

VERVAIN

Verbena officinalis Linn.

Family

Verbenaceae. Not to be confused with a different species in the verbena family, *Aloysia triphylla* Royle, commonly known as lemon verbena.

Parts Used

Herb.

Description

A native to Europe, vervain is a perennial herb of up to one metre in height, with angular stems, widely spaced, unevenly dissected leaves in opposite pairs, and slender, sparsely flowered spikes of small lilac flowers.¹

Traditional Use

“So many Virtues are attributed by Authors, to this Plant, that it would tire one to reckon them up.” John Pechey (1655 to 1716)

Vervain is such a delicate plant that it is easy to overlook, but its medicinal power is belied by its humble appearance. Historically, vervain has been associated with sorcerers, witches, the divine, magic and other supernatural forces. In ancient times it was bruised and worn about the neck as a charm against headaches and venomous bites. Its virtues in these areas may be due to the fact that in the early Christian era, folk legend stated that vervain was used to staunch the wounds of Christ after his removal from the cross. It was consequently called ‘holy herb’ or ‘Devil’s bane’. Until



recent times, picking vervain was accompanied by this prayer: 'Hallowed be thou, Verbena, as thou growest in the ground, For in the mount of calvary there thou was first found, Thou hailest our Saviour Jesus Christ, and stauncest his bleeding wound; In the name of the Father, the Son and the Holy Ghost, I take thee from the ground'.^{2,3} Prior to this in Egyptian mythology, vervain grew from the tears of Isis, goddess of fertility, as she grieved for her murdered brother-husband, Osiris.⁴

As a medicinal plant it has long standing use from as early as 8th Century BC. It has been used traditionally in northern Europe for rheumatic pain and wounds.⁵ During the Middle Ages, healing herbs were often called simples and herbalists were known as simplers. Vervain was prescribed so frequently for so many conditions that it became known as simpler's joy and achieved the reputation as a cure-all used as a panacea for colds, fevers, nervous complaints, skin infections and gout.⁶

Vervain was scientifically described by Carl Linnaeus in his 1753 *Species Plantarum (The Species of Plants)*, the primary starting point of plant nomenclature as it exists today. The name vervain is derived from the Celtic ferfaen, from fer (to drive away) and faen (a stone), as the plant was used for bladder problems, especially stones. Another derivation is given by some authors from *Herba veneris*, because of its aphrodisiac qualities attributed by the Ancients. The name *Verbena* was the classical Roman name for altar-plants in general and *officinalis* is Latin for 'used in medicine or herbalism'.⁷

The common names of vervain in many Central and Eastern European languages often associate it with iron, for example in German it is known as Eisenkraut (iron herb) and Stahlkraut (steel herb). It was traditionally associated with the gods of war and gun flints were sometimes boiled with rue and vervain to make them more effective. It was the vulnerary for wounds caused by weapons made of iron. Coincidentally the herb should not be taken concurrently with iron because of its ability to reduce its absorption relating to its high polyphenol content (see drug interactions below).⁸

17th Century botanist Nicholas Culpeper says:

'Excellent for the womb to strengthen and remedy all the cold griefs of it, as plantain doth the hot.

Vervain is hot and dry, opening obstructions,

*cleansing and healing. It helps the yellow jaundice, the dropsy and the gout; it kills and expels worms in the belly, and causes a good colour in the face and body, strengthens as well as corrects the diseases of the stomach, liver, and spleen; helps the cough, wheezing, and shortness of breath, and all the defects of the reins and bladder, expelling the gravel and stone. It is held to be good against the biting of serpents, and other venomous beasts... Applied with some oil of roses and vinegar unto the forehead and temples, it eases the inveterate pains and ache of the head, and is good for those that are frantic. The leaves bruised, or the juice of them mixed with some vinegar, doth wonderfully cleanse the skin, and takes away morpew (dandruff), freckles, fistulas and other such like inflammations and deformities of the skin in any parts of the body...'*⁹

Vervain is called ma bian cao in Chinese. It is a traditional Chinese medicine with bitter, pungent, cool qualities which is widely used for clearing away heat and detoxing, promoting blood circulation and removing blood stasis, inducing diuresis and excreting dampness. It is used to induce menstruation, relieve rheumatism and as an astringent and vermifuge.^{10,11}

Constituents

Glycosides: Iridoid glycosides; hastatoside, verbenalin (verbanalloside),¹² verbenin (aucubin). Phenylpropanoid glycosides; acteoside (verbascoside) and eukovoside.

Volatile oils: monoterpene components include citral, geraniol, limonene and verbenone.

Other constituents; apigenin;¹³ beta-sitosterol; ursolic acid; oleanolic acid; adenosine; alkaloid (unspecified); bitters; carbohydrates (stachyose, mucilage); beta-carotene; invertin (sucrose hydrolytic enzymes); saponins and tannic acid.^{14,15} Abundant in potassium together with phosphorus, calcium and magnesium.¹⁶

Actions

Sedative, astringent, mild antidepressant, spasmolytic, mild diaphoretic, diuretic, possible galactagogue.¹⁷

Pharmacological Activity

The pharmacological actions of vervain have not been significantly investigated so traditional use is discussed. Iridoid glycosides and the verbascoside or more likely the metabolites formed in the body could be, at least partly, responsible for the observed effects. The bitter taste and tonic use in stimulating digestion are ascribed to the iridoids.¹⁸ Modern pharmacological studies of the alcohol extract and decoction of vervain showed that it has anti-inflammatory and analgesic activities, exciting uterine smooth muscle, immunity reinforcement and nerve protection effects.^{19,20}

Digestive Activity

One small (N = 68) randomised trial investigated the effect of a tea containing vervain as well as chamomile, liquorice, fennel and balm-mint (better known as lemon balm) on infantile colic. Reduced symptoms of colic were noted, but the study was limited by the large volume of tea required for effect. Infantile colic, defined as excessive crying in an otherwise healthy baby, is a distressing phenomenon, but there is little evidence to support the many treatments offered. Several small studies report some benefit from use of a hypoallergenic (protein hydrolysate) formula, maternal diet adjustment (focusing on a low-allergen diet), and reduced stimulation of the infant. While dicyclomine has been shown to be effective for colic, there are significant concerns about its safety, and the manufacturer has contraindicated its use in this population. A herbal tea containing chamomile, vervain, licorice, fennel, and balm-mint was also effective in a small randomised controlled trial but the volume necessary for treatment limited its usefulness (strength of recommendation: B, inconsistent or limited-quality patient-oriented evidence). The one proven treatment is time, as this behavior tends to dissipate by six months of age.²¹

Anticancer Activity

A 2009 *in vitro* study evaluated the proapoptotic (leads to programmed cell death) activity of vervain essential oil, and its main component citral, on lymphocytes collected from normal blood donors and patients with chronic lymphocytic leukemia (CLL). The number of apoptotic cells was greater in CLL patients than in healthy subjects at all different

times of incubation (4, 8 and 24 hours) for samples treated with vervain essential oil and citral versus controls at different concentrations. The greater proapoptotic ability was shown by both vervain essential oil and citral at lower concentrations. The proapoptotic activity of vervain essential oil and citral is thought to be due to a direct procaspase 3 activation. This data further supports evidence that indicate natural compounds as a possible lead structure to develop new therapeutic agents.²²

The differentiation of a human adenocarcinoma cell line was induced by verbascoside, reducing the malignant phenotype.²³ Verbascoside affected telomerase activity and telomere length, as well as inducing apoptosis in a gastric cancer cell line.²⁴

Antioxidant and Antifungal Activity

The results of a 2008 Spanish study suggest that 50% methanolic extracts of vervain and caffeic acid derivatives (verbascoside) could potentially be considered as excellent, and readily available, sources of natural antifungal and antioxidant compounds. The scavenging activity against DPPH (1,1-diphenyl-2-picrylhydrazyl) radical and the antifungal effect against chloroform, ethyl acetate and 50% methanolic extracts of vervain leaves were investigated.²⁵

Antioxidant effects of verbascoside have been demonstrated in several models, including radical scavenging²⁶ and pulse radiolysis methods.²⁷ Vervain essential oil was active in an antioxidant screen, although the oil is not expected to contain verbascoside.²⁸

Anti-inflammatory Activity

In a recent *in vivo* study, vervain extracts obtained with different solvents (methanol; enriched flavonoids; supercritical (liquid) CO₂) were evaluated for anti-inflammatory, gastroprotective and cicatrizing (heal by scar formation) activities. Additionally, the antioxidant capacity was determined *in vitro*. In order to confirm the activities investigated, histological observations were performed. All extracts induced a remarkable anti-inflammatory activity. The gastric damage was significantly reduced by all extracts administered, whereby the most pronounced protection was observed for the liquid CO₂ and enriched flavonoid extracts. Finally, a wound healing effect was

obtained particularly by the liquid CO₂ extract, suggesting the presence of some lipophilic active principles. Histological evidence confirmed the results evaluated with the animal procedures. The results obtained after oral administration of vervain extracts were also in agreement with the antioxidant capacity evaluated *in vitro*, confirming the relationship between pharmacological activities and antiradical (counteracting free radicals) efficacy.²⁹

A vervain 3% preparation (3% of the alcohol extract) had significant anti-inflammatory activity the same as that of piroxicam (non-steroidal anti-inflammatory drug) and somewhat less analgesic activity than that of methyl salicylate (oil of wintergreen). These effects were concerned with iridoid glycosides. Previous studies have demonstrated the anti-inflammatory activity of vervain 50% methanolic extract in intraperitoneal injection and topical administration (see paragraph below). The effects of several formulations were prepared and studied using carrageenan-induced oedema and formalin testing. Piroxicam gel and methyl salicylate ointment were studied as positive control for anti-inflammatory and analgesic activity, respectively. The oedema inhibition of the preparations containing extract at the doses of 1 to 3% were significantly different from the control group. The anti-inflammatory effect of 3% vervain was similar to the effect of piroxicam gel three hours after carrageenan injection. The analgesic activity of topical preparation with more than 2.5% vervain was observed in the early phase. This activity was observed in concentrations of more than 2% vervain in the late phase. The topical analgesic activity of the extract was less than the analgesic activity of methyl salicylate ointment.³⁰

Petroleum ether, chloroform and methanol extracts of aerial parts of vervain have demonstrated anti-inflammatory activity *in vivo* using the carrageenan-induced paw oedema model, with the chloroform extract being the most active.³¹

In another study the anti-inflammatory activity of a 50% methanol extract of the leaves of vervain was investigated on topical and oral administration. In the TPA-induced ear inflammation model, the extract showed a high reduction of oedema, but in the carrageenin-induced rat paw oedema the effect observed was less at the two doses employed. The

results confirmed the use of vervain in folk medicine as a topical anti-inflammatory herbal drug.³²

Neuroprotective Activity

An aqueous extract of vervain prevented extracellular accumulation of beta-amyloid peptide, a factor considered to trigger neuronal death in Alzheimer disease. Decreased destruction of neurites and decreased neuronal apoptosis were also observed. Vervain may have potential to be a neuroprotective agent against neuronal loss in Alzheimer's disease after the study proved its novel neuroprotective effects. The study hypothesised that vervain can exert cytoprotective effects on cells of the central nervous system. Pre-treatment of aqueous extracts of vervain significantly weakened the toxicity of beta-amyloid (Abeta) peptide and reducing agent dithiothreitol in primary cultures of cortical neurons. Extracellular accumulation of Abeta peptide is an important cytotoxic factor involved in Alzheimer's disease.³³

Antilithic and Urinary Antiseptic Activity

Vervain's traditional action as an antilithic and diuretic has recently been investigated in rats and has had some beneficial effects, attributed partly to a disinfectant action and an alkalisng effect, possibly due to the presence of saponins. The study investigating the effects of vervain infusion was carried out because of its suspected application to prevent and treat kidney stone formation. Variations of the main urinary stone risk factors (citraturia, calciuria, phosphaturia, pH and diuresis) were evaluated.³⁴

Other Activity

Vervain is stated to have several properties, including galactogogue activity (attributed to aucubin) and luteinising activity (attributed to inhibition of the gonadotrophic action of the posterior lobe of the pituitary gland), although the scientific basis for these statements is not clear. Vervain has been documented to possess weak parasympathetic properties, causing slight contraction of the uterus. Verbenalin has been reported to exhibit uterine stimulant activity. Sympathetic activity has also been documented: in small doses verbenin has been reported to act as an agonist at sympathetic nerve endings whereas

larger doses result in antagonism. A slight laxative action in mice has been documented for iridoid glycosides.³⁵

Indications

- Depression
- Early stages of fever, debility of convalescence after fevers, especially influenza
- Inflammation of gallbladder, jaundice, gastrointestinal irritation
- Promotion of lactation
- Topically for headache, rheumatism and haemorrhoids

Energetics

Bitter, pungent, cooling.

Use in Pregnancy

Not recommended although further studies are needed. Vervain is reputed to act as an abortifacient and oxytocic agent. Verbenalin has been reported to exhibit uterine stimulant activity *in vivo*.³⁷

Contraindications

None known.

Drug Interactions

When iron supplementation is required, or in cases of anaemia, vervain should not be taken simultaneously with meals or iron supplements. If it is then a vitamin C-rich fruit juice can counteract its inhibiting effects.

An *in vitro* study into iron availability and consumption of tea, vervain and mint during weaning in Morocco has shown that vervain infusion inhibited iron availability but vitamin C helped in preventing these inhibiting properties.

At pH 4 and at pH 2.5, iron availability was decreased by tea and vervain and increased by mint and ascorbic acid. At both pHs it was increased by addition of ascorbic acid to tea and vervain.

In addition, at pH 2.5 it was increased by addition of ascorbic acid to mint. Iron availability was higher at pH 2.5 than at pH 4 (with single compounds or combinations with ascorbic acid). The polyphenol contents (mg/L) of tea, vervain and mint infusions were 2,236.1, 771.1, and 16.5. The study concluded that tea and vervain infusions inhibited iron availability. In contrast, mint improved it; vitamin C helped in preventing these inhibiting properties. It could be proposed to discourage tea and vervain drinking at early weaning and to replace them by mint infusion, or at least to promote the consumption of vitamin C-rich fruit juice to counteract these inhibiting effects.³⁸ Vervain tea was shown to inhibit the absorption of iron by 59% in a study using bread meal (compared with a water control meal). Inhibition by black tea was 79-94%. The inhibition was dose-dependent and depended on the content of total polyphenols.³⁹

Administration and Dosage

Liquid Extract:	1:1
Alcohol:	30%
Weekly Dosage:	20 to 80mL

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