

Egyptian Herbal Monograph

Volume 1

Wild Medicinal Plants

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Origanum syriacum L.

زعتر ، بردقوش

1. Names & Synonyms (1-3)

Family: Labiatae (Lamiaceae).

Syn. *Origanum maru* L. var. *sinaicum* Boiss.

Arabic: Bardaqoush بردقوش ، Za'atar زعتر.

English: Syrian oregano, Lebanese oregano, or the hyssop of the Bible (4).

2. Geographical distribution (1-3)

Confined to Sinai (endemic).

3. Parts used for medicinal purposes (3)

The leaves, the flower heads and the total herb.

4. Major chemical constituents (3)

- **Essential Oil:** Thymol, carvacrol, *p*-cymene, thymoquinone and γ -terpinene were identified as major constituents of *O. syriacum* oil. Other identified constituents were octan-3-ol, caryophyllene oxide, β -caryophyllene, *cis*-sabinene hydrate, terpinen-4-ol and α -terpinene (5-10). Only in one case the bicyclic *cis*-sabinene hydrate was described as a major compound in this species (7).

- **Flavonoids:** Luteolin, luteolin-6-C-glucoside, luteolin-3_-methylether-6-C-glucoside, luteolin-7,4_-dimethylether-6-C-glucoside, apigenin, apigenin-7-methylether-6-C-glucoside, apigenin-7-O-glucoside, diosmetin-7-O-glucoside, acacetin-7-O-glucoside, quercitrin, rutin, acacetin-7-O-rutinoside and acacetin-7-O-[2-O- α -L-rhamnopyranosyl-6-O- β -D-glucopyranosyl]- β -D-glucopyranoside (11, 12).

- **Phenolics:** Catechol, catechinic acid and pyrogallol. Other polyphenol components were chrysin, syringic, gallic, vanillic, coumaric, hydroxybenzoic, chlorogenic, caffeic and rosmarinic acids (12).

- **Carotenoid:** as β -carotene (12).

5. Traditional medicinal uses

Stomach troubles:

- Stomach and digestive disorders (13).

Origanum is also used as a stimulant, analgesic, antitussive, expectorant, sedative, antiparasitic and antihelminthic, but mostly for gastrointestinal complaints (7).

***O. syriacum* is a traditional medicinal plant for use in the specified indications exclusively based upon long-standing use.**

6. Herbal preparations correlated to medicinal use (13)

* Decoction:

Pour cold water on 2 teaspoonful of *O. syriacum* leaves and boil, simmer for 10 minutes. Pour into a cup and drink it sweetened if desired.

7. Posology and method of administration correlated to medicinal use

*Oral:

Drinking the extract of the boiled leaves 3 cups/day.

8. Contraindications

Hypersensitivity to active substances and to other plants of the same family.

9. Special warnings and precautions for use

- If the symptoms worsen during the use of the medicinal product, a doctor or a pharmacist should be consulted.
- Monitoring of blood glucose level should be done regularly (13, 14).

10. Interactions with other medicinal products and other forms of interaction

None reported.

11. Fertility, pregnancy and lactation

- Safety during pregnancy and lactation has not been established. In the absence of sufficient data, the use during lactation is not recommended.
- No fertility data available.

12. Effects on ability to drive and use machines

No studies on the effect on the ability to drive and use machines have been performed.

13. Undesirable effects

- None known.
- If adverse reactions occur, a doctor or a pharmacist should be consulted.

14. Overdose

No case of overdose has been reported.

15. Relevant biological activities

- Both cultivated and wild *O. syriacum* essential oil showed anti-bacterial and anti-fungal activities (15-19). The essential oil showed *in vitro* anti-oxidant and anti-microbial properties (20, 21). In addition, the aqueous extract showed anti-oxidant properties (22).
- Ethanol crude extract of the plant showed anti-proliferative activity. The hydrodistilled essential oil and aqueous extract did not show any cytotoxic activity (23).
- The essential oil exhibited some properties relevant to anti-inflammatory action. Moreover, even at very small concentrations, an interesting inhibitory activity on acetylcholinesterase (AChE) and butyrylcholinesterase (BChE), key enzymes in the pathogenesis of Alzheimer's disease was observed (24).
- The anthelmintic and insecticidal potential of the leaf essential oil of *O. syriacum* against the L3 larvae of the parasitic nematode *Anisakis simplex* and larvae and adults of the mosquito *Culex quinquefasciatus* was determined through the oil impact as AChE inhibitor (LC₅₀ of 0.087 and 0.067mg mL⁻¹ after 24 and 48h treatment, respectively). The essential oil was also highly effective on both larvae and adults of *C. quinquefasciatus*, showing LC₅₀ values of 32.4mg L⁻¹ and 28.1μg cm⁻², respectively (25) These results support the folk usage of *O. syriacum* as an antiparasitic agent, providing new insights about its utilization for developing new effective and eco-friendly nematocidal and insecticidal products.
- The essential oil of *O. syriacum* was evaluated for its AChE, nitric oxide production inhibitory activities, and antioxidant properties. The oil inhibited oxidation of linoleic acid after 30min and 60min of incubation, with IC₅₀ values of 46.9 and 58.9lg/ml, respectively. AChE and BChE inhibition was also assessed. The data suggest that *O. syriacum* oil could be used as a valuable new flavor with functional

properties for food or nutraceutical products with particular relevance to supplements for the elderly (24).

- The hepatoprotective and therapeutic effects of *O. syriacum* aqueous methanolic extract of defatted aerial parts on paracetamol induced liver cell damage in mice with respect to antioxidant status, was investigated. Mice were treated with the extract in saline solution (0.5ml of 1/10 extract LD50/day/ 5days) and silymarin in recommended dose (25mg/kg for 5days prepared in 0.5ml saline solution) after or before paracetamol administration (400mg/ kg/ day). The results proved sufficient activity of *O. syriacum* extract in hepatic protection against administration of paracetamol and showed the role of *O. syriacum* extract in liver amelioration of mucopolysaccharide content in hepatocytes and in cells of renal tissue. It was more effective than silymarin as hepatoprotective. Also, the plant extract was sufficient to decrease the oxidative stress on liver as mentioned in magnification of glutathione-antioxidant system (26).
- The anti-ulcer activity of the essential oil and the ethanol extract of *O. syriacum* L. was evaluated in indomethacin-induced rats (150-170g). Both essential oil and the ethanol extract showed significant reduction of ulcers in a dose-dependent manner and significantly decreased the gastric secretion, total acidity on gastric and the effects were compared with omeprazole (27).
- Antioxidant, anti-inflammatory, antinociceptive and antipyretic activities, of the total ethanol extract, were evaluated in rats at doses of 250, 500 and 1000mg/kg. The plant extract possessed antioxidant, anti-inflammatory and antinociceptive activities in a dose dependent manner. No antipyretic activity was detected at the used doses (28).
- The methanolic extract of *O. syriacum* leaves was tested against three opportunistic microorganisms by determining the minimum inhibitory concentration. The extract was also evaluated for its ability to suppress the release of the pro-inflammatory cytokine IL-6 while not suppressing the release of the anti-inflammatory cytokine IL-10 from peripheral blood mononuclear cells using ELISA. The extract exhibited high antimicrobial activity for the three microorganisms and inhibited the expression of the pro-inflammatory cytokine IL-6 with apparent dose-dependent responses and attenuated the secretion of the anti-inflammatory cytokine IL-10. This shows that *O. syriacum* may contribute to the reduction of inflammation and microbial growth and may also be preventive against various infections, including those related to the oral cavity (29).
- In a randomized double-blind controlled trial, the activity of a spray containing essential oils of *Eucalyptus citriodora*, *E. globulus*, *Mentha x piperita*, *Origanum syriacum*, and *Rosmarinus officinalis* was studied in patients with URTI. 34 patients in the test group used this spray 5 times a day (4 spraying each time) for 3 days. Then the change of the most debilitating symptoms (sore throat, hoarseness or

cough) was assessed in patients. 20 minutes after the use of the spray, participants in the test group reported a greater improvement in symptoms compared to participants in the control group. There was no difference in symptom severity between the two groups after 3 days of treatment. Based on these results, authors suggested the local, rather than systemic, effect of this spray on the upper respiratory tract (30).

16. Additional information

In Palestinian folk medicine, *O. syriacum* is used for the treatment of skin fungal diseases, abdominal pain, throat infection and cough. Similar therapeutic uses of *O. syriacum* have been reported from neighboring countries as Jordan, Syria and Lebanon (31-35).

O. syriacum oil was evaluated for its antifungal activity against *Aspergillus niger*, *Fusarium oxysporum*, and *Penicillium* species. The oil exhibited strong inhibitory action against the three fungi tested. The minimum inhibitory concentration of the oil was found to be 0.1 μ /ml of yeast extract sucrose broth for the fungi tested (36).

The assessment of the antimicrobial activity of plant essential oil against *Candida albicans* and six pathogenic bacteria revealed that *O. syriacum* oil showed moderate antimicrobial activity with minimal inhibitory concentrations varying from 400 to 1200 μ g/ml (19).

17. Date of compilation/last revision

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