

BIOLOGY AND MEDICINAL PROPERTIES OF PLANTAGO OVATA

¹Boboev Sarvar Baxtiyorovich, ²Abdugafforova Umixon Abdurasul qizi

¹Senior lecturer, Ph.D., ²Student of TSAU

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Abstract. This article analyzes the literature on *Plantago ovata*, focusing on its botanical description, medicinal properties, and yield indicators. *Plantago ovata* is a promising medicinal plant for regulating blood sugar and cholesterol levels, preventing cardiovascular diseases, diabetes, intestinal inflammation, and cancer. The adaptability of the plant to climate and soil conditions, along with methods to achieve high productivity, are discussed based on literary sources.

Keywords: *Plantago ovata*, medicinal plants, biologically active substances, cardiovascular diseases, diabetes, antibiotic properties.

Introduction

Cardiovascular diseases, diabetes, intestinal inflammation, and cancer pose a serious threat to human health, reducing quality of life, productivity, and increasing the demand for medical services. These conditions raise the risk of mortality and disability, lower societal labor productivity, and impose a significant economic burden on healthcare systems.

Distribution area:

The medicinal properties of *Plantago ovata* show great promise in preventing and treating the aforementioned diseases. The plant is mainly found in regions such as Southern Europe, India, Iraq, and Iran (Ross, 2005). It is also cultivated in France, Spain, North Africa, and Pakistan. India, supplying 90% of the global market, is the primary producer, where *Plantago ovata* is commonly known as Isabgol and is mainly cultivated for industrial use. The seeds are a key source of pure fiber and are widely utilized (Sharma, 2017).

Botanical Description:

Plantago ovata is an annual plant from the *Plantaginaceae* family, reaching a height of 30–45 cm. The leaves are long, lanceolate, and have three primary veins located in the middle and on both sides of the leaf. The root system consists of a primary root and secondary roots (Ross, 2005). The plant blooms for up to 60 days, with small white flowers arranged in clusters (Sharma, 2017). The seeds are oblong, boat-shaped, and feature a bulging vein on one side and a textured, deeper groove on the other. They measure 1.8–3.3 mm in length and 0.8–1.5 mm in width, ranging in color from reddish-gray to black with a shiny appearance (Sharma, 2017).

Medicinal Properties:

The seeds and husks of *Plantago ovata* are used medicinally as a source of dietary fiber (mucilage). They are effective in regulating blood sugar and cholesterol levels, improving cardiovascular health, and managing diabetes (Romero, 2002; Nazario Franco, 2020; Hannan, 2006). The mucilage also plays an important role in treating intestinal inflammation, constipation, and diarrhea, as well as preventing cardiovascular diseases (Rodriguez-Cabezas, 2003; Motamedi, 2010). The high fiber content in the seeds helps prevent intestinal disorders and cancer (López, 2009). Additionally, the seeds are effective in reducing blood lipid levels (Romero, 2002; Nazario Franco, 2020). The plant's natural antibiotic properties against antibiotic-resistant bacteria are also noteworthy (Motamedi, 2010). Its adaptability to climate and

soil conditions, allowing for high productivity, further enhances its agricultural and medicinal value (Karimzadeh, 2004; Ghaderi-Far, 2012).

Productivity:

Plantago ovata adapts well to different climates and soil conditions. Research suggests that the most effective planting time is around May 5, with a nitrogen fertilizer application of 100 kg/ha. This results in the highest yield, with seed swelling reaching 156 mm and a yield of 9104 g/m² (Karimzadeh, 2004). The seeds also demonstrate adaptability to various environmental factors, with a germination rate of 84–92% at temperatures of 10°C to 25°C. They can tolerate saline conditions, although germination decreases when salinity exceeds 200 mM (Ghaderi-Far, 2012). In vitro-grown plants show morphological differences from those grown in natural conditions, but the phytochemical content is higher (Sharma, 2017). When seeds are incorporated into food products, they help lower blood cholesterol and sugar levels while enhancing the nutritional value of the product (Nazario Franco, 2020).

Summary:

The literature review on *Plantago ovata* reveals that this plant is a promising tool for controlling blood sugar and cholesterol, preventing cardiovascular diseases, intestinal disorders, and cancer. Its adaptability to environmental conditions and high productivity are of significant interest in agriculture. This review will serve as a foundation for our future research, which will aim to enhance productivity and further explore the medicinal properties of this valuable plant.

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