



GREEN TEA EXTRACTS

- Date:** April 18, 2008
- Proper name(s):** *Camellia sinensis* (L.) Kuntze, synonym: *Thea sinensis* L. (Theaceae) (USDA 2007)
- Common name(s):** Green tea extract, *Camellia sinensis* extract, *Thea sinensis* extract (Westerterp-Plantenga et al. 2005; Henning et al. 2004; McGuffin et al. 2000)
- Source material(s):** Leaf (Nagao et al. 2005; Chantre and Lairon 2002)
- Route(s) of administration:** Oral
- Dosage form(s):** Those pharmaceutical dosage forms suited to oral administration, including but not limited to chewable tablets, caplets, capsules, strips, lozenges, powders or liquids where the dose is measured in drops, teaspoons, or tablespoons are acceptable. This monograph is not intended to include food-like dosage forms such as beverages, bars or chewing gums.
- Use(s) or Purpose(s):** Statement(s) to the effect of:
- ▶ Source of antioxidants for the maintenance of good health (Camargo et al. 2006; Coimbra et al. 2006; Henning et al. 2004; Nakagawa et al. 1999; Van het Hof et al. 1997)
 - ▶ To be used with a program of reduced intake of dietary calories and increased physical activity (if possible) to help in weight management (Nagao et al. 2005; Westerterp-Plantenga et al. 2005; Chantre and Lairon 2002; Dulloo et al. 1999)

Dose(s):

Antioxidant: Extracts providing up to 690 mg total catechins, and no more than 150 mg caffeine, per day (Nagao et al. 2005; Henning et al. 2004; Nakagawa et al. 1999)

Weight management: Extracts providing 136-300 mg (-)-epigallocatechin-3-gallate (EGCG) and 75-150 mg caffeine, with an EGCG:caffeine ratio of 1.8:1 to 4:1, per day (Nagao et al. 2005; Westerterp-Plantenga et al. 2005; Chantre and Lairon 2002)

Directions for use: Take with food.

Duration of use: Consult a health care practitioner for use beyond 12 weeks (Nagao et al. 2005; Westerterp-Plantenga et al. 2005; Chantre and Lairon 2002).

Risk Information: Statement(s) to the effect of:

Caution(s) and warning(s):

- ▶ Consult a health care practitioner prior to use if you have a liver disorder or develop symptoms of liver trouble (such as abdominal pain, dark urine or jaundice) (HC 2007a; Molinari et al. 2006; Gloro et al. 2005).
- ▶ Consult a health care practitioner prior to use if you are pregnant or breastfeeding (HC 2007b).
- ▶ Consult a health care practitioner prior to use if you have an iron deficiency (Cooper et al. 2006; Nelson and Poulter 2004; Zijp et al. 2000).

Contraindication(s): No statement required.

Known adverse reaction(s): No statement required.

Non-medicinal Ingredients: Non-medicinal ingredients must be chosen from the current NHPD *List of Acceptable Non-medicinal Ingredients* and must meet the limitations outlined in the list.

Specifications: Must comply with the minimum specifications outlined in the current NHPD *Compendium of Monographs*.

References cited:

Camargo AE, Daguer DA, Barbosa DS. Green tea exerts antioxidant action in vitro and its consumption increases total serum antioxidant potential in normal and dyslipidemic subjects. *Nutrition Research* 2006;26:626-631.

Chantre P, Lairon D. Recent findings of green tea extract AR25 (Exolise) and its activity for the treatment of obesity. *Phytomedicine* 2002;9(1):3-8.

Coimbra S, Castro E, Rocha-Pereira P, Rebelo I, Rocha S, Santos-Silva A. The effect of green tea in oxidative stress. *Clinical Nutrition* 2006;25(5):790-796.

Cooper MJ, Cockell KA, L'Abbe MR. The iron status of Canadian adolescents and adults: current knowledge and practical implications. *Canadian Journal of Dietetic Practice and Research* 2006;67(3):130-138.

Dulloo AG, Duret C, Rohrer D, Girardier L, Mensi N, Fathi M, Chantre P, Vandermander J. Efficacy of a green tea extract rich in catechin polyphenols and caffeine in increasing 24-h energy expenditure and fat oxidation in humans. *American Journal of Clinical Nutrition* 1999;70(6):1040-1045.

Gloro R, Hourmand-Ollivier I, Mosquet B, Mosquet L, Rousselot P, Salame E, Piquet MA, Dao T. Fulminant hepatitis during self-medication with hydroalcoholic extract of green tea. *European Journal of Gastroenterology & Hepatology* 2005;17(10):1135-1137.

HC 2007a: Health Canada. Case Presentation - Green tea extract (Green Lite): suspected association with hepatotoxicity. *Canadian Advisory Reaction Newsletter* 2007;17(1). Ottawa (ON). [Accessed 2008-04-18]. Available from: http://www.hc-sc.gc.ca/dhp-mps/medeff/bulletin/carn-bcei_v17n1_e.html

HC 2007b. Health Canada. It's Your Health: Caffeine. Ottawa (ON). [Accessed 2008-04-18]. Available from: http://www.hc-sc.gc.ca/iyh-vsv/food-aliment/caffeine_e.html

Henning SM, Niu Y, Lee NH, Thames GD, Minutti RR, Wang H, Go VL, Heber D. Bioavailability and antioxidant activity of tea flavanols after consumption of green tea, black tea, or a green tea extract supplement. *American Journal of Clinical Nutrition* 2004;80(6):1558-1564.

McGuffin M, Kartesz JT, Leung AY, Tucker AO, editors. *Herbs of Commerce*, 2nd edition. Austin (TX): American Herbal Products Association; 2000.

Molinari M, Watt KD, Kruszyna T, Nelson R, Walsh M, Huang WY, Nashan B, Peltekian K. Acute liver failure induced by green tea extracts: case report and review of the literature. *Liver Transplantation* 2006;12(12):1892-1895.

Nagao T, Komine Y, Soga S, Meguro S, Hase T, Tanaka Y, Tokimitsu I. Ingestion of a tea rich in catechins leads to a reduction in body fat and malondialdehyde-modified LDL in men. *American Journal of Clinical Nutrition* 2005;81(1):122-129.

Nakagawa K, Ninomiya M, Okubo T, Aoi N, Juneja LR, Kim M, Yamanaka K, Miyazawa T. Tea catechin supplementation increases antioxidant capacity and prevents phospholipid hydroperoxidation in plasma of humans. *Journal of Agricultural and Food Chemistry* 1999;47(10):3967-3973.

Nelson M, Poulter J. Impact of tea drinking on iron status in the UK: a review. *Journal of Human Nutrition and Dietetics* 2004;17(1):43-54.

USDA 2007: United States Department of Agriculture, Agricultural Research Service, National Genetic Resources Program. Germplasm Resources Information Network (GRIN). *Camellia sinensis* (L) Kuntze. National Germplasm Resources Laboratory, Beltsville (MD). [Accessed 2008-04-18]. Available from: http://www.ars-grin.gov/cgi-bin/npgs/html/tax_search.pl

Van het Hof KH, de Boer HS, Wiseman SA, Lien N, Weststrate JA, Tijburg LB. Consumption of green or black tea does not increase resistance of low-density lipoprotein to oxidation in humans. *The American Journal of Clinical Nutrition* 1997;66(5):1125-1132.

Westerterp-Plantenga MS, Lejeune MP, Kovacs EM. Body weight loss and weight maintenance in relation to habitual caffeine intake and green tea supplementation. *Obesity Research* 2005;13(7):1195-1204.

Zijp IM, Korver O, Tijburg LB. Effect of tea and other dietary factors on iron absorption. *Critical Reviews in Food Science and Nutrition* 2000;40(5):371-398.

References reviewed:

Arts IC, Hollman PC, Feskens EJ, Bueno de Mesquita HB, Kromhout D. Catechin intake might explain the inverse relation between tea consumption and ischemic heart disease: the Zutphen Elderly Study. *The American Journal of Clinical Nutrition* 2001;74(2):227-232.

Aviram M. Review of human studies on oxidative damage and antioxidant protection related to cardiovascular disease. *Free Radical Research* 2000;33:(S85-97).

Blumenthal M. *ABC Clinical Guide to Herbs*. New York (NY): Theime; 2003.

Bonkovsky HL. Hepatotoxicity associated with supplements containing Chinese green tea (*Camellia sinensis*). *Annals of Internal Medicine* 2006;144(1):68-71.

Booth SL, Madabushi HT, Davidson KW, Sadowski JA. Tea and coffee brews are not dietary sources of vitamin K-1 (phyloquinone). *Journal of the American Dietetic Association* 1995;95(1):82-83.

Borchardt RT, Huber JA. Catechol *O*-methyltransferase. Structure-activity relationships for inhibition by flavonoids. *Journal of Medicinal Chemistry* 1975;18(1):120-122.

Brinker F. Online Updates and Additions to Herb Contraindications & Drug Interactions. 3rd edition. Sandy (OR): Eclectic Medical Publications; 2008. [Accessed 2008-04-18]. Available from: <http://www.eclecticherb.com/emp/updatesHCDI.html>

Brinker F. Herb Contraindications & Drug Interactions, 3rd edition. Sandy (OR): Eclectic Medical Publications; 2001.

Cabrera C, Artacho R, Gimenez R. Beneficial effects of green tea--a review. *Journal of the American College of Nutrition* 2006;25(2):79-99.

Cherubini A, Beal MF, Frei B. Black tea increases the resistance of human plasma to lipid peroxidation in vitro, but not ex vivo. *Free Radical Biology and Medicine* 1999;27(3-4):381-387.

Chiu AE, Chan JL, Kern DG, Kohler S, Rehmus WE, Kimball AB. Double-blinded, placebo-controlled trial of green tea extracts in the clinical and histologic appearance of photoaging skin. *Dermatologic Surgery* 2005;31(7 Pt 2):855-860.

Chow S, Hakim I, Vining D, Crowell J, Ranger-Moore J, Chew W, Celaya C, Rodney S, Hara Y, Alberts D. Effects of dosing condition on the oral bioavailability of green tea catechins after single-dose administration of Polyphenone E in healthy individuals. *Clinical Cancer Research* 2005;11:4627-4633.

Christopher G, Sutherland D, Smith A. Effects of caffeine in non-withdrawn volunteers. *Human Psychopharmacology* 2005;20(1):47-53.

Cnattingius S, Signorello LB, Anneren G, Clausson B, Ekblom A, Ljunger E, Blot WJ, McLaughlin JK, Petersson G, Rane A, Granath F. Caffeine intake and the risk of first-trimester spontaneous abortion. *New England Journal of Medicine* 2000;343(25):1839-1845.

Dashwood WM, Orner GA, Dashwood RH. Inhibition of beta-catenin/Tcf activity by white tea, green tea, and epigallocatechin-3-gallate (EGCG): minor contribution of H₂O₂ at physiologically relevant EGCG concentrations. *Biochemical and Biophysical Research Communications* 2002;296(3):584-588.

Diepvens K, Kovacs EM, Nijs IM, Vogels N, Westerterp-Plantenga MS. Effect of green tea on resting energy expenditure and substrate oxidation during weight loss in overweight females. *British Journal of Nutrition* 2005;94(6):1026-1034.

Diepvens K, Kovacs EM, Vogels N, Westerterp-Plantenga MS. Metabolic effects of green tea and of phases of weight loss. *Physiology & Behaviour* 2006;87(1):185-191.

Doherty M, Smith PM. Effects of caffeine ingestion on rating of perceived exertion during and after exercise: a meta-analysis. *Scandinavian Journal of Medicine & Science in Sports* 2005;15(2):69-78.

Duffy SJ, Keaney JF Jr, Holbrook M, Gokce N, Swerdloff PL, Frei B, Vita JA. Short- and long-term black tea consumption reverses endothelial dysfunction in patients with coronary artery disease. *Circulation* 2001;104(2):151-156.

Dulloo AG. A sympathetic defense against obesity. *Science* 2002;297(5582):780-781.

Dulloo AG, Seydoux J, Girardier L, Chantre P, Vandermander J. Green tea and thermogenesis: interactions between catechin-polyphenols, caffeine and sympathetic activity. *International Journal of Obesity and Related Metabolic Disorders* 2000;24(2):252-258.

Erba D, Riso P, Bordoni A, Foti P, Biagi PL, Testolin G. Effectiveness of moderate green tea consumption on antioxidative status and plasma lipid profile in humans. *Journal of Nutritional Biochemistry* 2005;16(3):144-149.

Erba D, Riso P, Foti P, Frigerio F, Criscuoli F, Testolin G. Black tea extract supplementation decreases oxidative damage in Jurkat T cells. *Archives of Biochemistry and Biophysics* 2003;416(2):196-201.

FDA 2006: Qualified health claims: letter of denial – green tea and reduced risk of cardiovascular disease. Washington (DC): Food and Drug Administration, US Department of Health and Human Services, Docket Number 2005Q-0297; 2006. [Accessed 2008-04-18]. Available from: <http://www.cfsan.fda.gov/~dms/qhcgtea2.html>

FDA 2005: Letter responding to health claim petition dated January 27, 2004: green tea and reduced risk of cancer health claim. Washington (DC): Food and Drug Administration, US Department of Health and Human Services, Docket Number 2004Q-0083; 2005. [Accessed 2008-04-18]. Available from: <http://www.cfsan.fda.gov/~dms/qhc-gtea.html>

FDA 1988: Food and Drug Administration. 21 CFR Part 340. Stimulant drug products for over-the-counter human use; final monograph; final rule. Washington (DC): U.S. Food and Drug Administration, Department of Health and Human Services; 1988. [Accessed 2008-04-18]. Available from: http://ecfr.gpoaccess.gov/cgi/t/text/text-idx?c=ecfr&tpl=/ecfrbrowse/Title21/21cfr340_main_02.tpl

Felter HW, Lloyd JU. *King's American Dispensatory*, Volume 1, 18th edition. Sandy (OR): Eclectic Medical Publications [Reprint of 1898 original]. 1983.

Freese R, Basu S, Hietanen E, Nair J, Nakachi K, Bartsch H, Mutanen M. Green tea extract decreases plasma malondialdehyde concentration but does not affect other indicators of oxidative stress, nitric oxide production, or hemostatic factors during a high-linoleic acid diet in healthy females. *European Journal of Nutrition* 1999;38(3):149-157.

FSA 2004: Food Standards Agency. Survey of Caffeine Levels in Hot Beverages. London (UK): Food Standards Agency, Food Survey Information Sheet 53/04, April 29, 2004. [Accessed 2008-04-18]. Available from: <http://www.food.gov.uk/multimedia/pdfs/fsis5304.pdf>

Gardner EJ, Ruxton CH, Leeds AR. Black tea - helpful or harmful? A review of the evidence. *European Journal of Clinical Nutrition*. 2007;61(1):3-18.

Geleijnse JM, Launer LJ, Hofman A, Pols HA, Witteman JC. Tea flavonoids may protect against atherosclerosis: the Rotterdam Study. *Archives of Internal Medicine* 1999;159(18):2170-2174.

Gomikawa S, Ishikawa Y. Effects of catechins and ground green tea drinking on the susceptibility of plasma and LDL to oxidation in vitro and ex vivo. *Journal of Clinical and Biochemical Nutrition* 2002;32:55-68.

Graham HN. Green tea composition, consumption, and polyphenol chemistry. *Preventive Medicine* 1992;21(3):334-350.

Greden JF. Anxiety or caffeinism: a diagnostic dilemma. *American Journal of Psychiatry* 1974;131(10):1089-1092.

Grieve M. *A Modern Herbal, Volume 2*. New York (NY): Dover Publications; 1971 [Reprint of 1931 Harcourt, Brace & Company publication].

Hakim IA, Alsaif MA, Alduwaihy M, Al-Rubeaan K, Al-Nuaim AR, Al-Attas OS. Tea consumption and the prevalence of coronary heart disease in Saudi adults: results from a Saudi national study. *Preventive Medicine* 2003;36(1):64-70.

Hakim IA, Harris RB, Chow HH, Dean M, Brown S, Ali IU. Effect of a 4-month tea intervention on oxidative DNA damage among heavy smokers: role of glutathione S-transferase genotypes. *Cancer Epidemiology, Biomarkers, & Prevention* 2004;13(2):242-249.

Halder J, Bhaduri AN. Protective role of black tea against oxidative damage of human red blood cells. *Biochemical and Biophysical Research Communications* 1998;244(3):903-907.

Hertog MG, Feskens EJ, Hollman PC, Katan MB, Kromhout D. Dietary antioxidant flavonoids and risk of coronary heart disease: the Zutphen Elderly Study. *Lancet* 1993;342(8878):1007-1011.

Hertog MG, Kromhout D, Aravanis C, Blackburn H, Buzina R, Fidanza F, Giampaoli S, Jansen A, Menotti A, Nedeljkovic S. Flavonoid intake and long-term risk of coronary heart disease and cancer in the seven countries study. *Archives of Internal Medicine* 1995;155(4):381-386.

Hindmarch I, Rigney U, Stanley N, Quinlan P, Rycroft J, Lane J. A naturalistic investigation of the effects of day-long consumption of tea, coffee and water on alertness, sleep onset and sleep quality. *Psychopharmacology (Berlin)* 2000;149(3):203-216.

- Hirano R, Momiyama Y, Takahashi R, Taniguchi H, Kondo K, Nakamura H, Ohsuzu F. Comparison of green tea intake in Japanese patients with and without angiographic coronary artery disease. *The American Journal of Cardiology* 2002;90(10):1150-1153.
- Hodgson JM, Croft KD, Mori TA, Burke V, Beilin LJ, Puddey IB. Regular ingestion of tea does not inhibit in vivo lipid peroxidation in humans. *The Journal of Nutrition* 2002;132(1):55-58.
- Hodgson JM, Puddey JB, Burke V, Beilin LJ, Jordan N. Effects on blood pressure of drinking green and black tea. *Journal of Hypertension* 1999;17(4):457-463.
- Hodgson JM, Puddey IB, Croft KD, Burke V, Mori TA, Caccetta RA, Beilin LJ. Acute effects of ingestion of black and green tea on lipoprotein oxidation. *American Journal of Clinical Nutrition* 2000;71(5):1103-1107.
- Holbrook AM, Pereira JA, Labiris R, McDonald H, Douketis JD, Crowther M, Wells PS. Systematic overview of Warfarin and its drug and food interactions. *Archives of Internal Medicine* 2005;23:165(10):1095-1106.
- Hurrell RF, Reddy M, Cook JD. Inhibition of non-haem iron absorption in man by polyphenolic-containing beverages. *British Journal of Nutrition* 1999;81(4):289-295.
- Imai K, Nakachi K. Cross sectional study of effects of drinking green tea on cardiovascular and liver diseases. *British Medical Journal* 1995;310(6981):693-696.
- Ishikawa T, Suzukawa M, Ito T, Yoshida H, Ayaori M, Nishiwaki M, Yonemura A, Hara Y, Nakamura H. Effect of tea flavonoid supplementation on the susceptibility of low-density lipoprotein to oxidative modification. *American Journal of Clinical Nutrition* 1997;66(2):261-266.
- Javid A, Bonkovsky HL. Hepatotoxicity due to extracts of Chinese green tea (*Camellia sinensis*): a growing concern. *Journal of Hepatology* 2006;45(2):334-335.
- Jimenez-Saenz M, Martinez-Sanchez MC. Acute hepatitis associated with the use of green tea infusions. *Journal of Hepatology* 2006;44(3):616-617.
- Kamimori GH, Penetar DM, Headley DB, Thorne DR, Otterstetter R, Belenky G. Effect of three caffeine doses on plasma catecholamines and alertness during prolonged wakefulness. *European Journal of Clinical Pharmacology* 2000;56(8):537-544.
- Kim W, Jeong MH, Cho SH, Yun JH, Chae HJ, Ahn YK, Lee MC, Cheng X, Kondo T, Murohara T, Kang JC. Effect of green tea consumption on endothelial function and circulating endothelial progenitor cells in chronic smokers. *Circulation Journal* 2006;70(8):1052-1057.
- Kono S, Shinchu K, Ikeda N, Yanai F, Imanshi K. Green tea consumption and serum lipid profiles: a cross-sectional study in northern Kyushu, Japan. *Preventive Medicine* 1992;21(4):526-531.

Kovacs EM, Lejeune MP, Nijs I, Westerterp-Plantenga MS. Effects of green tea on weight maintenance after body-weight loss. *British Journal of Nutrition* 2004;91(3):431-437.

Kuriyama S, Shimazu T, Ohmori K, Kikuchi N, Nakaya N, Nishino Y, Tsubono Y, Tsuji I. Green tea consumption and mortality due to cardiovascular disease, cancer, and all causes in Japan. *The Journal of the American Medical Association* 2006;296(10):1255-1265.

Kyle JA, Morrice PC, McNeill G, Duthie GG. Effects of infusion time and addition of milk on content and absorption of polyphenols from black tea. *Journal of Agriculture and Food Chemistry* 2007;55(12):4889-4894.

Langley-Evans SC. Consumption of black tea elicits an increase in plasma antioxidant potential in humans. *International Journal of Food Sciences and Nutrition* 2000;51(5):309-315.

Lee W, Min W, Chun S, Lee Y, Park H, Lee DH, Lee YK, Son JE. Long-term effects of green tea ingestion on atherosclerotic biological markers in smokers. *Clinical Biochemistry* 2005;38(1):84-87.

Leenen R, Roodenburg AJ, Tijburg LB, Wiseman SA. A single dose of tea with or without milk increases plasma antioxidant activity in humans. *European Journal of Clinical Nutrition* 2000;54(1):87-92.

Leung LK, Su Y, Chen R, Zhang Z, Huang Y, Chen ZY. Theaflavins in black tea and catechins in green tea are equally effective antioxidants. *Journal of Nutrition* 2001;131:2248–2251.

Liang H, Liang Y, Dong J, Lu J, Xu H, Wang H. Decaffeination of fresh green tea leaf (*Camellia sinensis*) by hot water treatment. *Food Chemistry* 101 2007:1451-1456.

Liu HS, Chen YH, Hung PF, Kao YH. Inhibitory effect of green tea (-)-epigallocatechin gallate on resistin gene expression in 3T3-L1 adipocytes depends on the ERK pathway. *American journal of physiology. Endocrinology and metabolism* 2006;290(2):E273-281.

Łuczaj W, Skrzydlewska E. Antioxidative properties of black tea. *Preventative Medicine* 2005;40(6):910-918.

Maity S, Ukil A, Karmakar S, Datta N, Chaudhuri T, Vedasiromoni JR, Ganguly DK, Das PK. Thearubigin, the major polyphenol of black tea, ameliorates mucosal injury in trinitrobenzene sulfonic acid-induced colitis. *European Journal of Pharmacology* 2003;30:470(1-2):103-112.

McAnlis GT, McEneny J, Pearce J, Young IS. Black tea consumption does not protect low density lipoprotein from oxidative modification. *European Journal of Clinical Nutrition* 1998;52(3):202-206.

McGuffin M, Hobbs C, Upton R, Goldberg A, editors. *American Herbal Products Association's Botanical Safety Handbook*. Boca Raton (FL): CRC Press; 1997.

Mennen L, Hirvonen T, Arnault N, Bertrais S, Galan P, Hercberg S. Consumption of black, green and herbal tea and iron status in French adults. *European Journal of Clinical Nutrition* 2007; Epub ahead of print.

Miller NJ, Castelluccio C, Tijburg L, Rice-Evans C. The antioxidant properties of theaflavins and their gallate esters – radical scavengers or metal chelators? *FEBS Letters* 1996;392(1):40-44.

Mukamal KJ, Alert M, Maclure M, Muller JE, Mittleman MA. Tea consumption and infarct-related ventricular arrhythmias : the determinants of myocardial infarction onset study. *Journal of the American College of Nutrition* 2006;25(6):472-479.

Mukamal KJ, Maclure M, Muller JE, Sherwood JB, Mittleman MA. Tea consumption and mortality after acute myocardial infarction. *Circulation* 2002;105(21):2476-2481.

Nagaya N, Yamamoto H, Uematsu M, Itoh T, Nakagawa K, Miyazawa T, Kangawa K, Miyatake K. Green tea reverses endothelial dysfunction in healthy smokers. *Heart* 2004;90(12):1485-1486.

Nakachi K, Eguchi H, Imai K. Can teatime increase one's lifetime? *Ageing Research Reviews* 2003;2(1):1-10.

Nakachi K, Matsuyama S, Miyake S, Suganuma M, Imai K. Preventive effects of drinking green tea on cancer and cardiovascular disease: epidemiological evidence for multiple targeting prevention. *Biofactors* 2000;13(1-4):49-54.

Nawrot P, Jordan S, Eastwood J, Rotstein J, Hugenholtz A, Feeley M. Effects of caffeine on human health. *Food Additives and Contaminants* 2003;20(1):1-30.

Perva-Uzunalić A, Škerget M, Knez Ž, Weinrich B, Otto F, Grüner S. Extraction of active ingredients from green tea (*Camellia sinensis*): Extraction efficiency of major catechins and caffeine. *Food Chemistry* 2006;96(4):597-605.

Peters U, Poole C, Arab L. Does tea affect cardiovascular disease? A meta-analysis. *American Journal of Epidemiology* 2001;154(6):495–503.

Philip P, Taillard J, Moore N, Delord S, Valtat C, Sagaspe P, Bioulac B. The effects of coffee and napping on night time highway driving: a randomized trial. *Annals of Internal Medicine* 2006;144(11):785-791.

Princen HMG, van Duyvenvoorde W, Buytenhek R, Blonk C, Tijburg, LB, Languis JA, Meinders E, Pijl H. No effect of consumption of green and black tea on plasma lipid and antioxidant levels and on LDL oxidation in smokers. *Arteriosclerosis, Thrombosis and Vascular Biology* 1998;18(5):833-841.

Quinlan PT, Lane J, Moore KL, Aspen J, Rycroft JA, O'Brien DC. The acute physiological and mood effects of tea and coffee: the role of caffeine level. *Pharmacology, Biochemistry, and Behavior* 2000;66(1):19-28.

Ravussin E, Bogardus C. A brief overview of human energy metabolism and its relationship to essential obesity. *The American Journal of Clinical Nutrition* 1992;55(1S):242S-245S.

Ravussin E, Lillioja S, Anderson TE, Christin L, Bogardus C. Determinants of 24-hour energy expenditure in man: methods and results using a respiratory chamber. *The Journal of Clinical Investigation* 1986;78(6):1568-1578.

Ravussin E, Lillioja S, Knowler WC, Christin L, Freymond D, Abbott WG, Boyce V, Howard BV, Bogardus C. Reduced rate of energy expenditure as a risk factor for body-weight gain. *The New England Journal of Medicine* 1988;318(8):467-472.

Rice-Evans CA, Miller NJ, Paganga G. Structure-antioxidant activity relationships of flavanoids and phenolic acids. *Free Radical Biology & Medicine* 1996;20(7):933-956.

Sano J, Inami S, Seimiya K, Ohba T, Sakai S, Takano T, Mizuno K. Effects of green tea intake on the development of coronary artery disease. *Circulation Journal* 2004;68(7):665-670.

Santana-Rios G, Orner GA, Amantana A, Provost C, Wu SY, Dashwood RH. Potent antimutagenic activity of white tea in comparison with green tea in the Salmonella assay. *Mutation Research* 2001;495(1-2):61-74.

Sasazuki S, Kodama H, Yoshimasu K, Liu Y, Washio M, Tanaka K, Tokunaga S, Kono S, Arai H, Doi Y, Kawano T, Nakagaki O, Takada K, Koyanagi S, Hiyamatu K, Nii T, Shirai K, Ideishi M, Arakawa K, Mohri M, Takeshita A. Relation between green tea consumption and the severity of coronary atherosclerosis among Japanese men and women. *Annals of Epidemiology* 2000;10(6):401-408.

Sawynok J. Pharmacological rationale for the clinical use of caffeine. *Drugs* 1995;49(1):37-50.

Serafini M, Ghiselli A, Luzzi AF. In vivo antioxidant effect of green and black tea in man. *European Journal of Clinical Nutrition* 1996;50(1):28-32.

Serafini M, Laranjinha JAN, Almeida LM, Maiani G. Inhibition of human LDL lipid peroxidation by phenol-rich beverages and their impact on plasma total antioxidant capacity in humans. *The Journal of Nutritional Biochemistry* 2000;11(11-12):585-590.

Sesso HD, Paffenbarger RS, Oguma Y, Lee IM. Lack of association between tea and cardiovascular disease in college alumni. *International Journal of Epidemiology* 2003;32(4):527-533.

Shiraki M, Hara Y, Osawa T, Kumon H, Nakayama T, Kawakishi S. (Abstract only) Antioxidative and antimutagenic effects of theaflavins from black tea. *Mutation Research* 1994;323(1-2):29-34.

Shixian Q, VanCrey B, Shi J, Kakuda Y, Jiang Y. Green tea extract thermogenesis-induced weight loss by epigallocatechin gallate inhibition of catechol-O-methyltransferase. *Journal of Medicinal Food* 2006;9(4):451-458.

Smith A, Sutherland D, Christopher G. Effects of repeated doses of caffeine on mood and performance of alert and fatigued volunteers. *Journal of Psychopharmacology* 2005;19(6):620-626.

Stephoe A, Gibson EL, Vounonvirta R, Williams ED, Hamer M, Rycroft JA, Erusalimsky JD, Wardle J. The effects of tea on psychophysiological stress responsivity and post-stress recovery: a randomised double-blind trial. *Psychopharmacology (Berlin)* 2007;190(1):81-89.

Stephoe A, Wardle J. Mood and drinking: a naturalistic diary study of alcohol, coffee and tea. *Psychopharmacology (Berlin)* 1999;141(3):315-321.

Stevens T, Qadri A, Zein NN. Two patients with acute liver injury associated with use of the herbal weight-loss supplement hydroxycut. *Annals of Internal Medicine* 2005;142(6):477-478.

Sung H, Min WK, Lee W, Chun S, Park H, Lee YW, Jang S, Lee DH. The effects of green tea ingestion over four weeks on atherosclerotic markers. *Annals of Clinical Biochemistry* 2005;42(4):292-297.

Sung H, Nah J, Chun S, Park H, Yang SE, Min WK. In vivo antioxidant effect of green tea. *European Journal of Clinical Nutrition* 2000;54(7):527-529.

Taylor JR, Wilt VM. Probable antagonism of Warfarin by green tea. *The Annals of Pharmacotherapy* 1999;33:426-428.

Temme EH, Van Hoydonck PG. Tea consumption and iron status. *European Journal of Clinical Nutrition* 2002;56(5):379-386.

Thrift AG, Donnan GA. Re: "Does tea affect cardiovascular disease? A meta-analysis." (Letter). *American Journal of Epidemiology* 2002;156(5):490.

Tokunaga S, White IR, Frost C, Tanaka K, Kono S, Tokudome S, Akamatsu T, Moriyama T, Zakouji H. Green tea consumption and serum lipids and lipoproteins in a population of healthy workers in Japan. *Annals of Epidemiology* 2002;12(3):157-165.

Tsubono Y, Tsugane S. Green tea intake in relation to serum lipid levels in middle-aged Japanese men and women. *Annals of Epidemiology* 1997;7(4):280-284.

Unno T, Tago M, Suzuki Y, Nozawa A, Sagesaka YM, Kakuda T, Egawa K, Kondo K. Effect of tea catechins on postprandial plasma lipid responses in human subjects. *British Journal of Nutrition* 2005;93(4):543-547.

Van Gaal LF, Mertens IL, De Blcock CE. Mechanisms linking obesity with cardiovascular disease. *Nature* 2006;444(7121):875-880.

Warden BA, Smith LS, Beecher GR, Balentine DA, Clevidence BA. Catechins are bioavailable in men and women drinking black tea throughout the day. *Journal of Nutrition* 2001;131(6):1731-1737.

Westerterp-Plantenga M, Diepvens K, Joosen AM, Bérubé-Parent S, Tremblay A. Metabolic effects of spices, teas, and caffeine. *Physiology & Behaviour* 2006;89(1):85-91.

WHO 2003: WHO Pharmaceuticals Newsletter No. 3, 2003. [Accessed 2008-04-18]. Available from: http://www.who.int/medicines/publications/newsletter/en/news2003_3.pdf

Wichtl M, editor. *Herbal Drugs and Phytopharmaceuticals: A Handbook for Practice on a Scientific Basis*, 3rd edition. Stuttgart (D): Medpharm GmbH Scientific Publishers; 2004.

Williamson EM, Evans FJ, Wren RC. *Potter's New Cyclopaedia of Botanical Drugs and Preparations*. Essex (UK): C.W. Daniel Company Limited; 1988.

Woodward M, Tunstall-Pedoe H. Coffee and tea consumption in the Scottish Heart Health Study follow-up: conflicting relations with coronary risk factors, coronary disease, and all cause mortality. *Journal of Epidemiology and Community Health* 1999;53(8):481-487.

Wren RC. *Potter's Cyclopaedia of Botanical Drugs & Preparations*. London (UK): Potter and Clark; 1907.

Yang Y, Lu F, Wu J, Wu C, Chang C. The protective effect of habitual tea consumption on hypertension. *Archives of Internal Medicine* 2004;164(14):1534-1540.

Ye J, Liang Y, Jin J, Liang H, Du Y, Lu J, Ye Q, Lin C. Preparation of partially decaffeinated instant green tea. *Journal of Agriculture and Food Chemistry* 2007;55:3498-3502.

Young JF, Dragstedt LO, Haraldsdottir J, Daneshvar B, Kal MA, Loft S, Nilsson L, Nielsen SE, Mayer B, Skibsted LH, Huynh-Ba T, Hermetter A, Sandstrom B. Green tea extract only affects markers of oxidative status postprandially: lasting antioxidant effect of flavonoid-free diet. *British Journal of Nutrition* 2002;87(4):343-355.

Zwyghuizen-Doorenbos A, Roehrs TA, Lipschutz L, Timms V, Roth T. Effects of caffeine on alertness. *Psychopharmacology* 1990;100(1):36-39.