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Nutraceutical folk food plants used among indigenous people of east siang district of Arunachal Pradesh, India.

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ABSTRACT

For Indigenous people, food is also a medicine; they have rich traditional practices of using food in the management of various health problems. Arunachal Pradesh is a mountainous state with full of floral resources; aborigines of this state use numbers of food plants in their health practices. The folk food system in Arunachal Pradesh is composed mostly of semi-domesticated and wild collected vegetables. The present study was carried out to document the folk medicinal food plants used among the indigenous people of East Siang District of Arunachal Pradesh. The folk food plants are studied under nutraceutical point of view. Our work revealed a total of 36 plant species of folk medicinal food plants. The findings are given with scientific name, local name and uses as food and medicine in the paper.

Keywords: Folk food, Nutraceutical, Indigenous people, Medicinal plant.

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INTRODUCTION

Nature has endowed plant kingdom with full of resources to serve blue planet and her dweller. Since antiquity the plant resources has been used by man for food and medicine. Let food be your medicine and medicine be your food, Hippocrates once said over 2500 years ago. When a food becomes drugs; it is termed as “medical foods” or “nutraceuticals”. For the most indigenous people also food is a medicine. Food and medicine represent a continuum rather than artificial categories; Overlapping nature of traditional food system and medicine lead to the investigation of phytochemicals that explains the food culture and health outcomes¹. Edible wild plants that are included in local food baskets have both therapeutic and dietary functions and such medicinal foods have been part of Eastern Medicinal theories since ancient times; In Traditional Chinese Medicine also the concept of food as medicine is based on the same basic theories, and they are vice-versa^{2,3} and this domain have recently received attention in the USA and Europe within the fields of functional foods, nutraceuticals and phyto-nutrients⁴. Thus, concept of nutrition has started to include traditional medicinal food plants and have witnessed interest in the last few decades^{5,6}. Healthy eating now means more than just eating your greens; new types of foods are increasingly being seen on the shelves of health stores and supermarkets, touting health-boosting effects⁷. In aborigine world, the knowledge on plant as food-medicine is orally transferred from generation to generation as “folk medicinal food” and folk food-medicines are still practices in many pockets of tribal belts all over the world. Folk food also contains high phenolic and flavonoids, hence are good antioxidant sources too^{8, 9, 10}. Importance and research activities in nutraceutical science domain has attracted scientists from various biosciences subjects including nutritional scientist since the term was coined by Stephen DeFelice in 1989, the research activities in this domain has intensified and become very popular particularly among western countries. According to DeFelice, nutraceuticals can be defined as, “a food (or part of a food) that provides medical or health benefits, including the prevention and or/ treatment of a disease⁸ .

Arunachal Pradesh, the "land of the dawn-lit mountains", which is also known as the “Orchid State of India” or the “Paradise of the Botanists in India”, is a mountainous state. The state is internationally bounded the China in North, the Bhutan in West and the Myanmar in East; the state also lies in Myers’ biodiversity hotspot list (among ten threatened biotas “hot spots” in tropical forests in the world⁹) and (among the 25 hotspot biodiversity in the world¹⁰). This state has suitable climatic and topographic factors including tropical, temperate, alpine and secondary forest types that favour rich biodiversity; More than 26 major tribes and about 110 sub-tribes habitants with

different traditional culture and customs have their indigenous food systems that stand out distinctly from Indian mainland food system. The folk food system in Arunachal Pradesh is composed mostly of semi-domesticated and wild collected vegetables. These folk foods are used as food as well as medicinal purposes since time immemorial in the treatment of various health problems as a part of their rich traditional knowledge. The traditional practices, festive celebrations and traditional knowledge is as rich as the tribes itself in Arunachal Pradesh, geographical isolation from the Indian mainland has brought them certain distinctive characteristics in culture and customs, therefore the state has many dimensions in food habits and flavour¹¹. Indigenous people use numerous herbs, fruits, animals, insects, worm etc. in their folk food^{12, 13}.

Globally, mankind depend on a handful of widely cultivated crops^{14, 15}, during the course of agricultural history, some 12,000 plant species have been used as food, but only 2000 have been domesticated and only about 150 crops are commercially cultivated and about 30 species of plants have been reported to provide about 90% of world's nutritional needs¹⁶, while wild vegetables have wider utility as food, vegetable and medicine; there is need of scientific study to explore underutilized resources. Karla¹⁷, Brower^{7, 8} have defined and casted importance of nutraceutical science for healthy community; Feyssa *et al.*,¹⁸ have enumerated 20 nutraceutical plants from Ethiopi that act as health and food security resources. Rawal *et al.*,¹⁹ have studied Under-Utilized Nutraceuticals Plants (Potherbs) of Tribal Belts of Jharkhand, India; Sharma and Rawal²⁰ have studied 20 leafy nutraceutical vegetables from Jharkhand. But no work has been done on nutraceutical science from this part of the country.

MATERIALS AND METHOD:

To enumerate folk medicinal food plants used among the indigenous people of the study site interviews and questionnaire were carried out along with field visit. Around and above 50 years old aged Gaon Head bhuras, elderly citizen, women, man active in the hunters including herbal healers were selected as focus group. Ten villages of East Siang District namely Yagrung, Mirem, Bilat, Renging, Sika-Bamin, Sille, Runne, Miglung, Ngorlung and Ledum of Arunachal Pradesh were visited from time to time to cover all four seasons from 2000-2013.

RESULTS AND DISCUSSION:

A total of 36 folk food plants which are used as nutraceuticals (see Table) among the indigenous people of East Siang District of Arunachal Pradesh have been enumerated. Overlapping nature of folk food as medicine and medicine as food is observed among the indigenous people of Arunachal Pradesh as their traditional knowledge. There is need of further study in term of proximate and phytochemical context

Sl.No.	Name of the Species	Family	Local Name	Use
1	<i>Allium hookeri</i> Thwaites.	Amaryllidaceae	Disang-talap	Medicine-Whole plant is used in stomach pain, cold and cough. Necklace made of this plant is used to avoid epidemic diseases. Food- Shoot is used as vegetable, salad and chutney.
2	<i>Alocasiamacrorrhiza</i> (L.) Schott.	Araceae	Enge	Medicine- Stem juice is locally applied to relieve scorpion and nettle sting. Food- Stem and corm is boiled or burnt under hot soil in fire place as food; tender leaves are boiled as vegetable and most commonly used famine or lean period food among local people.
3	<i>Amaranthusspinosus</i> L.	Amaranthaceae	Gubor-oying	Medicine- Antidote in snake bite, root is used in gonorrhea. Food- Shoot is used as vegetable.
4	<i>Ammomumsubulatam</i> Roxb.	Zingiberaceae	Taje in Adi	Medicine-Seed is used in cold and cough. Food- Ripen fruit is consumed.
5	<i>Artocarpusheterophyllus</i> Lam.	Moraceae	Bellang in Adi	Medicine- Fermented fruit juice is useful for tuberculosis. Latex enhances lactation to breast feeding mother. Food- Fruit is edible and seed is used during famine and lean period as food.
6	<i>Bambusatulda</i> Roxb.		Dibang in Adi	Medicine-Fresh juice from tender shoot is given to child having urination habit on bed and powder made from mature culm is used to cloth blood in case of cut/ wound. Food-Tender shoot is boiled as vegetable.
7	<i>Bischofiajavanica</i> Blume.		Sitir in Adi	Medicine-Leaf juice is used in gastric. Food- ripen fruit is consumed.
8	<i>Citrus</i> sp. L.	Rutaceae	Sipayegra	Medicine-Boiled extract of the fruit mixed with <i>Litsea cubela</i> bark is used for treating liver problem. Food-Fruit is edible.
9	<i>Clerodendrumcolebrookianum</i> Walp.	Verbenaceae	Ongin	Medicine- Leaf juice is given to high blood pressure or cooked leaf is taken for the same. Food- Tender leaves are one of the most sought after folk food among local people.

10	<i>Dendrocalamusstrictus</i> (Roxb.) Nees.	Poaceae	Eeng	Medicine-Powdered bark is used in blood clothing Food- Tender shoot is used as vegetable.
11	<i>Dioscoreabulbifera</i> L.	Dioscoreaceae	Uli	Medicine- Used in loose motion. Food-one of the major famine food among locality.
12	<i>Eryngiumfoetidum</i> L.	Apiaceae	Ori-ritak in Adi	Medicine-Leaves are used for burns, fevers, asthma, worms. Food- Leaves are used in salad or boiled with almost all folk food to develop aroma.
13	<i>Ficuscordata</i> Thunberg.	Moraceae	Takuk	Medicine- Root extract is given to stop dysentery. Food- Fruit is edible.
14	<i>Houttuyniacordata</i> Thunb.	Sauraceae	Reram	Medicine- Whole plant is used in stomach pain, gas problems. Food- Shoot is used as vegetable and also used as Chutney.
15	<i>Hydrocotylesibthorpoides</i> Lam.	Apiaceae	Killing-kiro	Medicine-Raw juice of whole plant is used to treat blood dysentery. Food- Shoot is used as vegetable.
16	<i>Laporteaacrenulata</i> Gaud.	Urticaceae	Peji	Medicine- Leaf paste is used as antiseptic. Boiled root extract is given in colic pain and pneumonia. Food- Shoot is used as vegetable.
17	<i>Litseaacubeba</i>	Lauraceae	Rajil	Medicine-Barkis used in liver problem. Food- Fruit is used as appetizer.
18	<i>Morus alba</i> L.	Moraceae	Hinskai	Medicine-Gargling of inflammation of vocal cord, root is used in jaundice. Food- Fruit is edible
19	<i>Musa sapiantum</i> L.	Mosaceae	Kolung	Medicine- Boiled fruit is used in dysentery and urinary trouble. Fresh juice taken from underground stem is given to stop loose motion. Food- fruit is edible.
20	<i>Mussaendaglabra</i> Vahl.	Rubiaceae	Taksap	Medicine-Tender shoot is used in constipation. Food- Tender shoot is used as vegetable.
21	<i>Ocimum</i> sp.	Lamiaceae	Take-mareng	Medicine-leaves is used in gargling Food-Leaves are used as chutney or fish is boiling with

				(Ocimum sp.) taken-mareng leaves to aver come characteristic fish smell.
22	<i>Oxalis corniculata</i> L.	Oxalidaceae	Pak iyup	Medicine-good relieving for dysentery relieves intoxication from wine. Food- Leaves are consumed without cooking.
23	<i>Piper pedicellatum</i> Roxb.	Piperaceae	Lori	Medicine- Fruit is used as stomach disorder and in cold and cough. Food- Leaves are consumed as vegetable.
24	<i>Polygonum chinense</i> L.	polygonaceae	Tasummomi	Medicine-Leaf paste is applied on boils and thorn infected wounds. Food- Tender shoot is used as vegetable.
25	<i>Pouzolziabennettiana</i> Wight.	Urticaceae	Oyik	Medicine-Tender shoot is given breast feeding mother to enhance lactation. Food- shoot is among the most sought-after folk food.
26	<i>Rubus sp.</i> L.	Rosaceae	Tasintaen	Leaf mixed with <i>Piper nigrum</i> and their boiled juice extract is given during malaria. Food- Berry is edible.
27	<i>Solanum khasiana</i> Clarke.	Solanaceae	Kosiyang kopi	Medicine- Seeds used as contraceptive properties as well as deworm. Food- Berry is used as vegetable.
28	<i>Solanum nigrum</i> L.	Solanaceae	Okomamang	Medicine- Whole plant is used in Diarrhea, malaria and conjunctivitis. Food- Tender leaves are steamed upon rice vessel to use as food.
29	<i>Solanum kurzii</i> Prain.	Solanaceae	Kopir	Medicine- Fume of burning fruit are inhaled for toothache. Fruit made into a paste mixed with chilly and is applied locally to relieve toothache. Food- Berry is used as food.
30	<i>Solanum spirale</i> Roxb.	Solanaceae	Bangko	Medicine- Tender leaves in gastric, seed in fertility, root in malaria and high blood pressure. Food- tender leaves and berry are used as vegetable.
31	<i>Solanum torvum</i> Sw.	Solanaceae	Migom-kopi	Medicine- Fume of burning fruit is inhaled for toothache. Fruit made into a paste mixed with chilly and is applied

				locally to relieve toothache. Food- Berry is used as food.
32	<i>Spilanthesacmella</i> L.	Asteraceae	Marsang	Medicine- Seed is used to relieve toothache. Food- shoot is used as appetizer in folk food.
33	<i>Traoiainvolcrata</i> L.	Curticaceae	Pezi- pemang	Medicine- Leaves used in deworming of cattle. Food- Tender shoot is a vegetable.
34	<i>Zanthozylumhamiltonianum</i> Wall. Ex Hook.	Rutaceae	Ombeng	Medicine- Leaf extract is given to women with delivery problem. Food- Tender shoot is used as folk food. Fruit is used to increase appetite.
35	<i>Zanthoxylumrhetsa</i> .	Rutaceae	Onger	Medicine- Dried bark is used for treatment of Rheumatism. Roots are good for controlling toothache. Berries are tonic, used in fever and cholera. Fruit is used as piscicidal. Food-Tender shoot is one of the most sought after folk food used to enhance appetite.
36	<i>Zingiberofficinale</i> (Roxb.)	Zingiberaceae	Kekir	Medicine- Used in toothache, cold and cough and post- delivery pain relief ²¹ . Food- mixed with boiled egg or given in boiled non vegetables food items to enhance taste and neutralize smelly character.

CONCLUSION:

The indigenous people of East Siang district of Arunachal Pradesh use numbers of food plants as medicine and overlapping nature of food and medicine is observed in the study. Proximate and phytochemical analysis of such natural resources is suggested for further studies.

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