



## Oregano

Updated: April 28, 2023.

## OVERVIEW

### Introduction

Oregano is a perennial flowering plant the dried leaves and flowers of which are used as a spice and flavoring agent. In addition, oregano oils have been used in traditional medicine as therapy for a variety of conditions in respiratory diseases and parasitic and fungal infections. Oregano extracts have not been approved as therapy of any disease or condition but are available over-the-counter and are generally recognized as safe, have not been associated with serum enzyme elevations during therapy or implicated in cases of clinically apparent liver injury.

### Background

Oregano (*Origanum vulgare*) is a perennial flowering plant and member of the mint family (Lamiaceae) which is native to the Mediterranean area and Southwest Asia, extracts of which are used widely as a spice and food flavoring agent. In addition, oregano oil extracts have been used in traditional medicine, generally to treat respiratory disorders and infections such as colds, fever, cough, bronchitis, bacterial and fungal infections, parasites, and urinary tract infections. Oregano leaves and flowers contain more than 60 identified constituents including polyphenols, flavonoids, monoterpenoids, monoterpenes, and several volatile oils such a carvacrol, thymol, gamma terpinene, *p*-cymene and caryophyllene. The principal biologically active component of oregano oil is suspected to be carvacrol or thymol. Oregano has antimicrobial, antifungal, antiparasitic, antioxidant, and antineoplastic activities in vitro and in vivo, but these effects have not been demonstrated in humans, and the clinical significance of these actions has not been established. Oregano oil has not been approved as therapy of any disease or medical condition in the United States, but is available over-the-counter as a dietary supplement in multiple formulations including capsules and oil solutions which are advertised for boosting energy and general wellness. The typical recommended dose ranges widely based in part on the relative concentration of essential oils. Oregano oil is usually well tolerated but side effects of higher doses can include abdominal discomfort, heartburn, constipation or diarrhea, nausea and vomiting, dizziness, and headache. Rare adverse events include hypersensitivity reactions. Oregano in doses used as a dietary supplements is an abortifacient and should not be used during pregnancy or in women of childbearing age not using effective contraception.

### Hepatotoxicity

The effects of different oral doses of oregano on serum enzyme levels in humans has not been well defined, but in limited prospective studies, oregano has not been linked to serum aminotransferase elevations or clinically apparent liver injury. Despite widespread use as a culinary herb in spice and food flavoring as well as a dietary supplement, there have been no published reports of serum enzyme elevations or clinically apparent liver injury attributable to oregano oil.

Likelihood score: E (unlikely cause of clinically apparent liver injury).

## Mechanism of Injury

The mechanism by which oregano extracts might cause liver injury is unknown.

## Outcome and Management

Hepatotoxicity from extracts of oregano has not been reported.

Drug Class: [Herbal and Dietary Supplements](#)

Other names: Wild Marjoram, Winter Marjoram.

## PRODUCT INFORMATION

### REPRESENTATIVE TRADE NAMES

Oregano – Generic

### DRUG CLASS

Herbal and Dietary Supplements

### SUMMARY INFORMATION

[Fact Sheet at MedlinePlus, NLM](#)

## CHEMICAL FORMULA AND STRUCTURE

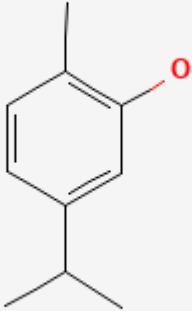
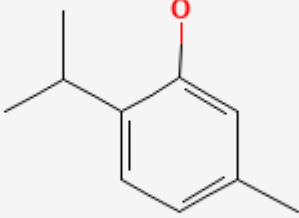
DRUG	CAS REGISTRY NUMBER	MOLECULAR FORMULA	STRUCTURE
Oregano	8007-11-2	Herbal	Not Applicable
Carvacrol	499-75-2	C <sub>10</sub> -H <sub>14</sub> -O*	

Table continued from previous page.

DRUG	CAS REGISTRY NUMBER	MOLECULAR FORMULA	STRUCTURE
Thymol	89-83-8	C <sub>10</sub> H <sub>14</sub> O*	

\* Structural isomers.

## ANNOTATED BIBLIOGRAPHY

References updated: 28 April 2023

Abbreviations: HDS, herbal and dietary supplements.

Zimmerman HJ. Unconventional drugs. Miscellaneous drugs and diagnostic chemicals. In, Zimmerman, HJ. Hepatotoxicity: the adverse effects of drugs and other chemicals on the liver. 2nd ed. Philadelphia: Lippincott, 1999: pp. 731-4.

*(Expert review of hepatotoxicity published in 1999; several herbal medications are discussed, but not oregano).*

Liu LU, Schiano TD. Hepatotoxicity of herbal medicines, vitamins and natural hepatotoxins. In, Kaplowitz N, DeLeve LD, eds. Drug-induced liver disease. 2nd ed. New York: Informa Healthcare USA, 2007, pp. 733-54.

*(Review of hepatotoxicity of herbal and dietary supplements [HDS] published in 2007; no mention of oregano).*

Oregano. In, PDR for Herbal Medicines. 4th ed. Montvale, New Jersey: Thomson Healthcare Inc. 2007: pp. 621-623.

*(Compilation of short monographs on herbal medications and dietary supplements).*

Electronic Code of Federal Regulations. Title 21. Part 182 -- Substances Generally Recognized As Safe. Available at: <https://www.accessdata.fda.gov/scripts/cdrh/cfdocs/cfcfr/CFRSearch.cfm?CFRPart=182>

*(Listing of agents generally recognized as safe by the FDA, lists culinary use of oregano as being safe).*

Benito M, Jorro G, Morales C, Peláez A, Fernández A. Labiatae allergy: systemic reactions due to ingestion of oregano and thyme. Ann Allergy Asthma Immunol. 1996;76:416-8. PubMed PMID: 8630713.

*(45 year old man with asthma had an immediate hypersensitivity reaction [rash, lip swelling, stridor, mild hypotension responding to epinephrine] in response to foods that contained oregano and then thyme, later tolerating the same foods without the spices and with positive skin prick tests and in vitro assays to multiple members of the mint family [Lamiaceae]).*

Ciganda C, Laborde A. Herbal infusions used for induced abortion. *J Toxicol Clin Toxicol*. 2003;41:235–9. PubMed PMID: 12807304.

*(Among 86 cases of herbal ingestion with abortive intent reported to the Uruguayan Poison Control Center over a 3 year period, all were within the first trimester [23 resulting in abortion, 6 fatal] and were attributed to a total of 30 different plant species, most frequently Ruta chalepensis [n=26, 13 with jaundice, 4 fatal], Lycopodium saururus [n=22], parsley [n=13], and a multiingredient product called “Carachipita” with pennyroyal, oregano, M. pinnatus, S. brasiliensis [n=13, 3 with jaundice, 1 fatal]).*

Nurmi A, Mursu J, Nurmi T, Nyyssönen K, Alftan G, Hiltunen R, Kaikkonen J, et al. Consumption of juice fortified with oregano extract markedly increases excretion of phenolic acids but lacks short- and long-term effects on lipid peroxidation in healthy nonsmoking men. *J Agric Food Chem*. 2006;54:5790–6. PubMed PMID: 16881679.

*(Among 45 healthy volunteers given daily mango-orange juice with or without a phenolic oregano extract [300 or 600 mg] daily for 4 weeks, the excretion of phenolic acids increased in those receiving the oregano extract but serum ALT, GGT and lipids levels as well as special biomarkers of lipid peroxidation did not change and were similar in the 3 groups).*

Jacobsson I, Jönsson AK, Gerdén B, Hägg S. Spontaneously reported adverse reactions in association with complementary and alternative medicine substances in Sweden. *Pharmacoepidemiol Drug Saf*. 2009;18:1039–47. PubMed PMID: 19650152.

*(Review of 778 spontaneous reports of adverse reactions to herbals in a Swedish Registry does not list oregano among products associated with 5 or more reports).*

Singletary K. Oregano: overview of the literature on health benefits. *Nutrition Today*. 2010;45:129–38. Not in PubMed.

*(Concise summary of the history of use of oregano in traditional medicine, the chemical constituents of oregano and the in vitro and in vivo evidence for its antioxidant, antimicrobial and antineoplastic activities).*

Reuben A, Koch DG, Lee WM; Acute Liver Failure Study Group. Drug-induced acute liver failure: results of a U.S. multicenter, prospective study. *Hepatology*. 2010;52:2065–76. PubMed PMID: 20949552.

*(Among 1198 patients with acute liver failure enrolled in a US prospective study between 1998 and 2007, 133 [11%] were attributed to drug induced liver injury of which 12 [9%] were due to herbals, including several herbal mixtures, usnic acid, Ma Huang, black cohosh, and Hydroxycut, but not oregano).*

Teschke R, Wolff A, Frenzel C, Schulze J, Eickhoff A. Herbal hepatotoxicity: a tabular compilation of reported cases. *Liver Int*. 2012;32:1543–56. PubMed PMID: 22928722.

*(A systematic compilation of all publications on the hepatotoxicity of specific herbals identified 185 publications on 60 different herbs, herbal drugs and supplements but does not mention or list oregano).*

Bunchorntavakul C, Reddy KR. Review article: herbal and dietary supplement hepatotoxicity. *Aliment Pharmacol Ther*. 2013;37:3–17. PubMed PMID: 23121117.

*(Systematic review of literature on HDS associated liver injury does not mention oregano).*

Navarro VJ, Seeff LB. Liver injury induced by herbal complementary and alternative medicine. *Clin Liver Dis*. 2013;17:715–35. PubMed PMID: 24099027.

*(Review of the epidemiology, regulatory status, diagnosis, pathogenesis and causes of liver injury from herbal products with specific discussion of conjugated linoleic acid, ephedra, germander, green tea, usnic acid, flavocoxid, aloe vera, chaparral, greater celandine, black cohosh, comfrey, kava, skullcap, valerian, noni juice, pennyroyal and traditional herbal remedies).*

Navarro VJ, Barnhart H, Bonkovsky HL, Davern T, Fontana RJ, Grant L, Reddy KR, et al. Liver injury from herbals and dietary supplements in the U.S. Drug-Induced Liver Injury Network. *Hepatology*. 2014;60:1399–408. PubMed PMID: 25043597.

*(Among 839 cases of liver injury from drugs collected in the US between 2004 and 2013, 130 were due to HDS products, including 45 from body building agents [probably anabolic steroids] and 85 from diverse HDS products, but no case was attributed specifically to oregano).*

Brown AC. Liver toxicity related to herbs and dietary supplements: Online table of case reports. Part 2 of 5 series. *Food Chem Toxicol*. 2017;107:472–501. PubMed PMID: 27402097.

*(Description of an online compendium of cases of liver toxicity attributed to HDS products does not list or discuss oregano).*

Medina-Caliz I, Garcia-Cortes M, Gonzalez-Jimenez A, Cabello MR, Robles-Diaz M, Sanabria-Cabrera J, Sanjuan-Jimenez R, et al; Spanish DILI Registry. Herbal and dietary supplement-induced liver injuries in the Spanish DILI Registry. *Clin Gastroenterol Hepatol*. 2018;16:1495–1502. PubMed PMID: 29307848.

*(Among 856 cases of hepatotoxicity enrolled in the Spanish DILI Registry between 1994 and 2016, 32 were attributed to herbal products, the most frequent cause being green tea [n=8] and Herbalife products [n=6], no mention of oregano).*

Sharifi-Rad M, Varoni EM, Iriti M, Martorell M, Setzer WN, Del Mar Contreras M, Salehi B, et al. Carvacrol and human health: a comprehensive review. *Phytother Res*. 2018;32:1675–1687. PubMed PMID: 29744941.

*(Review and discussion of the in vitro and in vivo studies demonstrating potent antioxidant, antimicrobial and antineoplastic activities of carvacrol, an aromatic volatile oil found in oregano and thyme mentions that “human trials of carvacrol are still lacking”).*

Negri R, Trinchese G, Carbone F, Caprio MG, Stanzione G, di Scala C, Micillo T, et al. Randomised clinical trial: calorie restriction regimen with tomato juice supplementation ameliorates oxidative stress and preserves a proper Immune surveillance modulating mitochondrial bioenergetics of T-lymphocytes in obese children affected by non-alcoholic fatty liver disease (NAFLD). *J Clin Med*. 2020;9:141. PubMed PMID: 31947953.

*(Among 61 obese children treated with a caloric restricted diet with or without an oral supplement of lycopine-rich tomato sauce, oregano and basil extract in a cross over design, addition of the supplement was associated with more weight loss and improvement in metabolic factors).*

Cohen SM, Eisenbrand G, Fukushima S, Gooderham NJ, Guengerich FP, Hecht SS, Rietjens IMCM, et al. FEMA GRAS assessment of natural flavor complexes: Origanum oil, thyme oil and related phenol derivative-containing flavoring ingredients. *Food Chem Toxicol*. 2021;155:112378. PubMed PMID: 34217738.

*(Extensive reevaluation of the safety of phenol-derivative containing flavoring agents including oregano oil providing the basis for continuing to list it as a flavoring agent that is “generally recognized as safe” [GRAS]).*

Balahbib A, El Omari N, Hachlafi NE, Lakhdar F, El Menyiy N, Salhi N, Mrabti HN, et al. Health beneficial and pharmacological properties of p-cymene. *Food Chem Toxicol*. 2021;153:112259. PubMed PMID: 33984423.

*(Extensive review of the in vitro and in vivo pharmacological activities of p-cymene, a monoterpene found in many medicinal plants including oregano; human studies of its safety and efficacy are lacking).*

Maral H, Ulupınar S, Türk Baydır A, Özbay S, Altınkaynak K, Şebin E, Şıktar E, et al. Effect of *Origanum dubium*, *Origanum vulgare subsp. hirtum*, and *Lavandula angustifolia* essential oils on lipid profiles and liver biomarkers in athletes. *Z Naturforsch C J Biosci*. 2021;77:177–187. PubMed PMID: 34496170.

*(Among 34 athletes treated with essential oils from 3 plants of the mint family, including oregano, or placebo for 4 weeks, treatment led to a significant decrease in LDL cholesterol and rise in HDL cholesterol in those receiving oregano oil).*

Bajagai YS, Radovanovic A, Steel JC, Stanley D. The effects of continual consumption of *Origanum vulgare* on liver transcriptomics. *Animals (Basel)*. 2021;11:398. PubMed PMID: 33557421.

*(Among 24 chicks fed with or without oregano oil supplementation for 42 days, body weight was similar in the two groups and liver histology was normal, but transcriptomics analysis demonstrated major inhibition of aldosterone and dihydrotestosterone pathways in those receiving oregano oil).*

Ballotin VR, Bigarella LG, Brandão ABM, Balbinot RA, Balbinot SS, Soldera J. Herb-induced liver injury: Systematic review and meta-analysis. *World J Clin Cases*. 2021;9:5490–5513. PubMed PMID: 34307603.

*(Systematic review of the literature on herb induced liver injury identified 446 references describing 936 cases due to 79 different herbal products, the most common being He Shou Wu [91], green tea [90] Herbalife products [64], kava kava [62] and greater celandine [48]; oregano was not listed among the 79 implicated products).*

Bessone F, García-Cortés M, Medina-Caliz I, Hernandez N, Parana R, Mendizabal M, Schinoni MI, et al. Herbal and dietary supplements-induced liver injury in Latin America: experience from the LATINDILI Network. *Clin Gastroenterol Hepatol*. 2022;20:e548–e563. PubMed PMID: 33434654.

*(Among 367 cases of hepatotoxicity enrolled in the Latin American DILI Network between 2011 and 2019, 29 [8%] were attributed to herbal products, the most frequent being green tea [n=7], Herbalife products [n=5] and garcinia [n=3], while oregano is not mentioned).*