**SYNONYMS**
Sage, common sage

**EFFECT**

**Introduction**
Salvia is a Latin word and means to heal. The fact that such a name has been given to a plant reflects the broad therapeutic value attributed to the plant. For thousands of years, people on various continents have used species of Salvia for a variety of disorders. Within Europe, Salvia officinalis is mainly known as a mouthwash and gargle, on account of its therapeutic importance in mouth and throat infections. It is also used as an oral phytotherapeutic medicine for stomach complaints, excess sweating and menopausal symptoms. Recent studies have shed light on the potential wider use of Salvia.

**Ingredients**

There are 5 main groups of ingredients. Many substances have already been established:

1. Monoterpenes
   - Alpha-pinene
   - Beta-pinene
   - Borneol
   - Camphor
   - 1,8-cineole
   - (eucalyptol)
   - 3-Carene
   - Terpinolene
   - Myrcene
   - Beta-phellandrene
   - Limonene
   - Alpha-thujone

2. Diterpenes
   - Tanshinone I en IIA
   - Cryptotanshinone
   - 15,16-Dihydrotsinshinone
   - Salvinorin A
   - Carnosol
   - Carnosinic acid
   - Ursolic acid
   - Oleanolic acid

3. Triterpenes
   - Uvaol
   - Betulin
   - Betulinic acid
   - Lithospermate B
   - Rosemary acid
   - Apigenin

4. Phenolic acids
   - 7-Methoxyrosmanol
   - Galdesol
   - Carnosol
   - Carnosinic acid
   - Apigenin
   - Hispidulin
   - Cirsimaritin

5. Flavonoids
   - Whole plant extract
   - Essential oil, Alpha-thujone
   - Ursoic acid, Carnosinic acid and Carnosol
   - Whole plant extract (Salvia tea), Carnosic acid, Carnosol, Rosemary acid, Lithospermate B, Caffeic acid
   - Whole plant extract (Salvia tea)
   - Carnosic acid and Carnosol
   - Carnosic acid

**Properties of Salvia officinalis**

**Properties**
- Sedative and sleep-inducing
- Memory-enhancing
- Inflammation-inhibiting and analgesic
- Antibacterial and antiviral
- Antioxidative
- Metformin-like effect
- TZD-like effect
- Regulation T3-hormone
- Reduction of menopausal symptoms

**Known responsible substances**
- 7-Methoxyrosmanol, Galdesol, Carnosol, Carnosinic acid, Apigenin, Hispidulin and Cirsimaritin
- Whole plant extract
- Ursoic acid, Carnosinic acid and Carnosol
- Essential oil, Alpha-thujone
- Whole plant extract (Salvia tea), Carnosic acid, Carnosol, Rosemary acid, Lithospermate B, Caffeic acid
- Whole plant extract (Salvia tea)
- Carnosic acid and Carnosol
- Carnosic acid
- Extract of salvia leaf (and alfalfa)

**Mechanisms of action:**
- Sedative, anxiolytic and sleep-inducing. In-vitro the substances demonstrate their effect on the GABA/benzodiazepine receptor complex in the brain. They work by opening the ion channel to chloride ions, resulting in an increase in the polarity of the neuron and a reduction in irritability.
- Memory-enhancing. In-vitro Salvia extract is demonstrated to have a cholinergic activity (cholinesterase inhibiting).
- Inflammation-inhibiting and analgesic. In-vitro ursolic acid inhibits the production of pro-inflammatory leukotrienes, antagonise intracellular Ca2+ mobilisation by a chemotactic stimulus and reduce the formation of oxygen radicals and the secretion of elastase by leucocytes.
- Antioxidative. In-vitro, liver cells of rats that have been treated with salvia tea contain a high level of glutathione.
- Antibacterial and antiviral. In-vitro, various terpenes and phenolic acids from salvia demonstrate a broad-spectrum antibacterial, antymyotic and antiviral property.
- Metformin-like effect. The slight metformin-like effect in-vitro indicates inhibition of specific gene activity in the liver which is involved in gluconeogenesis and glycogenolysis. This results in a lower fasting glucose. However, salvia tea does not seem to present its effect through a higher insulin secretion and does not improve the glucose clearance during a glucose tolerance test. Researchers suggest that salvia may become a new therapeutic agent in the treatment of metabolic syndrome and prediabetes.
- TZD-like effect. TZD=thiazolidinedione or glitazone; diabetes medicine. In-vitro research indicates a certain PPAR gamma receptor activation which is representative of a decrease in triglyceride and glucose levels in the blood.
- Regulation T3 hormone activity. At low doses, carnosic acid boosts the expression of vitamin D and vitamin A receptors, which form heterodimers (a link) with the thyroid gland hormone receptors. Jointly, these receptors then form the main mediators for the activity of the T3 hormone and through an improved receptor dimerisation, can advance the activity of this thyroid gland hormone. Research performed in postmenopausal women also indicated an increased response of TSH (thyroid stimulating hormone; hypophysis) on the TRH (thyroid releasing hormone; hypothalamus). The PPAR gamma, vitamin D and vitamin A receptors are part of the large family of nuclear hormone receptors which, under the influence of environmental factors such as nutrition, directly influence the function of the human genome.
- Reduction in menopausal symptoms. The essential oil of salvia has a slight oestrogenic activity.

**INDICATIONS**

Alzheimer’s: a randomised trial (RCT) lasting for 4 months with 60 drops of salvia tincture every day (1 kg dry leaf at 1 litre 45% alcohol) indicated a significant improvement in patients with a light to moderate form of Alzheimer’s disease in comparison to the control group.

Memory enhancement and a decrease in the perception of stress: an RCT involving healthy young adults demonstrated memory enhancing, anxiety reducing and mood improving properties at a one-off dose of 300 and 600 mg of salvia extract, before testing. Based on these results, salvia extract is potentially an aid to improve performance in studies and exams and other stressful circumstances.

Menopausal symptoms: In a study using an extract mix of Salvia officinalis and alfalfa involving 30 menopausal women with neurovegetative symptoms such as hot flushes and night sweats, ultimately 20 women were found to be totally asymptomatic. Follow-up in a number of women indicated an increase in prolactin and a greater response of TSH (thyroid stimulating hormone) on TRH (thyrotropine releasing hormone). The researchers concluded that the extract has a slight central antidopaminergic effect and is effective in the treatment of menopausal symptoms.

Metabolic syndrome and prediabetes: by means of in-vitro research, researchers discovered a metformin-like and TZD-like (TZD - Thiazolidinedione) effect of Salvia officinalis. As metformin and TZD, lately also known as glitazone, belong to the group of diabetes medication, the researchers suggested that salvia officinalis is potentially a new drug for the treatment of metabolic abnormalities such as metabolic syndrome and prediabetes.

Acute viral laryngitis: an RCT with liquid salvia extract as a spray reduces the severity of the sore throat. Traditionally, salvia tincture mixed with a little water was used as a gargle for inflammations of the mouth and throat. A different RCT demonstrated a similar effect of a Salvia-Echinacea spray in comparison to a lidocaine/chlorhexidine spray. The use consists of 2 sprays every 2 hours, to a maximum of 10 a day until the test subjects were asymptomatic, but up to a maximum of 5 days. If there was a positive response to the application, a criterion was applied of 50% symptom reduction in 3 days.

Cold sore: A placebo controlled RCT applied the effect of a cream with a rhubarb-salvia extract (23 mg/g of alcoholic rhubarb extract and 23 mg/g of water salvia extract), salvia extract and acyclovir (50 mg/g; Zovirax®). The results indicated equal effectiveness of Zovirax and the rhubarb salvia cream. The salvia cream was a little less effective and the healing of the cold sore took approximately 7.5 days, compared to 6.5 days for the other creams. A pilot study performed at an earlier stage had already revealed that a cream containing purely rhubarb extract was ineffective in treating a cold sore, which supports the conclusion that rhubarb potentiates the effect of salvia.

**INTERACTIONS**

Relatively little well-controlled research has been performed into interactions with Salvia officinalis preparates. This does not mean that there are no interactions; based on the in-vitro properties and the limited research results that are available, caution is advised in the combined use of blood glucose lowering medication, benzodiazepines, cholinesterase inhibitors, inflammation inhibitors (NSAID) and potentially also with thyroid gland hormone receptors. In theory, salvia should be able to intensify the action of these medicines. Literature reports that oral use of pure essential oil from salvia at a high dose of more than twenty drops can elicit an epileptic attack. Therefore, for the sake of caution, an undesirable interaction between Salvia officinalis preparates and anti-epileptics should be prepared for.

It has only been established in-vitro that Salvia inhibits the cytochrome P450 enzyme CYP3A4 in the intestines. It is difficult to predict what the in-vivo consequences of this can be. We do know that approximately half of all medicines are metabolised via this route. It is also known that grapefruit also inhibits CYP3A4 and that the consumption of grapefruit (juice) can lead to a significant rise in the plasma levels in medicines. These medicines, that are metabolised by CYP3A4, include, for example, paracetamol, codeine, diazepam, buspiron, cyclosporine, calcium-antagonists such as nifedipine (Adalat) and statins such as lovastatin and simvastatin. In short, based on the in-vitro findings of Salvia officinalis, there is reason to be prepared for interactions between Salvia officinalis preparates and the aforementioned medicines. However, there are also medicines that, like grapefruit, inhibit the CYP3A4 route such as erythromycin, fluconazole, saquinavir, verapamil and diltiazem, on account of which the use in combination with grapefruit, and therefore potentially also with Salvia officinalis preparates, can result in an additional increase in other medicines that are usually broken down through CYP3A4.
REFERENCES