

Nutrition and Aging: Herbal Supplements

This reading provides information on the following topics:

- Classification of herbal supplements
- Regulation of herbal supplements
- Safety issues
- Supplement labeling and claims
- A review of five herbal supplements for their use, efficacy, and safety

References concerning these and related topics can be found in the *Annotated Bibliography*.

Introduction

Use of herbal supplements in the United States has grown dramatically in recent years. Sales of herbals and botanicals increased nearly 70% between 1994 and 1997.¹ Currently, some of the most popular supplements include ginkgo, ginseng, garlic, St. John's wort, and Echinacea (see Table 1).

There is relatively little knowledge about herbal supplement practices of older adults. However, a nationally representative survey revealed that people over the age of 45 are more likely to use herbal supplements than are people in younger age categories.¹

Table 1.
Top Selling Herbal Supplements

1997 ³	1998 ³	1999 ⁴
1. Ginkgo	1. Ginkgo	1. Ginkgo
2. Ginseng	2. St. John's wort	2. St. John's wort
3. Garlic	3. Ginseng	3. Ginseng
4. Echinacea	4. Garlic	4. Garlic
5. St. John's wort	5. Echinacea	5. Echinacea

Classification of Herbal Supplements

Technically, herbs are non-woody plants that die at the end of the growing season.² However, the broader term botanicals includes trees and shrubs as well as herbs.² The Office of Dietary

Supplements categorizes herbal supplements as botanicals. Therefore, the terms herb or herbal are generally used to describe botanicals as well.

Regulation of Herbal Supplements

In October 1994, Congress passed the Dietary Supplement Health and Education Act (DSHEA). This act defines a dietary supplement as a product intended to supplement the diet that contains one of the following ingredients: a vitamin, mineral, amino acid, herb, or other botanical.

The FDA does not test or approve herbal supplements.

Many consumers assume that herbal remedies are tested for safety and quality. However, since they are not categorized as drugs, they are not subject to the same criteria as prescription and over-the-counter medications. Before being allowed on the market, drugs must be tested in clinical studies to determine their effectiveness, safety, interactions with other substances, and appropriate doses. The Food and Drug Administration (FDA) reviews the studies and decides whether drugs can be sold to consumers. In contrast, the FDA does not test or approve herbal supplements. Thus, the method of preparation, amount of active ingredients, and purity are not regulated, and can vary greatly from one preparation to another.

Safety Issues

Federal law requires manufacturers to ensure that the products they market are safe and properly labeled. However, herbal supplement manufacturers are not required to provide safety documentation to the FDA before marketing a product if its ingredients were on the U.S. market prior to the 1994 passage of DSHEA.

Consumers and manufacturers are responsible for checking the safety of supplements and the truthfulness of label claims.

If a manufacturer introduces a new dietary or herbal supplement, it must provide evidence to the FDA that the ingredient is “reasonably expected to be safe” at least 75 days before marketing. While the FDA does not formally approve the ingredients, it can reject them. The FDA must show that supplements are unsafe or mislabeled before it can restrict or ban them. Although supplements are legally required to be safe, the FDA lacks the resources to ensure that the numerous manufacturers meet regulations.

When a supplement poses a safety issue, the FDA rarely takes formal legal action, but instead requests a recall or issues a public warning. For example, in 1997 the FDA issued a public warning about products marketed as “herbal fen-phen.” It warned consumers that the herb was being marketed without prior approval as a drug, had not been shown to be safe or effective, and contained ingredients that may be harmful. This public warning and additional reports can be found on the FDA website at <http://www.fda.gov/medwatch>.

FDA’s requirement for pre-market review of dietary supplements is less than that for other products it regulates, such as drugs. Therefore, consumers and manufacturers are ultimately responsible for checking the safety of herbal supplements and determining the truthfulness of label claims.

Supplement Labeling Claims

Under DSHEA, supplement labels may include

Unapproved health claims can appear in places other than the label.

nutrition support and structural function claims. Nutrition support statements describe the effect of an ingredient on the

body’s structure or function, or its effect on well being (e.g., “helps maintain healthy intestinal flora” or “promotes relaxation”). The FDA examines these claims based on a review of the scientific literature. Manufacturers cannot make claims about the use of an herbal supplement to diagnose, prevent, mitigate, treat, or cure a specific disease. For example, a product label cannot include the claim “cures cancer” or “treats arthritis.”

If a nutrition support or structural function claim

is made, the following disclaimer must appear on the label: “This statement has not been evaluated by the FDA. This product is not intended to diagnose, treat, cure or prevent any disease.”

Within 30 days of marketing a product, manufacturers must notify the FDA of any statements on labels and must provide proof that the statements are truthful and not misleading. Although the FDA does not approve statements of nutritional support, it can object to them.

This regulation applies only to a product label. Unapproved health claims can appear in places other than the label, such as in magazines, on websites, and on signs in stores.¹

Review of Five Popular Herbal Supplements

Ginkgo biloba

Health Claims⁶

- Memory enhancement
- Improved blood circulation
- Antioxidant function

Introduction

The ginkgo tree, *Ginkgo biloba* L., is the last remaining member of the Ginkgoaceae family, and a popular ornamental tree in parks and gardens throughout the world.³ It has been used in China since 2800 B.C. In 1730, it was brought to Europe, where it has remained very popular. In 1997–99, ginkgo biloba was the top-selling herb in the U.S. (see Table 1).

Ginkgo biloba is thought to improve blood flow, especially to the brain and heart, by blocking the effects of platelet-activation factors (PAF); and it may protect against oxidative cell damage from free radicals.⁴ Claims of memory enhancement may make ginkgo particularly attractive for older adults. It has been prescribed in Germany for cognitive disorders for many years.

Although the active ingredients in ginkgo have not been positively identified, possible active ingredients include flavonoids, sesquiterpenes, and terpenes, which are also called ginkgolides. The flavonoids are thought to act as antioxidants, and the ginkgolides may act against PAF to reduce clotting time.

Efficacy

Many studies have shown positive results using ginkgo to enhance memory and concentration; however, many of the studies have not controlled well for certain variables.⁵ Several studies indicate that ginkgo supplementation slows the progression of dementia, especially the Alzheimer's type.⁶⁻⁸ However, a recent study with 214 older adults showed that ginkgo supplementation had no beneficial effect as a treatment for dementia or age-associated memory-impairment.⁹ Large, multi-site clinical trials are now underway in the U.S. to assess ginkgo's ability to enhance memory. Information on these studies can be found at <http://www.clinicaltrials.gov>. Animal and cell studies have demonstrated ginkgo's antioxidant effects on brain neurons.^{10, 11} Preliminary evidence suggests that ginkgo improves walking time and reduces pain in patients with peripheral vascular disease, although it does not seem to improve blood flow to legs.^{12, 13}

Safety

Reported side effects include gastrointestinal disturbances, headaches, allergic skin reactions, and bleeding. Bleeding is more likely to occur if ginkgo is combined with aspirin, garlic, ginseng, vitamin E, or anticoagulant drug therapies. Ginkgo is not recommended for patients with epilepsy because it can diminish the effectiveness of anticonvulsants.

Ginseng

Health Claims⁶

- Increased energy
- Improved physical performance
- Memory enhancement
- Protection against diabetes and cancer

Introduction

Ginseng is the Chinese word for "man-root". The name comes from its fleshy roots, which look like a crude human figure. Asian ginseng or *Panax ginseng* is the most common type found in supplements and added to foods. Other types include American ginseng (*Panax quinquefolius* L.) and Siberian ginseng (*Eleutherooccus senticosus*).

Ginseng has been the subject of many health claims, including increased energy, improved physical performance (ergogenic effects), and memory enhancement. Ginseng has also been studied in relation to diabetes and cancer.

The active ingredients are thought to be saponins, also called ginsenosides. The amount of ginsenosides can vary with the age of the plant, method of preservation and season of harvest.¹⁴ Since different forms of ginseng may contain varying amounts of ginsenosides, studying the effects of ginseng in humans can be difficult.

As with most other herbs, ginseng is poorly regulated for quality, purity, and quantity of active substance. A survey of 50 ginseng products sold in stores found a large variation in ginsenoside concentrations and a complete absence of ginseng in some products.¹⁵ Another study of 25 ginseng products also found significant variation in concentrations of active ingredients among products.¹⁶

Efficacy

There is a lack of consistent evidence on ginseng's overall effectiveness. Although ginseng is marketed as an energy booster, there have been no well-designed studies to support this claim.¹⁴ Recent studies have failed to demonstrate that ginseng increases physical performance.¹⁷⁻¹⁹ They have also failed to demonstrate the claim of memory enhancement in older adults.²⁰ Three studies reported that ginseng lowered blood glucose levels in type 2 diabetic patients.^{21, 22, 23} A Korean study suggested a possible reduced risk of cancer in people who used ginseng;^{24, 25} however, no other studies have verified these findings.

It is difficult to develop standardized studies because ginseng is prepared differently by various manufacturers and is sold in varying doses. Also, many studies have been conducted by companies that manufacture or sell ginseng, which leaves open the potential for bias. Currently, the American Botanical Council is conducting the Ginseng Evaluation Program. This program evaluates ginseng products sold in North America to be sure that they are properly labeled, are of high quality, and contain the ingredients stated by the manufacturer. The results of this program are to be published in 2001. More information on this program can be accessed at the following website: www.herbalgram.com/projects/index.html.

Safety

Ginseng has been reported to react with drugs, including digoxin and MAO inhibitors, and it may decrease the effectiveness of warfarin.²⁶

In one case report, a 74-year-old man was found to have high serum digoxin levels after taking ginseng concurrently with the prescribed medication.²⁷ In another case report, ginseng used in conjunction with an MAO inhibitor may have caused manic symptoms.²⁷

St. John's Wort

Health Claims⁶

- *Mood enhancement*
- *Natural treatment of depression*
- *Improved sleep*

Introduction

St. John's wort (*Hypericum perforatum*) is a wild-growing herb with golden yellow flowers that has been used for centuries to treat mental disorders. Today, the herb is popular for the treatment of depression. It is also used to treat anxiety, seasonal affective disorder, and sleep disorders.

The herb was named because it is especially abundant on June 24th, traditionally celebrated as John the Baptist's birthday. This herb is native to Europe, but is found throughout the United States. St. John's wort has become one of the top selling herbs in the United States. Although its active ingredients have not been confirmed, some researchers believe that they include hypericin, pseudohypericin, or hyperforin.

Efficacy

Many studies have examined the effects of St. John's wort on depression. Some have shown that it improves depressive symptoms better than placebo.²⁸⁻³⁰ Others have found St. John's wort to be as effective as antidepressant prescription medications.²⁸⁻³² However, a recent study performed with 200 adults in eleven academic medical centers found St. John's wort to be ineffective for treatment of major depression.³³

Interest in using the St. John's wort has been increasing because it appears to have fewer side effects than standard antidepressant prescription medications.^{28-32, 34} However, the dosages, preparations, and the inclusion criteria for patients in studies have been inconsistent among studies, which makes them difficult to compare. There has been no evidence that St. John's wort improves mood or emotional well-being in those without depression.

Safety

St. John's wort must be taken with caution. The National Institutes of Health Clinical Center has shown that St. John's wort may decrease the effectiveness of several drugs because it makes the body break down the drugs more quickly. Drugs that may be affected include Crixivan (indinavir) which is used to treat HIV infection, cyclosporine used to prevent organ transplant rejection, and other immunosuppressant drugs. Cholesterol-lowering medications such as Mevacor (lovastatin), cancer medications, anticonvulsants, and blood thinners such as Coumadin (warfarin) may also be affected.

Hypericin, one of the possible active ingredients, may induce photosensitivity. The skin and mucous membranes may become inflamed when exposed to sunlight. Usually, this occurs only in those taking large amounts of the herb for a long period of time.³

There have been reported cases of "serotonin syndrome" in elderly patients who were on antidepressant medications and began self-medicating with St. John's wort.³⁵ Serotonin syndrome is characterized by lethargy, confusion, agitation, tremors, and sweating.³⁵

Although the use of St. John's wort in the treatment for depression does seem promising, the evidence is insufficient to recommend it as the primary treatment. This is due to limited number of patients in the studies, insufficient information on long-term side effects, inconsistency of doses among studies, and inconsistent classification of depressive disorders.

Echinacea

Health Claims⁶

- *Immune system booster*
- *Protection*

Introduction

Echinacea, known as the purple coneflower herb, is a member of the daisy family (Asteraceae). It was historically used by Native Americans for a variety of ailments. It is marketed to boost the immune system and to cure and prevent the common cold.

Echinacea may be referred to as *Echinacea purpurea* (above-ground parts) and *Echinacea pallida* (root). Nine species grow in the U.S.

The most common types used in supplements are the roots and flowering leaves of *Echinacea purpurea*, *E pallida* and *E angustifolia*. The active ingredients have not been confirmed. Polysaccharides, caffeic acid derivatives, polyenes, and polyines are thought to be among the possible active ingredients.³⁶

Efficacy

Clinical studies have shown conflicting results in terms of the efficacy of *Echinacea* products. A recent study showed that people who took *Echinacea* were no less likely to catch a cold than those taking a placebo.³⁷ However, other studies have suggested that *Echinacea* can lessen or shorten the duration of symptoms of the common cold.³⁸⁻⁴⁰

Overall, there have been few well-designed, double-blind, placebo-controlled studies on *Echinacea*. Many recent studies have been criticized for poor design. They have used different preparations and dosages, making them difficult to compare.

There are many varieties and forms of *Echinacea*, each of which could have different effects (if any) on the immune system. Various preparations use different parts of the plant (leaves, roots, or both) and different methods of extracting the key ingredients. Future studies must be designed to control for these variables.

Safety

There has been one reported case of an anaphylactic reaction in a woman who took *Echinacea* in addition to other dietary supplements.⁴¹ People with autoimmune and progressive systemic diseases (i.e. lupus, HIV, tuberculosis, multiple sclerosis, scleroderma) should not take *Echinacea* supplements.⁴²

Garlic

Health Claims⁶

- Lower blood cholesterol
- Lower triglycerides
- Blood pressure control
- Protection against cancer

Introduction

Garlic (*Allium sativum*) is a member of the Lily family (Liliaceae), along with its close relatives the onion, leek, and shallot. It has been used since the earliest days of recorded history as both a food and a medicine.³ Today, it is often

used to treat atherosclerosis due to its possible ability to reduce blood cholesterol and triglycerides, and to increase the elasticity of the aorta. It is also used to treat high blood pressure, cancer, and bacterial and fungal diseases.

Garlic's active ingredient is thought to be a sulfur-containing compound called alliin that when mechanically disrupted (for example, chopped during food preparation) forms allicin, which gives garlic its characteristic odor.

Efficacy

Despite the widespread commercial marketing of garlic to lower cholesterol levels, studies have shown conflicting results. Many clinical trials have failed to show an effect of garlic on blood cholesterol levels⁴³⁻⁴⁶ while other trials have shown that garlic does lower cholesterol.⁴⁷⁻⁴⁹ Analysis of several studies indicates that garlic supplements may lower blood cholesterol by 6 to 9 percent^{50, 51} However, this is a modest reduction compared to dietary intervention and drug therapy. A study examining the effect of garlic on the elasticity of the aorta in an elderly population showed a protective effect from garlic.⁵² Analysis of eight blood pressure studies suggest that garlic powder may have an effect on those with mild hypertension; however, there is still insufficient evidence for its use as a routine therapy.⁵³ Analysis of twelve studies suggested that a high intake of raw and cooked garlic might be associated with a protective effect against colorectal and stomach cancers; however, differences in study designs make it hard to compare studies.⁵⁴

Safety

Garlic seems to be well tolerated. Reported adverse effects are garlic breath, body odor, and gastrointestinal discomfort. Of greatest concern should be garlic's effect on bleeding time. Since garlic is a platelet inhibitor, it may take more time for blood to clot. Therefore, people taking aspirin or anticoagulant therapy should consult their physician before taking garlic supplements. Also, people should not take garlic with ginkgo biloba, since ginkgo may also increase bleeding time.

Conclusion

One of the most important issues concerning herbal products is the lack of safety information. Product purity and potency can differ

among batches. In addition, a product may contain contaminants such as heavy metals, or parts of other herbs not mentioned on the label. In addition, a label may not accurately reflect the herbal content of the product.

An important issue is the lack of safety information.

Herbal preparations of the same herb can be completely different from each other. This is due to the use of different species (such as *Echinacea purpurea*, *Echinacea pallida* and *Echinacea angustifolia*), the use of different plant parts (leaves, roots, flowers), the different methods of extraction (pressed juice, alcoholic extraction), different forms (tea, capsule, powder, oil), and the addition of other plant extracts. Different plant parts may cause different effects. The active ingredients of most herbals have not been identified, making it difficult to standardize herbal preparations. Some herbals may contain more than one active ingredient, or may even contain an active ingredient with unknown action. Herbal products can differ in potency depending on when and how the herbs were grown. Herbs may interact with each other, drugs, or nutrients. Allergic reactions may occur, which are hard to detect because they are very individualized.

Although many studies have been reported on herbs, more research is needed. In some cases, a beneficial effect may have been observed, but the number of studies may have been too small to justify making any recommendations until further studies are conducted. In addition, many of the studies have had methodological problems. Herbal dosages may have differed, making it difficult to compare studies. In addition, amounts of active ingredients may have differed. The type of preparation may also have differed (i.e. garlic studies use fresh powder, steam distilled, or aged extract). The duration of the studies often has been inadequate to assess the long-term effects of herbs on health, or to assess all possible interactions with drugs or nutrients.

In the case of garlic studies, diet and physical activity levels often have not been controlled. This could confound results because study participants could have made other behavioral changes that could lower their cholesterol levels, such as (1) consuming large amounts of garlic in their regular diets, (2) eating less saturated fat and cholesterol, or (3) increasing physical activity.

In addition, 2/3 of participants in garlic trials guessed correctly that they were receiving garlic and not placebo, which also could have led to confounding behavioral changes.⁵⁰

Applications

Older adults are consumers of over-the-counter remedies and may be easily misled by the marketing claims on products.⁵⁵ They may be at a higher risk for herb-drug interactions, since they take an average of five prescription medications each day.⁵⁶ In addition, many adults fail to inform doctors about their use of alternative medicine therapies, including supplements.⁵⁷ Older adults should tell their physicians what herbals they are taking, especially before surgery.

Older adults may be misled by marketing claims, and at higher risk for herb-drug interactions.

Herbal supplements can be expensive, especially for older adults who may be on a fixed income. They may spend money on herbal supplements that should be spent on food and other necessary items. In addition, by using herbal supplements, older adults may be deceived into believing that they are taking care of their health. As a result, they may not see their doctor regularly or may not take prescribed medications. They may also abandon proven treatment options, including prescription medications, for herbal supplements.

In conclusion, use of herbal supplements will most likely continue to grow in the next few years. Health care professionals should become informed and take an active role in educating their patients, especially older adults, about the possible dangers of herbal supplements. ♣

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Penn State College of Agricultural Sciences research, extension, and resident education programs are funded in part by Pennsylvania counties, the Commonwealth of Pennsylvania, and the U.S. Department of Agriculture.

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Issued in furtherance of Cooperative Extension Work, Acts of Congress May 8 and June 30, 1914, in cooperation with the U.S. Department of Agriculture and the Pennsylvania Legislature. T.R. Alter, Director of Cooperative Extension, The Pennsylvania State University.

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