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List of references supporting the assessment of *Zingiber officinale* Roscoe, rhizoma

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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.

Abdel-Aziz H, Nahrstedt A, Petereit F, Windeck T, Ploch M, Verspohl EJ. 5-HT₃ receptor blocking activity of arylalkanes isolated from the rhizome of *Zingiber officinale*. *Planta Med* 2005, 71: 609-616.

Abdel-Aziz H, Windeck T, Ploch M, Verspohl EJ. Mode of action of gingerols and shagaols on 5-HT₃ receptors: binding studies, cation uptake by the receptor channel and contraction of isolated guinea-pig ileum. *Eur J Pharmacol* 2006, 530: 136-143.

Adanlawo IG, Dairo FAS. Nutrient and anti-nutrient constituents of ginger (*Zingiber officinale*, Roscoe) and the influence of its ethanolic extract on some serum enzymes in albino rats. *Int J Biol Chem* 2007, 1: 38-46.

Aeschbach R, Löliger J, Scott BC, Murcia A, Butler J, Halliwell N, Aruoma OI. Antioxidant actions of thymol, carvacrol, 6-gingerol, zingerone and hydroxytyrosol. *Food Chem Toxicol* 1994, 32: 31-36.

Afzal M, Al-Hadidi D, Menon M, Pasek J, Dhami MSI. Ginger: An ethnomedical, chemical and pharmacological review. *Drug metabolism and drug interactions* 2001, 18:159-190.

Agarwal V, Lal P, Pruthi V. Prevention of *Candida albicans* biofilm by plant oils. *Mycopathol* 2008, 165: 13-19.

Ahmad I, Zahin M, Aqil F, Hasan S, Khan MSA, Owais M. Bioactive compounds from *Punica granatum*, *Curcuma longa* and *Zingiber officinale*. *Drugs of the future* 2008, 33: 329-346.

Ahmed RS, Seth V, Pasha ST, Banerjee BD. Influence of dietary ginger (*Zingiber officinalis* Rosc) on oxidative stress induced by malathion in rats. *Food Chem Toxicol* 2000, 38: 443-450.



- Ahmed RS, Suke SG, Seth V, Chakraborti A, Tripathi AK, Banerjee BD. Protective effects of dietary ginger (*Zingiber officinalis* Rosc.) on lindane-induced oxidative stress in rats. *Phytother Res* 2008, 22: 902-906.
- Ahui MLB, Champy P, Ramadan A, Van LP, Araujo L, Andre KB, Diem S, Damotte D, Kati-Coulibaly S, Offoumou MA, Dy M, Thieblemont N, Herbelin A. Ginger prevents TH2-mediated immune responses in a mouse model of airway inflammation. *Intern Immunopharmacol* 2008, 8: 1626-1632.
- Aimbire F, Penna SC, Rodrigues M, Rodrigues KC, Lopes-Martins RAB, Sertie JAA. Effect of hydroalcoholic extract of *Zingiber officinalis* rhizomes on LPS-induced rat airway hyperreactivity and lung inflammation. *Prostaglandin Leukot Essent Fatty Acids* 2007, 77: 129-138.
- Ajith TA, Hema U, Aswathy MS. *Zingiber officinale* Roscoe prevents acetaminophen-induced acute hepatotoxicity by enhancing hepatic antioxidant status. *Food Chem Toxicol* 2007a, 45: 2267-2272.
- Ajith TA, Hema U, Aswathy MS. *Zingiber officinale* Roscoe alone and in combination with α -tocopherol protect the kidney against cisplatin-induced acute renal failure. *Food Chem Toxicol* 2007b, 45: 921-927.
- Ajith TA, Aswathy MS, Hema U. Protective effect of *Zingiber officinale* Roscoe against anticancer drug doxorubicin-induced acute nephrotoxicity. *Food Chem Toxicol* 2008, 46: 3178-3181.
- Akhani SP, Vishwakarma SL, Goyal RK. Anti-diabetic activity of *Zingiber officinale* in streptozotocin-induced type I diabetic rats. *J Pharm Pharmacol* 2004, 56: 101-105.
- Ali BH, Blunden G, Tanira MO, Nemmar A. Some phytochemical, pharmacological and toxicological properties of ginger (*Zingiber officinale* Roscoe): a review of recent research. *Food Chem Toxicol* 2008, 46: 409-420.
- Alnaqeeb MA, Thomson M, Al-Qattan KK, Kamel F, Mustafa T, Ali M. Biochemical and histopathological toxicity of an aqueous extract of ginger. *Kuwait J Sci Eng* 2003, 30: 35-48.
- Al-Zubairi AS, Abdul AB, Syam MM. Evaluation of the genotoxicity of zerumbone in cultured human peripheral blood lymphocytes. *Toxicol In Vitro* 2010, Feb 1.
- Alizadeh-Navaei R, Roozbeh F, Saravi M, Pouramir M, Jalali F, Moghadamnia AA. Investigation of the effect of ginger on lipid levels. A double blind controlled clinical trial. *Saudi M J* 2007, 29: 1280-1284.
- Altman RD, Marcussen KC. Effects of a ginger extract on knee pain in patients with osteoarthritis. *Arthritis Rheum* 2001, 44: 2531-2538.
- Amin A, Hamza AA, Kambal A, Daoud S. Herbal extracts counteract cisplatin-mediated cell death in rat testis. *Asian J Androl* 2008, 10: 291-297.
- Apariman S, Ratchanon S, Wiriyaasirivej B. Effectiveness of ginger for prevention of nausea and vomiting after gynecological laparoscopy. *J Med Assoc Thai* 2006, 89: 2003-2009.
- Arfeen Z, Owen H, Plummer JL, Ilsley AH, Sorby-Adams RAC, Doecke CJ. A double-blind randomized controlled trial of ginger for the prevention of postoperative nausea and vomiting. *Anaesth Intens Care* 1995; 23: 449-52.
- Awang DVC. Ginger. *Can Pharm J* 1992, 225: 309-311.
- Ayurvedic Pharmacopoeia of India 2009, 1st edition, vol 1:103-104.
- Ayurvedic Pharmacopoeia of India 2009, 1st edition, vol 2:12-13.
- Barnes J, Anderson LA, Phillipson JD. Herbal medicines, third ed. London - Chicago, Pharmaceutical Press 2007: 293-298.

Backon J. Ginger in preventing nausea and vomiting of pregnancy: a caveat due to its thromboxane synthetase activity and effect on testosterone binding. *Eur J Obstet Gynecol Reproduct Biol* 1991, 42: 163.

Betz O, Kranke P, Geldner G, Wulf H, Eberhart LHJ. Ist Ingwer ein klinisch relevantes Antiemetikum? Eine systematische Übersicht randomisierter kontrollierter Studien. *Forsch Kompl Klass Naturheilk* 2005, 12: 14-23.

Bhandari U, Sharma JN, Zafar R. The protective action of ethanolic ginger (*Zingiber officinale*) extract in cholesterol fed rabbits. *J Ethnopharmacol* 1998, 61: 167-171.

Bhandari U, Kanojia R, Pillai KK. Effect of ethanolic extract of *Zingiber officinale* on dyslipidaemia in diabetic rats. *J Ethnopharmacol* 2005, 97: 227-230.

Bhattarai S, Tran VH, Duke CC. Stability of [6]-gingerol and [6]-shagaol in simulated gastric and intestinal fluids. *J Pharm Biomed Anal* 2007, 45: 648-653.

Bliddal H, Rosetzky A, Schlichting P, Weidner MS, Andersen LA, Ibfelt H-H, Christensen K, Jensen ON, Barslev J. A randomized, placebo-controlled, cross-over study of ginger extracts and ibuprofen in osteoarthritis. *Osteoarthritis Cartilage* 2000, 8: 9-12.

Blumenthal M, , editor. The Complete German Commission E Monographs. American Botanical Council, Austin, Texas 1998: 135-136.

Bode AM, Ma W-Y, Surh Y-J, Dong Z. Inhibition of epidermal growth factor-induced cell transformation and activator protein 1 activation by [6]-gingerol. *Cancer Res* 2001, 61:850-853.

Bone K. Ginger. *Br J Phytother* 1997, 4:110-120.

Bone ME, Wilkinson DJ, Young JR, McNeil J, Charlton S. Ginger root – a new antiemetic. The effect of ginger root on postoperative nausea and vomiting after major gynecological surgery. *Anaesthesia* 1990, 45: 669-671.

Bordia A, Verma SK, Srivastava KC. Effect of ginger (*Zingiber officinale* Rosc.) and fenugreek (*Trigonella foenumgraecum* L.) on blood lipids, blood sugar and platelet aggregation in patients with coronary artery disease. *Prostagland Leukot Essent Fatty Acids* 1997, 56: 379-384.

Borelli F, Capasso R, Pinto A, Izzo AA. Inhibitory effect of ginger (*Zingiber officinale*) on rat ileal motility. *Life Sci* 2004, 74: 2889-2896.

Borelli F, Capasso R, Aviello G, Pittler MH, Izzo AA. Effectiveness and safety of ginger in the treatment of pregnancy-induced nausea and vomiting. *Obstet Gynecol* 2005, 105: 849-856.

Bradley P. Ginger - *Zingiberis* rhizome. In British herbal compendium – A handbook of scientific information on widely used plant drugs. Volume 1. Bournemouth: British Herbal Medicine Association 1992, 112-114.

British Pharmacopoeia 2008, vol III: 2740.

Brown AC, Shah C, Liu J, Pham JTH, Zhang JG, Jadus MR. Ginger's (*Zingiber officinale* Roscoe) inhibition of rat colonic adenocarcinoma cells proliferation and angiogenesis in vitro. *Phytother Res* 2009, 23: 640-645.

Careddu P. Motion sickness in children: results of a double blind study with ginger (Zintona) and dimenhydrinate. *Healthnotes Rev Complementary Integrative Med* 1999, 6: 102-107.

Chaiyakunapruk N, Kitikannakorn N, Nathisuwan S, Leeprakobboon K, Leelasettagool C. The efficacy of ginger for the prevention of postoperative nausea and vomiting: a meta-analysis. *Am J Obstet Gynecol* 2006, 194: 95-99.

Chen C-C, Ho C-T. Gas chromatographic analysis of volatile components of ginger oil (*Zingiber officinale* Roscoe) extracted with liquid carbon dioxide. *J Agric Food Chem* 1988, 36: 322-328.

Chen D, Wu CF, Huang L, Ning Z. Effects of the aqueous extract of xiao-ban-xia-tang on gastric emptying in mice. *Am J Chin Med* 2002, 30: 207-214.

Chittumna P, Kaewkiattikum K, Wiriyasiriwach B. Comparison of the effectiveness of ginger and vitamin B₆ for the treatment of nausea and vomiting in early pregnancy: a randomized double-blind controlled trial. *J Med Assoc Thai* 2007, 90: 15-20.

Chrubasik S, Pittler MH, Roufogalis BD. Zingeribis rhizome: A comprehensive review on the ginger effect and efficacy profiles. *Phytomedicine* 2005, 12: 684-701.

Chrubasik JE, Roufogalis S, Chrubasik S. Evidence of effectiveness of herbal antiinflammatory drugs in the treatment of painful osteoarthritis and chronic low back pain. *Phytother Res* 2007, 21: 675-683.

Connell DW. The chemistry of the essential oil and oleoresin of ginger (*Zingiber officinale* Roscoe). *The Flavour Industry* 1970; 1:677-693.

Dedov VN, Tran VH, Duke CC, Connor M, MacDonald JC, Mandadi S, Roufogalis BD. Gingerols: a novel class of vanilloid receptor (VR1) agonists. *Br J Pharmacol* 2002, 137: 793-798.

Desai HG, Kairo RH, Choksi AP. Effect of ginger & garlic on DNA content of gastric aspirate. *Indian J Med Res* 1990, 92: 139-141.

Dev S. Prime Ayurvedic Plant Drugs. Tunbridge Wells UK. Anshan Limited 2006, 451.

Dissabandara DLO, Chandrasekara MS. Effects of prenatal ginger rhizome extract treatment on pregnancy outcome and postnatal development of Sprague Dawley rats. *Ceylon J Med Sci* 2007, 50: 1-7.

Dorso CR, Levin RI, Eldor A, Jaffe EA, Weksler BB. Chinese food and platelets. *N Engl J Med* 1980, 303: 756-757.

Dugasani S, Pichika MR, Nadarajah VD, Balijepalli MK, Tandra S, Korlakunta JN. Comparative antioxidant and anti-inflammatory effects of [6]-gingerol, [8]-gingerol, [10]-gingerol and [6]-gingerol. *J Ethnopharmacol* 2010, 127: 515-520.

Eberhart LHJ, Mayer R, Betz O, Tzolakidis S, Hilpert W, Morin AM, Geldner G, Wulf H, Seeling W. Ginger does not prevent postoperative nausea and vomiting after laparoscopic surgery. *Anesth Analg* 2003, 96: 995-998.

Eldershaw TP, Colquhoun EQ, Dora KA, Peng ZC, Clark MG. Pungent principles of ginger (*Zingiber officinale*) are thermogenic in the perfused rat hindlimb. *Int J Obes Relat Metabol Disord* 1992, 16: 755-763.

El-Abhar HS, Hammad LNA, Gawad HAS. Modulating effect of ginger on rats with ulcerative colitis. *J Ethnopharmacol* 2008, 118: 367-372.

El-Sharaky AS, Newairy AA, Kamel MA, Eweda SM. Protective effect of ginger extract against bromobenzene-induced hepatotoxicity in male rats. *Food Chem Toxicol* 2009, 47: 1584-1590.

Ensiyeh J, Sakineh MS. Comparing ginger and vitamin B6 for the treatment of nausea and vomiting in pregnancy: a randomised controlled trial. *Midwifery* 2009, 25:649-653.

Erler J, Vostrowsky O, Strobel H, Knobloch. Über ätherische Öle des Ingwer, *Zingiber officinale* Roscoe. *Z Lebensm Unters Forsh* 1988, 186: 231-234.

Ernst E, Pittler MH. Efficacy of ginger for nausea and vomiting: a systematic review of randomized clinical trials. *Br J Anaesth* 2000, 84: 367-371.

ESCOP Monographs, The scientific foundation for herbal medicinal products, 2nd ed. Suppl. 2009, Stuttgart Thieme 2009, 289-303.

European pharmacopoeia 6th ed. Council of Europe 2009.

European pharmacopoeia 7th ed. Council of Europe 2011

Farthing JE, O'Neill MJ. Isolation of gingerols from powdered root ginger by countercurrent chromatography. *J Liq Chromat* 1990, 13: 941-950.

Ficker CE, Arnason JT, Vindas PS, Alvarez LP, Akpagana K, Gbeassor M, De Souza C, Smith ML. Inhibition of human pathogenic fungi by ethnobotanically selected plant extracts. *Mycoses* 2003, 46: 29-37.

Fischer-Rasmussen W, Kjær SK, Dahl K, Asping U. Ginger treatment of hyperemesis gravidarum. *Eur J Obstet Gynecol Repr Biol* 1990, 38: 19-24.

Flynn DL, Rafferty MF, Bector AM. Inhibition of human neutrophil 5-lipoxygenase activity by gingerdione, shogaol, capsaicin and related pungent compounds. *Prostaglandins Leukot Med* 1986, 24: 195-98.

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

Fouda A-MM, Berika MY. Evaluation of the effect of hydroalcoholic extract of *Zingiber officinale* rhizomes in rat collagen-induced arthritis. *Basic Clin Pharmacol Toxicol* 2009, 104: 261-271.

Frondoza CG, Sohrabi A, Polotsky A, Phan PV, Hungerford DS, Lindmark L. An in vitro assay for inhibitors of proinflammatory mediators in herbal extracts using human synovocyte cultures. *In Vitro Cell Dev Biol – Animal* 2004, 40: 95-101.

Fuhrman B, Rosenblat M, Hayek T, Coleman R, Aviram M. Ginger extract consumption reduces plasma cholesterol, inhibits LDL-oxidation and attenuates development of atherosclerosis in atherosclerotic, apolipoprotein E-deficient mice. *J Nutr* 2000, 130: 1124-1131.

Germer S, Franz G. Ingwer – eine vielseitige Arzneidroge. *Deutsche ApothekerZeitung* 1997, 137: 4260-4266.

Ghayur MN, Gilani AH. Pharmacological basis for the medicinal use of ginger in gastrointestinal disorders. *Dig Dis Sci* 2005a, 50: 1889-197.

Ghayur MN, Gilani AH. Ginger lowers blood pressure through blockade of voltage-dependent calcium channels. *J Cardiovasc Pharmacol* 2005b, 45: 74-80.

Ghayur MN, Gilani AH, Afridi MB, Houghton PJ. Cardiovascular effects of ginger aqueous extract and its phenolic constituents are mediated through multiple pathways. *Vasc Pharmacol* 2005, 43: 234-241.

Gonlachanvit S, Chen YH, Hasler WL, Sun WM, Owyang C. Ginger reduces hyperglycemia-evoked dysrhythmias in healthy humans: possible role of endogenous prostaglandins. *J Pharmacol Exper Ther* 2003, 307: 1098-1103.

Grzanna R, Lindmark L, Frondoza CG. Ginger – A herbal medicinal product with broad anti-inflammatory actions. *J Med Food* 2005; 8:125-32. Grøntved A, Hentzer E. Vertigo-reducing effect of ginger root. A controlled clinical study. *ORL* 1986, 48: 282-286.

Grøntved A, Brask T, Kambskard J, Hentzer E. Ginger root against seasickness. A controlled trial on the open sea. *Acta Otolaryngol* 1988, 105: 45-49.

Guh J-H, Ko F-N, Jomg T-T, Teng C-M. Antiplatelet effect of gingerol isolated from *Zingiber officinale*. *J Pharm Pharmacol* 1995, 47: 329-332.

Gupta YK, Sharma M. Reversal of pyrogallol-induced delay in gastric emptying in rats by ginger (*Zingiber officinale*). *Methods Find Exp Clin Pharmacol* 2001, 23: 501-503.

Habib SHM, Makpol S, Hamid NAA, Das S, Ngah WZWN, Yusof YAM. Ginger extract (*Zingiber officinale*) has anti-cancer and anti-inflammatory effects on ethionine-induced hepatoma rat cells. *Clinics* 2008, 63: 807-813.

Haghigi M, Khalvat A, Toliati T, Jallaei S. Comparing the effects of ginger (*Zingiber Officinale*) extract and ibuprofen on patients with osteoarthritis. *Arch Iranian Med* 2005, 8: 267-271.

Haksar A, Sharma A, Chawla R, Kumar R, Arora R, Singh S, Prasad J, Gupta M, Tripathi RP, Arora MP, Islam F, Sharma RK. *Zingiber officinale* exhibits behavioral radioprotection against radiation-induced CTA in a gender-specific manner. *Pharmacol Biochem Behav* 2006, 84: 179-188.

Harpestreng H. Liber herbarum ca. 1200 (Hauberg P. Henrik Harpestreng, Liber herbarum, København 1936).

Hashimoto K, Satoh K, Murata P, Makino B, Salakibara I, Kase Y, Ishige A, Higuchi M, Sasaki H. Component of *Zingiber officinale* that improves the enhancement of small intestinal transport. *Planta Med* 2002, 68: 936-939.

Heimes K, Feistel B, Verspohl EJ. Impact of the 5-HT₃ receptor channel system for insulin secretion and interaction of ginger extracts. *Eur J Pharmacol* 2009, 624: 58-65.

Henry CJK, Piggott SM. Effect of ginger on metabolic rate. *Hum Nutr Clin Nutr* 1987, 41C: 89-92.

Holtmann S, Clarke AH, Scherer H, Höhn M. The anti-motion sickness mechanism of ginger. *Acta Otolaryngol* 1989, 108: 168-174.

Imanishi N, Mantani N, Sakai S, Sato M, Katada Y, Ueda K, Terasawa K, Ochiai H. Inducible activity of ginger rhizome (*Zingiber officinale* Rosc.) on the mRNA expression of macrophage-inducible nitric acid (NO) synthase and NO production in a macrophage cell line, RAW264.7 cells. *Am J Chin Med* 2004, 32: 727-735.

Imbesi A. Index plantarum. Messina 1964, 710.

Indian Herbal Pharmacopoeia, Revised new edition, Mumbai: Indian drug manufacturer's association 2002: 479-490.

Indian Pharmacopoeia vol 3. The Indian Pharmacopoeia Commission, Ghaziabad 2007, 2067-2068.

Ippoushi K, Azuma K, Ito H, Horie H, Higashio H. [6]-gingerol inhibits nitric oxide synthesis in activated J774.1 mouse macrophages and prevents peroxynitrite-induced oxidation and nitration reactions. *Life Sci* 2003, 73: 3427-3437.

Isa Y, Miyakawa Y, Yanagisawa M, Goto T, Kang M-S, Kawada T, Morimitsu Y, Kubota K, Tsuda T. 6-shagaol and 6-gingerol, the pungent of ginger, inhibit TNF- α mediated downregulation of adiponectin

expression via different mechanisms in 3T3-L1 adipocytes. *Biochem Biophys Res Com* 2008, 373: 429-434.

Ishiguro K, Ando T, Maeda O, Ohmiya N, Niwa Y, Kadomatsu K, Goto H. Ginger ingredients reduce viability of gastric cancer cells via distinct mechanisms. *Biochem Biophys Res Comm* 2007, 362: 218-223.

Jagetia G, Baliga M, Venkatesh P. Ginger (*Zingiber officinale* Rosc.), a dietary supplement, protects mice against radiation-induced lethality: mechanism of action. *Cancer Biother Radiopharm* 2004, 19: 422-435.

Janssen PLTMK, Meyboom S, van Staveren WA, de Vegt F, Katan MB. Consumption of ginger (*Zingiber officinale* Roscoe) does not affect *ex vivo* platelet thromboxane production in humans. *Eur J Clin Nutr* 1996, 50: 772-774.

Jeong C-H, Bode AM, Pugliese A, Cho Y-Y, Kim H-G, Shim J-H, Jeon Y-J, Li H, Jiang H, Dong Z. [6]-gingerol suppresses colon cancer growth by targeting leukotriene A₄ hydrolase. *Cancer Res* 2009, 69: 5584-5591.

Jewell D, Young G. Interventions for nausea and vomiting in early pregnancy. *Cochrane Database Syst Rev* 2003, CD 000145.

Jiang X, Williams KM, Liauw WS, Ammit AJ, Roufogalis BD, Duke CC, Day RO, McLachlan AJ. Effect of ginkgo and ginger on the pharmacokinetics and pharmacodynamics of warfarin in healthy subjects. *Br J Clin Pharmacol* 2005, 59: 425-532.

Jiang S, Wang N, Mi S. Plasma pharmacokinetics and tissue distribution of [6]-gingerol in rats. *Biopharm Drug Dispos* 2008, 29: 529-537.

Jitoe A, Masuda T, Tengah IGP, Suprpta DN, Gara IW, Nakatani N. Antioxidant activity of tropical ginger extracts and analysis of the contained curcuminoids. *J Agricult Food Chem* 1992, 40: 1337-1340.

Jolad SD, Lantz RC, Solyom AM, Chen GJ, Bates RB, Timmermann BN. Fresh organically grown ginger (*Zingiber officinale*): composition and effects on LPS-induced PGE2 production. *Phytochemistry* 2004, 65: 1937-1954.

Jolad SD, Lantz RC, Chen GJ, Bates RB, Timmermann BN. Commercially processed dry ginger (*Zingiber officinale*): Composition and effects on LPS-stimulated PGE2 production. *Phytochemistry* 2005, 66: 1614-1635.

Jung HW, Toon C-H, Park KM, Han HS, Park Y-K. Hexane fraction of *Zingiberis Rhizoma* Crudud extract inhibits the production of nitric oxide and proinflammatory cytokines in LPS-stimulated BV2 microglial cells via the NF-kappaB pathway. *Food Chem Toxicol* 2009, 47: 1190-1197.

Kamtchouing P, Fandio GYM, Dimo T, Jatsa HB. Evaluation of androgenic activity of *Zinger officinale* and *Pentadiplandra Brazzeana* in male rats. *Asian J Androl* 2002, 4: 299-301.

Kapoor LD. Handbook of Ayurvedic Medicinal Plants. Boca Raton, Florida, CRC Press 1990: 341-342.

Kar A, Choudhary BK, Bandyopadhyay NG. Comparative evaluation of hypoglycaemic activity of some Indian medicinal plants in alloxan diabetic rats. *J Ethnopharmacol* 2003, 84: 105-108.

Katiyar SK, Agarwal R, Mukhtar H. Inhibition of tumor promotion in SENCAR mouse skin by ethanol extract of *Zingiber officinale* rhizome. *Cancer Res* 1996, 56: 1023-1030.

Keating A, Chez RA. Ginger syrup as an antiemetic in early pregnancy. *Altern Ther* 2002, 8: 89-91.

- Kim E-C, Min J-K, Kim T-Y, Lee S-J, Yang H-O, Han S, Kim Y-M, Kwon Y-G. 6-gingerol, a pungent ingredient of ginger, inhibits angiogenesis in vitro and in vivo. *Biochem Biophys Res Comm* 2005, 335: 300-308.
- Kim J-K, Kim Y, Na K-M, Surh Y-J, Kim T-Y. [6]-gingerol prevents UVB-induced ROS production and COX-2 expression *in vitro* and *in vivo*. *Free Rad Res* 2007, 41: 603-614.
- Koch C, Reichling J, Schnee J, Schnitzler P. Inhibitory effect of essential oils against herpes simplex virus type 2. *Phytomedicine* 2008, 15: 71-78.
- Koo KLK, Ammit AJ, Tran VH, Duke CC, Roufogalis BD. Gingerols and related analogues inhibit arachidonic acid-induced human platelet serotonin release and aggregation. *Thromb Res* 2001, 103: 387-397.
- Krüth P, Brosi E, Fux R, Mörike K, Gleiter CH. Ginger-associated overanticoagulation by phenprocoumon. *Ann Pharmacother* 2004, 38: 257-260.
- Langner E, Greifenberg S, Gruenwald J. Ginger: History and use. *Advances in Therapy* 1998; 15:25-44.
- Lantz RC, Chen GJ, Sarihan M, Solyom AM, Jolad SD, Timmermann BN. The effect of extracts from ginger rhizome on inflammatory mediator production. *Phytomedicine* 2007, 14: 123-128.
- Lawrence BM. Major tropical spices – Ginger (*Zingiber officinale* Rosc.). *Perfumer and Flavorist* 1984, 9:1-40.
- Leach MJ, Kumar S. The clinical effectiveness of ginger (*Zingiber officinale*) in adults with osteoarthritis. *Int J Evidence-based Healthcare* 2008, 6: 311-320.
- Lee E, Surh Y-J. Induction of apoptosis in HL-60 cells by pungent vanilloids, [6]-gingerol and [6]-paradol. *Cancer Lett* 1998, 134: 163-168.
- Lee S-H, Cekanova M, Baek SJ. Multiple mechanisms are involved in 6-gingerol-induced cell growth arrest and apoptosis in human colorectal cancer cells. *Mol Carcinogenesis* 2008, 47: 197-208.
- Lesho EP, Saullo L, Udvari-Nagy S. A 76-year-old woman with erratic anticoagulation. *Cleve Clin J Med* 2004, 71: 651-656.
- Lien H-C, Sun WM, Chen Y-H, Kim H, Hasler W, Owyang C. Effects of ginger on motion sickness and gastric slow-wave dysrhythmias induced by circularvection. *Am J Physiol Gastrointest Liver Physiol* 2003, 284: G481-489.
- Lohsirawat S, Rukkiat M, Chaikomin R, Leelakusolvong S. Effect of ginger on lower esophageal sphincter pressure. *J Med Assoc Thai* 2010, 93: 366-372.
- Lumb AB. Effect of dried ginger on human platelet function. *Thromb Haemost* 1994, 71: 110-111.
- Madaus G. Lehrbuch der biologischen Heilmittel vol III, G. Olms Verlag, Hildesheim 1938: 2857-61.
- Mahady GB, Pendland SL, Yun GS, Lu Z-Z, Stoia A. Ginger (*Zingiber officinale* Roscoe) and the gingerols inhibit the growth of Cag A+ strains of *Helicobacter pylori*. *Anticancer Res* 2003, 23: 3699-3702.
- Mahady GB, Pendland SL, Stoia A, Hamill FA, Fabricant D, Dietz BM, Chadwick LR. In vitro susceptibility of *Helicobacter pylori* to botanical extracts used traditionally for the treatment of gastrointestinal disorders. *Phytother Res* 2005, 19: 988-991.
- Mallikarjuna K, Chetan PS, Reddy KS, Rajendra W. Ethanol toxicity: Rehabilitation of hepatic antioxidant defense system with dietary ginger. *Fitoterapia* 2008, 79: 174-178.

- Manusirivithaya S, Sripramote M, Tangjitgamol S, Sheanakul C, Leelahakorn S, Thavaramara T, Tangcharoenpanich K. Antiemetic effect of ginger in gynecologic oncology patients receiving cisplatin. *Int J Gynecol Cancer* 2004, 14: 1063-1069.
- Martindale 2009. Sweetman SC. Martindale: The complete drug reference 2009, 36: 1732-3.
- Masuda Y, Kikuzaki H, Hisamoto M, Nakatani N. Antioxidant properties of gingerol related compounds from ginger. *Biofactors* 2004, 21: 293-296.
- Mehrdad M, Messripour M, Ghobadipour M. The effect of ginger extract on blood urea nitrogen and creatinine in mice. *Pakistan J Biol Sci* 2007, 10: 2968-2971.
- Meyer K; Schwarz J, Crater D, Keyes B. Zingiber officinale (ginger) used to prevent 8-Mop associated nausea. *Dermatology Nursing* 1997, 7: 242-244.
- Micklefield GH, Redeker Y, Meister V, Jung O, Greving I, May B. Effects of ginger on gastroduodenal motility. *Intern J Clin Pharmacol Ther* 1999, 37: 341-346.
- Mills SY, Bone K. Principles and Practice of Phytotherapy. Edinburgh, Churchill Livingstone 2000: 394-403.
- Mills SY in Evans WC. Trease and Evans Pharmacognosy 15th edition. Edinburgh, WB Saunders 2002: 482-487.
- Morin AM, Betz O, Kranke P, Geldner G, Wulf H, Eberhart LHJ. Ist Ingwer ein sinnvolles Antiemetikum für die postoperative Phase? *Anästhesiol Intensivmed Notfallmed Schmerzther* 2004, 39: 281-285.
- Mowrey DB, Clayson DE. Motion sickness, ginger, and psychophysics. *Lancet* 1982, i: 655-657.
- Mustafa T, Srivastava KC. Ginger (*Zingiber officinale*) in migraine headache. *J Ethnopharmacol* 1990, 29: 267-273.
- Nabekura T, Kamiyama S, Kitagawa S. Effects of dietary chemopreventive phytochemicals on P-glycoprotein function. *Biochem Biophys Res Comm* 2005, 327: 866-870.
- Nagabushan M, Bhide SV. Mutagenicity of chili extract and capsaicin in short-term trials. *Environ Mutagen* 1985, 7: 881-888.
- Nagabhushan M, Amonkar AJ, Bhide SV. Mutagenicity of gingerol and shagaol and antimutagenicity of zingerone in salmonella/microsome assay. *Cancer Lett* 1987, 36: 221-233.
- Nagoshi C, Shiota S, Kuroda T, Hatano T, Yoshida T, Kariyama R, Tsuchiya T. Synergistic effect of [10]-gingerol and aminoglycosides against vancomycin-resistant enterococci (VRE). *Biol Pharm Bull* 2006, 29: 443-447.
- Nakamura H, Yamamoto T. Mutagen and antimutagen in ginger *Zingiber officinale*. *Mutat Res* 1982, 103: 119-126.
- Nakamura H, Yamamoto T. The active part of the [6]-gingerol molecule in mutagenesis. *Mutat Res* 1983, 122: 87-94.
- Nale R, Bhawe S, Divekar DS. A comparative study of ginger and other routinely used antiemetics for prevention of post operative nausea and vomiting. *J Anaesth Clin Pharmacol* 2007, 23: 405-410.
- Nammi S, Kim MS, Gavande NS, Li GQ, Roufogalis BD. Regulation of low-density lipoprotein receptor and 3-hydroxy-3-methylglutaryl coenzyme A reductase expression by *Zingiber officinale* in the liver of high-fat diet-fed rats. *Basic Clin Pharmacol Toxicol* 2009a [Epub ahead of print].

Nammi S, Sreemantula S, Roufogalis BD. Protective effect of ethanolic extract of *Zingiber officinale* rhizome on the development of metabolic syndrome in high-fat diet-fed rats. *Basic Clin pharmacol Toxicol* 2009b, 104: 366-373.

Nanjundaiah SM, Annaiah HNM, Dharmesh SM. Gastroprotective effect of ginger rhizome (*Zingiber officinale*) extract: Role of gallic acid and cinnamic acid in H⁺,K⁺-ATPase/*H. pylori* inhibition and anti-oxidative mechanism. *eCAM Advance Access*, July 1, 2009; doi:10.1093/ecam/nep060.

Nanthakomon T, Pongrojpan D. The efficacy of ginger in prevention of postoperative nausea and vomiting after major gynecologic surgery. *J Med Assoc Thai* 2006, 89(Suppl 4): 130-136.

Narita M, Hatano E, Tamaki N, Yamanaka K, Yanagida A, Nagata H, Asechi H, Takada Y, Ikai I, Uemoto S. Dai-kenchu-to attenuates rat sinusoidal obstruction syndrome by inhibiting the accumulation of neutrophils in the liver. *J Gastroenterol Hepatol* 2009, 24: 1951-1057.

Nie H, Meng L-Z, Zhang H, Yin Z, Huang X-S. Analysis of anti-platelet aggregation components of *Rhizoma Zingiberis* using chicken thrombocyte extract and high performance liquid chromatography. *Chin Med J* 2008, 121: 1226-1229.

Nirmala K, Krishna TP, Polasa K. *In vivo* Antimutagenic potential of ginger in the formation and excretion of urinary mutagens in rats. *Int J Cancer Res* 2007, 3: 134-142.

Nirmala K, Krishna TP, Polasa K. Modulation of xenobiotic metabolism in ginger (*Zingiber officinale* Roscoe) fed rats. *Int J Nutr Metabol* 2010, 2: 56-62.

Nostro A, Cellini L, Di Bartolomeo S, Di Campli E, Grande R, Cannatelli MA, Marzio L, Alonzo V. Antibacterial effect of plant extracts against *Helicobacter pylori*. *Phytother Res* 2005, 19: 198-202.

Nostro A, Cellini L, Di Bartolomeo S, Cannatelli MA, Di Campli E, Procopio F, Grande R, Marzio L, Alonzo V. Effects of combining extracts (from propolis or *Zingiber officinale*) with clarithromycin on *Helicobacter pylori*. *Phytother Res* 2006, 20: 187-190.

Nurtjahja-Tjendraputra E, Ammit AJ, Roufogalis BD, Tran VH, Duke CC. Effective anti-platelet and COX-1 enzyme inhibitors from pungent constituents of ginger. *Thromb Res* 2003, 111: 259-265.

Ojewole JAO. Analgesic, antiinflammatory and hypoglycaemic effects of ethanol extract of *Zingiber officinale* (Roscoe) rhizomes (*Zingiberaceae*) in mice and rats. *Phytother Res* 2006, 20: 764-772.

Okonta JM, Uboh M, Obonga WO. Herb-drug interaction: a case study of effect of ginger on the pharmacokinetic of metronidazole in rabbit. *Indian J Pharm Sci* 2008, 70: 230-232.

Ozgoli G, Goli M, Simbar M. Effects of ginger capsules on pregnancy, nausea and vomiting. *J Altern Compl Med* 2009a, 15: 243-246.

Ozgoli G, Goli M, Moattar F. Comparison of effects of ginger, mefenamic acid, and ibuprofen on pain in women with primary dysmenorrhea. *J Altern Compl Med* 2009b, 15: 129-132.

Pan M-H, Hsieh M-C, Hsu P-C, Ho S-T, Lai C-S, Wu H, Sang S, Ho C-T. 6-shogaol suppressed lipopolysaccharide-induced up-expression of iNOS and COX-2 in murine macrophages. *Mol Nutr Food Res* 2008, 52: 1467-1477.

Park K-K, Chun K-S, Lee J-M, Lee SS, Surh Y-J. Inhibitory effects of [6]-gingerol, a major pungent principle of ginger, on phorbol ester-induced inflammation, epidermal ornithine decarboxylase activity and skin tumor promotion in ICR mice. *Cancer Lett* 1998, 129: 139-144.

Park M, Bae J, Lee D-S. Antibacterial activity of [10]-gingerol and [12]-gingerol isolated from ginger rhizome against periodontal bacteria. *Phytother Res* 2008, 22: 1446-1449.

- Penna SC, Medeiros MV, Aimbire FSC, Faria-Neto HCC, Sertie JAAA, Lopes-Martins RAB. Anti-inflammatory effect of the hydroalcoholic extract of *Zingiber officinale* rhizomes on rat paw and skin edema. *Phytomedicine* 2003, 10: 381-385.
- Phan PV, Sohrabi A, Polotsky A, Hungerford DS, Lindmark L, Frondoza CG. Ginger extract components suppress induction of chemokine expression in human synoviocytes. *J Altern Compl Med* 2005, 11: 149-154.
- Pharmacopoeia of the People's Republic of China vol 1. People's Medical Publishing House 2005: 280-281.
- Pharmacopoeia Danica 1772: 27.
- Phillips S, Hutchinson S, Ruggier R. *Zingiber officinale* does not affect gastric emptying rate. *Anaesthesia* 1993, 48: 393-395.
- Pillai AK, Sharma KK, Gupta YK, Bakhshi S. Anti-emetic effect of ginger powder versus placebo as an add-on therapy in children and young adults receiving high emetogenic chemotherapy. *Pediatr Blood Cancer* 2011, 56: 234-238.
- Pongrojapaw D, Somprasit C, Chanthasenanont A. A randomized comparison of ginger and dimenhydrinate in the treatment of nausea and vomiting in pregnancy. *J Med Assoc Thai* 2007, 90: 1703-1709.
- Portnoi G, Chng L-A, Karimi-Tabesh L, Koren G, Tan MP, Einarson A. Prospective comparative study of the safety and effectiveness of ginger for the treatment of nausea and vomiting in pregnancy. *Am J Obstet Gynecol* 2003, 189: 1374-1377.
- Reddy AC, Lokesh BR. Studies on spice principles as antioxidants in the inhibition of lipid peroxidation in rat liver microsomes. *Mol Cell Biochem* 1992, 111: 117-14.
- Rhode J, Fogoros S, Zick S, Wahl H, Griffith KA, Huang J, Liu JR. Ginger inhibits cell growth and modulates angiogenic factors in ovarian cancer cells. *BMC Compl Altern Med* 2007, 7: 44.
- Rong X, Peng G, Suzuki T, Yang Q, Yamahara J, Li Y. A 35-day gavage safety assessment of ginger in rats. *Reg Toxicol Pharmacol* 2009, 54: 118-123.
- Rosenbaum CC, O'Mathuna DP, Chavez M, Shields K. Antioxidants and antiinflammatory dietary supplements for osteoarthritis and rheumatoid arthritis. *Altern Ther Health Med* 2010, 16: 32-40.
- Rouhi H, Ganji F, Nasri H. Effects of ginger on the improvement of asthma (The evaluation of its treatment effects). *Pakistan J Nutr* 2006, 5: 373-376.
- Sanderson L, Bartlett A, Whitfield PJ. *In vitro* and *in vivo* studies on the bioactivity of a ginger (*Zingiber officinale*) extract towards adult schistosomes and their egg production. *J Helminth* 2002, 76: 241-247.
- Sang S, Hong J, Wu H, Liu J, Yang CS, Pan M-H, Badmaev V, Ho C-T. Increased growth inhibitory effects on human cancer cells and anti-inflammatory potency of shogaols from *Zingiber officinale* relative to gingerols. *J Agric Food Chem* 2009, 57: 10645-10650.
- Schmid R, Schick T, Steffen R, Tschopp, Wilk T. Comparison of seven commonly used agents for prophylaxis of seasickness. *J Travel Med* 1994, 1: 203-206.
- Schnitzler P, Koch C, Reichling J. Susceptibility of drug-resistant clinical herpes simplex virus type 1 strains to essential oils of ginger, thyme, hyssop, and sandalwood. *Antimicrob Agents Chem* 2007, 51: 1859-1862.

Shalansky S, Lynd L, Richardson K, Ingaszewski, Kerr C. Risk of warfarin-related bleeding events and supratherapeutic international normalized ratios associated with complementary and alternative medicine: a longitudinal analysis. *Pharmacotherapy* 2007, 27: 1237-1247.

Shariatpanahi ZV, Taleban FA, Mokhtari M, Shahbazi S. Ginger extract reduces delayed gastric emptying and nosocomial pneumonia in adult respiratory distress syndrome patients hospitalized in an intensive care unit. *J Crit Care* 2010 Febr 9 [Epub ahead of print].

Sharma JN, Srivastava KC, Gan EK. Suppressive effects of eugenol and ginger oil in arthritic rats. *Pharmacology* 1994, 49: 314-318.

Sharma SS, Gupta YK. Reversal of cisplatin-induced delay in gastric emptying in rats by ginger (*Zingiber officinale*). *J Ethnopharmacol* 1998, 62: 49-55.

Sharma A, Haksar A, Chawla R, Kumar R, Arora R, Singh S, Prasad J, Islam F, Arora MP, Sharma RK. *Zingiber officinale* Rosc. modulates gamma radiation-induced conditioned taste aversion. *Pharmacol Biochem Behav* 2005, 81: 864-870.

Shibata C, Sasaki I, Naito H, Ueno T, Matsuno S. The herbal medicine Dai-Kenchu-Tou stimulates upper gut motility through cholinergic and 5-hydroxytryptamine 3 receptors in conscious dogs. *Surgery* 1999, 126: 918-924.

Shukla Y, Singh M. Cancer preventive properties of ginger: A brief review. *Food Chem Toxicol* 2007, 45: 683-690.

Shukla Y, Prasad S, Tripathi C, Singh M, George J, Kalra N. *In vitro* and *in vivo* modulation of testosterone mediated alterations in apoptosis related proteins by [6]-gingerol. *Mol Nutr Food Res* 2007, 51: 1492-1502.

Siddaraju MN, Dharmesh SM. Inhibition of gastric H⁺,K⁺-ATPase and *Helicobacter pylori* growth by phenolic antioxidants of *Zingiber officinale*. *Mol Nutr Food Res* 2007, 51: 324-332.

Singh G, Kapoor IPS, Singh P, de Heluani CS, de Lampasona MP, Catalan CAN, Chemistry, antioxidant and antimicrobial investigations on essential oil and oleoresins of *Zingiber officinale*. *Food Chem Toxicol* 2008, 46: 3295-3302.

Sivaswami SN, Balachandran B, Balanehr S, Sivaramakrishnan VM. Mutagenic activity of South Indian food items. *Indian J Exper Toxicol* 1991, 29: 730-737.

Smith C, Crowther C, Willson K, Hotham N, McMillian V. A randomized controlled trial of ginger to treat nausea and vomiting in pregnancy. *Obstet Gynecol* 2004, 103: 639-645.

Sontakke S, Thawani V, Naik MS. Ginger as an antiemetic in nausea and vomiting induced by chemotherapy: a randomized, cross-over, double blind study. *Indian J Pharmacol* 2003, 35: 32-36.

Soudamini KK, Unnikrishnan MC, Sukumaran K, Kuttan R. Mutagenicity and anti-mutagenicity of selected spices. *Indian J Physiol Pharmacol* 1995, 39: 347-353.

Sripamote M, Lekhyananda N. A randomized comparison of ginger and vitamin B6 in the treatment of nausea and vomiting of pregnancy. *J Med Assoc Thai* 2003, 86: 846-853.

Srivastava KC. Aqueous extracts of onion, garlic and ginger inhibit platelet aggregation and alter arachidonic acid metabolism. *Biomed Biochem Acta* 1984, 8/9: 335-346.

Srivastava KC. Isolation and effects of some ginger components on platelet aggregation and eicosanoid biosynthesis. *Prostaglandins Leukot Essent Fatty Acids* 1986, 25: 187-198.

Srivastava KC. Effect of onion and ginger consumption on platelet thromboxane production in humans. *Prostaglandins Leukot Essent Fatty Acids* 1989, 35: 183-185.

Srivastava KC, Mustafa T. Ginger (*Zingiber officinale*) in rheumatism and musculoskeletal disorders. *Med Hypothes* 1992, 39: 342-348.

Steinegger E, Stucki K. Trennung und quantitative Bestimmung der Hauptscharfstoffe von Zingiberis rhizome mittels kombinierter DC/HPLC. *Pharm Acta Helv* 1982, 57: 66-71.

Stewart JJ, Wood MJ, Wood CD, Mims ME. Effects of ginger on motion sickness susceptibility and gastric function. *Pharmacol* 1991, 42: 111-120.

Suekawa M, Ishige A, Yuasa K, Sudo K, Aburada M, Hosoya E. Pharmacological studies on ginger. I. Pharmacological actions of pungent constituents, (6)-gingerol and (6)-shagaol. *J Pharm Dyn* 1984, 7: 836-848.

Sunderland J, Miles M, Hedderley D, Li J, Devoy S, Sutton K, Lauren D. In vitro effects of food extracts on selected probiotic and pathogenic bacteria. *Intern J Food Sci Nutr* 2009, 60: 717-727.

Suzuki F, Kobayashi M, Komatsu Y, Kato A, Pollard RB. Keishi-Ka-Kei-To, a traditional Chinese herbal medicine, inhibits pulmonary metastasis of B16 melanoma. *Anticancer Res* 1997, 17: 873-878.

Tavlan A, Tuncer S, Erol A, Reisli R, Aysolmaz G, Otelcioglu S. Prevention of postoperative nausea and vomiting after thyroidectomy. *Clin Drug Invest* 2006, 26: 209-214.

Teuscher E. Medicinal spices. Stuttgart Medpharm Scientific Publishers 2006: 182-188.

Thomson M, Al-Qattan KK, Al-Sawan SM, Alnaqeeb MA, Khan I, Ali M. The use of ginger (*Zingiber officinale* Rosc.) as a potential anti-inflammatory agent and antithrombotic agent. *Prostaglandins Leukot Essent Fatty Acids* 2002, 67: 475-478.

Tjendraputra E, Tran VH, Liu-Brennan D, Roufogalis BD, Duke CC. Effect of ginger constituents and synthetic analogues on cyclooxygenase-2 enzyme in intact cells. *Bioorg Chem* 2001, 29: 156-163.

Tokita Y, Yuzurihara M, Sakaguchi M, Satoh K, Kase Y. The pharmacological effects of *Daikenchuto*, a traditional herbal medicine, on delayed gastrointestinal transit in rat postoperative ileus. *J Pharmacol Sci* 2007, 104: 303-310.

Tripathi S, Maier KG, Bruch D, Kittur DS. Effect of 6-gingerol on pro-inflammatory cytokine production and costimulatory molecule expression in murine peritoneal macrophages. *J Surg Res* 2007, 138: 209-213.

Tripathi S, Bruch D, Kittur DS. Ginger extract inhibits LPS induced macrophage activation and function. *BMC Compl Altern Med* 2008, 8: 1.

Ueki S, Miyoshi M, Shido O, Hasegawa J, Watanabe T. Systemic administration of 6-gingerol, a pungent constituent of ginger, induces hypothermia in rats via an inhibitory effect on metabolic rate. *Eur J Pharmacol* 2008, 584: 87-92.

Unnikrishnan MC, Kuttan R. Cytotoxicity of extracts of spices to cultured cells. *Nutr Cancer* 1988, 11: 251-257.

USP 32-NF27. The United States Pharmacopoeia 32, The national formulary 27, 2009.

van Toorenbergen AW, Dieges PH. Immunoglobulin E antibodies against coriander and other spices. *Clin Immunol* 1985, 76: 477-481.

Verma SK, Singh J, Khamesra R, Bordia A. Effect of ginger on platelet aggregation in man. *Indian J Med Res* 1993, 98: 240-242.

- Verma SK, Bordia A. Ginger, fat and fibrinolysis. *Indian J Med Sci* 2001, 55: 83-86.
- Visalyaputra S, Petchpaisit N, Somcharoen K, Choavaratana R. The efficacy of ginger root in the prevention of postoperative nausea and vomiting after outpatient gynaecological laparoscopy. *Anaesthesia* 1998, 53: 486-510.
- Vutyavanich T, Kraissarin T, Ruangsri R-A. Ginger for nausea and vomiting in pregnancy: randomized, double-masked, placebo-controlled study. *Obstet Gynecol* 2001, 97: 577-582.
- Weidner MS, Sigwart K. The safety of a ginger extract in the rat. *J Ethnopharmacol* 2000, 73: 513-520.
- Weidner MS, Sigwart K. Investigation of the teratogenic potential of a *Zingiber officinale* extract in the rat. *Reprod Toxicol* 2001, 15: 75-80.
- Westerterp-Plantenga M, Diepvens K, Joosen AMCP, Bérubé-parent S, Tremblay A. Metabolic effects of spices, teas, and caffeine. *Physiol Behav* 2006, 89: 85-91.
- WHO monographs on selected medicinal plants vol 1. World Health Organization, Geneva 1999: 277-287.
- Wigler I, Grotto I, Caspi D, Yaron M. The effects of Zintona EC (a ginger extract) on symptomatic gonarthrosis. *Osteoarthritis Cartilage* 2003, 11: 783-789.
- Wilasrusmee C, Kittur S, Siddiqui J, Bruch D, Wilasrusmee S, Kittur DS. *In vitro* immunomodulatory effects of ten commonly used herbs on murine lymphocytes. *J Altern Compl Med* 2002a, 8: 467-475.
- Wilasrusmee C, Siddiqui J, Bruch D, Wilasrusmee S, Kittur S, Kittur DS. *In vitro* immunomodulatory effects of herbal products. *Am Surg* 2002b, 68: 860-864.
- Wilkinson JM. Effect of ginger tea on the fetal development of Sprague-Dawley rats. *Repr Toxicol* 2000, 14: 507-512.
- Willetts KE, Ekangaki A, Eden JA. Effect of ginger extract on pregnancy-induced nausea. *Austr NZ J Obstet Gynaecol* 2003, 43: 139-144.
- Wood CD, Manno JE, Wood MJ, Manno BR, Mims ME. Comparison of efficacy of ginger with various antiemetic drugs. *Clin Res Pract Drug Reg Affairs* 1988, 6: 129-136.
- Wu K-L, Rayner CK, Chuah S-K, Changchien C-S, Lu S-N, Chiu Y-C, Chiu K-W, Lee C-M. Effects of ginger on gastric emptying and motility in healthy humans. *Eur J Gastroenterol Hepatol* 2008, 20: 436-440.
- Yagihashi S, Miura Y, Yagasaki K. Inhibitory effect of gingerol on the proliferation and invasion of hepatoma cells in culture. *Cytotechnology* 2008, 57: 129-136.
- Yamahara J, Mochizuki M, Rong HQ, Matsuda H, Fujimura H. The anti-ulcer effect in rats of ginger constituents. *J Ethnopharmacol* 1988, 23: 299-304.
- Yamahara J, Rong HQ, Naitoh Y, Kitani T, Fujimura H. Inhibition of cytotoxic drug-induced vomiting in mice by a ginger constituent. *J Ethnopharmacol* 1989a, 27: 353-355.
- Yamahara J, Huang QR, Iwamoto M, Kobayashi G, Matsuda H, Fujimura H. Active components of ginger exhibiting anti-serotonergic action. *Phytother Res* 1989b, 3: 70-71.
- Yamahara J, Huang Q, Li Y, Xu L, Fujimura H. Gastrointestinal motility enhancing effect of ginger and its active constituents. *Chem Pharm Bull* 1990, 38: 430-431.

Yip YB, Tam ACY. An experimental study on the effectiveness of massage with aromatic ginger and orange essential oil for moderate-to-severe knee pain among the elderly in Hong Kong. *Compl Ther Med* 2008, 16: 131-138.

Young H-Y, Luo Y-L, Cheng H-Y, Hsieh W-C, Liao J-C, Peng W-H. Analgesic and anti-inflammatory activities of [6]-gingerol. *J Ethnopharmacol* 2005, 96: 207-210.

Young H-Y, Liao J-C, Chang Y-S, Luo Y-L, Lu M-C, Peng W-H. Synergistic effect of ginger and nifedipine on human platelet aggregation: a study in hypertensive patients and normal volunteers. *Am J Chin Med* 2006, 34: 545-551.

Zick SM, Djuric Z, Ruffin MT, Litzinger AJ, Normolle DP, Alrawi S, Feng MR, Brenner DE. Pharmacokinetics of 6-gingerol, 8-gingerol, 10-gingerol, and 6-shogaol and conjugate metabolites in healthy human subjects. *Cancer Epidemiol Biomarkers Prev* 2008, 17: 1930-1936.

Zick SM, Ruffin MT, Lee J, Normolle DP, Siden R, Alrawi S, Brenner DE. Phase II trial of encapsulated ginger as a treatment for chemotherapy-induced nausea and vomiting. *Support Care Cancer* 2009, 17: 563-572.

References, which have been evaluated but not included into the assessment report

Al-Amin ZM, Thomson M, Al-Qattan KK, Peltonen-Shalaby R, Ali M. Anti-diabetic and hypolipdaemic properties of ginger (*Zingiber officinale*) in streptozotocin-induced diabetic rats. *Br J Nutr* 2006, 96: 660-665.

Bartscher HC. En liden bog om allehånde sygdomme 1596. Aarhus. Wormianum 2002: 195-197.

Charles R, Garg SN, Kumar S. New gingerdione from the rhizomes of *Zingiber officinale*. *Fitoterapia* 2000, 71: 716-718.

Chen J-C, Huang L-J, Wu S-L, Kuo S-C, Ho T-Y, Hsiang C-Y. Ginger and its bioactive component inhibit enterotoxigenic *Escherichia coli* heat-labile enterotoxin-induced diarrhoea in mice. *J Agric Food Chem* 2007, 55: 8390-8397.

Eldershaw TP, Colquhoun EQ, Bennett KL, Dora KA, Clark MG. Resiniferatoxin and piperine: capsaicin-like stimulators of oxygen uptake in the perfused rat hindlimb. *Life Sci* 1994, 55: 389-397.

Endo K, Kanno E, Oshima Y. Structures of antifungal diarylheptones, gingerenones A,B,C and isogingerenone B, isolated from the rhizomes of *Zingiber officinale*. *Phytochemistry* 1990, 29: 797-799.

Evans WC. Trease and Evans Pharmacognosy 15th edition. Edinburgh, WB Saunders 2002: 277-280.

Ficker C, Smith ML, Akpagana K, Gbeassor M, Zhang J, Durst T, Assabgui R, Arnason JT. Bioassay-guided isolation and identification of antifungal compounds from ginger. *Phytother Res* 2003, 17: 897-902.

Germer S in: Blaschek W, Hänsel R, Keller K, Reichling J, Rimpler H, Schneider G (editors): Hagers Handbuch der Pharmazeutischen Praxis 5th ed. Folgeband 3. Berlin-Heidelberg. Springer-Verlag 1998: 837-858.

Goyal RK, Kadnur SV. Beneficial effects of *Zingiber officinale* on goldthioglucose induced obesity. *Fitoterapia* 2006, 77: 160-163.

Jagetia GC, Baliga MS, Venkatesh P, Ulloor JN. Influence of ginger rhizome (*Zingiber officinale* Rosc) on survival, glutathione and lipid peroxidation in mice after whole-body exposure to gamma radiation. *Rad Res* 2003, 160: 584-592.

Jolad SD, Lantz RC, Solyom AM, Chen GJ, Bates RB, Timmermann BN. Fresh organically grown ginger (*Zingiber officinale*): composition and effects on LPS-induced PGE2 production. *Phytochemistry* 2004; 65: 1937-1954.

Kim JS, Lee SI, Park HW, yang JH, Shin T-Y, Kim J-C, Baek N-I, Kim S-H, Choi SU, Kwon B-M, Leem K-H, Jung MY, Kim DK. Cytotoxic components from dried rhizomes of *Zingiber officinale* Roscoe. *Arch Pharm Res* 2008, 31: 415-418.

Lee HS, Seo EY, Kang NE, Kim WK. [6]-gingerol inhibits metastasis of MDA-MB-231 human breast cancer cells. *J Nutr Biochem* 2008, 19: 313-319.

Mathew AG. Ginger oil: A review. *Indian Perfumer* 2006, 50: 26-29.

Matsuda A, Wang Z, Takahashi S, Tokuda T, Miura N, Hasegawa J. Upregulation of mRNA of retinoid binding protein by cholesterol enriched-diet and effect of ginger on lipid metabolism. *Life Sci* 2009, 84: 903-907.

Murata P, Kase Y, Ishige A, Sasaki H, Kurosawa S, Nakamura T. The herbal medicine Dai-kenchu-to and one of its active components 6-shogaol increase intestinal blood flow in rats. *Life Sci* 2002, 70: 2061-2070.

Sekiya K, Ohtani A, Kusano S. Enhancement of insulin sensitivity in adipocytes by ginger. *Biofactors* 2004, 22: 153-156.

Tang W, Eisenbrand G. Chinese Drugs of Plant Origin. Berlin, Springer-Verlag 1992, 1011-1015.

Verma SK, Singh M, Jain P, Bordia A. Protective effect of ginger, *Zingiber officinale* Rosc. on experimental atherosclerosis in rabbits. *Indian J Exper Biol* 2004, 42: 736-738.