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## List of references supporting the assessment of *Thymus vulgaris* L. and *Thymus zygis* L., herba

Final

**The Agency acknowledges that copies of the underlying works used to produce this monograph were provided for research only with exclusion of any commercial purpose.**

Abd El Kader MA, Mohamed NZ. Evaluation of protective and antioxidant activity of thyme (*Thymus vulgaris*) extract on paracetamol-induced toxicity in rats. Austral J Basic Appl Sci 2012, 6: 476-474

Allegrini J, Simeon de Bouchberg M. Une technique d'étude du pouvoir antibactérien des huiles essentielles. Prod Probl Pharm 1972, 27: 891 - 897

Amirghofran Z, Hashemzadeh R, Javidnia K, Golmoghaddam H, Esmaeilbeig A. In vitro immunomodulatory effects of extracts from three plants of the Labiate family and isolation of the active compound(s). J Immunotoxicol 2011, 8: 265-273 (Abstract)

Amirghofran Z, Ahmadi H, Karimi MH. Immunomodulatory activity of the water extract of *thymus vulgaris*, *thymus daenensis*, and *zataria multiflora* on dendritic cells and T cells responses. J Immunoassay Immunochem 2012, 33: 388-402

Astani A, Reichling J, Schnitzler P. Comparative study on the antiviral activity of selected monoterpenes derived from essential oils. Phytother Res 2010, 24: 673-679

Aydin S, Basaran AA, Basaran N. Modulating effects of thyme and its major ingredients on oxidative DNA damage in human lymphocytes. J Agric Food Chem 2005, 53: 1299-1305

Aydin S, Basaran AA, Basaran N. The effects of thyme volatiles on the induction of DNA damage by the heterocyclic amine IQ and mitomycin C. Mutat Res 2005, 581: 43-53

Azizan A, Blevins RD. Mutagenicity and antimutagenicity testing of six chemicals associated with the pungent properties of specific spices as revealed by the Ames Salmonella/microsomal assay. Arch Environ Contam Toxicol 1995, 28: 248 – 258 (Abstract)



Baba S, Osakabe N, Natsume M, Terao J. Orally administered rosmarinic acid is present as the conjugated and/or methylated forms in plasma, and is degraded and metabolized to conjugated forms of caffeic acid, ferulic acid and m-coumaric acid. *Life Sci* 2004, 75: 165 - 178

Babaei, M, Abargheli, ME, Ansari, R, Vafaei, AA, Taherian, AA, Akhavan, MM, Toussy, G, Mousavi, S. Antispasmodic effect of hydroalcoholic extract of *Thymus vulgaris* on the guinea-pig ileum. *Nat Prod Res* 2008, 22: 1143-1150

Bazylko A, Strzelecka H. A HPTLC densitometric determination of luteolin in *Thymus vulgaris* and its extracts. *Fitoterapia* 2007, 78: 391-395

Beer AM, Lukyanov J, Sagorchev P. Effect of thymol on the spontaneous contractile activity of the smooth muscles. *Phytomed* 2007, 14: 65-69

Begrow F, Engelbertz J, Feistel B, Lehnfeld R, Bauer K, Verspohl EJ. Impact of Thymol in thyme extracts on their antispasmodic action and ciliary clearance. *Planta Med* 2010, 76: 311-318

Behnia, M, Haghghi, A, Komeylizadeh, H, Tabaei, SJS, Abadi, A. Inhibitory effects of Iranian *Thymus vulgaris* extracts on in vitro growth of *Entamoeba histolytica*. *Kor J Parasitol* 2008, 46: 153-156

Benito M, Jorro G, Morales C, Pelaez A, Fernandez A. Labiate allergy: systemic reactions due to ingestion of oregano and thyme. *Ann Allergy Asthma Immunol* 1996, 76: 416 - 418

Blaschek W, Ebel S, Hackenthal E, Holzgrabe U, Keller K, Reichling J, Schulz V, editors. *HagerROM* 2012: Hagers Handbuch der Drogen und Arzneistoffe. Version 10.4. Springer Medizin Verlag, Heidelberg 2012

Boskabady MH, Aslani MR, Kiani S. Relaxant effect of *Thymus vulgaris* on guinea-pig tracheal chains and its possible mechanism(s). *Phytother Res* 2006, 20: 28-33

Braga PC, Dal Sasso M, Culici M, Bianchi T, Bordoni L, Marabini L. Anti-inflammatory activity of thymol: inhibitory effect on the release of human neutrophil elastase. *Pharmacol* 2006, 77: 130-136

Braga PC, Sasso MD, Culici M, Alfieri M. Eugenol and thymol, alone or in combination, induce morphological alterations in the envelope of *Candida albicans*. *Fitoterapia* 2007, 78: 396-400

Brahmi Z, Niwa H, Yamasato M, Shigeto S, Kusakari Y, Sugaya K, Onose JI, Abe N. Effective cytochrome P450 (CYP) inhibitor isolated from thyme (*Thymus saturoides*) purchased from a Japanese market. *Biosci Biotechnol Biochem* 2011, 75: 2237-2239

British Herbal Pharmacopoeia. 4<sup>th</sup> ed. British Herbal Medicine Association, Exeter 1996

Büechi S, Vogelin R, von Eiff MM, Ramos M, Melzer J. Open trial to assess aspects of safety and efficacy of a combined herbal cough syrup with ivy and thyme. *Forsch Komplementärmed Klass Naturheilkd* 2005, 12: 328 – 332

Büyükbalci A, El, SN. Determination of in vitro antidiabetic effects, antioxidant activities and phenol contents of some herbal teas. *Plant Foods Hum Nutr* 2008, 63: 27-33

Chalchat JC, Garry RPH. Correlation composition chimique / activite antimicrobienne: contribution a la comparaison de 2 methodes de determination des CMI. *Plantes Med Phytother* 1991, 25: 184-193

Charles CH, Vincent JW, Borycheski L, Amatnieks Y, Sarina M, Qaqish J, Proskin HM. Effect of an essential oil-containing dentifrice on dental plaque microbial composition. *Am J Dent* 2000, 13: 26 - 30

Chizzola R, Michlitsch H, Franz C. Antioxidative properties of *Thymus vulgaris* leaves: Comparison of different extracts and essential oil chemotypes. *J Agric Food Chem* 2008, 56: 6897-6904

Choi WS, Park BS, Ku SK, Lee SE. Repellent activities of essential oils and monoterpenes against *Culex pipiens pallens*. *J Am Mosq Control Assoc* 2002, 18: 348 - 351

Blumenthal M, Busse WR, Goldberg A, Gruenwald J, et al., editors. *The Complete German Commission E Monographs*. American Botanical Council, Austin Texas 1998

Czygan FC, Hiller K. *Thymi herba*. In: Wichtl M, editor.: *Herbal drugs and Phytopharmaceuticals*. Medpharm Scientific Publishers, Stuttgart 2004: 607-610

Damianova, S, Tasheva, S, Stoyanova, A, Damianov, D. Investigation of extracts from thyme (*Thymus vulgaris L.*) for application in cosmetics. *J Ess Oil Bear Plants* 2008, 11: 443-450

Dandlen SA, Miguel MG, Duarte J, Faleiro ML, Sousa MJ, Lima AS, Figueiredo AC, Barroso JG, Pedro LG. Acetylcholinesterase inhibition activity of Portuguese thymus species essential oils. *J Ess Oil Bear Plants* 2011, 14: 140-150 (Abstract)

Dapkevicius A, van Beek TA, Lelyveld GP, van Veldhuizen A, de Groot A, Linssen JP, Venskutonis R. Isolation and structure elucidation of radical scavengers from *Thymus vulgaris* leaves. *J Nat Prod* 2002, 65: 892-896

Das Neves J, Pinto E, Amaral MH, Bahia MF. Antifungal activity of a gel containing *Thymus vulgaris* essential oil against *Candida* species commonly involved in vulvovaginal candidosis. *Pharm Biol* 2009, 47: 151-153

Domaracky M, Rehak P, Juhas S, Koppel J. Effects of selected plant essential oils on the growth and development of mouse preimplantation embryos in vivo. *Physiol Res* 2007, 56: 97-104

Dong RH, Fang ZZ, Zhu LL, Ge GB, Cao YF, Li XB, Hu CM, Yang L, Liu ZY. Identification of CYP isoforms involved in the metabolism of thymol and carvacrol in human liver microsomes (HLMs). *Pharmazie* 2012, 67: 1002-1006

Dorsch W, Loew D, Meyer-Buchtela E, Schilcher H, *Thymi herba*. Kinderdosierungen von Phytopharmaka. Kooperation Phytopharmaka, Bonn 2002

Englberger W, Hadding U, Etschenberg E, Graf E, Leyck S, Winkelmann J, Parnham MJ. Rosmarinic acid: a new inhibitor of complement C3-convertase with anti-inflammatory activity. *Int J Immunopharmac* 1988, 10: 729-737

Engelbertz J, Schwenk T, Kinzinger U, Schierstedt D, Verspohl EJ. Thyme extract, but not thymol, inhibits endothelin-induced contractions of isolated rat trachea. *Planta Med* 2008, 74: 1436-1440

Engelbertz J, Lechtenberg M, Studt L, Hensel A, Verspohl EJ. Bioassay-guided fractionation of a thymol-deprived hydrophilic thyme extract and its antispasmodic effect. *J Ethnopharmacol* 2012, 141: 848-853

Ernst E, Maerz R, Sieder C. A controlled multi-centre study of herbal versus synthetic secretolytic drugs for acute bronchitis. *Phytomedicine* 1997, 4: 287-293

ESCOP Monograph 2<sup>nd</sup> Ed. *Thymi herba*. ESCOP (ESCOP 2003)

Fabio A, Cermelli C, Fabio G, Nicoletti P, Quaglio P. Screening of the antibacterial effects of a variety of essential oils on microorganisms responsible for respiratory infections. *Phytother Res* 2007, 21: 374-377

Fachini-Queiroz FC, Kummer R, Estevão-Silva CF, Carvalho MDDB, Cunha JM, Grespan R, Bersani-Amado CA, Cuman RKN. Effects of thymol and carvacrol, constituents of *Thymus vulgaris* L. essential oil, on the inflammatory response. Evid-based Compl Altern Med 2012, art. no. 657026, doi: 10.1155/2012/657026

Farag RS, Salem H, Badei AZMA, Hassanein DE. Biochemical studies on the essential oils of some medicinal plants. Fette, Seifen, Anstrichmittel 1986, 88: 69-72

Fasse M, Bässler D, Zieseniß E. Behandlung akuter Erkältungskrankheiten bei Kindern. Ergebnisse einer Anwendungsbeobachtung mit einem Primel-Thymian-Präparat. PÄD 2006, 12: 3-8

Fintelmann V, Weiss R. Lehrbuch der Phytotherapie. Stuttgart, Hippokrates Verlag, 2002

Foster BC, Vandenhoeck S, Hana J, Krantis A, Akhtar MH, Bryan M, Budzinsky JW, Ramputh A, Amazon JT. In vitro inhibition of human cytochrome P450-mediated metabolism of marker substrates by natural products. Phytomedicine 2003, 10: 334 - 342

Gaedcke F. Thymianfluidextrakt DAB. Dtsch Apoth Ztg 2004, 144 (34): 3801 – 3803

Gao LP, Wei HL, Zhao HS, Xiao SY, Zheng RL. Antiapoptotic and antioxidant effects of rosmarinic acid in astrocytes. Pharmazie 2005, 60: 62-65

Garcia DA, Bujons J, Vale C, Sunol C. Allosteric positive interaction of thymol with the GABA<sub>A</sub> receptor in primary cultures of mouse cortical neurons. Neuropharmacology 2006, 50: 25-35

Giordani R, Regli P, Kaloustian J, Mikail C, Abou L, Portugal H. Antifungal effect of various essential oils against *Candida albicans*. Potentiation of antifungal action of amphotericin B by essential oil from *Thymus vulgaris*. Phytother Res 2004, 18: 990–995

Gonçalves MJ, Cruz MT, Cavaleiro C, Lopes MC, Salgueiro L. Chemical, antifungal and cytotoxic evaluation of the essential oil of *Thymus zygis* subsp. *sylvestris*. Ind Crops Prod 2010, 32: 70-75

Gracza L, Koch H, Löffler E. Isolierung von Rosmarinsäure aus *Symphytum officinale* und ihre anti-inflammatorye Wirksamkeit in einem In-vitro-Modell. Arch Pharm 1985, 318: 1090-1095

Gruenwald J, Graubaum HJ, Busch R. Efficacy and tolerability of a fixed combination of thyme and primrose root in patients with acute bronchitis. Arzneim Forsch 2005, 55: 669-676

Gruenwald J, Graubaum HJ, Busch R. Evaluation of the non-inferiority of a fixed combination of thyme fluid and primrose root extract in comparison to a fixed combination of thyme fluid extract and primrose root tincture in patients with acute bronchitis. Arzneim Forsch 2006, 56: 574-581

Hammad M, Sallal AK, Darmani H. Inhibition of *Streptococcus mutans* adhesion to buccal epithelial cells by an aqueous extract of *Thymus vulgaris*. Int J Dent Hygiene 2007, 5: 232-235

Hänsel R, Keller K, Rimpler H, Schneider G, editors. Thymus. In: Hagers Handbuch der Pharmazeutischen Praxis. Drogen P-Z Vol 6 5th ed., Springer-Verlag, Berlin.1994, 966-990

Haraguchi H, Saito T, Ishikawa H, Date H, Kataoka S, Tamura Y, Mizutani K. Antiperoxidative components in *Thymus vulgaris*. Planta Med 1996, 62:217-221

Haroun EM, Mahmoud OM, Adam SE. Effect of feeding *Cuminum cyminum* fruits, *Thymus vulgaris* leaves or their mixture to rats. Vet Hum Toxicol 2002, 44: 67-69

Hejazi SH, Shirani-Bidabadi L, Zolfaghari-Baghbaderani A, Saberi, S, Nilforoushzadeh MA, Moradi SH, Mahmoudi M, Khosravi SH, Ataei A. Comparision effectiveness of extracts of Thyme, Yarrow, Henna and Garlic on cutaneous leishmaniasis caused by *L. major* in animal model (Balb/c). J Med Plants 2009, 8: 129-136

Hikiba H, Watanabe E, Barrett JC, Tsutsui T. Ability of fourteen chemical agents used in dental practice to induce chromosome aberrations in Syrian hamster embryo cells. *J Pharmacol Sci* 2005, 97: 146-152

Horvathova E, Sramkova M, Labaj J, Slamenova D. Study of cytotoxic, genotoxic and DNA- protective effects of selected plant essential oils on human cells cultured in vitro. *Neuro Endocrinol Lett* 2006, 27(2): 44–47 (Abstract)

Huang SS, Zheng RL. Rosmarinic acid inhibits angiogenesis and its mechanism of action in vitro. *Cancer Lett* 2006, 239: 271-280

Inouye S, Takizawa T, Yamaguchi H. Antibacterial activity of essential oils and their major constituents against respiratory tract pathogens by gaseous contact. *J Antimicrob Chemother* 2001, 47: 565–573

Ismail C, Willer G, Steindl H. Bronchipret bei akuter Bronchitis. *Schweiz Zschr Ganzheitsmedizin* 2003, 15: 171-175

Iten F, Saller R, Abel G, Reichling J. Additive antimicrobial effects of the active components of the essential oil of thymus vulgaris - Chemotype carvacrol. *Planta Med* 2009, 75: 1231-1236

Janssen AM, Chin NLJ, Scheffer JJC, Baerheim Svendsen A. Screening for antimicrobial activity of some essential oils by the agar overlay technique. *Pharm Weekbl Sci* 1986, 8 (): 289–292

Janssen AM. Antimicrobial activities of essential oils. Leiden: University of Leiden 1989: 91–108

Jimenez J, Navarro MC, Montilla MP, Martin A. Thymus zygis oil: its effect on CCl<sub>4</sub>-induced hepatotoxicity and free radical scavenger activity. *J Ess Oil Res* 1993, 5: 153–158

Juhás, Š, Bujňáková, D, Rehák, P, Číkoš, Š, Czikková, S, Veselá, J, Il'ková, G, Koppel, J. Anti-inflammatory effects of thyme essential oil in mice. *Acta Vet Brno* 2008, 77: 327-334

Kaas PJ. Atemwegsinfekte im Kindesalter: Anwendungsbeobachtung bestätigt Effizienz einer Thymianzubereitung. *Natura Med* 2003, 18: 2–4

Kemmerich B, Eberhardt R, Stammer H. Efficacy and tolerability of a fluid extract combination of thyme herb and ivy leaves and matched placebo in adults suffering from acute bronchitis with productive cough. A prospective, double-blind, placebo-controlled clinical trial. *Arzneim Forsch* 2006, 56: 652–660

Kemmerich B. Evaluation of efficacy and tolerability of a fixed combination of dry extracts of thyme herb and primrose root in adults suffering from acute bronchitis with productive cough. *Arzneim Forsch* 2007, 57: 607-615

Kensara OA, ElSawy NA, Header EA. Aqueous extract of *Thymus Vulgaris*-induced prevention of kidney damage in hypertensive adult male albino rat: Biochemical and ultrastructural study. *Pak J Nutr* 2012, 11: 367-374

Kitajima J, Ishikawa T, Urabe A, Satoh M. Monoterpeneoids and their glycosides from the leaf of thyme. *Phytochemistry* 2004, 65: 3279–3287

Knols G, Stal PC, van Ree JW. Produktieve hoest: tijm of broomhexine? Een dubbelblind gerandomiseerd ondersoek. *Huisarts en Wetenschap* 1994, 37: 392–394

Koch C, Reichling J, Schneele J, Schnitzler P. Inhibitory effect of essential oils against herpes simplex virus type 2. *Phytomed* 2008, 15: 71-78

Koch U. Thymiankrautextrakt: Studie überprüft klinische Effizienz empfohlener Kinderdosierungen. Natura Med 2003, 18: 22-25

Kohlert C, Schindler G, März RW, Abel G, Brinkhaus B, Derendorf H, Gräfe EU, Veit M. Systematic availability and pharmacokinetics of thymol in humans. J Clin Pharmacol 2002, 42: 731–737

Lemiere, C, Cartier, A, Lehrer, SB, Malo, JL. Occupational asthma caused by aromatic herbs. Allergy 1996, 51: 647–649

Lens-Lisbonne C, Cremieux A, Maillard C, Balansard G. Méthodes d' évaluation de l'activité antibactérienne des huiles essentielles: application aux essences de thym et de cannelle. J Pharm Belg 1987, 42: 297–302

Lis-Balchin M, Hart S. A preliminary study of the effect of essential oils on skeletal and smooth muscle in vitro. J Ethnopharmacol 1997, 58: 183-187

Liu Y, Flynn TJ, Ferguson MS, Hoagland EM, Yu LL. Effects of dietary phenolics and botanical extracts on hepatotoxicity-related endpoints in human and rat hepatoma cells and statistical models for prediction of hepatotoxicity. Food Chem Toxicol 2011, 49: 1820-1827

Madaus R., Lehrbuch der biologischen Heilmittel, Thieme, Leipzig, 1938

Martínez-González MC, Goday Buján JJ, Martínez Gómez W, Fonseca Capdevila E. Concomitant allergic contact dermatitis due to Rosmarinus officinalis (rosemary) and Thymus vulgaris (thyme). Contact Dermatitis 2007, 56: 49-50

Maruniak J, Clark WB, Walker CB, Magnusson I, Marks RG, Taylor M, Clouser B. The effect of 3 mouthrinses on plaque and gingivitis development. J Clin Periodontol 1992, 19: 19–23

Meister A, Bernhardt G, Christoffel V, Buschauer A. Antispasmodic activity of Thymus vulgaris extract on the isolated guinea-pig trachea: discrimination between drug and ethanol effects. Planta Med 1999, 65: 512–516

Menghini A, Savino A, Lollini MN, Caprio A. Activite antimicrobienne en contact direct et en micro-atmosphère de certaines huiles essentielles. Plant Med Phytother 1987, 21: 36–42

Móricz AM, Ott PG, Böszörényi A, Lemberkovics E, Mincsovics E, Tyihák E. Bioassay-guided isolation and identification of antimicrobial compounds from thyme essential oil by means of overpressured layer chromatography, bioautography and GC-MS. Chromatographia 2012, 75: 991-999

Nauert C, Grünwald J, Graubaum HJ, Behandlung von 839 Kindern und Kleinkindern mit akuter Bronchitis: Therapieerfolge einer fixen Kombination aus Thymian und Primula. Z Phytother 2006, 27:13

Ocaña A, Reglero G. Effects of thyme extract oils (from *Thymus vulgaris*, *Thymus zygis*, and *Thymus hyemalis*) on cytokine production and gene expression of oxLDL-stimulated THP-1-macrophages. J Obesity 2012, art. no. 104706, doi: 10.1155/2012/104706

Oyewole OI, Owoseni AA, Faboro EO. Studies on medicinal and toxicological properties of Cajanus cajan, Ricinus communis and *Thymus vulgaris* leaf extracts. J Med Plants Res 2010, 4: 2004-2008

Park BS, Choi WS, Kim JH, Kim KH, Lee SE. Monoterpenes from thyme (*Thymus vulgaris*) as potential mosquito repellents. J Am Mosq Control Assoc 2005, 21: 80–83

Patakova D, Chladek M. Über die antibakterielle Aktivität von Thymian und Quendelölen. Pharmazie 1974, 29: 140–143

Penalver P, Huerta B, Borge C, Astorga R, Romero R, Perea A. Antimicrobial activity of five essential oils against origin strains of the Enterobacteriaceae family. *APMIS* 2005, 113: 1–6

Pereira P, Tysca D, Oliveira P, da Silva Brum LF, Picada JN, Ardenghi P. Neurobehavioral and genotoxic aspects of rosmarinic acid. *Pharmacol Res* 2005, 52: 199 - 203

Pérez-Sánchez, R, Ubera, J, Lafont, F, Gálvez. C. Composition and variability of the essential oil in *Thymus zygis* from Southern Spain. *J Ess Oil Res* 2008, 20: 192-200

Qureshi S, Shah AH, Al-Yahya MA, Ageel AM. Toxicity of *Achillea fragrantissima* and *Thymus vulgaris* in mice. *Fitoterapia* 1991, 62: 319–323

Reichling J, Nolkemper S, Stintzing FC, Schnitzler P. Impact of ethanolic lamiaceae extracts on herpesvirus infectivity in cell culture. *Forsch Kompl Med* 2008, 15: 313-320

Sasaki K, Wada K, Tanaka Y, Yoshimura T, Matuoka K, Anno T. Thyme (*Thymus vulgaris L.*) leaves and its constituents increase the activities of xenobiotic-metabolizing enzymes in mouse liver. *J Med Food* 2005, 8: 184 - 189

Schmidt M. Fixed combination of thyme herb and primula root fluid extracts against cough: A non-interventional study with Bronchicum® Elixir in infants. *Z Phytother* 2008, 29: 7-14

Shapiro S, Guggenheim B. The action of thymol on oral bacteria. *Oral Microbiol Immunol* 1995, 10: 241–246.

Shati AA, Elsaïd FG. Effects of water extracts of thyme (*Thymus vulgaris*) and ginger (*Zingiber officinale Roscoe*) on alcohol abuse. *Food Cem Toxicol* 2009, 47: 1945-1949

Shoeibi Sh, Rahimifard N, Pirouz B, Yalfani R, Pakzad SR, Mirab Samiee S, Pirali Hamedani M. Mutagenicity of four natural flavors: Clove, cinnamon, thyme and *Zataria multiflora* Boiss. *J Med Plants* 2009, 8 (5): 89-96 (Abstract)

Simeon de Bouchberg M, Allegrini J, Bessiere C, Attisso M, Passet J, Granger R. Propriétés microbiologiques des huiles essentielles de chimiotypes de *Thymus vulgaris Linnaeus*. *Riv Ital EPPOS* 1976, 58: 527–536

Sienkiewicz M, Łysakowska M, Denys P, Kowalczyk E. The antimicrobial activity of thyme essential oil against multidrug resistant clinical bacterial strains. *Microb Drug Resist* 1012, 18: 137-148

Soković, M, Glamoclija, J, Ćirić, A, Kataranovski, D, Marin, PD, Vukojević, J, Brkić, D. Antifungal activity of the essential oil of *Thymus vulgaris L.* and thymol on experimentally induced dermatomycoses. *Ind Pharm* 2008, 34: 1388-1393

Spiewak, R, Skorska, C, Dutkiewicz, J. Occupational airborne contact dermatitis caused by thyme dust. *Contact dermatitis* 2001, 44: 235–239

Ündeğer, U, Başaran, A, Degen, GH, Başaran, N. Antioxidant activities of major thyme ingredients and lack of (oxidative) DNA damage in V79 Chinese hamster lung fibroblast cells at low levels of carvacrol and thymol. *Food Chem Toxicol* 2009, 47: 2037-2043

Taherian, AA, Babaei, M, Vafaei, AA, Jarrahi, M, Jadidi, M, Sadeghi, H. Antinociceptive effects of hydroalcoholic extract of *Thymus Vulgaris*. *Pak J Pharm Sci* 2009, 22: 83-89

Takeuchi H, Lu ZG, Fujita T. New monoterpene glucoside from the aerial parts of thyme (*Thymus vulgaris L.*). *Biosci Biotechnol Biochem* 2004, 68: 1131–1134

Tohidpour A, Sattari M, Omidbaigi R, Yadegar A, Nazemi J. Antibacterial effect of essential oils from two medicinal plants against Methicillin-resistant *Staphylococcus aureus* (MRSA). *Phytomed* 2010, 17: 142-145

Tullio V, Mandras N, Allizond V, Nostro A, Roana J, Merlini C, Banche G, Scalas D, Cuffini AM. Positive interaction of thyme (red) essential oil with human polymorphonuclear granulocytes in eradicating intracellular *Candida albicans*. *Planta Med* 2012, 78: 1633-1635

Twetman S, Petersson LG. Interdental caries incidence and progression in relation to mutans streptococci suppression after chlorhexidine-thymol varnish treatments in schoolchildren. *Acta Odontol Scand* 1999, 57: 144-148

Vampa G, Albasini A, Provvisionato A, Bianchi A, Melegari M. Etude chimique et microbiologique sur les huiles essentielles de Thymus. *Plant Med Phytother* 1988, 22: 195-202

Van Den Broucke CO. Pharmacological and chemical investigations on *Thymi herba* and its liquid extracts. *Planta Med* 1980, 39: 253 - 254

Van den Broucke CO, Lemli J. Pharmacological and chemical investigations on thyme liquid extracts. *Planta Med* 1981, 41: 129-135

Van den Broucke CO, Lemli J, Lamy J. Action spasmolytique des flavones des différentes espèces de Thymus. *Plantes Med Phytother* 1982, 16: 310-317

Van den Broucke CO, Lemli J. Spasmolytic activity of the flavonoids from *Thymus vulgaris*. *Pharm Weekbl* 1983, 5: 9-14

Van Hellemond J. Fytotherapeutisch compendium. 2<sup>nd</sup> ed., Scheltema Holkema, Utrecht: Bohn 1988: 599-605

Van Vuuren, SF, Suliman, S, Viljoen, AM. The antimicrobial activity of four commercial essential oils in combination with conventional antimicrobials. *Lett Appl Microbiol* 2009, 48: 440-446

Von Skramlik E. Über die Giftigkeit und Verträglichkeit von ätherischen Ölen. *Pharmazie* 1959, 14: 435-445

Wagner H, Wierer M, Bauer R. In vitro Hemmung der Prostaglandin-Biosynthese durch etherische Öle und phenolische Verbindungen. *Planta Med* 1986, 52(3): 184-187

Wienkötter N, Begrow F, Kinzinger U, Schierstedt D, Verspohl EJ. The effect of thyme extract on  $\beta_2$ -receptors and mucociliary clearance. *Planta Med* 2007, 73: 629-635

Yin Q-H, Yan F-X, Zu X-Y, Wu Y-H, Wu X-P, Liao M-C, Deng S-W, Yin L-L, Zhuang Y-Z. Anti-proliferative and pro-apoptotic effect of carvacrol on human hepatocellular carcinoma cell line HepG-2. *Cytotechnol* 2012, 64: 43-51

Yürütümen A, Hocaoglu N, Ersel M, Özsaraç M, Kiyan S. Acute hepatitis associated with *Thymus Vulgaris* oil ingestion: Case report. *Turk Acil Tip Dergisi* 2011, 11: 68-71(Abstract)

Zani F, Massimo G, Benvenuti S, Bianchi A, Albasini A, Melegari M, Vampa G, Bellotti A, Mazza P. Studies on the genotoxic properties of essential oils with *Bacillus subtilis* rec-Assay and *Salmonella* Microsome Reversion Assay. *Planta Med* 1991, 57: 237-241

**References used but not cited in the Assessment report:**

Basch E, Ulbricht C, Hamneress P, Bevins A, Sollars D, Thyme (*Thymus vulgaris* L.), thymol. J Herb Pharmacother. 2004, 4: 49 – 67

Deans SG, Ritchie G. Antibacterial properties of plant essential oils. Int J Food Micro 1987, 5: 165–180

Hänsel R, Sticher O, Pharmakognosie – Phytopharmazie. Springer, Heidelberg, 2007