
A Compendium of Scientific References Supporting the Efficacy of Ingredients Used in the Formulation of dōTERRA's On Guard[®] Natural Whitening Toothpaste

The following is a compendium of scientific references supporting the health and wellness benefits associated with the use of On Guard[®] Natural Whitening Toothpaste with Certified Pure Therapeutic Grade[®] essential oils. The On Guard[®] Toothpaste is part of dōTERRA's essential oil products and is formulated to be used daily by everyone in the family as part of oral care health. Regular use of dōTERRA's On Guard[®] Toothpaste can eliminate and control pathogens due to the potency of its constituents.* The On Guard[®] Toothpaste is not formulated or intended as treatment or cure for disease.

Health Benefit Claims of dōTERRA's On Guard[®] Toothpaste:

- On Guard[®] protective blend of essential oils provides natural germ protection*
- Supports strong teeth and healthy gums*
- Naturally whitens teeth by removing stains with gentle polishing agents*
- Proprietary formula that is free of harsh abrasives, alcohol, and fluoride*

* These statements have not been evaluated by the Food and Drug Administration.
This product is not intended to diagnose, treat, cure, or prevent disease.

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Oral Care Essential Oil Ingredient Highlights

1. Myrrh Essential Oil

Latin name: Commiphora myrrha

Key Scientific References:

1. Nomicos, EY., *Myrrh: medical marvel or myth of the Magi?* *Holist Nurs Pract.* 2007 Nov-Dec;21(6):308-23.
2. El Ashry, ES., et al., *Components, therapeutic value and uses of myrrh.* *Pharmazie.* 2003 Mar;58(3):163-8.
3. Tonkal, AM. and Morsy, TA., *An update review on Commiphora molmol and related species.* *J Egypt Soc Parasitol.* 2008 Dec;38(3):763-96.
4. Wanner, J., et al., *Chemical composition and antibacterial activity of selected essential oils and some of their main compounds.* *Nat Prod Commun.* 2010 Sep;5(9):1359-64.
5. Tipton, DA., et al., *In vitro cytotoxic and anti-inflammatory effects of myrrh oil on human gingival fibroblasts and epithelial cells.* *Toxicol In Vitro.* 2003 Jun;17(3):301-10.

2. Wintergreen Essential Oil

Latin name: Gaultheria procumbens

Key Scientific References:

1. Charles, CH., et al., *Effect of an essential oil-containing dentifrice on dental plaque microbial composition.* *Am J Dent.* 2000 Sep;13(Spec No):26C-30C.
2. Simon, JE., et al., *Wintergreen: Herbs, An Indexed Bibliography.* 1980. *The Scientific Literature on Selected Herbs, and Aromatic and Medicinal Plants of the Temperate Zone.* P.
3. Tanen, DA., et al., *Comparison of oral aspirin versus topical applied methyl salicylate for platelet inhibition.* *Ann Pharmacother.* 2008 Oct;42(10):1396-401.
4. Le Grand, F., et al., *Natural abundance 2H-ERETIC-NMR authentication of the origin of methyl salicylate.* *J Agric Food Chem.* 2005 Jun 29;53(13):5125-9..

3. Peppermint Essential Oil

Latin name: *Mentha piperita*

Key Scientific References:

1. Hur, MH., et al., *Reduction of mouth malodour and volatile sulphur compounds in intensive care patients using an essential oil mouthwash*. *Phytother Res*. 2007 Jul;21(7):641-3.
2. Shapiro, S., et al., *The antimicrobial activity of essential oils and essential oil components towards oral bacteria*. *Oral Microbiol Immunol*. 1994 Aug;9(4):202-8.
3. Soković, M., et al., *Antibacterial effects of the essential oils of commonly consumed medicinal herbs using an in vitro model*. *Molecules*. 2010 Oct 27;15(11):7532-46.
4. Machado, M., et al., *Effects of essential oils on the growth of Giardia lamblia trophozoites*. *Nat Prod Commun*. 2010 Jan;5(1):137-41.
5. Sharafi, SM., et al., *Protective effects of bioactive phytochemicals from Mentha piperita with multiple health potentials*. *Pharmacogn Mag*. 2010 Jul;6(23):147-53.
6. Mimica-Dukić, N., et al., *Antimicrobial and antioxidant activities of three Mentha species essential oils*. *Planta Med*. 2003 May;69(5):413-9.

On Guard[®] Essential Oil

Protective Blend

Key Scientific References:

1. Mayaud, L., et al., *Comparison of bacteriostatic and bactericidal activity of 13 essential oils against strains with varying sensitivity to antibiotics*. *Lett Appl Microbiol*. 2008 Sep;47(3).
2. Prاسبuseenivasan, S., et al., *In vitro antibacterial activity of some plant essential oils*. *BMC Complement Altern Med*. 2006 Nov 30;6:39.
3. Wei, A. and Shibamoto, T. *Antioxidant/lipoxygenase inhibitory activities and chemical compositions of selected essential oils*. *J Agric Food Chem*. 2010 Jun 23;58(12):7218-25.
4. Wu, S., et al., *Protective essential oil attenuates influenza virus infection: an in vitro study in MDCK cells*. *BMC Complement Altern Med*. 2010 Nov 15;10:69.

4. Wild Orange Essential Oil

Latin name: Citrus sinensis

Key Scientific References:

1. Hammer, KA., et al., *Antimicrobial activity of essential oils and other plant extracts*. Journal of Applied Microbiology. 1999 (86):985-90.
2. Kivanc, M., et al., *Antibacterial activities of essential oils from Turkish spices and citrus*. Flavour and Fragrance Journal. 2006 (1):175-9.
3. Ramful, D., et al., *Citrus Fruit Extracts Reduce Advanced Glycation End Products (AGEs)- and H(2)O(2)-Induced Oxidative Stress in Human Adipocytes*. J Agric Food Chem. 2010.
4. O'Bryan, CA., et al., *Orange essential oils antimicrobial activities against Salmonella spp*. J Food Sci. 2008 Aug;73(6):M264-7.
5. Araújo, CP. Jr., et al., *Acaricidal activity against Tetranychus urticae and chemical composition of peel essential oils of three Citrus species cultivated in NE Brazil*. Nat Prod Commun. 2010 Mar;5(3):471-6.
6. Sharma, N. and Tripathi, A. *Effects of Citrus sinensis (L.) Osbeck epicarp essential oil on growth and morphogenesis of Aspergillus niger (L.) Van Tieghem*. Microbiol Res. 2008;163(3):337-44.
7. Crowell, PL. *Prevention and therapy of cancer by dietary monoterpenes*. J Nutr. 1999 Mar;129(3):775S-778S.

5. Clove Bud Essential Oil

Latin name: Eugenia caryophyllata

Key Scientific References:

1. Larhsini, M., et al., *Antibacterial activity of some Moroccan medicinal plants*. Phytother Res. 2001 May;15(3):250-2.
2. Chaieb, K., et al., *The chemical composition and biological activity of clove essential oil Eugenia Caryophyllata (syzigium aromaticum L. myrtaceae): a short review*. Phytotherapy Research. 2007;12(501-6.
3. Astani, A., et al., *Screening for antiviral activities of isolated compounds from essential oils*. Evi Based CAM. 2009; 1-8.
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5. Halder, S., et al., *Essential oil of clove (Eugenia caryophyllata) augments the humoral immune response but decreases cell mediated immunity*. *Phytother Res.* 2011 Aug;25(8):1254-6.
6. Friedman, M., et al., *Bactericidal activities of plant essential oils and some of their isolated constituents against Campylobacter jejuni, Escherichia coli, Listeria monocytogenes, and Salmonella enteric*. *J Food Prot.* 2002 Oct;65(10):1545-60.

6. Cinnamon Essential Oil

Latin name: Cinnamomum zeylanicum

Key Scientific References:

1. Prabuseenivansan, S., et al., *In vitro antibacterial activity of some plant essential oils*. *BMC Complementary and Alternative Medicine.* 2006;6:39-47.
2. Goni, P., et al., *Antimicrobial activity in the vapour phase of a combination of cinnamon and clove essential oils*. *Food Chem.* 2009;116:982-9.
3. Inouye, S., et al., *Antibacterial activity of essential oils and their major constituents against respiratory tract pathogens by gaseous contact*. *Antimicrobial Chemotherapy.* 2001;47:565.
4. Warnke, PH., et al., *The battle against multi-resistant strains: Renaissance of antimicrobial essential oils as a promising force to fight hospital-acquired infections*. *Cranio-Maxillo-Facial Surgery.* 2009;37:392-7.
5. Quale, JM., et al., *In vitro activity of Cinnamomum zeylanicum against azole resistant and sensitive Candida species and a pilot study of cinnamon for oral candidiasis*. *Am J Chin Med.* 1996;24(2):103-9.
6. Kamath, JV., et al., *Pro-healing effect of Cinnamomum zeylanicum bark*. *Phytother Rese.* 2003 Sep;17(8):970-2.
7. Nuryastuti, T., et al., *Effect of cinnamon oil on icaA expression and biofilm formation by Staphylococcus epidermidis*. *Appl Environ Microbiol.* 2009 Nov;75(21):6850-5.

7. Eucalyptus Essential Oil

Latin name: Eucalyptus radiata

Key Scientific References:

1. Hendry, ER., et al., *Antimicrobial efficacy of eucalyptus oil and 1,8-cineole alone and in combination with chlorhexidine digluconate against microorganisms grown in planktonic and biofilm cultures*. Antimicrob Chemo. 2009;64:1219-25.
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 3. Mayaud, L., et al., *Comparison of bacteriostatic and bactericidal activity of 13 essential oils against strains with varying sensitivity of antibiotics*. Appl Microbiol. 2008;47:167-73.
 4. Sadlon, AE. and Lamson, DW. *Immune-modifying and antimicrobial effects of Eucalyptus oil and simple inhalation devices*. Altern Med Rev. 2010 Apr;15(1):33-47.
 6. Serafino, A., et al., *Stimulatory effect of Eucalyptus essential oil on innate cell-mediated immune response*. BMC Immunol. 2008 Apr 18;9:17.
 7. Ashour, HM. *Antibacterial, antifungal, and anticancer activities of volatile and extracts from stems, leaves, and flowers of Eucalyptus sideroxylon and Eucalyptus torquata*. Cancer Biol Ther. 2008 Mar;7(3):399-403.
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8. Rosemary Essential Oil

Latin name: Rosmarinus officinalis

Key Scientific References:

1. Baratta, MT., et al., *Antimicrobial and antioxidant properties of some commercial essential oils*. Flavour and Fragrance. 1998;13:235-44.
2. Bozin, B., et al., *Antimicrobial and antioxidant properties of rosemary and sage (rosmarinus officinalis L. and salvia officinalis L., Lamiaceae) essential oils*. Agric and Food Chem. 2007.
3. Lugman, S., et al., *Potential of rosemary oil to be used in drug-resistant infections*. Alt Ther Health and Med. 2007; 13:54-9.
4. Van Vuuren, SF., et al., *The antimicrobial activity of four commercial essential oils in combination with conventional antimicrobials*. Appl Microbiol. 2009; 48:440-6.
5. Bernardes, WA., et al., *Antibacterial activity of the essential oil from Rosmarinus officinalis and its major components against oral pathogens*. Z Naturforsch C. 2010 Sep-Oct;65(9010):588-93.
6. Bernardes, WA., et al., *Antimicrobial activity of Rosmarinus officinalis against oral pathogens: relevance of carnosic acid and carnosol*. Chem Biodivers. 2010 Jul;7(7):1835-40.

7. Rasooli, I., et al., *Phytotherapeutic prevention of dental biofilm formation*. *Phytother Res.* 2008 Sep;22(9):1162-7.
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9. Hydroxyapatite

Key Scientific References:

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 2. Nishio, M., et al., *A New Enamel Restoring Agent for Use after PMTC*. *Journ Dent Res.* 2004; 83:1920.
 3. Guo, C., et al., *Effect of hydroxyapatite toothpaste on vital tooth color*. *Juan Dent Res.* 2002; 81:A254-1964.
 4. Jones, SP., et al., *Comparison of fluoridated apatites with pure hydroxyapatite as potential biomimetic alternatives to enamel for laboratory-based bond strength studies*. *Aust Orthod J.* 2009 May;25(1):12-8.
 5. Dabanoglu, A., et al., *Whitening effect and morphological evaluation of hydroxyapatite materials*. *Am J Dent.* 2009 Feb;22(1):23-9.
 6. Niwa, M., et al., *Polishing and whitening properties of toothpaste containing hydroxyapatite*. *J Mater Sci Med.* 2001 Mar;12(3):277-81.
 7. Itthagarun, et al., *The effect of nano-hydroxyapatite toothpaste on artificial enamel carious lesion progression: an in-vitro pH-cycling study*. *Hong Kong Dent J.* 2010;7:61-6.
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Other references:

1. George, J., et al., *The efficacy of a herbal-based toothpaste in the control of plaque and gingivitis: a clinic-biochemical study*. *Indian J Den Res.* 2009 Oct-Dec;20(4):480-2.
2. Bauroth, K., et al., *The efficacy of an essential oil antiseptic mouthrinse vs. dental floss in controlling interproximal gingivitis: a comparative study*. *J Am Dent Assoc.* 2003 Mar;134(3):359-65.
3. Stoeken, JE., et al., *The long-term effect of a mouthrinse containing essential oils on dental plaque and gingivitis: a systematic review*. *J Periodontol.* 2007 Jul;78(7):1218-28.
4. Chung, SH., *[The effects of an essential oil mouthrinse on oral health in the community indwelling elderly]*. *Taehan Kanho Hakhoe Chi.* 2006 Feb;36(1):84-93.
5. Fine, DH., et al., *Effect of rinsing with an essential oil-containing mouthrinse on subgingival periodontopathogens*. *J Periodontol.* 2007 Oct;78(10):1935-42.

On Guard[®] Natural Whitening Toothpaste

Ingredients:

Glycerin, Water, Hydrated Silica, Hydroxyapatite, Xylitol, Calcium Carbonate, Cellulose Gum, *Mentha piperita* (Peppermint) Essential Oil, *Citrus sinensis* (Wild Orange) Essential Oil, *Eugenia caryophyllata* (Clovebud) Essential Oil, *Cinnamomum zeylanicum* (Cinnamon Bark) Essential Oil, *Eucalyptus radiata* (Eucalyptus) Essential Oil, *Rosemarinus officinalis* (Rosemary) Essential Oil, *Stevia rebaudiana* (Stevia) Extract, *Gaultheria procumbens* (Wintergreen) Essential Oil, *Commiphora myrrha* (Myrrh) Essential Oil, Sodium Lauroyl Sarcosinate, Carrageenan, Titanium Dioxide



Directions for Use

After flossing, apply a dime size amount of paste to moistened toothbrush, brush gently but thoroughly, preferably after each meal and in morning, and night, or use as directed by a dentist or physician. For improved results, follow with a mouthwash of 1 drop of On Guard[®] essential oil blend mixed in 8 oz. of water. Swish wash vigorously in mouth for 1 minute and rinse.

Manufactured in the U.S.A. exclusively for dōTERRA Int., LLC, 370 West Center Street, Orem, UT 84057, www.doterra.com. For customer support, call 801-615-7200.