



1- Botanical information: *Plantago lanceolata* L. is also called Narrowleaf or English plantain and it is one out of 200 species of the botanical genus *Plantago* some perennial herbaceous weeds, growing all over the world in temperate climates and known for medicinal use since prehistorical ages. Plantains are stout plants, even invasive, adapting to nutritional poor soils. *Plantago lanceolata* grows up to 40 cm high. The leaves are oval-lanceolate and grow up to 30 cm long and 4 cm wide, grass green in color, with 3-5 prominent parallel veins. Each flower is made up of a greenish calix and a pink-brownish corolla; the strongly exerted stamens have long filaments and large, white anthers. Fruits are ovoid, brown capsules which split when ripe, releasing two small seeds.

2- Parts used: whole or cut dried aerial parts (mainly leaves)

3- Active constituents: *Plantago lanceolata* contains 2-6.5% mucilage (polysaccharides), 2-3% up to 9% in young leaves of iridoid glycosides (bicyclic monoterpenes, mainly aucubin and catalpol); flavonoids as apigenin and luteolin; 6.5% tannins and phenolic carboxylic acids, caffeoyl phenylethanoid glycosides (CPGs) as verbascoside.

4- Galenic forms: Sedox is the EPO extract of *Plantago lanceolata* L. available as fluid or dry extract. The dry form is standardized to contain $\geq 5\%$ total phenols expressed as gallic acid and $\geq 1\%$ verbascoside; the fluid form is standardized to contain $\geq 1.5\text{mg}$ gallic acid/ml of total phenols and $\geq 0.007\%$ verbascoside.

5- Traditional uses, safety and warnings: Narrowleaf plantain is a typical bechic and expectorant plant; in Europe it has been used by traditional herbalists to treat cough, whooping cough, bronchitis, bronchial asthma, and as antidiarrhoeic, antihemorrhoidal and anti-inflammatory agent. For external use, the mush obtained by crushed leaves or the juice have been applied directly on damaged skin to stop blood flow, repair wounds, soothe burns and insect bites. Anti-inflammatory and antispasmodic properties seem to depend on flavonoids and CPGs, as demonstrated in experimental studies. In particular, luteolin and verbascoside seem to be responsible of the antispasmodic activity. The anti-inflammatory properties are recognized for the upper respiratory airways, buccal and pharyngeal mucosa and skin. Mucilages contribute to the lenitive and bechic properties also in dry cough. Aucubin may possess clinically relevant antimicrobial and antitarrhal activities. The antioxidant and free radical scavenging properties are due both to luteolin and to CPGs, especially to verbascoside. Few clinical trials have been carried out to support the anti-inflammatory, broncholytic and expectorant properties of *Plantago lanceolata*; these results positively confirm the traditional uses. According to EMA (European Medicine Agency) and German E commission monographs, the oral administration could be considered as safe in elderly, adults, adolescents and children between 3 and 12 years of age; while the oromucosal administration is recommended only for elderly and adults. No data are available about the use of Narrowleaf plantain during pregnancy and breast feeding, therefore it should be avoided. The pollen of many *Plantago* species may cause allergy reactions.