

Harmless Herbs? A Review of the Recent Literature

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Herbal medicines have become a popular form of therapy. They are often perceived as being natural and therefore harmless. This article reviews the recent literature on the adverse effects of herbal remedies. Examples of allergic reactions, toxic reactions, adverse effects related to an herb's desired pharmacological actions, possible mutagenic effects, drug interactions, drug contamination, and mistaken plant identities are provided. Because

of underreporting, our present knowledge may well be just the "tip of the iceberg." Little is known about the relative safety of herbal remedies compared to synthetic drug treatments, although for some herbal remedies, the risks may be less than for conventional drugs. *Am J Med.* 1998;104:170-178. © 1998 by Excerpta Medica, Inc.

Both in the United States and in Europe, botanical medications have become increasingly popular. In the United States, the botanical industry is now a \$1.5 billion per year industry. The vast majority of its products are unlicensed and are not required to demonstrate efficacy, safety, or quality (1,2). Even though they are often promoted as natural and therefore harmless, herbal remedies are by no means free from adverse effects. The debate on whether phytomedicines should be submitted to proper licensing procedures incorporating standards for quality, safety, and efficacy is therefore continuing (1,2).

How safe are herbals? Major reference texts (3-5) give detailed information on adverse effects associated with herbal remedies published before 1992. This article reviews data on adverse effects of botanical preparations published since then based on Medline searches, a review of the specialized literature between 1992 and 1996, as well as communications with experts in the field. The classification into different types of drug reactions employed here (7,8) is somewhat arbitrary.

ALLERGIC REACTIONS

Herbal preparations can lead to hypersensitivity reactions (8). Reactions can vary from a transient dermatitis to anaphylactic shock (Table 1). Royal jelly has been repeatedly linked with severe bronchospasm (8) and the alleged aphrodisiac yohimbine has been associated with an allergic reaction culminating in a lupus-like syndrome (9). Other recent reports demonstrate the allergic potential of camphor (10) and a mixture of lavender, jasmine, and rosewood used in the form of aromatherapy (11).

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TOXIC REACTIONS

Many, if not most, medicinal plants contain flavonoids; over 100 such herbal preparations are on the European market. This family of compounds has been associated with several beneficial effects, such as antioxidative activity or reduction in vascular permeability. However, recent reports suggest that adverse reactions such as hemolytic anemia (12), chronic diarrhea (13), severe nephropathy (14), and colitis (15) can be associated with their use. In some of these cases, causality has been suggested through drug rechallenge.

Pennyroyal is widely available from U.S. health food shops. It has traditionally been advocated as an abortifacient. A recent review summarized 18 cases where moderate to severe toxicity occurred after a minimum of 10 ml pennyroyal oil, and details four further cases, two of which were fatal (16).

Germander is a popular folk remedy used in the United States for its alleged choleric and antiseptic properties. It is contained in liqueurs, teas, tonics, and appetizers. In France, germander capsules were marketed as an adjuvant for weight control. More than 30 cases of acute liver failure, including at least one fatality, have occurred (17-20), and germander preparations were subsequently prohibited. Two cases were reported recently from Canada. Both patients had taken germander as a slimming aid for several months when hepatitis was diagnosed. Fortunately, it was reversible after discontinuation of the herbal preparation (21).

The use of a herbal tea made of valerian root, skullcap, and chaparral, all of which are frequently used in the United States, has been associated with acute hepatitis (22), confirming earlier suspicions of liver toxicity associated with these plants. Valerian can contain alkylating agents that inhibit thymidine incorporation into DNA, leading to impaired mitochondrial function. Chaparral is being promoted as a free radical scavenger. A 60-year-old woman who had taken chaparral for 10 months was brought to the hospital with severe hepatitis. Chaparral ingestion was the only identifiable cause. Her condition deteriorated and she

Table 1. Medicinal Plants Frequently Associated with Allergic Reactions*

•Agnus Castus	•Holy Thistle
•Angelica	•Hops
•Aniseed	•Hydrangea
•Apricot	•Hydrocotyle
•Arnica	•Juniper
•Artichoke	•Lady's Slipper
•Asafoetida	•Meadowsweet
•Boneset	•Motherwort
•Cassia	•Parsley
•Celery	•Pilewort
•Cinnamon	•Plantain
•Cowslip	•Pulsatilla
•Dandelion	•Rosemary
•Elecampane	•Royal Jelly
•Euphorbia	•Tansy
•Feverfew	•Wild Carrot
•Fucus	•Yarrow
•Gravel Root	
•Guaicum	

* Adapted from Newall et al (122).

required liver transplantation, after which she recovered. Similar cases implicating chaparral as the cause of severe liver damage have been reported (23).

Comfrey and skullcap have been linked with hepatitis verified by liver biopsy (24); discontinuation of the herbal therapy resulted in prompt clinical improvement. *Momordica charantia* is an antidiabetic herb also used as a common vegetable in Sri Lanka. Its fruit juice has been shown to contain hepatotoxins (25).

Sauropus androgynus is a plant from Malaysia now commercially cultivated in Taiwan. Its juice is commonly ingested for weight control. There have been 23 cases reported in which an average intake of 10 weeks led to bronchiolitis obliterans. The prognosis of these cases is still uncertain and lung transplantations are being considered (26).

Chinese herbal preparations are becoming increasingly popular in the United States and Europe. They have repeatedly been associated with toxic effects. Interstitial renal fibrosis (27) and renal failure (28) following the use of a slimming drug containing aristolochic acid (29) have been implicated in the death of more than 30 women. The slimming aid was sold through Belgian pharmacies between 1990 and 1992 until an increasing number of cases of progressive interstitial renal fibrosis were noted. All patients had followed the same slimming regimen, and diagnoses were confirmed with renal biopsies. Most of the patients deteriorated quickly, requiring dialyses. It was postulated that *Aristolochia fangchi* containing aristolochic acids might be responsible. After initial difficulties, these nephrotoxic substances were identified in the capsules. A follow-up demonstrated that more than 80

women were affected; about half needed renal transplants (30). Recently a similar case was reported from Spain. The interstitial renal fibrosis was clinically and histologically identical to the Belgian cases. The intoxication was caused in this instance by the regular intake of an infusion made from *Aristolochia pistolochia* (31). Numerous cases of aconite poisoning have also been described, including two fatalities (32,33).

There are several further reports of liver toxicity associated with the administration of Chinese herbal medicines. Seven cases of acute hepatitis have been reported following the use of a Chinese herbal sedative and analgesic, known as Jin Bu Huan, that has been in traditional use for more than 1,000 years (34). Three cases of hepatitis, one fatal, have occurred following the administration of a Chinese herbal mixture for eczema (12,35,36). The traditional Chinese remedy Bajiaolian was shown to contain the toxic compound podophyllotoxin, and has caused several cases of thrombocytopenia and liver damage (37). Another traditional Chinese herbal remedy, Syo-saiko-to, is used in China to treat the common cold. More recently, it has been used in Japan to treat chronic liver disease. Japanese authors have described 4 patients in whom this drug has caused acute liver injury and cholestasis. The authors also mentioned that they have seen 40 similar cases (38).

The shiitake mushroom is renowned in China as a medicinal plant with alleged immunostimulative properties. It has been repeatedly associated with severe dermatitis. One publication described 51 such complications (39). The Kombucha "mushroom" (not a true mushroom but a symbiotic yeast and bacteria aggregate surrounded by a permeable membrane) is a traditional remedy that today is being promoted for a variety of conditions, from cancer cure to hair restoration. It has been associated with severe hepatotoxicity in at least two cases (40). *Tripterygium wilfordii* hook F is a popular Chinese medicinal plant used for its antiinflammatory properties. It has been reported to cause severe lupus nephritis that resolved after discontinuation of the preparation (41).

Two reports of fulminant liver failure have been associated with Chinese herbal preparations taken as a tea. In both cases, the product was called "eternal life." Enquiries about the composition of this product led to the information that it does not always contain the same herbs but each prescription is tailor-made to suit the patient's needs (42,43).

A further report described 11 cases of liver damage after ingestion of Chinese herbal remedies. In two cases, there was compelling evidence for a causal link based on dechallenge/rechallenge results. In two other cases, a causal relationship was deemed likely. Several Chinese herbs were implicated. The effects seem to be idiosyncratic and not dose-related (44). These remedies have been in use for thousands of years. They serve as impres-

sive examples of the limits of such "tests of time" as a warrant for safety (see also below).

The safety of Chinese herbal medicines has been reviewed in detail (45,46). In a recent review, Bensousan and Meyers (47) conclude that "there are currently insufficient data to fully quantify the risks presented by Chinese herbal medicine. Obtaining these data should be considered a research priority."

ADVERSE EFFECTS RELATED TO THE DESIRED PHARMACOLOGICAL ACTIONS

A general deterioration in the conditions of schizophrenic patients, including symptoms of irritability, activity, and sleep disturbances was noticed after these patients had smoked ginseng cigarettes (48). Discontinuation of this habit resulted in clinical improvement. One woman with a history of depression started taking ginseng tablets (1 per day) in addition to her antidepressants. Four days later she became overtly manic and had to be admitted to the hospital. After discontinuation of the ginseng tablets, her mood normalized promptly (49). Siberian ginseng has also been reported to lead to increased digoxin levels with concomitant digitalis therapy. This action was confirmed through dechallenge and rechallenge (50). One case report related a regular dose of ginseng taken for 3 days with a reversible Stevens-Johnson syndrome (51) and another one associated ginseng overdose with cerebral arteriitis (52).

Ma Huang is a Chinese herb that contains ephedrine. It is widely used as a herbal stimulant. In one patient, 10 days self-medication led to hallucinations and paranoia. Discontinuation of Ma Huang normalized his mental state (53).

Agnus castus is a plant with estrogen-like properties and is used for a variety of gynecological problems. One case report describes a woman undergoing in vitro fertilisation who took this remedy during an unstimulated cycle (54). Close monitoring of her serum hormone concentrations revealed considerable abnormalities in concentrations of gonadotrophic and ovarian hormones. *Agnus castus* may, therefore, lead to ovarian hyperstimulation and increase the risk of miscarriage.

Guar gum is being promoted as an aid to weight reduction and as a laxative. According to an analysis of FDA reports, there have been 26 cases of severe adverse reactions associated with guar gum use: 18 cases of esophageal obstruction, 7 cases of small bowel obstruction, and one fatality (55). A risk factor for these complications seems to be preexisting gastrointestinal disorders.

Another "slimming aid" derived from broom has been associated with circulatory collapse and respiratory arrest

caused by sparteine (56), which is a quinolizidine alkaloid with oxytocic properties.

Many plants contain salicylates. Salicylism with vomiting and generalised seizures has been described in a child who had accidentally swallowed 20 ml of a remedy containing oils of wintergreen, camphor, peppermint, menthol, and eucalyptus (57). Other herbs have coumarin-like activity (58); taking such herbal drugs during pregnancy and/or lactation may increase the risk of intracranial bleeding in breast-fed babies (59).

MUTAGENIC EFFECTS

Anthranoid laxatives such as aloe, cascara, frangula, and rhubarb senna are commonly used and generally considered to be safe. However, the long-term use (10–30 years) of these drugs may be a risk factor for colorectal cancer (60). In patients with colorectal carcinoma, the prevalence of pseudo-melanosis coli (typically caused by chronic laxative use) was 18.6%, while in cancer-free patients it was 6.9%. This potentially important finding needs confirmation from other studies, as the epidemiological data on the topic are contradictory (61).

Capsaicin is a major constituent of chilli pepper. Taken orally in high regular doses, it may act as a carcinogen and could promote gastric cancer (62). Yet in low doses it seems to exhibit anticarcinogenic activity.

DRUG INTERACTIONS

The interactions of phytomedicines with prescription indications are underresearched. An inactivation or an enhancement of activity is possible (63). For example, concomitant administration of phenytoin and the Ayurvedic (traditional Indian) remedy shankhapushpi has also been reported to have led to a reduction in serum phenytoin concentration, resulting in a loss of seizure control (64).

On the other hand, grapefruit juice ingestion elevates serum concentrations of cyclosporin, calcium-channel blockers, and certain other drugs (65) by competing for the same metabolic pathway. One case has been reported of a coagulation abnormality occurring after the use of Chinese herbal drugs in combination with warfarin (66). In a crossover trial involving healthy volunteers (67), Chinese herbs containing glycyrrhizin (Sho-saiko-Tok, Sai-boku-To, and Sairei-To) were shown to affect prednisolone pharmacokinetics (67). Glycyrrhizin is also found in liquorice.

CONTAMINATION

The lack of regulation in the area of herbal remedies may lead to contamination, which has repeatedly been a prob-

lem with Ayurvedic medicines. Lead poisoning has been described (68–70). Furthermore, some Ayurvedic preparations contain arsenic and other highly toxic substances as medicinal agents (71,72). A British poison information center identified 5 such cases during a 7-year observation period. The preparations concerned contained lead (up to 60% lead by weight) zinc, mercury, arsenic, aluminium, and tin. In the individuals who had ingested these contaminated herbals, blood concentrations of these heavy metals were elevated by 2–10 times the upper limit of normal physiological values (73). Mercury, lead, and other heavy metal contamination may occur during the unique manufacturing processes of these remedies (74,75). Some Ayurvedic drugs have also been shown to be adulterated with undeclared conventional drugs such as aspirin and paracetamol (76).

Kelp has been reported to contain arsenic, and has been associated with autoimmune thrombocytopenia (77). The patient presented with widespread petechiae and bruised after 6 weeks of kelp self-medication (550 mg kelp/day). Her platelet antibodies were raised and the bone marrow revealed an increase in megakaryocytes and megaloblasts. Analysis of the kelp capsules showed that each contained 1.3 mg/g arsenic. She was treated with intravenous immunoglobulin, prednisolone, and subsequently with azathioprine. She had a complete recovery after 3 months. One case report described an elderly man who had taken 2–4 (undefined) “herbal” tablets daily for more than a year. He developed symptoms of glucocorticoid excess, including proximal muscle weakness and osteoporosis. Each tablet was subsequently shown to contain 5.4 mg of triamcinolone (78).

Contamination may also be a problem with Chinese herbal remedies. Five cases have been reported where Chinese herbal pills contained undeclared mefenamic acid and diazepam; adverse effects included massive gastrointestinal bleeding (79) and acute interstitial nephritis (80). A further report described the adulteration of a Chinese herbal preparation with mefenamic acid, which resulted in acute renal failure. The patient required hemodialysis and improved later (81). Another Chinese herbal remedy was shown to contain toxic amounts of arsenic and mercury (24). Chinese herbal preparations for systemic or topical application also contained powerful corticosteroids (82–84). Thus self-prescribed use during 1 month led to a Cushing's-like syndrome that was reversible after discontinuation of the preparation (85). Similarly, there have been cases of lead (86), mercury (87), thallium (88), arsenic (89), and cadmium (90) poisoning due to the use of contaminated Chinese herbal medicines.

In Oman and the United Arab Emirates bint al dhahab (“daughter of gold”) is used in neonates and small children for various stomach complaints. It has been shown to consist mainly of lead oxide and cases of lead encephalitis have occurred. The Omani government has banned

its import. A bulk analysis revealed that 100 g of bint al dhahab contains 91 g of lead monoxide, 600 mg of antimony oxide, and 50 mg of cadmium (91).

MISTAKEN PLANTS

False authentication can be another problem with plant-derived medicines. This can happen inadvertently or be done deliberately to save money. An example of the former is the occurrence of fibrosing interstitial nephritis in individuals in Germany and France following the administration of a slimming aid; in this preparation the Chinese drug “Fangji” was substituted by “Guang fangji,” which contains nephrotoxic aristolochic acids (27,29,92,93). An example of the latter scenario is an alleged aphrodisiac containing not yohimbine, as declared, but caffeine (94) or the adulteration of Chinese herbal mixtures with *Podophyllum hexandrum*. This was responsible for several cases of neuropathy in Hong Kong where about 10% of a Chinese herbal remedy was shown to be adulterated by this toxic plant (95).

The problem is made much more complex by confusing terminology. There can be many names to identify a single preparation: the English common name or names, the translation of a foreign name, the latinized pharmaceutical name, the scientific name, and the brand name.

INCIDENCE OF ADVERSE EFFECTS

One group of investigators retrospectively studied all 2,695 patients admitted to a Taiwan department of medicine during a 10-month period. Four percent of these patients were admitted because of drug-related problems; herbal remedies ranked third among the categories of medicines responsible for causing adverse effects (96). A case-control study from the Philippines identified herbal medicine use as one of the main risk factors for nasopharyngeal carcinoma (97). Another study, involving 1,701 patients admitted to two general wards of a Hong Kong hospital, revealed that 0.2% of all patient admissions were due to adverse reactions to Chinese herbal drugs; two of these cases were serious (98). A recent note from the WHO Collaborating Center for International drug monitoring mentioned that 5,000 reports of suspected adverse effects of herbal preparations are on file (99).

The London-based National Poisons Unit retrospectively surveyed the period January 1983 to March 1989, and did a prospective survey in 1991 (100). The unit received 1,070 enquiries in relation to herbal and other traditional drugs, 25% of which were from patients who were symptomatic at the time of contact. Most adverse effects were associated with herbal sedatives. In the following cases, a causal relationship between the use of

herbal medication and the occurrence of adverse effects was rated as highly probable: one case of hepatitis after use of an Ayurvedic remedy; one case of fatal liver failure after a Chinese herbal tea was taken for eczema; one case of atropine poisoning following ingestion of belladonna tea; one case of abdominal pain after taking a herbal tonic containing capsicum; one case of liver damage after use of a herbal sedative comprising valerian, hops, gentian, and skullcap; one case of photodermatitis after ingestion of rue; one case of jaundice after ingestion of skullcap and broom. The authors advocated routine liver function tests for individuals using Chinese herbal remedies.

We conducted a survey on 400 users of complementary medicine, and found that 8% of those who had tried herbal remedies had experienced adverse effects (101). None of these were serious.

Underreporting, is a major problem in establishing the incidence of adverse drug reactions (102), and may be even more problematic with phytomedicine. Therefore, the true incidence of adverse reactions due to herbal remedies is unknown.

COMPARATIVE SAFETY

Are botanical drugs more or less safe than synthetic medications? *Hypericum perforatum* seems to be as effective as standard antidepressants for mild to moderate depression, but is associated with significantly fewer adverse effects (103,104). Similarly, two different herbal expectorant and secretolytic mixtures have been shown to be associated with fewer adverse effects than synthetic counterparts of comparable efficacy (105,106).

In a large (n = 1,098) randomized clinical trial comparing a plant extract (Permixon) with a 5 alpha-reductase inhibitor (Finasteride) in the treatment of benign prostate hyperplasia, similar improvements in symptoms were seen with both remedies. The adverse effects profile, however, favored the herbal treatment (107). A recent review of herbal and synthetic agents for benign prostate hyperplasia confirms this finding and concludes that "the benefit-risk ratio of phytotherapy is positive in comparison to the synthetic agents" (108).

Sixty patients with non-specific upper abdominal discomfort were randomised to receive either an herbal mixture (fennel, peppermint, wormwood) or metoclopramide for 2 weeks. The botanical drug yielded better symptomatic improvement and significantly fewer adverse effects (109).

Finally, garlic extracts may lower total cholesterol levels in hypercholesterolemic patients, with few adverse effects (110).

COMMENT

Not all that is natural is harmless. Table 2, however, lists

Table 2. Examples of Commonly Used Plants Thought to Be Free of Serious Adverse Effects

Plant Name	Alleged Main Pharmacological Activity
Camomile	Antiinflammatory
Garlic (<i>Allium sativum</i>)	Cholesterol-lowering Antihypertensive
Maidenhair Tree (<i>Ginkgo biloba</i>)	Increase blood flow
Peppermint (<i>Mentha piperita</i>)	Analgesic
Sabal (<i>Sabal serrulata</i>)	Antiinflammatory
Saw Palmetto (<i>Serenoa repens</i>)	Antiandrogenic, Estrogenic Antiedema activity
St John's Wort (<i>Hypericum perforatum</i>)	Antidepressive

some popular plants commonly thought to be free of serious adverse effects. By contrast, several herbs seem likely to cause adverse effects (Table 3). Common adulterants are presented in Table 4.

Traditional use is no guarantee for safety. In particular, rare adverse effects, delayed effects (eg, mutagenicity), or effects that require long-term use may fail to be identified through the "test of time" (111). Historical use can be valuable as an indicator for safety (or effectiveness), but post-marketing surveillance studies and other methods for detecting safety problems with herbal remedies must be initiated just as for any other drug. Mechanisms for quality control should be mandatory. Advertising needs to be scrutinized (112). The introduction of MEDWatch by the FDA in the United States, a voluntary reporting system also covering botanical preparations, may be a step in the right direction (113).

Worldwide, more than 80% of the population use botanical preparations as medicine, and in most industrialized countries herbalism is experiencing an unprecedented renaissance (114,115). Every third U.S. citizen is thought to use herbal remedies, and use of alternative therapies is more common among the well educated, the affluent, and women (116). The U.S. market amounts to about \$1.5 billion per year; the European market amounts to three times that size (2). Table 5 lists medicinal plants that are particularly popular in the United States (117).

Both prescription and over-the-counter drugs require stringent examinations before being made available. In contrast, herbal preparations are usually marketed as supplements that are not subjected to such scrutiny. Herbal supplements are not allowed to make specific health claims. They may, however, provide claims in relation to maintenance of good health (118).

In addition to the direct safety issues, there are indirect

Table 3. Adverse Effects with Likely Cause-Effect Relationship*

Name of Plant/Constituent	Adverse Effect	Reason for Assuming Causality
Aconite [†]	Palpitations, arrhythmias, nausea, abdominal pain	Adverse effect reported frequently
Aristolochic acid [†]	Nephrotoxic	Adverse effect reported repeatedly
Ayurvedic remedies	Heavy metal poisoning	Reported repeatedly; heavy metals are introduced during manufacturing process and are detectable in remedies
Broom	Oxytoxic properties	Adverse effect of one plant constituent (sparteine) is well known
Chaparral	Liver damage	Adverse effect reported repeatedly
Chinese herbal mixtures	Heavy metal poisoning	Adverse effect reported frequently and documented by blood analyses
Comfrey	Liver damage	Adverse effect reported repeatedly
Flavonoids [§]	Hemolytic anemia, kidney damage	Causal relation made likely through rechallenge, adverse effects are rare
Germander	Liver damage	Adverse effect reported repeatedly
Guar gum	Obstruction of gastrointestinal tract	Adverse effect reported repeatedly
Liquorice root [†]	Hypokalemia, hypertension, arrhythmias, edema	Adverse effect reported frequently
Pennyroyal	Liver damage	Adverse effect reported repeatedly
Pyrrolizidine alkaloides	Liver damage	Adverse effect reported repeatedly

* Based on evidence cited in this review and in Bensousan and Meyers, 1996 (47).

[†] Contained in Chinese herbal mixtures.

[‡] Contained, for instance, in Virginian or Texas snakeroot or in Chinese herbs like *Stepania tetrandra* and *Magnolia officinalis*.

[§] Contained in many medicinal plants.

^{||} Contained in comfrey and several other plants (eg, borage, senecio, clofts food).

hazards associated with herbalism. These relate to the competence of the practitioner and that access to more effective therapy may be hindered (119). Similarly, there are indirect risks associated with herbal self-medication (120) and the plethora of books aimed at the lay audience, full of advice that is naive at best and dangerous at worst.

Table 4. Some Contaminants Repeatedly Found in Herbal Remedies*

Adulterant Chemical	
Aluminium [†]	Ephedrine [†]
Aminopyrine [†]	Indomethacin [†]
Arsenic ^{†,‡}	Lead ^{†,‡}
Aspirin	Mefenamic acid [†]
Betamethasone [†]	Mercury ^{†,‡}
Bromhexine [†]	Paracetamol ^{†,‡}
Cadmium [†]	Phenacetin [†]
Caffeine	Penylbutazone [†]
Chlordiazepoxide [†]	Thallium [†]
Chlorpheniramine [†]	Theophylline [†]
Corticosteroids [†]	Thiazide diuretics [†]
Diazepam [†]	Tin [†]
Diclofenac [†]	Zinc [†]

* Based on evidence cited in this review and partly in Bensousan and Meyers, 1996 (47).

[†] In Ayurvedic herbal mixtures.

[‡] In Chinese herbal mixtures.

A recent investigation from the United States suggests, furthermore, that advice given in health food stores can be dangerously misleading (121).

Some plants used for medicinal purposes are associated with serious risks. The size of this safety problem is not known. Given the growing frequency of their use, there is an urgent need for systematic investigations into the risks of phytomedicines.

Table 5. Medicinal Plants That Are Popular in the United States*

Plant Name	Indications
<i>Echinacea purpurea</i> , <i>E. angustifolia</i>	Antiseptic, antiviral
Garlic (<i>Allium sativum</i>)	Cholesterol-lowering, antihypertensive
Goldenseal (<i>Hydrastis canadensis</i>)	Digestive disorders
Ginseng (<i>Panax ginseng</i>) [†]	Stimulant, tonic
Saw palmetto (<i>Serenoa repens</i>)	Diuretic
Aloe (<i>Aloe vera</i>)	Wound healing
Ma huang (and other ephedra products) [†]	Stimulant
Cranberry (<i>Vaccinium oxycoccus</i>)	Urinary infections

* Adapted from Brevoort, 1996 (117).

[†] Type unspecified.

[‡] The U.S. Food and Drug Administration (FDA) warns consumers not to purchase or consume such products, as they pose significant health risks.

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