

Egyptian Herbal Monograph

Volume 1

Traditional wild medicinal plants

Egyptian Drug Authority (EDA)

2024



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Origanum syriacum L.

زعرور ، بردقوش

1. Names & Synonyms (1-3)

Family: Labiatae (Lamiaceae).

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

Arabic: Bardaqoush بردقوش ، Za'atar زعرور.

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

05/04/2022.

References

1	Boulos, L. (2000). Flora of Egypt, Al Hadara Publishing, Cairo, Egypt.
2	Batanouny, K. H. (1999). Wild Medicinal Plants in Egypt (with contribution: Aboutabl, E., Shabana, M. and Soliman, F.). Academy of Scientific Research and Technology, Egypt. The World Conservation Union (IUCN).
3	Hammouda, F. M., Abdel-Azim, N. S, and Shams, K. A. (2018). <i>Origanum syriacum</i> L. In: Egyptian Encyclopedia of Wild Medicinal Plants, 8 , 474-489. Academy of Scientific Research and Technology, Cairo, Egypt.
4	Mesmar, J., Abdallah, R., Badran, A., Maresca, M. and Baydoun, E. (2022). <i>Origanum syriacum</i> phytochemistry and pharmacological properties: A comprehensive review. <i>Molecules</i> , 27 , 4272. https://doi.org/10.3390/molecules27134272 .
5	Kamel, M. S., Assaf, M. H., Hasanean, H. A., Ohtani, K., Kasai, R. and Yamasaki, K. (2001). Monoterpene glycosides from <i>Origanum syriacum</i> . <i>Phytochemistry</i> , 58 (8), 1149-1152.
6	Zgheib, R., Chaillou, S., Ouaini, N., Kassouf, A., Rutledge, D., Azzi, D. and El Beyrouthy, M. (2016). Chemometric tools to highlight the variability of the chemical composition and yield of Lebanese <i>Origanum syriacum</i> L. essential oil. <i>Chem. Biodivers.</i> , 13 , 1326-1347.
7	Baser, K. H. C., Kurkcuoglu, M., Demirci, B. and Ozek, T. (2003). The essential oil of <i>Origanum syriacum</i> L. var. <i>sinaicum</i> (Boiss.) letswaart. <i>Flavour Fragrance J.</i> , 18 , 98-99.
8	Halim, A. F., Mashaly, M. M., Zaghloul, A. M., Abd El-Fattah, H. and De-Pooter, H. L. (1991). Chemical constituents of the essential oils of <i>Origanum syriacum</i> L. and <i>Stachys aegyptiaca</i> . <i>Int. J. Pharmacogn.</i> , 29 , 183-187.
9	Soliman, F. M., Yousif, M. F., Zaghloul, S. S., Okba, M. M. and El-Sayed, E. M. (2007). Seasonal variation in the essential oil composition of <i>Origanum syriacum</i> L. subsp. <i>sinaicum</i> greuter and burdet; evaluation of its tocolytic activity. <i>Egypt. J. Biomed. Sci.</i> , 23 , 121-134.
10	Shamseddine, L. and Chidiac, J. J. (2020) Composition's effect of <i>Origanum syriacum</i> essential oils in the antimicrobial activities for the treatment of denture stomatitis. <i>Odontology</i> , 109 (2), 327-335. doi: 10.1007/s10266-020-00547-3.
11	Samy K. El-Desoukya et al (2009) Phytochemical constituents and biological activities of <i>Origanum syriacum</i> . <i>Z. Naturforsch.</i> , 64b , 447-451.
12	Afify, M. R. A., Esawy, S. H., El-Hadidy, E. M. and Abdel-Salam, M. A. L. (2014). Antioxidant content and cytotoxicity of <i>Origanum syriacum</i> L. <i>Advances in Food Sciences</i> , 36 (2), 58-64.
13	Conservation and Sustainable Use of Medicinal Plants in Egypt, National Surveys (2016). UNDP, GEF, ASRT and NRC, Volumes 1-5 .
14	https://www.drugs.com/npc/oregano.html
15	Daouk, R. K., Dagher, S. M. and Sattout, E. J. (1995). Antifungal activity of the essential oil of <i>Origanum syriacum</i> L. <i>Journal of Food Protection</i> , 58 (10), 1147-1149.

16	El Gendy, A. N., Leonardi, M., Mugnaini, L., Bertelloni, F., Ebanic, V. V., Nardonic, S., Manciantic, F., Hendawy, S., Omer, E. and Pistelli, L. (2015). Chemical composition and antimicrobial activity of essential oil of wild and cultivated <i>Origanum syriacum</i> plants grown in Sinai, Egypt. <i>Ind. Crops Prod.</i> , 67 , 201-207.
17	Ramadan, A., Afifi, N. A., Fathy, M. M., El-Kashoury, E. A. and El-Naeneey, E. V. (1994). Some pharmacodynamic effects and antimicrobial activity of essential oils of certain plants used in Egyptian folk medicine. <i>Veterinary Medical Journal</i> , 42 (1B), 263-270.
18	Ibrahim, L., Karky, M., Ayoub, P., El Ajouz, N. and Ibrahim, S. (2012). Chemical composition and antimicrobial activities of essential oil and its components from Lebanese <i>Origanum syriacum</i> L. <i>The Journal of Essential Oil Research</i> , 24 (4), 339-345.
19	Al Hafi, M., El Beyrouthy, M., Ouaini, N., Stien, D., Rutledge, D. and Chaillou, S. (2016). Chemical composition and antimicrobial activity of <i>Origanum libanoticum</i> , <i>Origanum ehrenbergii</i> and <i>Origanum syriacum</i> growing wild in Lebanon. <i>Chem. Biodivers.</i> , 13 , 555-560.
20	Alma, M. H., Mavi, A., Yildirim, A., Digrak, M. and Hirata, T. (2003). Screening chemical composition and <i>in vitro</i> antioxidant and antimicrobial activities of the essential oils from <i>Origanum syriacum</i> L. growing in Turkey. <i>Biol. Pharm. Bull.</i> , 26 (12), 1725-1729.
21	Tepe, B., Daferera, D., Sokmen, M., Polissiou, M. and Atalay, S. (2004). The <i>in vitro</i> antioxidant and antimicrobial activities of the essential oil and various extracts of <i>Origanum syriacum</i> L. var. <i>bevanii</i> . <i>J. Sci. Food Agric.</i> , 84 , 1389-1396.
22	Dorman, H. J., Bachmayer, O., Kosar, M. and Hiltunen, R. (2004). Antioxidant properties of aqueous extracts from selected Lamiaceae species grown in Turkey. <i>J. Agric. Food Chem.</i> , 52 (4), 762-770.
23	Al-Kalaldehy, J. Z., Abu-Dahab, R. and Afifi, F. U. (2010). Volatile oil composition and antiproliferative activity of <i>Laurus nobilis</i> , <i>Origanum syriacum</i> , <i>Origanum vulgare</i> and <i>Salvia triloba</i> against human breast adenocarcinoma cells. <i>Nutrition Research</i> , 30 , 271-278.
24	Loizzo, M. R., Menichini, F., Conforti, F., Tundis, R., Bonesi, M., Saab, A. M., Statti, G. A., Cindio, B., Houghton, P. J., Menichini, F. and Frega, N. G. (2009). Chemical analysis, antioxidant, antiinflammatory and anticholinesterase activities of <i>Origanum ehrenbergii</i> Boiss and <i>Origanum syriacum</i> L. essential oils. <i>Food Chemistry</i> , 117 , 174-180.
25	López, V., Pavela R., Gómez-Rincón, C., Les, F., Bartolucci, F., Gali, V., Petrelli, R., Cappellacci, L., Maggi, F., Canale, A., Otranto, D., Sut, S., Dall'Acqua, S. and Benelli, G. (2019). Efficacy of <i>Origanum syriacum</i> essential oil against the mosquito Vector <i>Culex quinquefasciatus</i> and the gastrointestinal parasite <i>Anisakis simplex</i> , with insights on acetylcholinesterase inhibition. <i>Molecules</i> , 24 , 2563.
26	Ibrahim, A. Y., Shaffie, N. M. and Motawa, H. M. (2010). Hepatoprotective and therapeutic activity of <i>Origanum syriacum</i> aqueous extract in paracetamol induced cell damage in albino mice. <i>Journal of American Science</i> , 6 (11), 449-458.
27	Afify, A. M. R., Esawy, S. H., El-Hadidy, E. M. and Abdel-Salam, M. A. L. (2012). Anti-ulcer activity of oregano (<i>Origanum syriacum</i> L.) against gastric ulcer in rats. <i>Advances in Food Sciences</i> , 34 (3), 145-149.

28	Awaad, A. S., El-meligy, R. M., Qenawy, S. A., Atta, A. H. and Soliman, G. A. (2011). Anti-inflammatory, antinociceptive and antipyretic effects of some desert plants. <i>Journal of Saudi Chemical Society</i> , 15 , 367-373.
29	Assaf, A. M., Amro, B. I., Mashallah, S. and Haddadin, R. N. (2016). Antimicrobial and anti-inflammatory potential therapy for opportunistic microorganisms. <i>J. Infect. Dev. Ctries.</i> , 10 (5), 494-505.
30	Ben-Arye, E., Dudai, N., Eini, A., Torem, M., Schiff, E. and Rakover, Y. (2011). Treatment of upper respiratory tract infections in primary care, A randomized study using aromatic herbs. <i>Evid. Based Complement. Alternat. Med.</i> , 690346. doi: 10.1155/2011/690346.
31	Shehadeh, M., Silvio, S., Ghadeer, A., Darwish, R. M., Giangaspero, A., Vassallo, A., Lepore, L., Oran, S. A., Hammad, H. and Tubaro, A. (2014). Topical anti-inflammatory potential of six <i>Salvia</i> species grown in Jordan. <i>Jordan J. Pharm. Sci.</i> , 7 (2), 153-161.
32	Shehadeh, M., Suaifan, G. and Darwish, R. (2017). Complementary and alternative modalities, a new vein in weight control and reduction interventions. A pilot study in Jordan. <i>Int. J. Biol. Biomed.</i> , 2 , 1-5.
33	Aburjai, T., Hudaib, M., Tayyem, R., Yousef, M. and Qishawi, M. (2007). Ethnopharmacological survey of medicinal herbs in Jordan, the Ajloun Heights region. <i>J. Ethnopharmacol.</i> , 110 (2), 294-304.
34	Ali-Shtayeh, M. S., Yaniv, Z. and Mahajna, J. (2000). Ethnobotanical survey in the Palestinian area: a classification of the healing potential of medicinal plants. <i>Journal of Ethnopharmacology</i> , 73 , 221-232.
35	Husein, A. I., Ali-Shtayeh, M. S., Jamous, R. M., Zaitoun, S. Y. A., Jondi, W. J. and Zatar, N. A. A. (2014). Antimicrobial activities of six plants used in traditional Arabic Palestinian herbal medicine. <i>Afr. J. Microbiol. Res.</i> , 8 (38), 3501-3507.
36	Daouk, R. K., Dagher, S. M. and Sattout, E. J. (1995). Antifungal activity of the essential oil of <i>Origanum syriacum</i> L. <i>Journal of Food Protection</i> , 58 (10), 1147-1149.