

PERILLA: A SUPERFOOD FOR A HEALTHIER FUTURE

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Abstract

Humans require around forty known nutrients in adequate amounts to live healthy and productive lives. Collectively, these nutrients play important roles in humans and dictate our physical and mental development. For humans, agricultural based products are the main source of nutrients. However, the majority of the people diets mainly based on cereals such as rice, wheat, and maize contain insufficient amounts of several nutrients. Due to nutrient deficient agricultural products, results in poor health, sickness, increased morbidity and disability, impaired development, stunted mental and physical growth, diminished livelihoods, and reduced national socioeconomic development. The annual herb *Perilla frutescens* (Bhangjeera) is a member of the mint family Lamiaceae. The perilla plant has recently attracted increased attention due to its therapeutic properties and phytochemical composition. The perilla seeds are considered to be dense in certain nutrients with a mega load of health benefits. Perilla seeds are high in calcium and they are rich in vitamins & minerals. Thus, Perilla seeds come under the category of a superfood.

Keywords: Perilla, Mental development, Physical growth, Nutrients, Superfood

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Introduction

Increasing population of India has started creating demographic pressure on agriculture sector to ensure food security (Meena and Sharma, 2015). According to United Nations Food and Agriculture Organization, 792.5 million people across the world are malnourished out of which 780 million people live in developing countries. In addition, two billion people across the world suffer from another type of hunger known as "hidden hunger," which is caused by an inadequate intake of essential micronutrients in the daily diet despite increased food crop production (Hodge, 2016; Gould, 2017). As of now, our agricultural system exclusively prioritises boosting grain yield and crop productivity rather than promoting human health (Garg *et al.*, 2018). The present and future generations can be empowered by good nutrition. Even after 75 years of independence, the majority of India's population, particularly its women and children, does not receive the necessary diet to meet their nutritional demands (Gogoi, 2022). To meet the growing demand for food grains, increasing agricultural production and ensuring nutritional security are crucial problems. However, the long-term sustainability of agricultural productivity is seriously threatened by the increase in crop yield brought about by the excessive use of fertilisers and pesticides. The health of the soil has been seriously impacted and is steadily declining as a result of removal of agricultural residue and indiscriminate use of chemical fertiliser. The government suggests promoting organic farming techniques, combining modern technology with traditional farming practices like green manuring, biological pest control and weed management and traditional agricultural crops (Meena and Sharma, 2015). One of the most rapidly expanding segments of the global food and agriculture market is organic food (Ballester-Costa *et al.*, 2013). The EU regulation (EC) (No 834/2007) defines organic foods as "items produced under controlled cultivation circumstances characterised by the absence of synthetic fertilisers and extremely limited use of pesticides due to customer perceptions that organic foods are better for their health, higher nutritional quality, and more nutrient-dense than conventionally produced foods (Magnusson *et al.*, 2001). The nutritional, sensorial, and food safety benefits of organic vs conventional crops are, nevertheless, poorly understood. It appears that the scientific literature on organic products is still incoherent (Rouphae *et al.*, 2015).

Perilla frutescens L. commonly known as Perilla (Bhangjeera) is an annual herb belongs to the family Lamiaceae which consists of 236 genera and more than 7000 species. *P. frutescens* found in the Himalayan region of India, China, Korea, Japan and Nepal. Now it is also being cultivated by some western countries like U.S.A, Russia, and Europe due to its growing economic importance (Dhyani *et al.*, 2019). Perilla, has been traditionally grown for its leaves and seeds. Its health benefits have been mainly attributed to its content of bioactive flavonoids and phenolic compounds (Rouphae *et al.*, 2015). In India, it is mainly cultivated in Uttarakhand, Uttar Pradesh, Himachal Pradesh and Kashmir states for its flavoring essential oil. Perilla seeds (Bhangjeera) are roasted with onion and tomato to form chutney (sauce) and also used in the curry material. It is mostly used by tribal communities in Northeast Asia for its edible seeds because they are a less expensive source of fat and protein. In Manipur, a salad known as "Singju" is made with ground, roasted seeds. Perilla leaves are used in many meals to provide colour and flavour as well as as a vegetable and spice. Its leaves are edible and can be dried to preserve them. Its

young stalks are used to make soup, and its blossom buds can be eaten uncooked (Dhyani et al., 2019).

Additionally, it has been shown that perilla seed oil is a good source of both saturated (like palmitic and stearic) and unsaturated (like oleic, linoleic, and particularly omega-3 linolenic acid) fatty acids (Guan *et al.*, 2014). Essential polyunsaturated fatty acids like linoleic and α -linolenic cannot be synthesised by the human body and must thus be included in both humans diets (Jorgensen *et al.*, 2012). These two polyunsaturated fatty acids can be transformed by the body into other polyunsaturated fatty acids viz., eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA) (Heuer *et al.*, 2002).

P. frutescens oil (PFO) is abundant with omega-3 polyunsaturated fatty acids (omega 3-PUFA), particularly α -linolenic acid (ALA) at 54–65% (w/w) of the total fatty acid content. In the human body, ALA is metabolized into eicosapentaenoic acid (EPA), docosahexaenoic acid (DHA), and eicosanoids, all of which are known to exert nutrients, anti-inflammatory, anti-thrombotic, and various neuroprotective effects. With regard to its anti-atherogenic properties, perilla oil has been observed to lower plasma lipids and decrease the size of fatty-streak lesions in apolipoprotein-E knockout mice. Accordingly, these properties can improve various cardiovascular and immune functions (Koonosyong *et al.*, 2022). Moreover, the ethanolic extract of *P. frutescens* fruits is abundant with phenolics and flavonoids that have been observed to exhibit anti-inflammatory activities in tumor necrosis factor-alpha (TNF- α) -induced endothelial (EA. hy926) cells. Furthermore, this extract can also reduce oxidative stress and lipid peroxidation in human hepatocellular carcinoma (HuH7) cells (Paradee *et al.*, 2020). Perilla seed consists of 51.7% fat and 17.0% protein, and defatted perilla seed meal consists of ~40% protein (Longvah and Deosthale, 1998). It is worthwhile to investigate the use of perilla seed meal as a food ingredient with added value. Perilla protein, particularly perilla protein isolate (PPI), offers a number of highly functional qualities that could broaden its applications in the food sector, including a high water solubility index, water absorption capacity, oil holding capacity, and foaming ability.

Composition and Functional Properties of Perilla Seed and Perilla Seed Oil

The entire perilla plant is extremely beneficial and nourishing, because it includes fat, protein, vitamins, minerals, and phytochemicals. Perilla leaf extract has 5.47% crude protein, 7.61% crude fat, and 7.68% moisture, respectively (Li *et al.*, 2014). Perilla leaves are also a great source of carotenoids, just like spinach leaves are (Schirmmacher *et al.*, 2010). The seed has a nutty flavour and contains yellowish oil (40%) as well as protein, polyphenols, and amino acids (Valine, Leucine, Isoleucine, Lysine, Tryptophan, Threonine, Tyrosine, Phenylalanine, Cysteine, Methionine, and Histidine). As the protein content of whole perilla seed and perilla kernel is 17.2% and 20.1%, respectively, the protein content of perilla seed increased following hulling and roasting (Longvah *et al.*, 1998).

Medicinal Uses of Perilla (Bhangjeera)

Food poisoning, asthma, diabetes, cancer, and heart disease are just a few of the illnesses that this plant's constituents may be able to treat. Medical research revealed the plant may have antiviral, antioxidant, anti-inflammatory, anti-allergic, and anti-aging properties. It has been asserted that omega-3 fatty acids have neuroprotective effects in

Parkinson's disease and also have a protective effect against Alzheimer's disease as well (Asif and Das, 2012).

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