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Perilla: A Nutritious Food Crop for Future

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INTRODUCTION

Perilla (*Perilla frutescens*)is an annual medicinal, aromatic, herbal and functional food plant. That belongs to the mint family, Lamiaceae, which grows mainly in Asia and is native to the mountainous areas of China and India. The primary center of origin for the crop is China. Seed yield of perilla is 770 kg/ha. It is generally grown in the courtyardsand has wider occurrence in humid sub tropical, subtemperate, and temperate parts of the country. However it grows well in loamy soil having gooddrainage property. The indigenous names of Perilla are 'Su-tzu' (Chinese), 'Bhanjira' (Hindi), 'Kkaennip' (Korean), 'Unei' (Khasi), 'Kenie Thoiding (Manipur), and Silam (Nepali). In Asia, Perilla frutescens has three principal varieties. These are crispa, acuta, and japonica in addition to another var. proper. Out of this, var. proper and var. japonica usually grown in North Eastern region of India. Two distinct varieties are known on the basis of their use: var. frutescens, an oil crop and var. crispa (Thunb.) Decne, a spicy vegetable or used as medicine. The var. frutescens is larger in size and height, with larger soft seeds, whereas var. cripsa smaller in habit has more branching, with smaller, hard seeds. Habit wise there are morphological variations among these plants. The tall, bushy, leafy types do occur in NEH region. The leaves are fragrant and variable in size, texture and aroma. Inflorescence length is also variable, affecting the seed produce. The seeds vary in size and colour and thus vary in oil quality and quantity. Recently, Perilla is an important plant gaining attention due to its medicinal values and beneficial phytochemical constituents. The leaves, seeds, and stems of Perilla are used for various medicinal applications. In this review it has aims to present an overview pertaining to the nutritional and medicinal values of Perilla.

Botanical describtion

Plant :- ***Perilla frutecens*** is an annual herb with 5-6 branches growing upto a height of 1-2 m. It belongs to the mint family **Lamiaceae**.

Fig 1: Perilla plant

Leaves:- Leaves are medium sized ovate to slightly round shaped with serrated edges. Moreover, there are numerous fine hairs on adaxial side of leaves which are purple – green in colour. Furthermore, leaves are aromatic and have smell of mint.The leaves are simple (i.e., lobed or unlobed but not separated into leaflets) Leaf arrangement opposite: there are two leaves per node along the stem Leaf blade edges the edge of the leaf blade has teeth.

Fig 2: leaves and seeds of Perilla.

Flowers :- Flowers are borne on spike at the apex of each branch. They are minute and white coloured. Flower symmetry there is only one way to evenly divide the flower (the flower is bilaterally symmetrical). Number of sepals, petals or tepals there are five petals, sepals, or tepals in the flower Fusion of sepals and petals the petals or the sepals are fused into a cup or tube. Stamen are four in number. Fruit type (general) the fruit is dry but does not split open when ripe.

Seeds:- Seeds are slightly larger than Mustard seeds and are available in different shades ranging from grey to black. Perilla seeds can be soft or hard, being white, grey, brown, and dark brown in colour and globular in shape.1000 seeds weigh about 4 g (1⁄8 oz). Perilla seeds contain about 38-45% lipid.

Floral biology

Fig 3: 1, flowering branch; 2, flower; 3, fruiting calyx; 4, nutlet

The flowers bloom on racemes at the end of branches and the main stalk in late summer. The calyx, 3–4 mm (1⁄8–5⁄32 in) long, consists of upper three sepals and the hairy lower two. The corolla is 4–5 mm (5⁄32–3⁄16 in) long with its lower lip longer than the upper. Two of the four stamens are long. Flowers are pale purple and white in colour.

Varietal types -

Perilla frutescens has three known varieties.

1. *P frutescens* (var. frutescens) – called Korean perilla or deulkkae
2. *P frutescens var. crispa* – also called shiso or tía tô
3. *P frutescens var. hirtella* – also called lemon perilla.

Distribution in North East India–

Perilla has special importance in food culture of North East India it is known as Bhangjeera or Bhangira, Khamela in Manipuri. It is cultivated in an unorganised manner to a very limited scale in the north-eastern hill region. The local hilly people of this region grow Perilla in certain pockets under jhum (shifting) cultivation or in kitchen garden to use as condiments. In Nagaland, it is also used for dying cotton and medicinal. Improvement of existing germplasm is necessary under local condition in order to boost the production and productivity of this crop.

Nutritional property

The species Perilla has various uses in India and abroad in at least nine ways: seeds are sold as food for birds or human consumption; the seed oil is used as a fuel, a drying oil, or a cooking oil; the leaves are used as a potherb, for medicine, or for food colouring; and the foliage is distilled to produce an essential oil for flavouring. The seeds are eaten by people and used as bird seed.

The protein and total ash content 18.5g and 3.4g per 100gm seeds respectively. The results showed a significant content of magnesium (261.7mg/100g) and iron (9.54mg/100g).Manganese (4.93mg/100g) was also found in more quantity which can help to assist the body in metabolizing protein and carbohydrates. Magnesium (Mg) improves insulin sensitivity, protects against diabetes and its complications, reduces blood pressure, prevents heart rhythm abnormalities and is found in chlorophyll. The elements like copper and chromium were found in low content (0.20 mg/100g and 17.6µg/100g, respectively). Copper (Cu) is an essential redox-active transition element that plays vital role in various metabolic processes. Being toxic, its quantity in plants should be very low. It is essential to the human body since it forms a component in many enzyme systems, such as cytochrome oxidase, lysyl oxidase and an iron-oxidizing enzyme in blood. Chromium (Cr) is known to regulate carbohydrate, nucleic acid and lipoprotein metabolism and also potentiates insulin action.

Table 1: Approximate composition and mineral content of Perilla frutescens oils compared to other seeds oil (per 100gm seeds).

CONTENT	PERILLA
Moisture (g)	6.8
Protein (g)	18.5
Fat (g)	52.0
Ash (g)	3.4
Carbohydrate (g)	22.8
Energy (Kcal)	630
Calcium (mg)	249.9
Magnesium (mg)	261.7
Phosphorous (mg)	677.2
Iron (mg)	9.54
Manganese (mg)	4.93
Zinc (mg)	4.22
Copper (mg)	0.20
Chromium (µg)	17.6

(Longvah and Deosthale, 1991

Table 2: Plant parts use

PLANTPARTS/ PRODUCTS	USES
Seed	Powdered seeds and oil cake edible; crushed seeds for flavouring or garnishing preparations, press residue used as food or animal feed.
Leaves	Used as potherb/ vegetable or raw, processed as soup, herbal tea, pickled leaves.
Flower buds	Edible raw or cooked processed as perilla alcohol
Seed oil	Cooking oil; culinary use, burning; antiseptic agent for mouthwashes, tooth paste, soap manufacture
Essential oil	For flavouring Perilla alcohol and other products.
Medicinal use	Herbal tea from flowers and leaves for cold, asthma, fever; leaf extract for allergic reaction

Traditional medicinal property

MANIPUR- Paste of shoot is applied to wounds. Decoction of the whole plant used in influenza, corhyza and headache. The fruit effective against cough.

ARUNACHAL PRADESH- Adi tribe used its medicinal value particularly for pregnant ladies.

MEGHALAYA- In Khasi it is also known as ‘ Nei Lieh’ used to cure skin irritation.

Food item prepared by the local tribes of N.E India

In the Manipur region a famous salad cuisine called 'singju' is prepared by using the roasted and ground seed of perilla. One of the famous dishes of Nagaland, ‘Akini Chakibo’ is considered to be an exotic dish. Akini in local language reders to Perilla seed and chokibo refers to snails. The dish is prepared by roasting and grounding the perilla seeds and

then cooking them with snails. 'Silam achaar' in Sikkim the seeds of perilla are use in making chutney together with chilli. In Meghalaya 'Rosted veggies' are use to cook as a healthy recipe with perilla seeds.

Akini Chakibo Silam achaar Singju

Fig 4: Food items prepared from Perilla.

PHARMACOLOGICAL PROPERTY

Antioxidant Activity- due to the content of phenolic acids, flavonoids, and carotenoids.
Antibacterial and Antifungal Activity- due to polyphenols, luteolin.
Anti-Allergic Effect- due to ethanol extract from *Perilla frutescens*, Rosamaric acid (RA)
Anti-Depressant Activity- due toapigenin,RA,caffeic acid,perillaldehyde
Anti-Inflammatory Activity- due to uteolin, Lipophilic triterpene acids
Antitumor Effect- due to tormentic acid, a lipophilic triterpene acid
Neuroprotective- due to α-linolenic acid

CONCLUSION

It is found that leaves, seeds and its oil are used in various regions of the world like China, Japan, Korea and India in the preparations of spices, condiments, sauces, tea, leafy vegetables and herbal medicines. Medicinal importance showed that the plant has potential antiasthmatic, antioxidant, antidepressants, antimicrobial, neuroprotective, hepatoprotective and other uses. Hence, further researches are required to validate its use in product development by using seed and seed oil.It is cheap and good source of omega – 6 & omega – 9 fatty acids in comparison to cod liver oil extraction. Moreover, it has greater culinary use from leaves to seeds. Toxicology profiles of the active constitutes of perilla, especially aromatic compounds (essential oils), are significantly lacking and need to be addressed. Inhaling smoke from roasting perilla seeds led to occupational asthma through an IgE-mediated mechanism. Additionally, a single case of anaphylaxis caused by perilla seed was also reported. Due to genetic variations, it has been exploited as an ornamental plant in gardens. Taxonomical aspects of perilla species must be recognized to avoid misleading identification of the plant species via a proper molecular study. The traditional and local uses of the plant are not well documented in the English literature since the plant originally belongs to the Asian countries, and might be the main reason why the ethnobotanical uses of perilla species are not widespread. Although its bioactivity in vitro and in vivo has been revealed to present potential health benefits, such as anti-microbial, antioxidant, anti-allergic, antidepressant, anti-inflammatory, anticancer, and neuroprotective effects, the clinical trials are insufficient to declare a well-established efficacy and safety, therefore human studies are recommended.Farmers of suitable regions can earn a good income from Perilla Cultivation.

REFERENCES

SK Singh and P C Kole.1996 Collection and Conservation of Landraces of Perilla

frutescens (Linn.) Britt. from North Eastern Hill (NEH.) Region of India.

Subhash Chandra, Sri Narain, Pradeep Dwivedi. 2005. Studies on Nutritional and Medicinal Values of Perilla frutescens (L.)

Akriti Dhyani, Rajni Chopra and Meenakshi Garg. 2015. A Review On Nutritional Value, Functional Properties and Pharmacological Application of Perilla (Perilla Frutescens L.)

Tanaka. Wealth of India. 1985. Hanelt and Institute of Plant Genetics and Crop Research.

Brenner, D.M. 1993. Perilla: Botany, uses and genetic resources. P. 322-328. In: J. Janick and J.E. Simon (eds.), New crops. Wiley, New York.

Hiwa M. Ahmed Ethnomedicinal, Phytochemical and Pharmacological Investigations of Perilla frutescens (L.) Britt

Anjula Pandey, K. C. Bhat, Diversity distribution and collection of genetic resources of cultivated and weedy type in Perilla frutescens (L.) Britton var. frutescens and their uses in Indian Himalay.

S K Singh, . P C Kole Collection and Conservation of Landraces of frutescens (Linn.) Britt. from Northeastern Hill (NEH) Region of India.