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E: ISSN NO.: 2349-980X **Shrinkhla Ek Shodhparak Vaicharik Patrika**

Lungru as an Important Future Food Plant to Fight against Malnutrition in India

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Abstract

Lungru belongs to Ferns (Pteridophytes) of plant Kingdom. It is an Indian indigenous plant. It is distributed in all over our country. Good quality variety present in Kangra district. The plant is the source ofvaluable nutrients it can be helpful to fight against malnutrition.Lungru is also known as Kasrod and scientifically *Diplazium esculantum syn. Athyrium esculantum.* It belongs to Athyriaceae, Order – Polypodiales, in Class – Polypodiopsida of Pteridophyta. The fernsare grown in Himalayan foot hills- Himachal Pradesh, Laddakh, Jammu Kashmir, Uttrakhand, Nepal, Bhutan, Sikkim and Assam. It is grown in dense Himalaya's forest where hemp is very low and moisture is high. It is perennials, herbaceous with 30 Cm height of Rhizome.Lungru has richsource of food withhigh nutritive values per 100 gm. Fresh rachis has 35 calories, vitamin 32 mg, 42 mg, phosphorus, calcium 32 mg, and many other important minerals *viz.*Iron, Manganese, Copper, Potassium, Vitamins B-Complex, Vitamins-A, Carotenes, Excellent source of natural Polyphenolic flavonoids compounds such as α and β carotenes. The herb is helpful to cure malnutrition. Such type of indigenous plants can be the source of farmer's economy and Enrich the human food list in future. Domastication of the plant is very easy as we find during study.

Keywords: Lungru, Food Plant, Vitamins, Calories, Malnutrition.

Introduction

India is the second most populated country where any problems we faced every day. Economically poor children are suffered due to malnutrition. According to WHO (2007) our country is on worst ranking due to lack of proper and balanced food. The rural areas gentry is unaware towards under weight and suffer from nutrient deficiency. Our growth rate had been affected. Since 1993 to 2006 our economy growing but declination of child and youth health is as such. The demand of food in future will be more challenge to the world's most populated country. The alternative food resources will be met from wild natural resources. There are great reservoirs in our wild nature.The cheap resources of the balance diet for the man are a big problem. The wild and indigenous plants / herbs can be included in the future diet viz.Moringa, Kasrod, chenopodium, Raghi. Savak etc. Their domestication and agricultural practice may introduce into the new food crops list. Lungru is one of the wild plant which can be introduced in the daily diet chart for the healthy life. (Kaushik and Dhimann, 1995)

Lungru is also known as Kasrod scientifically it is *Diplazium escululentum syn. Athyrium esculantum* belongs to Athyriaceae, Order – Polypodiales, in Class –Polypodiopsida of Pteridophyta grown in Himalayan Region near by Himachal Pradesh, Jammu Kashmir, Uttrakhand, Sikkim, Nepal, Bhutan, and Assam. It is perennials, herbaceous with 30 cm height of Rhizome. It might be an indigenous food plant in the local community kitchen and a Good source of vital economy (Cobb, 1963). *Aware from backers poisoning which is Carcinogenic. It's color is bright green leaves.(Mehra and Bir,1964).*

Fiddle fern/ Lungru is an herbaceous plant stem is underground and leaves are erect and circinately vernation. Leaves are bipinnately compound the rachis is green fleshy and thicker. The rachis is 3-5 feet in length and 2-5 Cm in thickness. In mature condition the plant leaves pinnae having sorri. The rhizome is underground and roots are fibrous where is

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underground and roots are fibrous where arise from the nodes of the rhizome.

Figure 1. Young plant of Lungru

Figure 2. Bunch of collected Lungru leaves

Domestication

The small farmers and farming people can grown the fiddle fern in hilly regions. The sandy and loamy soil is appropriate humus rich and low pH is helpful to grown the plant. The humidity must be 90-100% and the temperature is suitable for cropping is 10-25 ^{0}C. The blosom season is February to June, July. At high altitude, the fiddle fern is more luxuriant in humus rich, aerated and fine greened soil. These are grown in rich flooded planes on river bottom meadows. The spores bearing pinnae point upward and are clustered below the tip. The fertile fronds persist into the winter season.The plants found above timber line the spore are grown in the favorable condition. The rhizome is germinated in the spring seasons.(Kashyap, 2002, Barnett & Diket 2014 and Khullar, 1994)

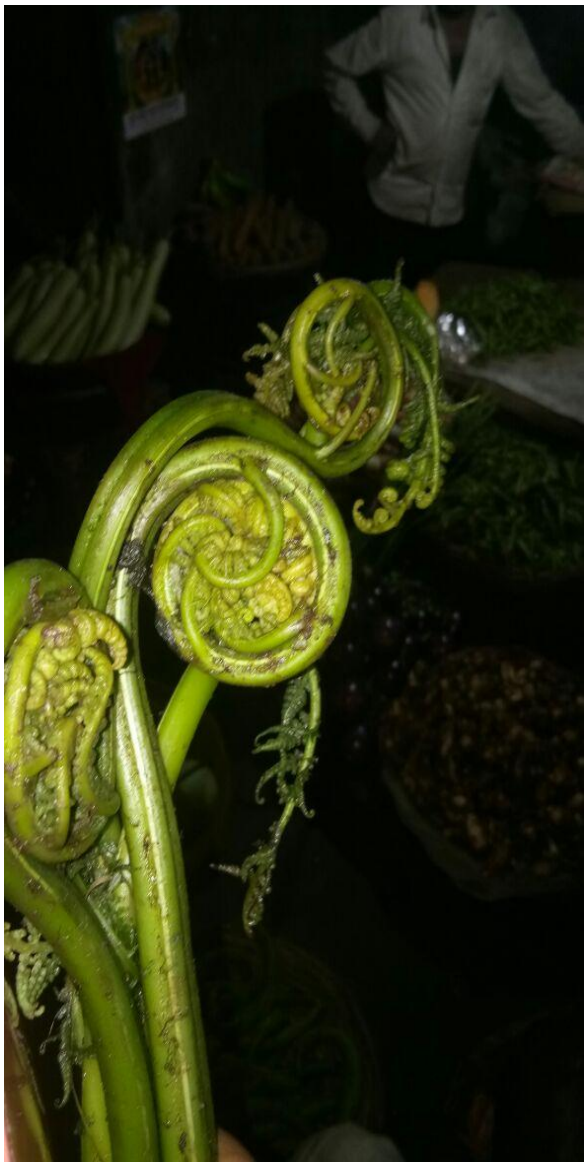

Figure 3. Vegitable venders selling the Lungru

Reproduction

The fiddle fern is grown naturally by spore and vegetative process through rhizome.

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Table: Lungru has 34 Kcal/100gm soup which has following major nutrients: (Courtesy: USDA: National Nutrient Database)

S. N.	Major Nutrients		100 gm of Fiddle Fern	
1.	Cu	35.50 %	Cu	3.20gm.
2.	Zn	07.50%	Zn	0.83mg
3.	Manganese	22.17 %	Mn	0.51 gm
4.	Iron	16.00%	Fe	1.31 mg
5.	Magnisium	08.50%	Mg	34mg
6.	Selenium	01.00%	Selenium	0.7mg
7.	Ca	03.00%	Ca	32mg
8.	Vit-A	25.86 %	Vit-A	181 µg
9.	Vit-B3	31.13%	Vit-B3	.32mg
10.	Vit.-C	29.56 %	Niacin	4.98 mg
11.	Fat	02.00%	Fat	40mg
12.	Carbohydrate	Very Low	Carbohydrate	55.4mg
13.	Protein	08.00%	Protein	45.5mg

Taxonomical Description

Rhizome

Crept or a little erect, underground and aerial, Size attain up to 6cm thick, scaly at the apex; silky hairs present, apex long acuminate, margin. Stipes tufted, up to 3-4 feet long, 25 mm thick, dark brown, glabrous hair above; the stipe and rachis. Lamina deltoid circinatly coiled. Bipinnately compound leaf has upto seven Pairs pinnules. The basal one to two pairs opposite or sub opposite, rest of the pairs alternative. Long stalk, narrowly deltoid a deeply lobed terminal pin is present. Atthe base the pinnules are sessile and apart some 3 cm long. Margin serrate at the apex, shallowly lobed or crenate in the rest and lobes broadly deltoid. Oblique margin grooved above side and flattened below with a narrow wing on other sides. Veins in pairs in pinnae reaching at the base. Pinnae dark green and glabrous. The texture is herbaceous.

Figure 4 Young Leaves of Lungru

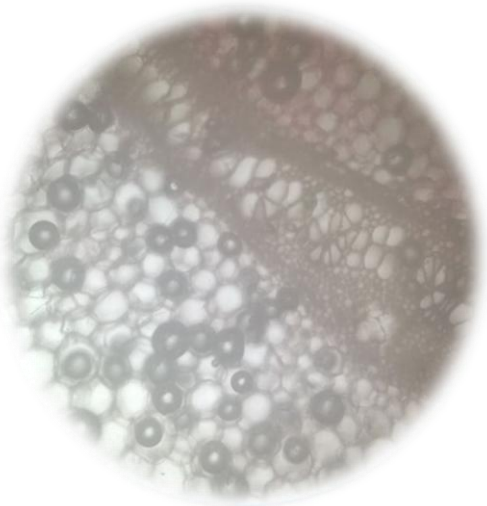

Figure 5. Rachis T.S. Showing Mucilaginous cells

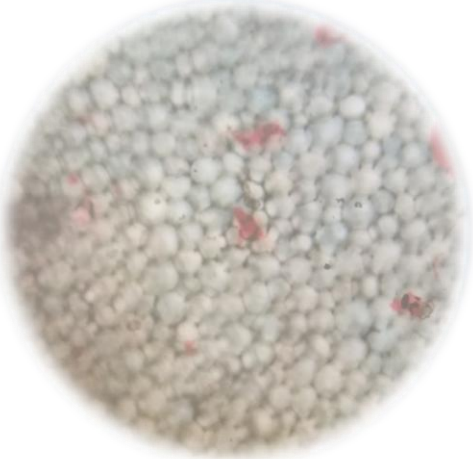

Figure 6. Anatomy of Rachila

Ethnobotanical importance

Lungru is a valuable source for good health for all. It has the quality to make away from many diseases by suppling the natural diet constituents. It helps to cure -**Cancer:**The high amount of Vitamins-Cpromotes the drugs activation in Chemotherapy. Vitamins-C Helps to target the cell which require the nutrients without having the normal cells the lung &

ovarian cancer effetely can be treated by Vitamins-C obtained from Lungru.

Eye Ailments

Due to the presence of Vitamins A and E it helps in eye ailments. Copper & Zinc helps to reduce the muscular degeneration. Stargardt's disease can be prevented.

Bone Disorders

Manganese with Vitamins D, Zn, Cu, & Ca helps to preventthe bone loss in older age. The deficiency of Manganese increasesthe chance of bone related ailments and it helps in bone metabolism also. (Khullar, 1994) Osteoporosis also treated.

Anemia

The Iron beat the anemia which is the rich source in this plant. The low amount ofIroncause low amount of oxygen to the cells, result is low level of energy, poor immunity and slow brain functions but in case of this fern it may cured.

Cause Migraines

B_2 (Riboflavin), 400 mg dose helps to treat cure the headache and Migraine attack.

Digestion

Phosphorus act as phospholipids which is a component of biological membrane e.g. nucleic acid and Nucleotides helps to balance the pH level in body. Phosphorus reduce the water retention, diarrhea bloating. Product the heavily growth bacteria.

Study Area

Kangra district of Himachal Pradesh is the present study area which has rich biodiversity and largest range in Himachal Pradesh. It is located in the western Himalayas due to favorable environmental conditions. The area is home to indigenous plants varieties and the abode of the richest assemblage of flora and fauna in India. The local community utilizes the natural resources for food, medicine. The annual temperature is 21.8 degree, rainfall is 2500ml, humidity 60% to 90%. 427 to 6401 meters above sea level. Latitude 32.0998 N and Longitude 76.2691 E of the district. Dharamsala is highly rain fed area.

The study had been started since 2017. Attended a workshop conducted by Central University of Himachal Pradesh, Kangra. There after many follow up were taken. The Lab studies were held in Department of Botany, Multanimal Modi (Post Graduate and Research) College, Modinagar. Ghaziabad. The plant was verified from FRI, Dehradun, Uttrakhand.

Prospectives of the Study

The present study solely based on the security of alternative food resources in prospect to the future. Since 1947 Indian population is growing rapidly. Population density is going to attain an alarming position. There is no extension in agricultural land, forest area, water resources and food availability. As we have a vision to be a perfect and healthy nation. (Shil and Chaudhary, 2009). We have to plan for the next 100 years' for the constant availability of food and clothes. So that we could ensure the dignity of every citizen. Health security for every one fighting against the malnutrition to attain the WHO health standards (Annonymous, 2018, Goel et al, 1999 and Dutta et al, 2015) Saving the capital money of citizens and lowering the dependency on chief resources of food. In future we can proceed to scrutinize the alternative herbs to add in food list. We can provide chief sources of food and balanced diet to all citizens. There is very shameful situation that a huge number of malnutrition people and below poverty line populations live in our country.If we love our country and love to human race, we have to set time bound operation to free the people from under nutrition and BPL.

Material and Method

The present work is mainly based on the survey and interviews with local inhabitants.The local people's food habit was surveyed by discussing with vegetable venders, dhabas owners, local inhabitants/ families and old people. The survey was made on the pre-determined questionnaire Performa. Dialogue were set up with the local inhabitants who had the knowledge about indigenous food, fodder and medicines. From Medicines man, authentic, Vaidyas, home traditions and old literature get the information were obtained. The plants' materials were collected from the study areas through repeated visits as well from field surveys. Authenticity and taxonomical investigations and identifications were laid by BSI (*Botanical Survey of India*), Dehradun, Uttarakhand.The specimens were preserved in the herbarium and photographs were kept. The section cutting micro and macro anatomical studies, Morphologically Studies were made in our Botany Lab. The biomass studies were also considered. Ethno-Botanical Information were collected by referenced and questioner method. Pharmacognostical studies were performed in the Botany Laboratory. Slides and photography were prepared. Kashyap, 2002)

Figure 7. Prepared disch

Figure 8. At Venders shop

Result and Discussion

As Lungru is an important plant of foot hills of Himalayas. It attains 80 to 100 cm heights. Rhizome is under ground and petiole attained height in the air. Leaves petioles, rachis is flashy and parenchymatous. The cells are oval shaped inter cellular space is present. Outer most layer is covered by single layered Epidermis. Ground tissue has mucilaginous cells also. Conducting tissue is siphonous/ dictyo stele. Young leaves frond is highly circinatly coiled. Flashy green Leaflets arranged on rachis.

Some tribes used to have some indigenous plants in the food. Those plants which are essentially valuable as the food plants explained by Mathew et al 2000 and Thayer, 2006 in their Ethnobotanical survey on the tribal food habit. In India 1.5 million people will be near by 2025 and we will be on first position in populations. There would be more challenges for health problems.The economic importance of fiddle head fern is estimated by different scholars and scientist reported that eye ailments, bone disorders, anemia, migraine, digestion, cancer can be treated by fiddle head fern. Benniamin (2011) and Singh(1999), Boughton. (1963), Singh & Panigrahi Fern and Fern allies of Arunachal Pradesh. Shil and Choudhary (2009:) studied Ethnomedicinal importance of Pteridophytes used by Reang tribe of Tripura,

Von (1984) Gave the formulations of orchid ferns, Kaushik P.and Dhiman (1995) and Kashyap (2002), studied on herbal medicinal plants with different aspects. Singh (1999) did the work on herbal plants for medicinally proposes. Goel, (1999) Datta, et al (2015) Gave the population survey on different issues. population data of Meerut for health. Anonymous (2018, 2011,1991) gave the WHO standard health and NSSO reported to uplift the health standards. Benniamin (2011.) studied about the ferns uses. Khullar (1994.), Mehra & Bir (1964) and Kaushik and Dhiman (1995) did the survey of medicinal and food plants illustrated fern flora of western Himalaya. Lyon, et al (1999) wrote a book about food plants. Thayer and Samuel. (2006.) gave the foragers harvest A guide to identifying, Harvesting and preparing edible wild plant. Singh (1999) explained about potential medicinal Pteridophytes of India and their chemical constituents, Singh, S. & Panigrahi, G. (2005) worked for the foragers harvest A guide to identifying, Harvesting and preparing Edible wild plant plants. Forager's Harvest. USDA-NRCS (2009). The different workers and scientist did the work on different aspect of edible vegetation hence the Lungru is the right plant to be enlisted as a popular food plant. Even a little amount is helpful to make healthy. Many local diseases can be cured.

Conclusion

Lungru is a dedicated fern it has the capacity to add as supplement food for the indigenous community and it is medicinal s well food plant. It has rich nutritive source. It is recommended to grow commercially but its geographical habitat is restricted. After many followsupof local community survey it was found that Many herbs like Lungruare used by local people which have nutritive values. They can keep away from malnutrition.These herbs are very cheap source for indigenous community and available to all in the Himalayan region. Such herbs may also be introduced in the agricultural crop.

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