**Plantago major L.**

*Plantaginaceae*

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**Morphological Description**

*Plantago major L.* is a perennial plant that belongs to the Plantaginaceae family. It can grow up to 15 cm high, though size varies depending on the growth habitats. The leaves grow in rosettes, and they are ovate to elliptical with parallel venation. The leaves are glabrous and have an entire or irregularly dentate margin. Flowers are small, brownish-green on long non-ramified spikes. Seeds are small with an ovate shape and a slightly bitter taste. The seed endosperm has highly thickened cellulosic walls with the cell lumen filled with oil and protein. It forms the major part of the seeds and surrounds the embryo completely. The seeds are located in capsules and become sticky in humid weather due to the swelling of the polysaccharides present in the seed coat.

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**Geographical Distribution**

**Local:** The Nile region including the delta, the oases of the Western Desert and the entire Sinai peninsula.

**Regional:** The Mediterranean region, Arabia to Central and Northern Asia

**Global:** Europe, cosmopolitan as introduced.

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**Ecology**

The plant grows along the Nile and canal banks, irrigated fields and open moist grounds.

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**Status**

The plant is common.

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**Part(s) Used**

leaves and aerial parts

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**Collection**

plants are collected during flowering season throughout the summer.

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**Preparations**

decotion, tincture, ointment.

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**Use**

oral.

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**Constituents**

Carbohydrates: the seeds contain monosaccharide glucose, fructose, xylose and rhamnose, as well as disaccharide sucrose and trisaccharide plantose. Polysaccharides are composed of xylose, arabinose, galactose, rhamnose and galacturonic acid. The trisaccharide raffinose and the tetrasaccharide stachyose have been isolated from the leaves. Lipids: myristic, palmitic, stearic, oleic, linoleic, linolenic, arachidic, behenic, lignoceric and 9-Hydroxy-cis-11-octadecenoic acids have been found in the seeds.
Myristic, palmitic, stearic, arachidic and behenic acids have been found in the leaves. Alkaloids: indicain and plantagonin. Caffeic acid derivatives: ethyl and methyl esters of caffeic acid, chlorogenic and neochlorogenic acids were isolated. Plantamajoside is the main caffeic acid derivative, acetoside is also present. Flavonoids: apigenin 7-glucoside, baicalein, hispidulin, hispidulin 7-glucuronide, homoplatnaginin, luteolin 7-glucoside, luteolin 7-diglucosid, luteolin 6-hydroxy-4’-methoxy-7-galactoside, nepetin 7-glucosid, plantaginin and scutellarein have been found in the plant. Iridoidglycosides: asperuloside, aucubin, catapol, gardoside, geniposidic acid, majoroside, 10-actoxymajoroside, 10-hydroxymajoroside and melittoside were isolated. Other terpenoids: lolioloid, oleanolic acid, ursolic acid, 18b-glycyrrhetinic acid and sitosterol were the leaf wax.

Pharmacological Action and Toxicity
The combined methanol and water extract inhibited ulcer formation by 40% relative to the control group. A P. major preparation was reported to be effective in a screening system for prophylactic oncology. The aqueous extract was shown to have a prophylactic effect on mammary cancer in mice. The plant extract had a good effect on human herpes infections. The leaves extract had chemotactic activity on neutrophils using the Boyden migration chamber method. Some intermediately polar or nonpolar substances of relatively low molecular weight in the plant have shown antibiotic activity against some gram negative and gram positive bacteria in addition to a weak antmycotic activity. Antigiardiasic and antimalarial activities were reported. The aqueous extract of the dried leaves has shown immuno modulating, anti-inflammatory and analgesic activities. The infusion of P. major tea contained small amounts of free radical scavengers compared to black tea indicating that processing can lead to significant loss of activity. Plant decoction had intermediate diuretic activity. The 70% ethanol extract was found to be toxic to shrimps but the plant possesses a low toxicity in rats at oral and i.p. administration.

Traditional Medicinal Uses
- Against tumours
- Digestive system problems
- Infectious diseases
- Pain relief
- Reducing fever
- Reproduction and circulation disorders
- Respiratory diseases
- Skin diseases
- Wound healing

Other uses of the plant: Plantain is edible. The very young leaves have been cooked as greens. Leaves become stringy and strong rather quickly as they age, particularly when they grow in very sunny locations; they are therefore used to make stock. Plantain is very high in beta carotene (A) and calcium and provides ascorbic acid (C). The immature flower stalks may be eaten raw or cooked. The seeds are said to have a nutty flavour; they are added to a variety of foods and ground into flour. Medicinally, plantain is documented to affect blood sugar, usually lowering it. Plantain is currently being marketed to help stop smoking as it is said to cause aversion to tobacco.

References


**General References**


