

## Medicinal Herbs

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Medicinal herbs are among our oldest medicines and their increasing use in recent years is evidence of public interest in alternatives to conventional medicine. The use of herbal medicines and other dietary supplements has increased substantially since passage of the 1994 Dietary Supplement Health and Education Act. Herbal medicines are a major market in U.S. pharmacies and constitute a multi-billion dollar industry. Although approximately 1500 botanicals are sold as dietary supplements or ethnic traditional medicines, herbal formulations are not subject to Food and Drug Administration (FDA) pre-market toxicity testing to assure their safety or efficacy.

The National Toxicology Program (NTP), held a workshop on herbal medicines in 1998 in response to public concerns regarding the use and efficacy of medicinal herbs and to recent nominations of these products for study. Recommendations from the workshop included a call for (1) more research on herbals, (2) the identification and standardization of product ingredients by industry, and (3) increased consumer education through package inserts.

In follow-up to this workshop, the NTP staff began working with the National Institutes of Health (NIH) Office of Dietary Supplements, the FDA, the academic community, and others to conduct research that would address deficiencies in our knowledge about herbal medicines and their potential toxicities. Herbs and active or toxic ingredients found in some herbs continue to be nominated and selected for study by the NTP. Studies have been designed for many herbal products that focus on the characterization of potential adverse health effects, including reproductive toxicity, neurotoxicity, and immunotoxicity, as well as those effects associated with short-term high-dose exposure or long-term exposure to lower doses. In addition, special attention is being given to the potential for herb/herb and herb/drug interactions and to the responses of sensitive subpopulations (e.g., pregnant women, the young, the developing fetus, the elderly, etc). NTP studies include both traditional toxicological research and molecular mechanistic considerations.

Aloe vera gel	Widely used herb for centuries as a treatment for minor burns and is increasingly being used in products for internal consumption.
Bitter Orange	Bitter orange peel and its constituent synephrine are present in dietary supplements used for weight. Synephrine and other bitter orange biogenic amine constituents have adrenergic activity and may result in cardiovascular or other adverse effects similar to those induced by ephendra alkaloids.
Black cohosh	Used to treat symptoms of pre-menstrual syndrome, dysmenorrhea and menopause.
Bladderwrack	A source of iodide used in treatment of thyroid diseases and also found as a component of weight-loss preparations.
Blue-Green algae	Claims to prevent cancer and heart disease and boost immunity. Use has been promoted for use in children to treat Attention Deficit Disorder
Comfrey	Used externally as an anti-inflammatory agent in the treatment of bruises, sprains, and other external wounds. Consumed in teas and as fresh leaves for salads. Based in part on NTP studies on the alkaloid components of comfrey, the FDA recommended that manufacturers of dietary supplements containing this herb remove them from the market.
<i>Echinacea purpurea</i> extract	Used as an immunostimulant to treat colds, sore throat, and flu.

Ephedra	Also known as Ma Huang. Traditionally used as a treatment for symptoms of asthma and upper respiratory infections. Often found in weight loss and "energy" preparations, which usually also contain caffeine. The Food and Drug Administration (FDA) has prohibited the sale of dietary supplements containing ephedra.
<i>Ginkgo biloba</i> extract	Ginkgo fruit and seeds have been used medicinally for thousands of years to promote improved blood flow, and short-term memory and to treat headache, and depression.
Ginseng and Ginsenosides	Ginsenosides are thought to be the active ingredients in ginseng. Ginseng has been used as a laxative, tonic and diuretic.
Goldenseal root	Traditionally used to treat wounds, digestive problems and infections. Current uses include as a laxative, tonic, and diuretic.
Green tea extract	Used for its antioxidative properties.
Kava kava extract	A widely used medicinal herb with psychoactive properties sold as a calmative and antidepressant. A recent report of severe liver toxicity has led to restrictions of its sale in Europe.
Milk thistle extract	Used to treat depression and several liver conditions including cirrhosis and hepatitis and to increase breast milk production.
Pulegone	A major terpenoid constituent of the herb pennyroyal. Has been used as a carminative, insect repellent, emmenagogue, and abortifacient. Has well-recognized acute toxicity to the liver, kidney and central nervous system.
Senna	Laxative with increased use due to the removal of a widely used chemical-stimulant type laxative from the market.
Thujone	Terpenoid is found in a variety of herbs including sage and tansy and in high concentrations in wormwood. Suspected as the causative toxic agent associated with drinking absinthe, a liqueur flavored with wormwood extract.

***For further information, contact: NTP Scientific Review and Liaison Office,  
NIEHS, P.O. Box 12233, MD A3-01, Research Triangle Park, NC 27709  
Phone: 919/541-0530; E-mail: liaison@starbase.niehs.nih.gov***