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GINSENG, PANAX

Also Known As:

Asian Ginseng, Asiatic Ginseng, Chinese Ginseng, Chinese Red Ginseng, Ginseng, Ginseng Asiatique, Ginseng Radix Alba, Ginseng Root, Guigai, Hong Shen, Japanese Ginseng, Jen-Shen, Jinsao, Jintsam, Insam, Korean Ginseng, Korean Panax, Korean Panax Ginseng, Korean Red Ginseng, Korean White Ginseng, Ninjin, Oriental Ginseng, Radix Ginseng Rubra, Red Chinese Ginseng, Red Ginseng, Red Kirin Ginseng, Red Korean Ginseng, Red Panax Ginseng, Renshen, Renxian, Sheng Shai Shen, White Ginseng, White Panax Ginseng.
CAUTION: See separate listings for Blue Cohosh, Canaigre, Codonopsis, Ginseng American, Ginseng Siberian, Panax Pseudoginseng, and Ashwaganda.

Scientific Name:

Panax ginseng, synonym Panax schinseng.
Family: Araliaceae.

People Use This For:

Orally, Panax ginseng is used as a so-called "adaptogen" for increasing resistance to environmental stress and as a general tonic for improving well-being. It is also used for stimulating immune function, improving physical and athletic stamina, improving cognitive function, concentration, memory, and work efficiency. It is also used orally for depression, anxiety, chronic fatigue syndrome (CFS), Pseudomonas infection in cystic fibrosis, chronic bronchitis, breast cancer, ovarian cancer, liver cancer, lung cancer, and skin cancer. Panax ginseng is also used orally for anemia, diabetes, gastritis, neurasthenia, erectile dysfunction, impotence and male fertility, fever, hangover, and asthma. It is also used orally for bleeding disorders, loss of appetite, vomiting, colitis, dysentery, cancer, insomnia, neuralgia, rheumatism, dizziness, headache, convulsions, disorders of pregnancy and childbirth, hot flashes due to menopause, and to slow the aging process.
Topically, Panax ginseng is used as part of a multi-ingredient preparation for treating premature ejaculation.
In manufacturing, Panax ginseng is used to make soaps, cosmetics, and as a flavoring in beverages.

Safety:

POSSIBLY SAFE ...when used orally and appropriately, short-term. Panax ginseng seems to be safe when used for less than 3 months (8813, 8814). ...when used topically, short-term as part of a multi-ingredient preparation (SS Cream). This preparation seems to be safe when applied and left on the glans penis for one hour (2537). Further evaluation is needed to determine its safety after prolonged, repetitive topical use.
POSSIBLY UNSAFE ...when used orally, long-term. There is some concern about

the long-term safety due to potential hormone-like effects, which might cause adverse effects with prolonged use (12537). Tell patients to limit continuous use to less than 3 months.

CHILDREN: LIKELY UNSAFE ...when used orally in infants. Use of Panax ginseng in newborns is associated with intoxication that can lead to death (12). There is insufficient reliable information available about use in older children; avoid using.

PREGNANCY: POSSIBLY UNSAFE ...when used orally. Ginsenoside Rb1, an active constituent of Panax ginseng, has teratogenic effects in animal models (10447); avoid using.

LACTATION: Insufficient reliable information available; avoid using.

Effectiveness:

POSSIBLY EFFECTIVE

Cognitive function. Taking Panax ginseng orally might improve abstract thinking, mental arithmetic skills, and reaction times in healthy, middle-aged people (2064). Panax ginseng alone does not seem to improve memory (2064), but there is some evidence that a combination of Panax ginseng and ginkgo leaf extract can improve memory in otherwise healthy people ages 38 to 66 years (1903, 8591).

Diabetes. There is some evidence that taking Panax ginseng orally, 200 mg daily, can decrease fasting blood glucose levels and hemoglobin A1c (HbA1c) in patients with type 2 diabetes (4225).

Erectile dysfunction (ED). Taking Panax ginseng orally seems to improve sexual function in men with erectile dysfunction (8813).

Premature ejaculation. Applying a multi-ingredient cream preparation containing Panax ginseng, angelica root, Cistanches deserticola, Zanthoxyl species, torlidis seed, clove flower, asiasari root, cinnamon bark, and toad venom (SS Cream) to the glans penis one hour prior to intercourse and washing off immediately before intercourse seems to improve ejaculatory latency in men with premature ejaculation (2537).

POSSIBLY INEFFECTIVE

Athletic performance. Taking Panax ginseng orally doesn't seem to improve aerobic exercise performance (1427, 4230, 4231, 4236).

Menopausal symptoms. Taking Panax ginseng orally doesn't seem to help vasomotor symptoms such as hot flashes in postmenopausal women (10981). In postmenopausal women, some preliminary clinical research suggests that panax ginseng might improve quality of life, and menopausal symptoms such as fatigue, insomnia, and depression (3863, 10981).

Quality of life. Taking Panax ginseng orally doesn't seem to be helpful for improving mood, sense of well being and overall quality of life. Although some research suggests that Panax ginseng might improve self-rated quality of life (6254), other studies show no benefit (8601, 10314). Tell patients not to rely on Panax ginseng to improve mood or sense of well being.

INSUFFICIENT RELIABLE EVIDENCE to RATE

Breast cancer. Population research in China suggests that breast cancer patients who regularly take any form of ginseng, including either Panax ginseng or American

ginseng, have higher quality of life scores and have a lower risk of overall mortality, breast cancer-related mortality, and breast cancer recurrence compared to patients who do not take ginseng (14466); however, ginseng users were also significantly more likely to have been treated with tamoxifen.

Bronchitis. Taking a specific Panax ginseng extract (G115) orally might be beneficial when used adjunctively for treating acute exacerbations of chronic bronchitis. Panax ginseng, combined with antibiotic therapy, might reduce bronchial bacterial counts more than antibiotic therapy alone (8814).

Cancer. Epidemiological data suggests that taking ginseng orally might decrease the incidence of cancer, specifically stomach cancer, lung cancer, liver cancer, ovarian cancer, and skin cancer (2063, 3122).

Common cold. There is some evidence that taking a specific Panax ginseng extract (G115) orally can decrease the chance of catching a cold (589).

Congestive heart failure (CHF). An intravenous formulation of ginseng seems to increase ejection fraction in patients with congestive heart failure. Ginseng might improve hemodynamics and might work synergistically with digoxin (4243, 8604).

Influenza. There is some preliminary evidence that suggests taking a specific Panax ginseng extract (G115) orally four weeks prior to influenza vaccination and continued for eight more weeks can decrease the risk of getting the flu (589).

More evidence is needed to rate Panax ginseng for these uses.

Mechanism of Action:

The applicable part of Panax ginseng is the root. Panax ginseng contains several active constituents. The constituents thought to be of most importance are triterpenoid saponins referred to collectively as ginsenosides or panaxosides. Ginsenosides is the term developed by Asian researchers, and the term panaxosides was developed by early Russian researchers. Numerous subtypes of ginsenosides have been identified. Other constituents include pectin, B vitamins, and various flavonoids (11). Panax ginseng also contains the peptidoglycans, panaxans, which have hypoglycemic effects (12536). The ginsenosides have a wide range of pharmacological activity and effects. In some cases, these isolated constituents seem to counteract each other's activity. For example, ginsenoside Rg1, raises blood pressure and acts as a central nervous system (CNS) stimulant. Ginsenoside Rb1 lowers blood pressure and acts as a CNS depressant (11). They also seem to interfere with platelet aggregation and coagulation (1522). Ginsenosides also potentiate nerve growth factor (11) and might confer neuroprotection through nicotinic activity (3109). There is also evidence that ginsenosides can relax human bronchial smooth muscle by stimulating the release of nitrous oxide from airway epithelium which may account for the potential anti-asthmatic effect of Panax ginseng (11007). However, research on related ginseng species, Panax pseudoginseng, suggests these ginsenosides may not be pharmacologically significant. Rb1 has a low oral bioavailability, and Rg1 is rapidly eliminated from the blood in animal models (11153).

Ginseng is widely used as a general tonic or "adaptogen" for fighting stress. There is some evidence that it might work against stress by affecting the hypothalamic-pituitary-adrenal (HPA) axis. Panax ginseng saponins seem to increase serum cortisol concentrations (3256, 3257). Panax ginseng might also increase dehydroepiandrosterone sulfate (DHEA-S) levels in women (3863).

Panax ginseng might affect immune function and might have anticancer effects. Panax ginseng appears to stimulate natural-killer cell activity and possibly other immune-system activity. It might also have some antitumor activity (3122). Extracts of

Panax ginseng decrease the production of tumor necrosis factor (TNF), diminish DNA strand breakage, and inhibit the formation of induced skin tumors (11006). There is conflicting research about the antioxidant and free radical scavenging activity of panax ginseng (4227, 8602). Ginsenosides have been shown to inhibit tumor cell invasion and suppress sister chromatid exchanges in human lymphocytes (11006). Panax ginseng also contains water insoluble polyacetylenic constituents such as panaxynol, panaxydol, and panaxytriol. Panaxydol seems to have antiproliferative effects on various types of cancer cells by inhibiting cancer cell growth at the cell cycle G1 to S transition phase (11005). In peptic ulceration, Panax ginseng has shown inhibitory activity on Helicobacter pylori-induced hemagglutination (3121). Samgyetang, a soup made from chicken, panax ginseng, garlic, jujube, and chestnuts, appears to offer protection from experimentally induced peptic ulcers (10249).

Panax ginseng may lower serum cholesterol and triglycerides, possibly by increasing lipoprotein lipase activity, which enhances lipid metabolism (12538). However, panax ginseng appears to have negligible effects on cardiovascular function (4322).

Panax ginseng may affect blood glucose. Preliminary evidence that Panax ginseng might reduce tissue insulin resistance and changes in gene expression in Type II diabetes (8605). Ginsenosides in Panax ginseng might also directly stimulate insulin release (6461). The effect of various ginsengs on glucose appears to be related in part to the mix of ginsenosides. Other nonginsenoside constituents likely affect blood glucose as well. Panax ginseng and other ginsengs contain protopanaxadiol (PPD) ginsenosides, Rb1, Rb2, Rc, and Rd. They also contain protopanaxatriol (PPT) ginsenosides, Rg1, Re, and Rf. A higher ratio of PPD ginsenosides to PPT ginsenosides is related to greater blood glucose and insulin lowering potency of the ginseng product. Compared with American ginseng, panax ginseng appears to have a lower PPD to PPT ratio and may have less blood glucose. Some research suggests Panax ginseng may actually increase postprandial blood glucose and lower preprandial insulin levels. However, ginsenoside content varies among batches, plant parts, and preparation methods (12536).

The estrogenic effects of ginseng are controversial. Some clinical evidence suggests it doesn't have estrogen-mediated effects such as increasing follicle-stimulating hormone (FSH), estradiol levels, or endometrial thickness (10981). However, case reports of ginseng side effects such as postmenopausal vaginal bleeding suggest estrogen activity (590, 591, 592, 10982, 10983) . Panax ginseng extract has been shown to increase serum ceruloplasmin oxidase activity (a measure of estrogenic activity in the liver) in animal models when ovaries are removed (6180). In vitro research also shows estrogen activity. Studies on human breast cancer cells indicate that ginseng, specifically its constituent ginsonside-Rb1, acts as a phytoestrogen (10984).

Panaxagin, a protein isolated from unprocessed ginseng root, seems to have antiviral and antifungal activity, according to preliminary research. It appears to inhibit HIV reverse transcriptase and ribosomal activity of some fungi (8603).

A multi-ingredient cream preparation containing Panax ginseng is thought to work in premature ejaculation by increasing the penile vibratory threshold and reducing the amplitude of penile somatosensory evoked potentials (2537). Some people try ginseng for cystic fibrosis because there is preliminary evidence that it has activity against Pseudomonas aeruginosa lung infections, but this effect has not yet been demonstrated in humans (3095, 3096).

There is some evidence that a Panax ginseng root extract can mildly inhibit cytochrome P450 2D6 (CYP2D6) activity by approximately 6% in humans. However, contradictory research suggests Panax ginseng might not significantly inhibit

CYP2D6. Panax ginseng appears to have no effect on CYP1A2 and CYP3A4 activity (1303, 10847).

Adverse Reactions:

Orally, Panax ginseng is usually well tolerated, but some patients can experience side effects. The most common side effect is insomnia (589). Less commonly patients can experience mastalgia (590), vaginal bleeding (591, 592, 3354), amenorrhea, tachycardia and palpitations, hypertension, hypotension, edema, decreased appetite, diarrhea, hyperpyrexia, pruritus, rose spots, headache, vertigo, euphoria, and mania (594). Uncommon side effects can include cerebral arteritis (595), Stevens-Johnson syndrome (596), cholestatic hepatitis (associated with a Panax ginseng-containing, multi-ingredient product, Prostata) (598), and anaphylaxis (11971).

There is a lot of controversy about the existence of a "ginseng abuse syndrome". In the late 1970s one author reported the existence of this syndrome that occurred after long-term use of ginseng. Symptoms included one or more of the following- hypertension, nervousness, insomnia, increased libido, estrogenic effects, skin eruptions, edema, and diarrhea (3353). Experts now agree there is not a ginseng abuse syndrome (515). However, many of these individual side effects can occur in some patients, even after short-term use of Panax ginseng.

There is a case report of menometrorrhagia and tachyarrhythmia in a 39-year-old woman who took Panax ginseng 1000-1500 mg/day orally and also applied a facial cream topically that contained Panax ginseng. Upon evaluation for menometrorrhagia, the patient also reported a history of palpitations. It was discovered that she had sinus tachycardia on ECG. However, the patient was a habitual consumer of coffee 4-6 cups/day and at the time of evaluation was also mildly anemic. The patient was advised to discontinue taking Panax ginseng. During the 6 month period following discontinuation the patient did not have any more episodes of menometrorrhagia or tachyarrhythmia (13030).

Topically, when a specific multi-ingredient cream preparation (SS Cream) has been applied to the glans penis, sporadic erectile dysfunction, excessively delayed ejaculation, mild pain, and local irritation and burning has occurred (2537).

Interactions with Herbs & Supplements:

BITTER ORANGE: Theoretically, comitant use might prolong the QT interval due to its sympathomimetic effects. Ephedra, another herb with sympathomimetic effects, has been reported to have an additive effect with Panax ginseng and increase the risk of life-threatening ventricular arrhythmias (4322, 11355).

COFFEE, GUARANA, TEA: Theoretically, concomitant use may potentiate therapeutic and adverse effects due to the caffeine content of coffee, guarana, or tea (589, 594).

COUNTRY MALLOW: Theoretically, comitant use might prolong the QT interval due to its ephedrine content. Ephedra, which also contains ephedrine, has been reported to have an additive effect with Panax ginseng and increase the risk of life-threatening ventricular arrhythmias (4322, 11355).

EPHEDRA: Ephedra-containing supplements may prolong the QT interval. This might have an additive effect with Panax ginseng and increase the risk of life-threatening ventricular arrhythmias (4322, 11355).

HERBS AND SUPPLEMENTS WITH HYPOGLYCEMIC EFFECTS: There is some evidence that Panax ginseng might lower blood glucose (4225). Theoretically, concomitant use with other herbs and supplements that decrease blood glucose levels

might increase the risk of hypoglycemia. Some of these products include bitter melon, ginger, goat's rue, fenugreek, kudzu, willow bark, and others.

Interactions with Drugs:

ALCOHOL (Ethanol)

Interaction Rating = **Moderate** Be cautious with this combination
Severity = Mild " Occurrence = Probable " Level of Evidence = B

Taking Panax ginseng 3 grams/65 kg body weight before drinking alcohol seems to significantly increase the clearance of alcohol. People taking Panax ginseng have blood alcohol levels about 35% lower compared to people not taking Panax ginseng while drinking alcohol. It is thought that Panax ginseng might lower alcohol levels by increasing activity of alcohol and aldehyde dehydrogenase (12191).

ANTICOAGULANT/ANTIPLATELET DRUGS

Interaction Rating = **Moderate** Be cautious with this combination
Severity = High " Occurrence = Unlikely " Level of Evidence = B

In vitro evidence suggests that ginsenoside constituents in Panax ginseng might decrease platelet aggregation (1522, 11891). However, research in humans suggests that ginseng does not affect platelet aggregation (11890). Animal research indicates low oral bioavailability of Rb1 and rapid elimination of Rg1, which might explain the discrepancy between in vitro and human research (11153). Until more is known, use with caution in patients concurrently taking anticoagulant or antiplatelet drugs. Some antiplatelet and anticoagulant drugs include aspirin, cilostazol (Pletal), clopidogrel (Plavix), dalteparin (Fragmin), enoxaparin (Lovenox), heparin, ticlopidine (Ticlid), and others.

ANTIDIABETES DRUGS

Interaction Rating = **Moderate** Be cautious with this combination
Severity = Moderate " Occurrence = Probable " Level of Evidence = B

Theoretically, concomitant use might enhance blood glucose lowering effects (4225). Monitor blood glucose levels closely. Some antidiabetes drugs include glimepiride (Amaryl), glyburide (DiaBeta, Glynase PresTab, Micronase), insulin, pioglitazone (Actos), rosiglitazone (Avandia), and others.

CAFFEINE

Interaction Rating = **Moderate** Be cautious with this combination
Severity = Moderate " Occurrence = Probable " Level of Evidence = B

Theoretically, caffeine might have an additive effect on the stimulant effects of panax ginseng (589, 594).

CYTOCHROME P450 2D6 (CYP2D6) SUBSTRATES

Interaction Rating = **Moderate** Be cautious with this combination
Severity = Moderate " Occurrence = Possible " Level of Evidence = B

There is some evidence that Panax ginseng can inhibit the cytochrome P450 2D6 (CYP2D6) enzyme by approximately 6% (1303). However, contradictory research suggests Panax ginseng might not inhibit CYP2D6 (10847). Until more is known, use Panax ginseng cautiously in patients taking drugs metabolized by these enzymes. Some of these drugs include amitriptyline (Elavil), clozapine (Clozaril), codeine, desipramine (Norpramin), donepezil (Aricept), fentanyl (Duragesic), flecainide (Tambocor), fluoxetine (Prozac), meperidine (Demerol), methadone (Dolophine), metoprolol (Lopressor, Toprol XL), olanzapine (Zyprexa), ondansetron (Zofran), tramadol (Ultram), trazodone (Desyrel), and others.

FUROSEMIDE (Lasix)
Interaction Rating = **Moderate** Be cautious with this combination
Severity = Moderate " Occurrence = Possible " Level of Evidence = D

There is some concern that Panax ginseng might contribute to diuretic resistance. There is one case of resistance to furosemide diuresis in a patient taking a germanium-containing ginseng product (770).

IMMUNOSUPPRESSANTS
Interaction Rating = **Moderate** Be cautious with this combination
Severity = High " Occurrence = Possible " Level of Evidence = B

Theoretically, concurrent use might interfere with immunosuppressive therapy. Panax ginseng might have immune system stimulating properties (3122). Immunosuppressant drugs include azathioprine (Imuran), basiliximab (Simulect), cyclosporine (Neoral, Sandimmune), daclizumab (Zenapax), muromonab-CD3 (OKT3, Orthoclone OKT3), mycophenolate (CellCept), tacrolimus (FK506, Prograf), sirolimus (Rapamune), prednisone (Deltasone, Orasone), and other corticosteroids (glucocorticoids).

INSULIN
Interaction Rating = **Moderate** Be cautious with this combination
Severity = Moderate " Occurrence = Probable " Level of Evidence = B

There is some concern that Panax ginseng might have additive hypoglycemic effects when used with insulin. Insulin dose adjustments might be necessary in patients taking Panax ginseng (4225); use with caution.

MONOAMINE OXIDASE INHIBITORS (MAOIs)
Interaction Rating = **Moderate** Be cautious with this combination
Severity = Moderate " Occurrence = Probable " Level of Evidence = D

Theoretically, Panax ginseng can interfere with MAOI therapy. Concomitant use with phenelzine (Nardil) is associated with insomnia, headache, tremors (617), and hypomania (618).

STIMULANT DRUGS
Interaction Rating = **Moderate** Be cautious with this combination
Severity = Moderate " Occurrence = Possible " Level of Evidence = D

Theoretically, panax ginseng might have an additive effect when used with stimulant drugs (589, 594).

WARFARIN (Coumadin)
Interaction Rating = **Moderate** Be cautious with this combination
Severity = High " Occurrence = Unlikely " Level of Evidence = B

There has been a single case report of decreased effectiveness of warfarin in a patient who also took Panax ginseng (619). However, it's questionable whether Panax ginseng was the cause of this decrease in warfarin effectiveness. Some research in humans and animals suggests that Panax ginseng does not affect the pharmacokinetics of warfarin (2531, 11890). However, other research in humans suggests that Panax ginseng might modestly increase the clearance of the S-warfarin isomer (15176). More evidence is needed to determine whether Panax ginseng causes a significant interaction with warfarin.

Interactions with Foods:

ALCOHOL: Taking Panax ginseng 3 grams/65 kg body weight before drinking alcohol seems to significantly increase the clearance of alcohol. People taking Panax ginseng have blood alcohol levels about 35% lower compared to people not taking Panax ginseng while drinking alcohol. It is thought that Panax ginseng might lower alcohol levels by increasing activity of alcohol and aldehyde dehydrogenase (12191).
COFFEE, TEA: Theoretically, panax ginseng might have an additive stimulant effect with the caffeine in coffee and tea (589, 594).

Interactions with Lab Tests:

ACTIVATED PARTIAL THROMBOPLASTIN TIME (aPTT), THROMBIN TIME (TT): Theoretically, Panax ginseng might prolong aPTT, TT, and increase test results (1522).
GLUCOSE: The effect of Panax ginseng on blood glucose may vary with batches, plant parts, and preparation methods (12536). Panax ginseng might reduce or increase fasting blood glucose concentrations and test results (4225, 12536).
GLYCOSYLATED HEMOGLOBIN (HbA1c): Panax ginseng might improve glucose control and reduce HbA1c values in patients with type 2 diabetes (4225).

Interactions with Diseases or Conditions:

AUTOIMMUNE DISEASES: Panax ginseng seems to stimulate immune function (3122). Theoretically, ginseng might exacerbate autoimmune diseases by stimulating disease activity. Advise patients with autoimmune diseases such as multiple sclerosis (MS), systemic lupus erythematosus (SLE), rheumatoid arthritis (RA), or others to avoid or use ginseng with caution.
BLEEDING CONDITIONS: Ginseng has been reported to decrease blood coagulation (3122); contraindicated in cases of hemorrhage or thrombosis.
CARDIAC CONDITIONS: Ginseng can slightly increase the QT interval and slightly decrease diastolic blood pressure in healthy adults on the first day of therapy. However, there are no changes with prolonged use (4322). Ginseng has not been studied in people with cardiovascular disease. Use with caution.
DIABETES: Ginseng is reported to have hypoglycemic activity (4225). Use in diabetics might increase the risk of hypoglycemic episodes; use with caution.
HORMONE SENSITIVE CANCERS/CONDITIONS: Preliminary evidence shows that Panax ginseng can have estrogenic effects (590, 591, 592, 6180, 10982, 10983, 10984) . The estrogenic activity is attributed to the ginsenosides constituents of Panax ginseng (10984). Women with hormone sensitive conditions should avoid taking Panax ginseng. Some of these conditions include breast cancer, uterine cancer, ovarian cancer, endometriosis, and uterine fibroids.
INSOMNIA: High doses of ginseng have been associated with insomnia (597). Theoretically, use in patients with insomnia might worsen the condition; use with caution.
ORGAN TRANSPLANT RECIPIENTS: Theoretically, concurrent use might interfere with immunosuppressive therapy. Panax ginseng might have immune system stimulating properties (3122); avoid concurrent use.
SCHIZOPHRENIA: High doses of ginseng have been associated with insomnia and agitation in schizophrenic patients (597); use with caution.

Dosage/Administration:

ORAL: For reducing the risk of getting the common cold or flu, Panax ginseng 100 mg daily started four weeks prior to influenza vaccination and continued for eight weeks thereafter has been used (589). For use in an acute attack of chronic bronchitis, Panax ginseng 100 mg twice daily for 9 days combined with antibiotic therapy has been used (8814). For erectile dysfunction, Panax ginseng 900 mg three times daily has been used (8813). For treating type 2 diabetes, 200 mg daily has been used (4225).
TOPICAL: For premature ejaculation, a cream containing panax ginseng and other ingredients has been applied to the glans penis 1 hour before intercourse and washed off before intercourse (2537).

Editor's Comments:

Ginseng has been used for medicinal purposes for over two thousand years. Approximately 6 million Americans use it regularly. Some consider the age of the ginseng roots important. In 1976, a 400-year-old root of Manchurian ginseng from the mountains of China reportedly sold for $10,000 per ounce. The contents of commercial preparations labeled as containing Panax ginseng can vary greatly; many contain little or no Panax ginseng (6, 13).
Sometimes you will hear people refer to ginseng as red or white ginseng. This distinguishes how some ginseng roots are prepared. For example, red ginseng is produced by steam-curing the root. Heat treatment of ginseng at a temperature and pressure higher than what is conventionally used to prepare red ginseng has been found to cause increased production of the ginsenosides Rg3, Rg5, Rg6, Rh2, Rh3, Rh4, and Rs3 which are usually absent or present in only small amounts in preparations of white or red ginseng (11006). In contrast to the usual promotion of ginseng as a stimulant, ginseng is used in Traditional Chinese Medicine (TCM) as a calming and sedative agent. It is also widely used in China as a cardiovascular agent. Typically, higher doses are used in TCM than Western medicine (8600, 8604).

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