

Expert Herbal Reality Resource

Meadowsweet

Names

Botanical Name *Filipendula ulmaria* (L) Maxim

Family: Rosaceae

Common names: queen of the meadow, meadowwort (Engl), Mädesüßblüten, Spierblumen (Ger), fleur d'ulmaire, reine des prés, ulmaire (Fr), ulmaria (Ital)

Alternate botanical names: *Spiraea ulmaria* L



Description

Meadowsweet is a perennial herb up to 120 cm tall, with long petioled leaves up to 65 cm long and composed of 2 to 5 pairs of 8 cm-long ovate leaflets with double-toothed margins and a tomentose underside. The small creamy white flowers are arranged in dense, many flowered, cymose panicles with many protruding stamens.

Constituents

Phenolic constituents are the most prominent actives in meadowsweet,^{1,2} including the following

- Ellagitannins (10 to 15%), especially rugosin-D.
- Phenolic (salicylaldehyde) glycosides, including methyl salicylate (spiraein) in the flowers, monotropitin (gaultherin) in the flowers and leaves, and a salicyll alcohol glycoside.
- Flavonoids (up to 3-5%) consisting of spiraeoside, hyperoside and other glycosides of quercetin and kaempferol.
- Essential oil (0.2% from the flowers) notably salicylaldehyde (75%).³

There is evidence of postbiotic transformation of meadowsweet metabolites by the microbiome. Protective urolithins have been generated from meadowsweet ellagitannins in human faecal cultures,⁴ and in the case of cultures of pig microbiota (which are similar to humans) polyphenol metabolites were detected demonstrating anti-inflammatory and diuretic activity.⁵

Traditional use

Meadowsweet has been used for its astringent property in the treatment of diarrhoea, and it is almost a specific for children's diarrhoea. It has also been used in the management of arthritis and rheumatism, oedema, cellulitis, kidney disorders, cystitis, urinary stones.

What practitioners say

- **Digestion:** Meadowsweet is used to treat conditions of the upper gastrointestinal tract. Its tannins appear to provide protection to the oesophageal and gastric mucosa while allowing the salicylates to modulate inflammation without causing the harm associated with aspirin derivatives. It is used principally for reflux

other acid-associated problems of the gastroesophageal sphincter (such as hiatal hernia, and GERD/GORD), and more widely to a range of acid dyspepsia symptoms and gastritis. Its tannin astringency makes it a useful component in reducing diarrhoea that originates as a reflex from the stomach such as in gastro-enteritis and especially children's diarrhoea.

- **Urinary:** meadowsweet is widely regarded as an effective diuretic, as a component of a detox regime especially in the case of arthritic problems (see below), and also to reduce oedematous inflammatory conditions. It was also used in kidney or urinary stones and urinary infection.
- **Musculoskeletal:** although its aspirin-equivalence is low there is a tradition of incorporating meadowsweet in formulations to help with arthritic disease. This may have more to do with its reputation as a urinary remedy and the old tradition of using remedies (like nettle, clivers and birch) that were seen to help eliminate acid metabolites from the body.
- **Skin:** there is a reputation for the use of meadowsweet as an external application for skin and mucosal lesions – in a similar way to other salicylate-based treatments with some observations of benefits for acne and cervical dysplasia.



Evidence

There is very little human research on the effects of meadowsweet. One review of the literature supported its traditional use in inflammatory conditions, including evidence of COX-1 and COX-2 inhibition,⁶ with others well demonstrating a reduction of other inflammatory markers,⁷ and with indication that flavonoid and tannin components are partially responsible for the demonstrated pharmacological activities.⁸

Laboratory studies have additionally indicated that the high tannin levels are associated with elastase inhibiting activities.⁹ In vivo antimutagenic activity has been identified,^{10,11} and in vitro effects have been demonstrated against *Helicobacter pylori*,¹² and *Staphylococcus aureus*.¹³

Safety

Meadowsweet is widely judged to be safe even for long term use. No significant adverse effects are expected, even in the case of theoretical gastric reactions to salicylates (high tannin levels are postulated as one protective mechanism). However caution is advised in cases of salicylate sensitivity and in patients taking warfarin or other anticoagulants. Large doses may also be inappropriate in or may even exacerbate constipation or iron-deficiency anaemia, due to the high tannin levels.

A herbal syrup including salicylate-rich ingredients willow and meadowsweet was withdrawn from the Italian market after being associated with gastrointestinal bleeding in a child.¹⁴ Meadowsweet extracts have not shown genotoxic activity,¹⁵ and have even demonstrated antigenotoxic effects in vivo and in vitro.¹⁶

Dosage

Effective dosage levels are relatively high with traditional use of between 12 to 18 g/day of dried aerial parts in the form of a tea for short term use. Modern usage recommendations are often between 2-6g per day or equivalent in other formulations.

References

1. Bijttebier S, Van der Auwera A, Voorspoels S, et al. (2016) A First Step in the Quest for the Active Constituents in *Filipendula ulmaria* (Meadowsweet): Comprehensive Phytochemical Identification by Liquid Chromatography Coupled to Quadrupole-Orbitrap Mass Spectrometry. *Planta Med.* 82(6): 559-72. doi: 10.1055/s-0042-101943.
2. Katanić J, Boroja T, Stanković N, et al. (2015) Bioactivity, stability and phenolic characterization of *Filipendula ulmaria* (L.) Maxim. *Food Funct.* 6(4): 1164-75. doi: 10.1039/c4fo01208a
3. Valle MG, Nano GM, Tira S. (1988) The Essential Oil of *Filipendula ulmaria*. *Planta Med.* 54(2): 181-2. doi: 10.1055/s-2006-962390.
4. Piwowarski JP, Granica S, Zwierzyńska M, et al. (2014) Role of human gut microbiota metabolism in the anti-inflammatory effect of traditionally used ellagitannin-rich plant materials. *J Ethnopharmacol.* 155(1): 801-9. doi: 10.1016/j.jep.2014.06.032.
5. Popowski D, Zentek J, Piwowarski JP, Granica S. (2021) Gut Microbiota of Pigs Metabolizes Extracts of *Filipendula ulmaria* and *Orthosiphon aristatus*-Herbal Remedies Used in Urinary Tract Disorders. *Planta Med.* doi: 10.1055/a-1647-2866
6. Katanić J, Boroja T, Mihailović V et al. (2016) In vitro and in vivo assessment of meadowsweet (*Filipendula ulmaria*) as anti-inflammatory agent. *J Ethnopharmacol.* 193: 627-636. doi: 10.1016/j.jep.2016.10.015.
7. Drummond EM, Harbourne N, Marete E, et al. (2013) Inhibition of proinflammatory biomarkers in THP1 macrophages by polyphenols derived from chamomile, meadowsweet and willow bark. *Phytother Res.* 27(4): 588-94. doi: 10.1002/ptr.4753.
8. Samardžić S, Arsenijević J, Božić D, et al (2018). Antioxidant, anti-inflammatory and gastroprotective activity of *Filipendula ulmaria* (L.) Maxim. and *Filipendula vulgaris* Moench. *J Ethnopharmacol.* 213: 132-137. doi: 10.1016/j.jep.2017.11.013.
9. Lamaison JL, Carnat A, Petitjean-Freytet C. (1990) Teneur en tanins et activité inhibitrice de l'élastase chez les Rosaceae [Tannin content and inhibiting activity of elastase in Rosaceae]. *Ann Pharm Fr.* 48(6): 335-40. French. PMID: 2131766.
10. Bespalov VG, Alexandrov VA, Vysochina GI, et al. (2018) Inhibitory Effect of *Filipendula ulmaria* on Mammary Carcinogenesis Induced by Local Administration of Methylnitrosourea to Target Organ in Rats. *Anticancer Agents Med Chem.* 18(8): 1177-1183. doi: 10.2174/1871520618666180402125913.
11. Bespalov VG, Alexandrov VA, Semenov AL, et al. (2017) The inhibitory effect of meadowsweet (*Filipendula ulmaria*) on radiation-induced carcinogenesis in rats. *Int J Radiat Biol.* 93(4): 394-401. doi: 10.1080/09553002.2016.1257834.
12. Cwikla C, Schmidt K, Matthias A, Bone KM, et al. (2010) Investigations into the antibacterial activities of phytotherapeutics against *Helicobacter pylori* and *Campylobacter jejuni*. *Phytother Res.* 24(5): 649-56. doi: 10.1002/ptr.2933.
13. Rauha JP, Remes S, Heinonen M, et al (2000) Antimicrobial effects of Finnish plant extracts containing flavonoids and other phenolic compounds. *Int J Food Microbiol.* 56(1): 3-12. doi: 10.1016/s0168-1605(00)00218-x.
14. Moro PA, Flacco V, Casseti F, et al (2011) Hypovolemic shock due to severe gastrointestinal bleeding in a child taking an herbal syrup. *Ann Ist Super Sanita.* 7(3): 278-83. doi: 10.4415/ANN_11_03_07.
15. Pukalskienė M, Slapšytė G, Dedonytė V, et al. (2018) Genotoxicity and antioxidant activity of five *Agrimonia* and *Filipendula* species plant extracts evaluated by comet and micronucleus assays in human lymphocytes and Ames Salmonella/microsome test. *Food Chem Toxicol.* 113: 303-313. doi: 10.1016/j.fct.2017.12.031.
16. Matic S, Katanić J, Stanić S, et al. (2015) In vitro and in vivo assessment of the genotoxicity and antigenotoxicity of the *Filipendula hexapetala* and *Filipendula ulmaria* methanol extracts. *J Ethnopharmacol.* 174: 287-92. doi: 10.1016/j.jep.2015.08.025.