

## Antimicrobial Properties of Oregano

Yadu Moharir, Ph.D.  
Nutritional Consultants Unlimited, Inc.

Oregano (*Origanum vulgare*) has long been used as a culinary herb, but it has also been used as medicine from the time of the ancient Greeks. Oregano has been shown to inhibit the growth of certain pathogenic bacteria and fungi and is among the strongest of the antimicrobial plant oils.

There are many scientific citations that document the powerful antimicrobial properties of oregano against many pathogens. Some of those papers are cited below:

1. Inhibition of oregano essential oil and EDTA on *Escherichia coli* O157:H7.  
Skandamis, P.; Koutsoumanis, K.; Fasseas, K.; Nychas, G. J. E.; *Italian journal of food science*; **13 (1)**; 2001; PP 65-75.
2. Antimicrobial agents from plants: antibacterial activity of plant volatile oils  
  
Dorman, H. J. D.; Deans, S. G.; *Journal of applied microbiology*; **88(2)**; Feb 2000; PP 308-316
3. A predictive model for the non-thermal inactivation of *Salmonella enteritidis* in a food model system supplemented with a natural antimicrobial  
  
Koutsoumanis, K.; Lambropoulou, K.; Nychas, G. J. E.; *International journal of food microbiology*; **49(1/2)**; August 1, 1999; PP 63-74
4. Inhibition of resident microbial flora and pathogen inocula on cold fresh fish fillets in olive oil, oregano, and lemon juice under modified atmosphere or air.  
  
Tassou, C. C.; Drosinos, E. H.; Nychas, G. J. E.; *Journal of food protection*; **59(1)**; January 1996; PP 31-34
5. In vitro behaviour of *Erwinia amylovora* towards some natural products showing bactericidal activity  
  
Scortichini, M.; Rossi, M. P.; *Acta horticulturae*; **(338)**; 1993; PP 191-198
6. Inhibitory and stimulatory effects of cumin, oregano and their essential oils on growth and acid production of *Lactobacillus plantarum* and *Leuconostoc mesenteroides*  
  
Kivanc, M.; Akgul, A.; Dogan, A.; *International journal of food microbiology*; **13(1)**; May 1991; PP 81-85
7. Antimicrobial effect of spices on the growth of *Yersinia enterocolitica*  
  
Bara, M. T. F.; Vanetti, M. C. D.; *Journal of Herbs Spices & Medicinal Plants*; **3(4)**; 1995; PP 51-58
8. Antimicrobial and cytotoxic activities of *Origanum* essential oils

- Sivropoulou, A.; Papanikolaou, E.; Nikolaou, C.; Kokkini, S.; Lanaras, T.; Arsenakis, M.; *Journal of Agricultural and Food Chemistry*, **44(5)**; 1996; 1202-1205
9. Antibacterial activities of plant essential oils and their components against *Escherichia coli* O157:H7 and *Salmonella enterica* in apple juice  
Friedman, Mendel; Henika, Philip R.; Levin, Carol E.; Mandrell, Robert E.; *Journal of Agricultural and Food Chemistry*; **52(19)**; September 22, 2004; PP 6042-6048
  10. Chemical composition and antimicrobial activity of essential oil from *Origanum applii* a *O. vulgare*  
Rehder, V. L. G.; Machado, A. L. M.; Delarmelina, C.; Sartoratto, A.; Figueira, G. M.; Duarte, M. C. T.; *Revista Brasileira de Plantas Mediciniais*; **6(2)**; February 2004; PP 67-71
  11. Antibacterial activity and composition of essential oils from *Origanum*, *Thymbra* and *Satureja* species with commercial importance in Turkey  
Baydar, Hasan; Sagdic, Osman; Ozkan, Gulcan; Karadogan, Tahsin; *Food Control*; **15(3)**; April 2004; PP 169-172
  12. Antimicrobial activity of Mexican oregano (*Lippia berlandierii*) to food-contaminant fungi  
Viramontes-Ramos, S.; Portillo-Ruiz, M. C.; Nevarez-Moorillon, G. V.; *Abstracts of the General Meeting of the American Society for Microbiology*; **103**; 2003; PP P-029
  13. Antibacterial activity of 11 essential oils against *Bacillus cereus* in tyndallized carrot broth  
Valero, M.; Salmeron, M. C.; *International Journal of Food Microbiology*; **85(1-2)**; 15 August 2003; PP 73-81
  14. Inhibition of *Listeria monocytogenes* by elite clonal extracts of oregano (*Origanum vulgare*)  
Shetty, K.; Labbe, R. G.; Seaberg, A. C.; *Food Biotechnology (New York)*; **17(2)**; July 2003; PP 129-149
  15. The effectiveness of plant essential oils on the growth of *Botrytis cinerea*, *Fusarium sp.* and *Clavibacter michiganensis subsp. Michiganensis*  
Polissiou, Moschos G.; Daferera, Dimitra J.; Ziogas, Basil N.; *Crop Protection*; **22(1)**; February 2003; PP 39-44
  16. Antimicrobial activity of organic fractions from Mexican oregano  
Torres-Munoz, V.; Nevarez-Moorillon, G. V.; Gastelum-Franco, M. G.; Camacho-Davila, A.; Avila-Sosa, R.; *Abstracts of the General Meeting of the American Society for Microbiology*; **102**; 2002; 367
  17. The effect of oregano essential oil on survival/death of *Salmonella typhimurium* in meat stored at 5degree C under aerobic, VP/MAP conditions

- Nychas, G.-J. E.; Skandamis, P.; Tsigarida, E.; *Food Microbiology (London)*; **19(1)**; February 2002; PP 97-103
18. Impedance measurements to study the antimicrobial activity of essential oils from *Lamiaceae* and *Compositae*
- Marino, Marilena; Bersani, Carla; Comi, Giuseppe; *International Journal of Food Microbiology*; **67(3)**; 5 August 2001; PP 187-195
19. Bacterial colonization of phyllosphere of Mediterranean aromatic plants
- Constantinidou, H.-I.; Karamanoli, K.; Menkissoglu, U.; Vokou, D.; *Journal of Chemical Ecology*; **26(9)**; September 2000; PP 2035-2048
20. Antimicrobial capacity of oregano in different presentations
- Torres-Munoz, J. V.; Nevarez-Moorillon, G. V.; Lozano-Gutierrez, P.; Alvarez-Hernandez, C. A.; *Abstracts of the General Meeting of the American Society for Microbiology*; **100**; 2000; PP 534
21. GC-MS analysis of essential oils from some Greek aromatic plants and their fungitoxicity on *Penicillium digitatum*
- Polissiou, Moschos G.; Daferera, Dimitra J.; Ziogas, Basil N.; *Journal of Agricultural and Food Chemistry*; **48(6)**; June 2000; PP 2567-2581
22. Ecophysiological attributes of *Salmonella typhimurium* in liquid culture and within a gelatin gel with or without the addition of oregano essential oil
- Nychas, G.-J. E.; Skandamis, P.; Tsigarida, E.; *World Journal of Microbiology & Biotechnology*; **16(1)**; February 2000; PP 31-35
23. Inhibitory effects of some spice essential oils on *Aspergillus ochraceus* NRRL 3174 growth and *ochratoxin A* production
- Basilico, J. C. .; Basilico, M. Z.; *Letters in Applied Microbiology*; **29(4)**; October 1999; PP 238-241
24. Antimicrobial activity of essential oils and other plant extracts
- Hammer, K. A.; Carson, C. F.; Riley, T. V.; *Journal of Applied Microbiology*; **86(6)**; June 1999; PP 985-990
25. Antimicrobial activity of essential oils from plants to selected pathogenic and saprophytic microorganisms
- Mount, J. R.; Golden, D. A.; Elgayyar, M.; Draughon, F. A.; *Abstracts of the General Meeting of the American Society for Microbiology*; **99**; 1999; P 526
26. Antibacterial activity of essential oils from aromatic plants growing in Chile

- Montes, M. A.; Wilkomirsky, T.; Bello, H.; *Fitoterapia*; **69(2)**; 1998; PP 170-172
27. Essential oil from *Origanum-Vulgare* L. components and antimicrobial activity  
Montes, M. A.; Valenzuela, L.; Wilkomirsky, T.; Bello, H.; Valladares, G.; *AN R ACAD FARM*; **58(4)**; 1992; PP 509-518
28. Antimicrobial properties of spices and herbs  
Zaika, L. L.; *Abstracts of papers – American chemical Society*; 191; 1986
29. Sensitivity of *vibrio-parahaemolytius* to spices and organic acids  
Beuchat, L. R.; *Journal of Food Science*; **41(4)**; 1976; PP 899-902
30. Inhibition of *Listeria monocytogenes* in fish and meat systems by use of oregano and cranberry phytochemical synergies  
Lin, Y. T.; Labbe, R. G.; Shetty, K.; *Applied and Environmental Microbiology*; **70(9)**; 2004; PP 5672-5678
31. Oregano: properties, composition and biological activity  
Arcila-Lozano, C. C.; Loarca-Pina, G.; Lecona-Urbe, S.; Gonzalez de Mejia, E.; *Archivos Latinoamericanos de Nutricion*; **54(1)**; 2004; PP 100-111
32. Antibacterial activities of naturally occurring compounds against antibiotic-resistant *Bacillus cereus* vegetative cells and spores, *Escherichia coli*, and *Staphylococcus aureus*  
Friedman, M.; Buick, R.; Elliott, C. T.; *Journal of Food Protection*; **67(8)**; 2004; PP 1774-1778
33. Biological activities of the essential oils and methanol extract of *Origanum vulgare ssp. vulgare* in the Eastern Anatolia region of Turkey  
Sahin, F.; Gulluce, M.; Daferera, D.; Sokmen, A.; Sokmen, M.; Polissiou, M.; Agar, G.; Ozer, H.; *Food Control*; **15(7)**; 2004; PP 549-557
34. Oregano, thyme and sage, as natural additives to foods  
Solomakos, N.; Govaris, A.; *Deltion tes Ellenikes Kteniatrikes Etaireias = Journal of the Hellenic Veterinary Medical Society*; **55(1)**; 2004; PP 75-81
35. Susceptibility of methicillin-resistant *staphylococci* to oregano essential oil, carvacrol and thymol  
Nostro, A.; Blanco, A. R.; Cannatelli, M. A.; Enea, V.; Flamini, G.; Morelli, I.; Roccaro, A. S.; Alonzo, V.; *FEMS Microbiology Letters*; **230(2)**; 2004; PP 191-195
36. The mechanism of bactericidal action of oregano and clove essential oils and of their phenolic major components on *Escherichia coli* and *Bacillus subtilis*

- Khadija Rhayour; Touria Bouchikhi; Abdelrhafour Tantaoui-Elaraki; Khalid Sendide; Adnane Remmal; *Journal of Essential Oil Research*; **15(5)**; 2003; PP 356-362
37. Sensitivity of four pathogenic bacteria to Turkish thyme and oregano hydrosols  
Sagdic, O.; *Lebensmittel-Wissenschaft und –Technologie*; **36(5)**; 2003; PP 497-473
38. Note: inhibition of pathogenic bacteria by essential oils at different concentrations  
Ozkan, G.; Sagdic, O.; Ozcan, M.; *Food Science and Technology International*; **9(2)**; 2003; PP 85-88
39. Antimicrobial activity of Greek oregano and winter savory extracts (essential oil and SCFE) investigated by impedimetry  
Mohacsi-Farkas, C.; Tulok, M.; Balogh, B., (editor- Szoke, E.; Mathe, I.; Blunden, G.; Kery, A.); *Acta Horticulturae*; **597**; 2003; PP 199-204
40. Antimicrobial effect of spices and herbs on *Shigella sonnei* and *Shigella flexneri*  
Bagamboula, C. F.; Uyttendaele, M.; Debevere, J.; *Journal of Food Protection*; **66(4)**; 2003; PP 668-673
41. Antibacterial activity of Turkish spice hydrosols  
Sagdic, O.; Ozcan, M.; *Food Control*; **14(3)**; 2003; PP 141-143
42. Component composition and analysis of antibiotic activity of essential oil of *Origanum vulgare* L. grown in certain regions of West Siberia  
Kazarinova, N. V.; Tkachenko, K. G.; Muzychenko, L. M.; Safonova, N. G.; Tkachev, A. V.; Koroljuk, E. A.; *Rastitel'nye Resursy*; **38(2)**; 2002; PP 99-103
43. The experience of using essential oils of *Origanum vulgare* L. and *O. tythanthum Gontsch.* to control intra-hospital infections  
Kazarinova, N. V.; Tkachenko, K. G.; Muzychenko, L. M.; Shurgaya, A. M. ; *Rastitel'nye Resursy*; **35(4)**; 1999; PP 51-58
44. Chemical composition, antimicrobial and antioxidative activity of laurel, sage, rosemary, oregano and coriander essential oils  
Baratta, M. T.; Dorman, H. J. D.; Deans, S. G.; Biondi, D. M.; Ruberto, G. ; *Journal of Essential Oil Research*; **10(6)**; 1998; PP 618-627
45. Some scientific and practical aspects of production and utilization of oregano in central Europe  
Bernath, J. (Ed- Padulosi, S); *MONOGRAPH TITLE- Oregano. Proceedings of the IPGRI International Workshop on Oregano, 8-12 May 1996, CIHEAM, Valenzano, Bari, Italy*; 1997; PP 76-93

46. Analysis of the essential oil of wild oregano from Martinique (*Coleus aromaticus Benth.*) - evaluation of its bacteriostatic and fungistatic properties  
  
Prudent, D.; Perineau, F.; Bessiere, J. M.; Michel, G. M.; Baccou, J. C.; *Journal of Essential Oil Research*; **7(2)**; 1995; PP 165-173
47. Antimicrobial activity and chemical composition of essential oils from Sicilian aromatic plants  
  
Biondi, D.; Cianci, P.; Geraci, C.; Ruberto, G.; Piattelli, M.; *Flavour and Fragrance Journal*; **8(6)**; 1993; PP 331-337
48. In vitro activity of some essential oils toward *Erwinia amylovora (Burriel) Winslow et al*  
  
Scortichini, M.; Rossi, M. P.; *Acta Phytopathologica et Entomologica Hungarica*; **24(3-4)**; 1989; PP 423-431
49. Phenolcarboxylic acids of *Origanum vulgare*  
  
Mirovich, V. M.; Peshkova, V. A.; Shatokhina, R. K.; Fedoseev, A. P.; *Chemistry of Natural Compounds*; **25(6)**; 1989, publ. 1990; PP 722-723
50. Antibacterial activities of essential oils from Turkish spices and citrus  
  
Kivanc, M.; Akgul, A.; *Flavour and Fragrance Journal*; **1(4/5)**; 1986; PP 175-179
51. Antibacterial Activity of the Essential Oils from Cultivated Plants of *Origanum vulgare* L  
  
Souleles, C.; Chinou, I.; Loukis, A.; *ANNUAL CONGRESS ON MEDICINAL PLANT RESEARCH*; Vol. Medicinal plant research; **44**; 1996; P 24
52. Antibacterial Efficiency of Finnish Spice Essential Oils against Pathogenic and Spoilage Bacteria  
  
Nevas, M.; Korhonen, A.-R.; Lindstroem, M.; Turkki, P.; Korkeala, H.; *Journal of Food Protection*; **67(1)**; 2004-01-00; PP 199-202
53. Antibacterial activity of selected plant essential oils against *Escherichia coli* O157:H7  
  
Burt, S.; Reinders, R.; *Letters in Applied Microbiology*; **36(3)**; 2003-03-00; PP 162-167
54. Effects of Turkish spice extracts at various concentrations on the growth of *Escherichia coli* O157:H7  
  
Sadic, O.; Kucu, A.; Oezcan, M.; Oezcelik, S.; *Food Microbiology*; **19(5)**; 2002-10-00; PP 473-480
55. A study of the minimum inhibitory concentration and mode of action of oregano essential oil, thymol and carvacrol  
  
Lambert, R.; Skandamis, P.\*; Coote, P.; Nychas, G.; *Journal of Applied Microbiology*; **91(3)**; 2001-09-00; PP 453-462

56. Effect of essential oils on the enveloped viruses: antiviral activity of oregano and clove oils on herpes simplex virus type 1 and Newcastle disease virus  
Siddiqui, Y. M.; *Medical Science Research*; **24(3)**; PP 185-186
57. Inhibitory and Stimulatory Effects of Oregano on *Lactobacillus plantarum* and *Pediococcus cerevisiae*  
Zaika, L. L.; Kissinger, J. C.; *Journal of Food Science*; **46(4)**; 1981; PP 1205-1210
58. Chemical compositions and antibacterial effects of essential oils of Turkish oregano (*Origanum minutiflorum*), bay laurel (*Laurus nobilis*), Spanish lavender (*Lavandula stoechas* L.), and fennel (*Foeniculum vulgare*) on common foodborne pathogens  
Dadalioglu, I.; Evrendilek, G. A.; *Journal of Agriculture and Food Chemistry*; **52(26)**; 2004 Dec 29; PP 8255-8260
59. Phenolic antioxidants from clonal oregano (*Origanum vulgare*) with antimicrobial activity against *Helicobacter pylori*  
Chun, S. S.; Vatter, D. A.; Lin, Y. T.; Shetty, K.; *Process Biochemistry*; **40(2)**; 2005; PP 809-816
60. Chemical Composition, Antimicrobial and In Vitro Antioxidant Properties of *Monarda citriodora* var. *citriodora*, *Myristica fragrans*, *Origanum vulgare* ssp. *hirtum*, *Pelargonium* sp. and *Thymus zygis* Oils  
Dorman, H. J. D.; Deans, S. G. ; *Journal of Essential Oil Research*; **16(2)**; 2004; PP 145-150
61. Essential oil *Origanum vulgare* L. Components and antimicrobial activity  
Montes, M. A.; Valenzuela, L.; Wilkomirsky, T.; Bello, H.; *Anales – Real Academia de Farmacia Madrid*; **58(4)**; 1992; P 509

**Disclaimer:** This document is prepared for educational purpose only and not intended to diagnose, treat, cure, or prevent any disease.