanthoxylum acanthopodium DC (shrub, Rutacecae), Skimmia arborescens T. Anders (Shrub, Rutaceae); Lycianthus pachypetala Hasst. (Shrub, Solanaceae); Polygonum microcephalum D.Don (Herb, Polygonaceae), Rhus semialata Murr. (Tree, Anacardiaceae). The present study was undertaken against this backdrop to make preliminary evaluation about the nutritive values of 9 wild edible leafy vegetable of the hilly state of Nagaland, N.E. India.

III. RESULTS AND DISCUSSION

Among The Nine Species In The Present Study Crude Protein Content Exhibited Wide Variability In The Range Of 11.65% In Skimmia Arborescens To 28.54% In Eryngium Foetidum On The Other Hand Total Carbohydrate Contents Are Consistently Low And Exhibited Limited Variability In The Narrow Range Of 7.5% In Zanthoxylum Acanthopodium To 11.25% In Zanthoxylum Oxyphylum Likewise Total Soluble Sugar Level Was Found To Vary In The Lower Range Of 0.90% In G. Gnemon And Lycianthus Pachypetala To 3.60% In R. Semialata. Total Lipid Contents Were Generally Low Varying In The Narrow Range Of 1.57 % In E Foetidum To 3.6% In G. Gnemon. However, R. Semialata Is An Exception With Comparatively High Level Of 6.14 % Lipid. Crude Fibre Were Found In Appreciably High Amount With Wide Variability In The Range Of 12.50% In Z. Oxyphyllum To 26.59% In G. Gnemon. Total Minerals In The Form Of Ash Content Were Quite High And Varied In The Range Of 7.0% In P. Microcephalum To 19.69%In Skimmia Arborescens. Calorific

Value Exhibited Wide Variability And Varied In The Range Of 98.21 Kcal/100gm In Skimmia Arborescens To 168.44 Kcal/100gm In G. Gnemon..”

Table : Major nutritional components and calorific values of the nine non-conventional leafy vegetable studied. Results are in terms of % dry weight

Species	Moisture	Crude protein	Total carbohydrate	Total soluble sugar	Lipid	Crude fibre	Ash	Calorific value kca/100 gm
Gnetum gnemon	81.33	23.66	10.35	0.90	3.6	26.59	8.72	168.44
Rhynhotechum ellipticum	88.88	26.75	9.35	1.00	2.51	18.33	16.60	167.00
Zanthoxylum oxyphylum	78.13	18.39	11.25	1.75	1.71	12.5	9.53	133.98
Zanthoxylum acanthopodium	87.10	19.09	7.5	1.95	2.29	18.8	19.22	126.92
Skimmia arborescens	77.49	11.65	8.25	2.55	2.07	24.33	19.69	98.21
Lycianthus pachypetala	90.80	26.14	9.80	0.90	2.29	13.0	17.52	164.32
Polygonum microcephalum	81.57	24.32	9.60	2.05	1.90	15.15	7.0	152.82
Rhus semialata	83.23	17.95	9.80	3.6	6.14	19.20	10.0	166.28
Eryngium foetidum	88.51	28.54	9.88	1.35	1.57	20.35	14.84	167.82
CD at5%		1.25	0.97	0.25	0.43	1.46	1.03	2.87
CD at1%		1.84	1.32	0.34	0.58	2.00	1.41	3.93

Scientific scrutiny of non- conventional food plants should be given high priority for three reasons. Firstly in view of the growing concern for food security and nutritional security, non- conventional food plants can play a significant role as supplement to major or conventional crops. Secondly in view of changing life style, even among ethnic tribals in geographically remote hilly areas, many ethnic knowledge and practices including ethnic knowledge about wild, semi-wild food plants are on the verge of getting lost. Additionally, the increasing deforestation and loss of biodiversity imply that many edible

wild, semi-wild plants with promising food value may be lost even before they are scientifically studied. In the present study protein content has been found to be remarkable. Out of nine species in the present study as many as five have protein content above 23%. As against this only few conventional and cultivated leafy vegetables have such high values like Spinach 23.75% and Fenugreek 28.0%(Srivastava,1990). Therefore the non-conventional leafy vegetables in the present study have protein content comparable or superior to many conventional leafy vegetables. Leaf proteins are known to be richer than cereals in lysine and richer than pulses in methionine content. Moreover it has greater, protein efficiency ratio than pulses (Srivastava, 1990). In terms of relative proportion, the other major components are crude fiber and total minerals in the form of ash content while total carbohydrate and lipids occur in relatively lower proportion. Earlier studies by Handique (2003 a,b) also shows that non-conventional leafy vegetables generally have high level of protein, crude fiber and ash content while total carbohydrate and lipids occur in lower quantities . This is a point of advantage for those who require low intake of carbohydrate and lipids on health ground like persons suffering from diabetes and hypertension.

The high level of ash content in the present study is of much significance. Most food grains aregenerally low in ash content. Grains of major crops like paddy has 1.60 % (Juliano et al., 1964), wheat 1.5% and lentil 2.1% ash content (Gopalan et at., 1989). As against this in the present study as many as five species have been found to contain over 14% ash and two among them contain over 19% ash , which is remarkable. Various minerals are essential components of diet and their metabolic role are well documented. It appears that non-conventional leafy vegetable are some of the best source of dietary minerals. Crude fibre itself is not a nutritional component since it is not digested but its dietary role is well established and in fact a daily intake of 40gm dietary fibre is recommended (Gopalan et al.,1989). Among the species in the present study G. gnemon is regularly sold in the local market and it is very popular among the tribal people of Nagaland, Manipur and Karbi-Anglong district of Assam. The traditional belief associated with G. gnemon is that it is energy booster and soup prepared from its leaf is fed to woman after child birth. A small bunch comprising of 4/5 twigs and weighing about 300/ 400 gm cost Rs. 10- 15 and is one of the costliest wild leafy vegetable in the rural market. The present study shows that apart from impressive values for protein, total mineral and crude fibre, it has a calorific value of 168.44 Kcal/100gm, the highest in the present study. Earlier studies revealed that the leaves of G. gnemon are rich in free essential amino acids like valine, tryptophan, leucine and isoleucine (Handique 1993).The present study indicate that wild and non-conventional leafy vegetables are nutritionally very rich with relatively lower calorific value which appear to vindicate the age old ethnic belief about them.

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AUTHORS PROFILE

Dimple Gogoi- M Sc from Gauhati University; Guwahati 781014, Assam, India.Now she Pursuing Ph. D in Zoology under Gauhati University

DR. Ratul Ch. Rajkhow- Associate Professor ,Department of Zoology, Cotton College, Guwahati -781014, Assam, India

A.K Handique3-- Professor Department of Biotechnology, Gauhati University; Guwahati 781014, Assam, India,