

NATURAL HEALTH PRODUCT

PANAX GINSENG

This monograph is intended to serve as a guide to industry for the preparation of Product Licence Applications (PLAs) and labels for natural health product market authorization. It is not intended to be a comprehensive review of the medicinal ingredient.

Notes

- ▶ Text in parentheses is additional optional information which can be included on the PLA and product label at the applicant's discretion.
- ▶ The solidus (/) indicates that the terms and/or statements are synonymous. Either term or statement may be selected by the applicant.

Date

August 28, 2018

Proper name(s), Common name(s), Source information

Table 1. Proper name(s), Common name(s), Source information

Proper name(s)	Common name(s)	Source information		
		Source material(s)	Part(s)	Preparation(s)
<i>Panax ginseng</i>	<ul style="list-style-type: none"> ▶ Asian ginseng ▶ Chinese ginseng ▶ Hong shen ▶ Korean ginseng ▶ Korean red ginseng ▶ Oriental ginseng ▶ Panax ginseng ▶ Red ginseng ▶ Ren shen 	<i>Panax ginseng</i>	<ul style="list-style-type: none"> ▶ Root ▶ Rootlet 	Dried

References: Proper name: USDA 2018; McGuffin et al. 2000; Common names: USDA 2018, PPRC 2010, USP 32 2008, Vuksan et al. 2008, Reay et al. 2006, Kim et al. 2005, Sünram-Lea et al. 2005, McGuffin et al. 2000, WHO 1999; Source information: PPRC 2010, Ph. Eur 2008, USP 32 2008, Vuksan et al. 2008, Sievenpiper et al. 2006, ESCOP 2003, WHO 1999, Bradley 1992, BHP 1983, Wren 1907.

Route of administration

Oral

Dosage form(s)

This monograph excludes foods or food-like dosage forms as indicated in the Compendium of Monographs Guidance Document.

Acceptable dosage forms for the age category listed in this monograph and specified route of administration are indicated in the Compendium of Monographs Guidance Document.

Use(s) or Purpose(s)

- ▶ (Used in Herbal Medicine as) supportive therapy for the promotion of healthy glucose levels (Vuksan et al. 2008; Sievenpiper et al. 2006; Williamson 2003; Tetsutani et al. 2000; WHO 1999; Sotaniemi et al. 1995).
- ▶ (Used in Herbal Medicine to) help(s) support cognitive function and/or reduce mental fatigue (in cases of mental stress) (Reay et al. 2006; Reay et al. 2005; Sünram-Lea et al. 2005; Kennedy et al. 2004; ESCOP 2003; Kennedy et al. 2002; Scholey and Kennedy 2002; Kennedy et al. 2001; Sorensen and Sonne 1996; Bradley 1992; D'Angelo et al. 1986; BHP 1983).
- ▶ Helps support cognition (Reay et al. 2006; Reay et al. 2005; Sünram-Lea et al. 2005; Kennedy et al. 2004; ESCOP 2003; Kennedy et al. 2002; Scholey and Kennedy 2002; Kennedy et al. 2001; Sorensen and Sonne 1996; Bradley 1992; D'Angelo et al. 1986; BHP 1983).
- ▶ (Used in Herbal Medicine to) help(s) enhance physical capacity/performance (in cases of physical stress) (Kim et al. 2005; ESCOP 2003; Gross et al. 2002; WHO 1999; Gross et al. 1995; Sotaniemi et al. 1995; Schepdael 1993).
- ▶ Used in Herbal Medicine as an adaptogen to help increase energy and resistance to stress (e.g. in case of mental and physical fatigue related to stress) (Winston and Maimes 2007, Bone 2003, Hoffman 2003, Blumenthal et al. 2000, WHO 1999, Bradley 1992).
- ▶ Used in Traditional Chinese Medicine (TCM) to reinforce *qi*, benefit the spleen and lung, relieve symptoms of thirst due to impairment of body fluids and internal heat (PPRC 2010; Bensky et al. 2004, Chen and Chen 2004).

Note

Claims for traditional use must include the term “Herbal Medicine”, “Traditional Chinese Medicine”, or “Ayurveda”.

Dose(s)

Subpopulation(s)

Adults 18 years and older

Quantity(ies)

Glucose levels; Cognitive function/cognition; Mental stress; Physical stress; Adaptogen

Methods of preparation: Standardized extracts (Dry extract)

200 - 600 milligrams of extract, per day; standardized to 4 - 7% total ginsenosides; Not to exceed 9 grams of dried root/rootlet, per day (Vuksan et al. 2008; Reay et al. 2006; Sievenpiper et al. 2006; Reay et al. 2005; Sunram-Lea et al. 2005; Kennedy et al. 2004; ESCOP 2003; Kennedy et al. 2002; Scholey and Kennedy 2002; Engels et al. 2001; Kennedy et al. 2001; Scaglione et al. 2001; Blumenthal et al. 2000; Tetsutani et al. 2000; McGuffin et al. 1997; Engels et al. 1996; Scaglione et al. 1996; Gross et al. 1995; Scaglione et al. 1994; Scaglione et al. 1990; Petkov and Mosharrof 1987; D'Angelo et al. 1986; Soldati and Sticher 1980).

Methods of preparation: Dry, Powder, Non-Standardised Extracts (Dry extract, Tincture, Fluid extract, Decoction, Infusion)

0.5 - 9 grams dried root/rootlets, per day (Vuksan et al. 2008; Reay et al. 2006; Sievenpiper et al. 2006; Reay et al. 2005; Sunram-Lea et al. 2005; Kennedy et al. 2004; ESCOP 2003; Kennedy et al. 2002; Scholey and Kennedy 2002; Engels et al. 2001; Kennedy et al. 2001; Scaglione et al. 2001; Blumenthal et al. 2000; McGuffin et al. 1997; Engels et al. 1996; Scaglione et al. 1996; Gross et al. 1995; Scaglione et al. 1994; Scaglione et al. 1990; Petkov and Mosharrof 1987; D'Angelo et al. 1986; Soldati and Sticher 1980).

Traditional Chinese Medicine

Methods of preparation: Decoction, Decoction concentrate

3 - 10 grams dried root, per day (PPRC 2010; Bensky et al. 2004, Chen and Chen 2004)

Methods of preparation: Powder

0.5 - 4 grams dried root, per day (PPRC 2010, Bensky et al. 2004, Chen and Chen 2004)

Direction(s) for use

No statement required.

Duration(s) of use

Consult a health care practitioner/health care provider/health care professional/doctor/physician for use beyond 3 months (Mills and Bone 2005; Blumenthal et al. 2000; McGuffin et al. 1997; Bradley 1992).

Risk information

Caution(s) and warning(s)

- ▶ Consult a health care practitioner/health care provider/health care professional/doctor/physician prior to use if you are pregnant or breastfeeding, or have diabetes (Brinker 2010; Vuksan et al. 2008; Seely et al. 2008; Sievenpiper et al. 2006; ESCOP 2003; Tetsutani et al. 2000; Sotaniemi et al. 1995; Chin 1991).
- ▶ Consult a health care practitioner/health care provider/health care professional/doctor/physician prior to use if you are taking antidepressant medication, blood thinners or digoxin (Brinker 2010; Lee et al. 2008a; Dasgupta and Reyes 2005; Janetzki and Morreale 1997; Gonzalez-Seijo et al. 1995; Shader and Greenblatt 1988; Jones and Runikis 1987; Shader and Greenblatt 1985).

Contraindication(s)

Traditional Chinese Medicine

Do not use this product in cases of yin deficiency with heat signs, heat excess, or in the absence of significant *qi* deficiency (Bensky et al. 2004).

Known adverse reaction(s)

Stop use if you experience insomnia, anxiety or headaches (Lee et al. 2008b; Vuksan et al 2008; de Andrade et al.2007; Sievenpiper et al. 2006; Coon and Ernst 2002; Ellis and Reddy 2002; Scaglione et al. 2001; Siegel 1979).

Non-medicinal ingredients

Must be chosen from the current Natural Health Products Ingredients Database (NHPID) and must meet the limitations outlined in the database.

Storage conditions

No statement required.

Specifications

- ▶ The finished product specifications must be established in accordance with the requirements described in the Natural and Non-prescription Health Products Directorate (NNHPD) Quality of Natural Health Products Guide.
- ▶ The medicinal ingredient must comply with the requirements outlined in the NHPID.

References cited

Bensky D, Clavey, Stöger E, Gamble A. Chinese Herbal Medicine: Materia Medica. 3rd edition. Seattle (WA): Eastland Press, Incorporated; 2004.

BHP 1983: British Herbal Pharmacopoeia. Bournemouth (UK): British Herbal Medical Association.

Blumenthal M, Goldberg A, Brinkmann J, editors. 2000. Herbal Medicine: Expanded Commission E Monographs. Boston (MA): Integrative Medicine Communications.

Bone K. A clinical guide to blending liquid herbs: Herbal formulations for the individual patient. St. Louis (MI): Churchill Livingstone; 2003.

Bradley PR, editor. 1992. British Herbal Compendium: A Handbook of Scientific Information on Widely Used Plant Drugs, Volume 1. Bournemouth (UK): British Herbal Medicine Association.

Brinker F. Herb Contraindications and Drug Interactions, 4th edition. Sandy (OR): Eclectic Medical Publications; 2010.

Chen JK, Chen TT. Chinese Medical Herbology and Pharmacology. Crampton L, editor. City of Industry (CA): Art of Medicine Press Inc.; 2004.

Chin RKH. 1991. Ginseng and common pregnancy disorders. *Asia-Oceania Journal of Obstetrics and Gynaecology* 17(4):379-380.

Coon JT, Ernst E. 2002. *Panax ginseng*: a systematic review of adverse effects and drug interactions. *Drug Safety* 25(5):323-344.

D'Angelo L, Grimaldi R, Caravaggi M, Marcoli M, Perucca E, Lecchini S, Frigo GM, Crema A. 1986. A double-blind, placebo-controlled clinical study on the effect of a standardized ginseng extract on psychomotor performance in healthy volunteers. *Journal of Ethnopharmacology* 16(1):15-22.

Dasgupta A, Reyes MA. 2005. Effect of Brazillian, Indian, Siberian, Asian, and North American ginseng on serum digoxin measurement by immunoassays and binding of digoxin-like immunoreactive components of ginseng with Fab Fragment of antidigoxin antibody (Digiband). *American Journal of Clinical Pathology* 124(2):229-236.

de Andrade E, de Masquita AA, de Almeida Claro J, de Andrade PM, Ortiz V, Paranhos M, Srougi M. 2007. Study of the efficacy of Korean Red Ginseng in the treatment of erectile dysfunction. *Asian Journal of Andrology* 9(2):241-244.

Ellis JM, Reddy P. 2002. Effects of *Panax ginseng* on quality of life. *The Annals of Pharmacotherapy* 36(3):375-379.

Engels HJ, Fahlman MM, Wirth JC. 2003. Effects of ginseng on secretory IgA, performance, and recovery from interval exercise. *Medicine & Science in Sports & Exercise* 35(4):690-696.

Engels HJ, Kolokouri I, Cieslak TJ, Wirth JC. 2001. Effects of ginseng supplementation on supramaximal exercise performance and short-term recovery. *Journal of Strength and Conditioning Research* 15(3):290-295.

Engels HJ, Said JM, Wirth JC. 1996. Failure of chronic ginseng supplementation to affect work performance and energy metabolism in healthy adult females. *Nutrition Research* 6(8):1295-1305.

Engels HJ, Wirth JC. 1997. No ergogenic effects of ginseng (*Panax ginseng* C.A. Meyer) during graded maximal aerobic exercise. *Journal of the American Dietetic Association* 97(10):1110-1115.

ESCOP 2003: European Scientific Cooperative on Phytotherapy Scientific Committee. 2003. ESCOP Monographs: The Scientific Foundation for Herbal Medicinal Products, 2nd edition. Exeter (UK): European Scientific Cooperative on Phytotherapy and Thieme.

Gonzalez-Seijo JC, Ramos YM, Lastra I. 1995. Manic episode and ginseng: report of a possible case. *Journal of Clinical Psychopharmacology* 15(6):447-448.

Gross D, Krieger D, Efrat R, Dayan. 1995. Ginseng extract G115 for the treatment of chronic respiratory diseases. *Schweiz Zschr Ganzheits Medizin* 1:29-33.

Gross D, Shenkman Z, Bleiberg B, Dayan M, Gittelsohn M, Efrat R. 2002. Ginseng improves pulmonary functions and exercise capacity in patients with COPD. *Monaldi Archives for Chest Disease* 57(5-6):242-246.

Heo JH, Lee ST, Chu K, Oh MJ, Park HJ, Shim JY, Kim M. 2008. An open-label trial of Korean red ginseng as an adjuvant treatment for cognitive impairment in patients with Alzheimer's disease. *European Journal of Neurology* 15(8):865-868.

Hoffmann D. 2003. *Medical Herbalism: The Science and Practice of Herbal Medicine*. Rochester (VT): Healing Arts Press.

Janetzki K, Morreale AP. 1997. Probable interaction between warfarin and ginseng. *American Journal of Health-System Pharmacy* 54(6):692-693.

Jones BD, Runikis AM. 1987. Interaction of ginseng with phenelzine. *Journal of Clinical Pharmacology* 7(3):201-202.

Kennedy DO, Haskell CF, Wesnes KA, Scholey AB. 2004. Improved cognitive performance in human volunteers following administration of guarana (*Paullinia cupana*) extract: comparison and interaction with *Panax ginseng*. *Pharmacology, Biochemistry and Behavior* 79(3):401-411.

- Kennedy DO, Scholey AB, Wesnes KA. 2002. Modulation of cognition and mood following administration of single doses of *Ginkgo biloba*, ginseng, and a ginkgo/ginseng combination to healthy young adults. *Physiology & Behavior* 75(5):739-751.
- Kennedy DO, Scholey AB, Wesnes KA. 2001. Dose dependent changes in cognitive performance and mood following acute administration of *Ginseng* to healthy young volunteers. *Nutritional Neuroscience* 4(4):295-310.
- Kim SH, Park KS, Chang MJ, Sung JH. 2005. Effects of panax ginseng extract on exercise-induced oxidative stress. *Journal of Sports Medicine and Physical Fitness* 45(2):178-182.
- Lee SH, Ahn YM, Ahn SY, Doo HK, Lee BC. 2008a. Interaction between warfarin and *Panax ginseng* in ischemic stroke patients. *The Journal of Alternative and Complementary Medicine* 14(6):715-721.
- Lee ST, Chu K, Sim JY, Heo JH, Kim M. 2008b. *Panax ginseng* enhances cognitive performance in Alzheimer disease. *Alzheimer Disease and Associated Disorders* 22(3):222-226.
- McGuffin M, Hobbs C, Upton R, Goldberg A, editors. 1997. American Herbal Products Association's Botanical Safety Handbook. Boca Raton (FL): CRC Press.
- McGuffin M, Kartesz JT, Leung AY, Tucker AO, editors. 2000. Herbs of Commerce, 2nd edition. Silver Spring (MD): American Herbal Products Association.
- Mills S, Bone K. 2005. The Essential Guide to Herbal Safety. St. Louis (MO): Elsevier Churchill Livingstone.
- Petkov VD, Mosharraf AH. 1987. Effects of standardized ginseng extract on learning, memory and physical capabilities. *American Journal of Chinese Medicine* 15(1-2):19-29.
- Ph. Eur. 2008: European Pharmacopoeia Commission. 2008. European Pharmacopoeia, 6th edition, Volume 1. Strasbourg (FR): Directorate for the Quality of Medicines and HealthCare of the Council of Europe (EDQM).
- PPRC 2010: Pharmacopoeia of the People's Republic of China, Volume I. English edition 2010. Beijing (CN): The State Pharmacopoeia Commission of the People's Republic of China.
- Reay JL, Kennedy DO, Scholey AB. 2006. Effects of Panax ginseng, consumed with and without glucose, on blood glucose levels and cognitive performance during sustained 'mentally demanding' tasks. *Journal of Psychopharmacology* 20(6):771-781.
- Reay JL, Kennedy DO, Scholey AB. 2005. Single doses of Panax ginseng (G115) reduce blood glucose levels and improve cognitive performance during sustained mental activity. *Journal of Psychopharmacology* 19(4):357-365.

Scaglione F, Cattaneo G, Alessandria M, Cogo R. 1996. Efficacy and safety of the standardized ginseng extract G115 for potentiating vaccination against common cold and/or influenza syndrome. *Drugs Under Experimental and Clinical Research* 22(2):65-72.

Scaglione F, Cogo R, Cocuzza C, Arcidiacono M, Beretta A. 1994. Immunomodulatory effects of *Panax ginseng* C.A. Meyer (G115) on alveolar macrophages from patients suffering with chronic bronchitis. *International Journal of Immunotherapy* 10(1):21-24.

Scaglione F, Ferrara F, Dugnani S, Falchi M, Santoro G, Fraschini F. 1990. Immunomodulatory effects of two extracts of *Panax ginseng* C.A. Meyer. *Drugs Under Experimental and Clinical Research* 16(10):537-542.

Scaglione F, Weiser K, Alessandria M. 2001. Effects of the standardised ginseng extract G115 in patients with chronic bronchitis. *Clinical Drug Investigation* 21(1):41-45.

Schepdael PV. 1993. Les effets du ginseng G115 sur la capacité physique de sportifs d'endurance. *Acta Therapeutica* 19(4):337-347.

Scholey AB, Kennedy DO. 2002. Acute, dose-dependent cognitive effects of *Ginkgo biloba*, *Panax ginseng* and their combination in healthy young volunteers: differential interactions with cognitive demand. *Human Psychopharmacology* 17(1):35-44.

Seely D, Dugoua JJ, Perri D, Mills E, Koren G. 2008. Safety and efficacy of *Panax ginseng* during pregnancy and lactation. *The Canadian Journal of Clinical Pharmacology* 15(1):e87-e94.

Shader RI, Greenblatt DJ. 1988. Bees, ginseng and MAOIs revisited. *Journal of Clinical Psychopharmacology* 8(4):235.

Shader RI, Greenblatt DJ. 1985. Phenelzine and the dream machine – ramblings and reflections. *Journal of Clinical Psychopharmacology* 5(2):65.

Siegel RK. 1979. Ginseng abuse syndrome. Problems with the panacea. *The Journal of the American Medical Association* 241(15):1614-1615.

Sievenpiper JL, Sung MK, Buono MD, Seung-Lee K, Nam KY, Arnason JT, Leiter LA, Vuksan V. 2006. Korean red ginseng rootlets decrease acute postprandial glycemia: results from sequential preparation- and dose-finding studies. *Journal of the American College of Nutrition* 25(2):100-107.

Soldati F, Sticher O. 1980. HPLC separation and quantitative determination of ginsenosides from *Panax ginseng*, *Panax quinquefolium* and from ginseng drug preparations. 2nd communication. *Planta Medica* 39(4):348-357.

Sorensen H, Sonne J. 1996. A double-masked study of the effects of ginseng on cognitive functions. *Current Therapeutic Research* 57(12):959-968.

Sotaniemi EA, Haapakoski E, Rautio A. 1995. Ginseng therapy in non-insulin-dependent diabetic patients. *Diabetes Care* 18(10):1373-1375.

Sünram-Lea SI, Birchall RJ, Wesnes KA, Petrini O. 2005. The effect of acute administration of 400 mg of *Panax ginseng* on cognitive performance and mood in healthy young volunteers. *Current Topics in Nutraceutical Research* 3(1):65-74.

Tetsutani T, Yamamura M, Yamaguchi T, Onoyama O, Kono M. 2000. Can red ginseng control blood glucose in diabetic patients. *The Ginseng Review* 28:44-47.

USDA 2018: United States Department of Agriculture, Agricultural Research Service, National Genetic Resources Program. Germplasm Resources Information Network (GRIN) [database online]. *Panax ginseng*. Beltsville (MD): National Germplasm Resources Laboratory. [Accessed 2018 June 29]. Available from: http://www.ars-grin.gov/cgi-bin/npgs/html/tax_search.pl

USP 32 2009: United States Pharmacopeial Convention. 2009. United States Pharmacopeia and the National Formulary (USP 32 - NF 27). Rockville (MD): The United States Pharmacopeial Convention.

Vuksan V, Sung MK, Sievenpiper JL, Stavro PM, Jenkins AL, Buono MD, Lee KS, Leiter LA, Nam KY, Arnason JT, Choi M, Naeem A. 2008. Korean red ginseng (*Panax ginseng*) improves glucose and insulin regulation in well-controlled, type 2 diabetes: results of a randomized, double-blind, placebo-controlled study of efficacy and safety. *Nutrition, Metabolism & Cardiovascular Diseases* 18(1):46-56.

WHO 1999: World Health Organization (WHO) Monographs on Selected Medicinal Plants: Volume 1. Geneva (CHE): World Health Organization.

Williamson EM. 2003. *Potter's Herbal Cyclopaedia: The Authoritative Reference work on Plants with a Known Medical Use*. Saffron Walden (UK): The C.W. Daniel Company Limited.

Winston D, Maimes S. *Adaptogens: Herbs for strength, stamina and stress relief*. Rochester (VT): Healing Arts Press; 2007.

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

References reviewed

Awang DVC, Fugh-Berman A. 2002. Herbal interactions with cardiovascular drugs. *The Journal of Cardiovascular Nursing* 16(4):64-70.

Bahrke MS. 1997. Comments on 'manic episode and ginseng: report of a possible case'. *Journal of Clinical Psychopharmacology* 17(2):140-141.

- Bahrke MS, Morgan WP. 1994. Evaluation of the ergogenic properties of ginseng. *Sports Medicine* 18(4):229-248.
- Bahrke MS, Morgan WP. 2000. Evaluation of the ergogenic properties of ginseng: an update. *Sports Medicine* 29(2):113-133.
- Bartram T. 1998. *Bartram's Encyclopedia of Herbal Medicine*. London (UK): Robinson Publishing Ltd.
- BHP 1996: *British Herbal Pharmacopoeia*. Bournemouth (UK): The British Herbal Medicine Association.
- Blumenthal M. 2003. *ABC Clinical Guide to Herbs*. New York (NY): Theime.
- Bove M. 2001. *An Encyclopedia of Natural Healing for Children and Infants*, 2nd edition. Toronto (ON): McGraw-Hill.
- BP 2008: *British Pharmacopoeia Commission*. 2007. *British Pharmacopoeia 2008*. London (UK): The Stationary Office.
- Bradley PR, editor. 2006. *British Herbal Compendium: A Handbook of Scientific Information on Widely Used Plant Drugs, Volume 2*. Bournemouth (UK): British Herbal Medicine Association.
- Bucci LR. 2000. Selected herbs and human exercise performance. *The American Journal of Clinical Nutrition* 72(Suppl 2):624S-636S.
- Buettner C, Yeh GY, Phillips RS, Mittleman MA, Kaptchuk TJ. 2006. Systematic review of the effects of ginseng on cardiovascular risk factors. *Complementary and Alternative Medicine* 40(1):83-95.
- Cardinal BJ, Engels HJ. 2001. Ginseng does not enhance psychological well-being in healthy, young adults: results of a double-blind, placebo-controlled, randomized clinical trial. *Journal of the American Dietetic Association* 101(6):655-660.
- Chen K. 1981. The effect and abuse syndrome of ginseng. *Journal of Traditional Chinese Medicine* 1(1):69-72.
- Cho YK, Sung H, Lee HJ, Joo CH, Cho GJ. 2001. Long-term intake of Korean red ginseng in HIV-1-infected patients: development of resistance mutation to zidovudine is delayed. *International Immunopharmacology* 1(7):1295-1305.
- Choi HK, Choi YJ, Choi YD, Rha KH, Kim JH, Kim DK. 2002. SS-penogram: a new diagnostic test for erectile dysfunction. *Yonsei Medical Journal* 43(1):1-6.
- Choi HK, Seong DH, Rha KH. 1995. Clinical efficacy of Korean red ginseng for erectile

- dysfunction. *International Journal of Impotence Research* 7(3):181-186.
- Chosidow O, Dega H, Peytavin G. 1996. Ginseng as cause of Stevens-Johnson syndrome? *The Lancet* 348(9022):267.
- Coleman CI, Hebert JH, Reddy P. 2003. The effects of *Panax ginseng* on quality of life. *Journal of Clinical Pharmacy and Therapeutics* 28(1):5-15.
- Collomp K, Wright F, Collomp R, Shamari K, Bozzolan F, Préfaut C. 1996. Ginseng et exercice supramaximal. *Science & Sports* 11(4):250-251.
- Covington MB. 2001. Traditional Chinese medicine in the treatment of diabetes. *Diabetes Spectrum* 14(3):154-159.
- Dega H, Laporte JL, Francès C, Herson S, Chosidow O. 1996. Ginseng as a cause for Stevens-Johnson syndrome? *The Lancet* 347(9011):1344.
- Dukes MNG. 1978. Ginseng and mastalgia. *British Medical Journal* 1(6127):1621.
- Ellingwood F. 1983. *American Materia Medica, Therapeutics and Pharmacognosy*. Sandy (OR): Eclectic Medical Publications; [Reprint of 1919 original].
- Engelberg D, McCutcheon A. 2001. A case of ginseng-induced mania. *Journal of Clinical Psychopharmacology* 21(5):535-537.
- Faleni R, Soldati F. 1996. Ginseng as cause of Stevens-Johnson syndrome? *The Lancet* 348(9022):267.
- Felter HW. 1983. *The Eclectic Materia Medica, Pharmacology and Therapeutics*. Sandy (OR): Eclectic Medical Publications; [Reprint of 1922 original].
- Felter HW, Lloyd JU. 1983. *King's American Dispensatory, Volume 1, 18th edition*. Sandy (OR): Eclectic Medical Publications; [Reprint of 1898 original].
- Forgo I. 1982. The effect of different ginsenoside concentration on physical work capacity. *Notabene Medici* 12:721.
- Forgo I. 1983. [Effect of drugs on physical and the hormonal system of athletes]. *Wirkung von Pharmaka auf körperliche Leistung und Hormonsystem von Sportlern. 2. Mitteilung. Münchener Medizinische Wochenschrift* 125(38):822-824. [in German].
- Forgo I. 1985. The duration of effect of the standardized ginseng extract G115 in healthy competitive athletes. *Notabene Medici* 15:636.
- Forgo I, Kayasseh L, Staub JJ. 1981. [Effect of a standardized ginseng extract on general wellbeing, reaction time, lung function and gonadal hormones]. *Einfluss eines standardisierten Ginseng-Extraktes auf das Allgemeinbefinden, die Reaktionsfähigkeit, Lungenfunktion und die*

- gonadalen Hormone. Die Medizinische Welt 32(19):751-756. [in German]
- Forgo I, Kirchdorfer AM. 1981. [On the question of influencing the performance of top sportmen by means of biologically active substances]. Ginseng steigert die körperliche Leistung. *Arztliche Praxis* 33(44):1784-1786. [in German].
- Gaffney BT, Hügel HM, Rich PA. 2001. The effects of *Eleutherococcus senticosus* and *Panax ginseng* on steroidal hormone indices of stress and lymphocyte subset numbers in endurance athletes. *Life Sciences* 70(4):431-442.
- Gillis CN. 1997. *Panax ginseng* pharmacology: a nitric oxide link? *Biochemical Pharmacology* 54(1):1-8.
- Grieve M. 1971. *A Modern Herbal, Volume 1*. New York (NY): Dover Publications; [Reprint of 1931 Harcourt, Brace & Company publication].
- Gross D, Shenkman Z, Bleiberg B, Dayan M, Gittelsohn M, Efrat R. 2002. Ginseng improves pulmonary functions and exercise capacity in patients with COPD. *Monaldi Archives for Chest Disease* 57(5-6):242-246.
- Hallstrom C, Fulder S, Carruthers M. 1982. Effects of ginseng on the performance of nurses on night duty. *Comparative Medicine East and West* 6(4):277-282.
- HC 2007: Health Canada. Canada Vigilance Online Database: CADRMP Online Query. Ottawa (ON): Drugs and Health Products, Health Canada. [Accessed 2009 April 23]. Available from: http://205.193.93.51/CADRMP/index_e.jsp
- Hong H, Ji YH, Hong JH, Nam KY, Ahn TY. 2002. A double-blind crossover study evaluating the efficacy of Korean red ginseng in patients with erectile dysfunction: a preliminary report. *The Journal of Urology* 168(5):2070-2073.
- Izzo AA, Di Carlo G, Borrelli F, Ernst E. 2005. Cardiovascular pharmacotherapy and herbal medicines: the risk of drug interaction. *International Journal of Cardiology* 98(1):1-14.
- Jang DJ, Lee MS, Shin BC, Lee YC, Ernst E. 2008. Red ginseng for treating erectile dysfunction: a systematic review. *British Journal of Clinical Pharmacology* 66(4):444-450.
- Jiang X, Blair EYL, McLachlan AJ. 2006. Investigation of the effects of herbal medicines on warfarin response in healthy subjects: a population pharmacokinetic-pharmacodynamic modeling approach. *Journal of Clinical Pharmacology* 46(11):1370-1378.
- Jiang X, Williams KM, Llauw WS, Ammit AJ, Roufogalis BD, Duke CC, Day RO, McLachlan AJ. 2004. Effect of St. John's wort and ginseng on the pharmacokinetics and pharmacodynamics of warfarin in healthy subjects. *British Journal of Clinical Pharmacology* 57(5):592-599.
- Kaneko H, Nakanishi K. 2004. Proof of the mysterious efficacy of ginseng: basic and clinical trials: clinical effects of medical ginseng, Korean red ginseng: specifically, its anti-stress action

- for prevention of disease. *Journal of Pharmacological Sciences* 95(2):158-162.
- Kaneko H, Nakanishi K, Kuwashima K, Ikeda K. 2000. Effects of the long-term administration of red ginseng on working stress and changes of physiological parameters of workers. A study at a care hospital for the aged (ROUJIN BYOUIN). *Therapeutic Research* 21(5):1451-1463. [abstract]
- Kang HY, Kim SH, Lee WJ, Byrne HK. 2002. Effects of ginseng ingestion on growth hormone, testosterone, cortisol, and insulin-like growth factor 1 responses to acute resistance exercise. *Journal of Strength and Conditioning Research* 16(2):179-183.
- Kennedy DO, Scholey AB. 2003. Ginseng: potential for the enhancement of cognitive performance and mood. *Pharmacology, Biochemistry and Behavior* 75(3):687-700.
- Kennedy DO, Scholey AB, Drewery L, Marsh VR, Moore B, Ashton H. 2003. Electroencephalograph effects of single doses of *Ginkgo biloba* and *Panax ginseng* in healthy young volunteers. *Pharmacology, Biochemistry and Behavior* 75(3):701-709.
- Kim JH, Park CY, Lee SJ. 2006. Effects of sun ginseng on subjective quality of life in cancer patients: a double-blind, placebo-controlled pilot trial. *Journal of Clinical Pharmacy and Therapeutics* 31(4):331-334.
- Klepser TB, Klepser ME. 1999. Unsafe and potentially safe herbal therapies. *American Journal of Health-System Pharmacy* 56(2):125-138.
- Kolokouri I, Engels HJ, Cieslack T, Wirth JC. 1999. Effect of chronic ginseng supplementation on short duration, supramaximal exercise test performance. *Medicine & Science in Sports & Exercise* 31(Suppl 5):S117.
- Kulaputana O, Thanakomsirichot S, Anomasiri W. 2007. Ginseng supplementation does not change lactate threshold and physical performances in physically active Thai men. *Journal of the Medical Association of Thailand* 90(6):1172-1179.
- Kwak HE, Kim SS, Kim YC, Jung SR, Kang HY, Lee CD. 2007. Effects of red ginseng intake on muscle injury due to eccentric exercise. *Medicine & Science in Sports & Exercise* 39(Suppl 5):S361.
- Lee HY, Kim CS. 1986. [Clinical investigation of Insam (Korean ginseng) on sexual potency]. *Korean Journal of Urology* 27(2):235-240. [in Korean]
- Lee FC, Ko JH, Park JK, Lee JS. 1987. Effects of *Panax ginseng* on blood alcohol clearance in man. *Clinical and Experimental Pharmacology & Physiology* 14(6):543-546.
- Lee HY, Paick JS, Lee SW. 1988. [Efficacy of ginseng extract on patients with oligospermia]. *Korean Journal of Urology* 29(8):950-960. [in Korean]
- Lust J. 1974. *The Herb Book*. New York (NY): Bantam Books Incorporated, published by

arrangement with Benedict Lust Publications.

Ma SW, Benzie IF, Chu TT, Fok BS, Tomlinson B, Critchley LA. 2008. Effect of *Panax ginseng* supplementation on biomarkers of glucose tolerance, antioxidant status and oxidative stress in type 2 diabetic subjects: results of a placebo-controlled human intervention trial. *Diabetes, Obesity and Metabolism* 10(11):1125-1127.

Mills S, Bone K. 2000. *Principles and Practice of Phytotherapy*. Toronto (ON): Churchill Livingstone.

Mills E, Duguo J, Perri D, Koren G. 2006. *Herbal Medicines in Pregnancy and Lactation. An Evidence-Based Approach*. New York (NY): Taylor and Francis.

Moerman DE. 1998. *Native American Ethnobotany*. Portland (OR): Timber Press.

Murphy LL, Lee TJ. 2002. Ginseng, sex behavior, and nitric oxide. *Annals of the New York Academy of Sciences* 962:372-377.

Nocerino E, Amato M, Izzo AA. 2000. The aphrodisiac and adaptogenic properties of ginseng. *Fitoterapia* 71(Suppl 1):S1-S5.

Palmer BV, Montgomery ACV, Monteiro JCMP. 1978. Gin seng and mastalgia. *British Medical Journal* 1(6122):1284.

Persson J, Bringlov E, Nilsson LG, Nyberg L. 2004. The memory-enhancing effects of ginseng and ginkgo biloba in healthy volunteers. *Psychopharmacology* 172(4):430-434.

Ravens JA, Edwards D. 2001. Roots: evolutionary origins and biogeochemical significance. *Journal of Experimental Botany* 52(90001):381-401.

Reay JL, Kennedy DO, Scholey AB. 2006. The glycaemic effects of single doses of *Panax ginseng* in young healthy volunteers. *British Journal of Nutrition* 96(4):639-642.

Reay JL, Scholey AB, Milne A, Fenwick J, Kennedy DO. 2008. *Panax ginseng* has no effect on indices of glucose regulation following acute or chronic ingestion in healthy volunteers. *British Journal of Nutrition* 19:1-6

Ryu SJ, Chien YY. 1995. Ginseng-associated cerebral arteritis. *Neurology* 45:829-830.

Salvati G, Genovesi G, Marcellini L, Paolini P, De Nuccio I, Pepe M, Re M. 1996. Effects of *Panax ginseng* C.A. Meyer saponins on male fertility. *Panminerva Medica* 38(4):249-254.

Schilcher, H. 1997. *Phytotherapy in Paediatrics. Handbook for Physicians and Pharmacists*. Stuttgart (D): Medpharm Scientific Publishers.

Shou-zhong Y, translator. 2004. *The Divine Farmer's Materia Medica - A translation of the Shen Nong Ben Cao Jing*. Boulder (CO): Blue Poppy Press.

Sievenpiper JL, Arnason JT, Leiter LA, Vuksan V. 2003. Null and opposing effects of asian ginseng (*Panax ginseng* C.A Meyer) on acute glycemia: results of two acute dose escalation studies. *Journal of the American College of Nutrition* 22(6):524-532.

Sievenpiper JL, Arnason JT, Leiter LA, Vuksan V. 2004. Decreasing, null and increasing effects of eight popular types of ginseng on acute postprandial glycemic indices in healthy humans: the role of ginsenosides. *Journal of the American College of Nutrition* 23(3):248-258.

Soldati F. 1988. Immunological studies of ginseng. *Proceedings of the 5th International Ginseng Symposium, Seoul*: 108-114.

Srisurapanon S, Rungroeng K, Apibal S, Cherdrugsi P, Siripol R, Vanich-Angkul V, Timvipark C. 1997. The effect of standardized ginseng extract on peripheral blood leukocytes and lymphocyte subsets: a preliminary study in young healthy adults. *Journal of the Medical Association of Thailand* 80(Suppl 1):S81-S85.

Sticher O, Soldati F. HPLC Trennung and quantitative Bestimmung der Ginsenoside von *Panax ginseng*, *Panax quinquefolium* and von ginseng-spezialitäten. *Planta Medica* 36(1):30-42.

Sung H, Kang SM, Lee MS, Kim TG, Cho YK. 2005. Korean red ginseng slows depletion of CD4 T cells in human immunodeficiency virus type 1-infected patients. *Clinical and Diagnostic Laboratory Immunology* 12(4):497-501.

Teves M, Wright J, Welch M, Patton J, Mello R, Rock PB, Knapik JJ, Vogel JA, der Marderosian A. 1983. Effects of ginseng on repeated bouts of exhaustive exercise. *Medicine & Science in Sports & Exercise* 15(2):162.

Tilgner S. 1999. *Herbal Medicine from the Heart of the Earth*. Creswell (OR): Wise Acre Press.

Tode T, Kikuchi Y, Hirata J, Kita T, Nakata H, Nagata I. 1999. Effect of Korean red ginseng on psychological functions in patients with severe climacteric syndromes. *International Journal of Gynecology & Obstetrics* 67(3):169-174.

von Ardenne M, Klemm W. 1987. Measurements of the increase in the difference between the arterial and venous Hb-O₂ saturation obtained with daily administration of 200 mg standardized ginseng extract G115 for four weeks. *Panminerva Medica* 29:143-150.

Vogel VJ. 1970. *American Indian Medicine*. Norman (OK): The University of Oklahoma Press.

Vogler BK, Pittler MH, Ernst E. 1999. The efficacy of ginseng. A systematic review of randomized clinical trials. *European Journal of Clinical Pharmacology* 55(8):567-575.

Weiss RF. 1998. *Herbal Medicine*. Gothenburg (SE), Beaconsfield (UK): AB Arcanum, Beaconsfield Publishers Ltd.

WHO 2002: World Health Organization (WHO) Monographs on Selected Medicinal Plants: Volume 2. Geneva (CHE): World Health Organization.

WHO 2007: World Health Organization (WHO) Monographs on Selected Medicinal Plants: Volume 3. Geneva (CHE): World Health Organization.

Wiersema J, León B. 1999. World Economic Plants: A Standard Reference. Boca Raton (FL): CRC Press LLC.

Williamson EM, Evans FJ, Wren RC. 1998. Potter's New Cyclopaedia of Botanical Drugs and Preparations. Saffron Walden (UK): C.W. Daniel Company Limited.

Wiseman N and Ye F. 1999. A Practical Dictionary of Chinese Medicine. 2nd edition. Brookline (MA): Paradigm Publications.

Yeh G, Eisenberg DM, Kaptchuk TJ, Phillips RS. 2003. Systematic review of herbs and dietary supplements for glycemic control in diabetes. *Diabetes Care* 26(4):1277-1294.

Yeung H. 1998. Handbook of Chinese Herbal Formulas. Rosemeade (CA): Institute of Chinese Medicine.

Ziemia AW, Chmura J, Kaciuba-Uscilko H, Nazar K, Wisnik P, Gawronski W. 1999. Ginseng treatment improves psychomotor performance at rest and during graded exercise in young athletes. *International Journal of Sport Nutrition* 9(4):371-377.