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STUDY OF THE VALUABLE AGRONOMIC AND ECONOMIC CHARACTERISTICS OF THE NON-TRADITIONAL VEGETABLE CROP PERILLA (PERILLA L.)

Juraxolava Xurshida Qudratbekovna
Master's degree student
Nurmamatov Furqat Abdug'anievich
q.x.f.f.d.(PhD) Doctoral student
Termiz State University of Engineering and Agrotechnologies
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Annotation: The article presents the results of evaluating the nutritional, medicinal, and other beneficial properties of the perilla plant. To promote wider cultivation of this unconventional vegetable, the study considers its morphological and biological traits, the value of its essential oil, and cultivation and care technologies for home gardens and commercial farms.

Keywords: Perilla plant, Importance and uses, Medicinal properties, Origin, Botanical description, Biological characteristics

Аннотация: В статье представлены результаты оценки пищевой, лечебной и других полезных свойств растения периллы. Для широкого внедрения этого нетрадиционного овоща рассматриваются его морфо-биологические особенности, ценность эфирного масла, а также технологии выращивания и ухода в приусадебных и фермерских хозяйствах.

Ключевые слова: Растение периллы, Значение и применение, Лечебные свойства, Происхождение, Ботаническое описание, Биологические характеристики

Introduction. In recent years, as new innovations have been introduced into agriculture, many crops have been introduced and evaluated according to their economic characteristics, as well as their nutritional value and medicinal properties. At the same time, recommendations on the agro-technologies for cultivating these crops are being developed and implemented in production.

In our republic, the number of new non-traditional vegetable crops is increasing year by year. Among these crops, the perilla plant (Perilla L.) occupies a special place for our country.

Importance and Uses. Certainly, its leaves provide an attractive appearance and are used as an ornamental crop, while on the other hand, the powder obtained from its leaves is used as a food product. Perilla powder has found its way into many culinary applications, enriching the flavor profile of various dishes with its unique taste that combines nutty flavors with delicate minty notes. This ingredient is valued by both professional chefs and home cooks for its versatile nature and serves as an excellent seasoning for a wide variety of dishes, ranging from savory main courses to sweet desserts.

Medicinal Properties of Perilla. Perilla powder also has an impressive nutritional value. It is rich in omega-3 fatty acids, especially alpha-linolenic acid (ALA), providing a plant-based alternative for people who want to increase their omega-3 intake. This makes it an excellent addition to vegetarian and vegan diets, where obtaining sufficient omega-3 fatty acids can sometimes be difficult.

The health-promoting properties of perilla have attracted the attention of the food industry. Research suggests that perilla seed extract and perilla leaf extract may provide various health benefits, making them valuable ingredients in dietary supplements and functional foods. Worldwide, perilla is mainly cultivated for its beneficial oil, although there is also high demand for its leaves and stems on the global market.

Perilla oil is widely used in the pharmaceutical and food industries, while the upper leaves are used in cosmetology. Leaves and stems with high oil content are also processed into long-burning briquettes or used as hay for livestock feed. In addition, perilla contains a high amount of unsaturated "omega" fatty acids that are important for human health. Therefore, modern medicine uses it in the treatment of cardiovascular diseases, bronchitis, nervous system disorders, and many other illnesses. The oil in perilla also helps reduce cholesterol levels in the human body and may be beneficial for diabetes management.

Perilla oil is also highly valued in Eastern cuisine, contributing to its strong market demand. For example, China alone has an annual demand of more than 50,000 tons of this plant.

One of the remarkable advantages of perilla extract is its potential anti-inflammatory effect. The omega-3 fatty acids and antioxidants present in the plant help reduce inflammation in the body and may alleviate symptoms associated with chronic inflammatory diseases. In addition, some studies indicate that perilla extract may contribute to cardiovascular health by supporting healthy cholesterol levels and improving blood circulation.

Rich in essential fatty acids and antioxidants, perilla extract is widely used in skincare and haircare products. These nutrients help nourish and protect the skin, potentially reducing signs of aging and promoting a healthy, radiant appearance. In haircare, perilla seed extract is valued for its moisturizing properties. It improves hair texture, reduces frizz, and adds shine to dull hair. Some manufacturers are also exploring the use of perilla extract in scalp treatments because of its anti-inflammatory properties, which may soothe irritated scalps and support healthy hair growth.

Perilla powder and its extracts demonstrate remarkable versatility in culinary applications, food production, and cosmetic industries. The combination of omega-3 fatty acids, antioxidants, and bioactive compounds provides a wide range of benefits. As scientific research continues to reveal additional uses and health benefits, further innovations involving this remarkable plant are expected in many industries.

Perilla seed powder contains a high amount of oil, with an oil content reaching approximately 45%. The oil composition includes 62.73% linolenic acid, 15.43% linoleic acid, and 12.01% oleic acid. The seeds contain around 25% protein and include 18 types of amino acids, among which lysine and methionine are present in higher amounts than in amaranth, a high-protein plant. In addition, perilla contains oryzanol, vitamin E, vitamin B1, alcohol compounds, phospholipids, and other beneficial substances.

Perilla seeds are rich in plant-based omega-3 fatty acids, which support brain health and help maintain clear skin and shiny hair. Their high linolenic acid content helps reduce cholesterol levels in the blood. Perilla also contains many other beneficial nutrients, including proteins, vitamins A, B, and E, calcium, iron, and essential minerals.

Botanical Description of Perilla Perilla (Perilla) is an annual herbaceous plant belonging to the mint family, Lamiaceae. It is cultivated in two main forms: oilseed and ornamental varieties. About five species are found in Southeast Asia. Oilseed, essential-oil, and vegetable types of perilla are mainly cultivated in China and Japan, while ornamental forms with dark red or variegated leaves are grown in the Far East, Western Europe, and the United States.

Perilla is a moisture-loving and heat-loving plant with a vegetation period of 100–150 days. It can self-pollinate as well as cross-pollinate. The seeds contain 46–53% rapidly drying

industrial oil, which is used in the production of varnishes, paints, and coatings, although it is also suitable for food consumption.

According to one year of scientific research on perilla morphology, the plant has an upright-growing and strongly developed stem system. On average, it forms three main stems, and each main stem develops about 12 secondary lateral branches. In total, one plant produced approximately 115 branches.

The stem is quadrangular and covered with soft hairs, with branching increasing toward the upper part of the plant. The leaves are oppositely arranged, softly pubescent, and broadly ovate in shape. The average leaf length is about 5 cm. One plant formed a total of 2,473 leaves, demonstrating the intensive leaf productivity of the Rosinka variety. The leaf margins are finely serrated, and the surface is dark green with soft pubescence.

The flowers are small and arranged in spike-like inflorescences. They are white or light purple in color, although the Rosinka variety usually produces white flowers. The flower diameter ranges from 3–5 mm, and each flower has a five-part calyx and four stamens.

The fruit is a small nutlet divided into four parts, with a diameter of 1.3–1.8 mm. When mature, the fruit becomes gray or light brown in color. Each calyx produces four seeds. The seeds are small, reticulated, mucilaginous, and rich in oil content.

Biological Characteristics

Perilla is cultivated as an annual plant with a height ranging from 60 to 140 cm. The stem is erect and covered with hairs. The stems and leaves may be green, purple, or red. In red-leaved forms and varieties, the leaves are larger and more prominently serrated. Green-leaved forms usually have softer and juicier leaves. All leaves are covered with sparse long hairs, and the veins are densely pubescent.

The flowers are numerous and densely clustered at the apical part of the plant. The fruit is dry and splits into four nutlets. The seeds are very small, with up to 800 seeds per gram, and are light orange or brown in color. Perilla is a short-day plant; flowering accelerates under 9–11 hours of daylight for approximately three weeks.

The plant grows well in loose, nutrient-rich soils and prefers warm and well-lit conditions. One of the most valuable morphobiological characteristics of perilla is its highly productive foliage.

Agrotechnology

Perilla is relatively resistant to cool conditions and grows well in moist environments; therefore, it is often cultivated between orchards and vineyards. Importantly, its cultivation does not negatively affect neighboring crops.

Perilla is usually sown from late February to early March. Its growing period lasts about 120–150 days. Under extremely hot conditions, the plant tends to shed its seeds. Perilla has high productivity, yielding up to 1,500 kg of seeds per hectare.

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