

A review on the medicinal properties of *Ginkgo biloba*

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ABSTRACT

The purpose of this review is to enlighten the reader on the usage of alternative herbs which can be used as medical supplement. One of the most famous herbs used is ginkgo which has been the subject for a number of investigations in the scientific community. It is a genus of non-flowering plants originally from China. It is now cultivated all over the world for its medicinal properties.

KEY WORDS: Alzheimer, Ginkgo, Medicinal properties

INTRODUCTION

Ginkgo, a genus of unusual non-flowering plants has its scientific name, is also used as its English name. The genus first appeared in the Permian period Circa 250 million years ago. It was possibly derived from “seed ferns” of the order Peltaspermales.^[1] The rate of evolution within the genus has been slow and most of its species had become extinct by the end of the Pliocene; the exception being the sole living species, *Ginkgo biloba*, which was found only in the wild in China but is now cultivated all over the world. The relationships between ginkgo’s and other groups of plants are not fully resolved. It is an ancient seed plant due to which it is referred to as a “living fossil.”^[2] This large tree lives for over 1000 years and reaches a height of 40 m. It is originally a native of China, but now Gb is cultivated all over the world. Traditional Chinese medicine for centuries made use of the extract from these leaves to treat circulatory disorders, asthma, tinnitus, vertigo, and cognitive problems.^[3] Today, Gb extracts are one of the most commonly taken phytomedicines globally which are commonly prescribed in Europe as a nootropic agent in old age and dementia.

PHYLOGENY

Molecular phylogenetic studies have now produced at least six different placements of ginkgo relative to cycads, conifers, gnetophytes, and angiosperms.^[4] The two most common are that ginkgo is a sister to a clade composed of conifers and gnetophytes or that ginkgo and cycads form a clade within the gymnosperms.^[5] A 2013 study examined the reasons for the discrepant results and concluded that the best support was for the monophyly of ginkgo and cycads, these being the earliest diverging gymnosperms.

PLANT DESCRIPTION

Ginkgo biloba is one of the oldest living tree species. A single tree can live as long as 1000 years and can grow to a height of 120 feet. It has short branches with fan-shaped leaves and inedible fruits that have a foul smell. The fruit has an inner seed, which may be poisonous. Ginkgos are tough, hardy trees and are sometimes planted along urban streets in the United States. The leaves turn brilliant colors in autumn.^[6] Although Chinese herbal medicine has used both the ginkgo leaf and seed for thousands of years, modern research has only now focused on the standardized *Ginkgo biloba* extract made from the dried green leaves. This standardized extract is highly concentrated and seems to treat health problems (particularly circulatory problems) better than the non-standardized leaf alone.

Access this article online

Website: jprsolutions.info

ISSN: 0975-7619

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Received on: 14-08-2018; Revised on: 17-09-2018; Accepted on: 26-10-2018

Uses of Ginkgo

Ginkgo is known to treat Alzheimer's disease and other forms of dementia. Some studies seem to show that taking ginkgo leaf extract by mouth improves symptoms of Alzheimer's, vascular, or mixed dementias. However, there are concerns that findings from many of the early ginkgo studies are not entirely reliable. Although most clinical trials show ginkgo helps for symptoms of Alzheimer's disease and other dementias, there are some conflicting findings, suggesting it may be hard to determine the usefulness of this plant.

Another aspect is the improving the thinking problems caused by old age. Taking ginkgo leaf extract by mouth improve thinking skills in some elderly people with mild-to-moderate age-related memory loss or thinking problems. Ginkgo leaf extract is shown to improve short-term visual memory and speed of mental processing in non-demented people with age-related memory loss.

Improving thinking in young people is another import at aspect of this plant.^[7] Taking ginkgo leaf extract by mouth improves some thinking skills in healthy young to middle-aged people. Ginkgo improves the memory and the speed of mental processing in people without memory loss. Some evidence suggests a combination of Panax ginseng and ginkgo is effective for improving memory and that the combination might be more effective than either product alone.

Painful response to cold, especially in the fingers and toes (Raynaud's syndrome), is mitigated by ginkgo. Research claims that taking ginkgo leaf extract by mouth seems to decrease the number of painful attacks per week in people with Raynaud's syndrome.

Leg pain when walking due to poor blood flow (claudication and peripheral vascular disease) is also treated by this plant. Some research shows that taking ginkgo might increase the distance people with poor blood circulation in their legs can walk without pain. Taking ginkgo might also reduce the chance of requiring surgery.

Taking Ginkgo might also reduce the chance of requiring surgery. Also reduces vertigo and dizziness. Taking ginkgo leaf by mouth seems to significantly improve symptoms of dizziness and balance disorders.^[8]

Premenstrual syndrome (PMS)

Taking ginkgo leaf extract by mouth produces significant relief in breast tenderness and other symptoms associated with PMS when started during the 16th day of the menstrual cycle and continued until the 5th day of the following cycle.

Glaucoma

Taking ginkgo leaf extract by mouth may serve well to improve preexisting damage to the visual field in people with normal tension glaucoma.^[9]

Improving color vision in people with diabetes

There is adequate evidence to substantiate that taking ginkgo leaf extract by mouth for 6 months does improve color vision in people whose retinas have been damaged by diabetes.

However, the beneficial effect of ginkgo in both chronic schizophrenia and dementia is modest. Particularly, there is a considerably less meaningful mean effect observed in patients who are taking ginkgo.^[10] However, ginkgo was equal to donepezil in two recent clinical trials, thus it provides an evidence for its use in dementia, which even today can be treated only with a few pharmacological agents. Ginkgo is generally used as an adjunctive therapy in schizophrenia. It is not a first-line intervention. Therefore, even a small additional improvement could be valuable. Most of the trials were said to demonstrate a good safety profile for Gb.

Side Effects

Constituents in ginkgo leaves may affect blood clotting, so ginkgo leaf extracts are contraindicated in people with bleeding disorders. People with epilepsy (or anyone with a history of seizures) should avoid ginkgo because it may increase the frequency of seizures.^[11] Ginkgo leaf products may affect blood sugar levels, so people with diabetes should use ginkgo bases medication only under the supervision of a health-care provider. The safety of ginkgo in pregnant or nursing women and children is very ambiguous. Side effects of ginkgo leaf include excessive bleeding. Seizures have been reported in people using either the ginkgo leaf or seed. Other side effects include digestive problems, headaches, allergic skin reactions, or muscle weakness.

People should not consume fresh ginkgo seeds. Roasted ginkgo seeds may cause diarrhea, nausea, indigestion, vomiting, or allergic skin reactions.^[12] Side effects of fresh ginkgo seeds or over 10 roasted ginkgo seeds may include difficulty breathing, seizures, unconsciousness, and death.

Available Forms

Standardized extracts contain 24–32% flavonoids (also known as flavone glycosides or heterosides) and 6–12% terpenoids (triterpene lactones).

It is available in the form of capsules, tablets, liquid extracts (tinctures, fluid extracts, glycerites) dried leaf for teas.

Dosage

Pediatric ginkgo should not be given to children.

- Adult: It can take 4–6 weeks to see any effects from ginkgo. A proper medical consultation is necessary to help to find the right dose.
- Memory problems and Alzheimer's disease: Many studies have used 120–240 mg daily in divided

doses, standardized to contain 24–32% flavone glycosides (flavonoids or heterosides) and 6–12% triterpene lactones (terpenoids).^[13]

- Intermittent claudication: Studies have used 120–240 mg per day.

Possible Interactions

Ginkgo may interact with some prescription and non-prescription medications. Some of these interactions are given as follows:

- Medications broken down by the liver - Ginkgo can interact with some medications that are processed through the liver.
- Seizure medications (anticonvulsants) - High doses of ginkgo could make anti-seizure drugs not work as well.^[14] These drugs include carbamazepine (Tegretol) and valproic acid (Depakote).
- Antidepressants - Taking ginkgo along with a kind of antidepressant called selective serotonin reuptake inhibitors (SSRIs) may increase the risk of serotonin syndrome, a life-threatening condition. Furthermore, ginkgo may strengthen both the good and bad effects of antidepressants known as monoamine oxidase inhibitors (MAOIs) such as phenelzine (Nardil). SSRIs include:
 - Citalopram (Celexa)
 - Escitalopram (Lexapro)
 - Fluoxetine (Prozac)
 - Fluvoxamine (Luvox)
 - Paroxetine (Paxil)
 - Sertraline (Zoloft).
- Medications for high blood pressure - Ginkgo may lower blood pressure, so taking it with blood pressure medications may cause blood pressure to drop too low. There has been a report of an interaction between ginkgo and nifedipine (Procardia), a calcium channel blocker used for blood pressure and heart rhythm problems.^[15]
- Blood-thinning medications - Ginkgo may raise the risk of bleeding, especially if you take blood thinners such as warfarin (Coumadin), clopidogrel (Plavix), and aspirin.
- Alprazolam (Xanax) - Ginkgo may make Xanax, and drug taken to treat anxiety, not work as well.^[11]
- Ibuprofen (Advil, Motrin) - Like ginkgo, the nonsteroidal anti-inflammatory drug, ibuprofen, also raises the risk of bleeding. There has been bleeding in the brain reported when using a ginkgo product and ibuprofen.
- Medications to lower blood sugar - Ginkgo may raise or lower insulin levels and blood sugar levels.
- Cyclosporine - Ginkgo biloba may help protect the cells of the body during treatment with the drug cyclosporine, which suppresses the immune system.^[2]
- Thiazide diuretics (water pills) - There is one report of a person who took a thiazide diuretic and ginkgo

developing high blood pressure. If you take thiazide diuretics, ask your doctor before taking ginkgo.

- Trazodone - There is one report of an elderly Alzheimer's patient going into a coma after taking ginkgo and Trazodone (Desyrel), an antidepressant medication.

It is vital that proper care is taken to prevent interactions with other drugs which can lead to serious complications.^[3] As mentioned earlier even ibuprofen when combined with Ginkgo can lead to internal bleeding

Patients with blood circulation disorders or individuals on anticoagulants, such as aspirin, who take ginkgo are at a higher risk of experiencing undesirable effects.

Ginkgo reducing the effectiveness of SSRI as antidepressants since it inhibits monoamine oxidase. Combination of the two may prove fatal since it increases the risk of a potentially fatal condition known as serotonin syndrome. Examples of SSRIs are Prozac, or fluoxetine, and sertraline, also known as Zoloft. Ginkgo can also exaggerate both the good and bad effects of other antidepressants like MAOIs.^[4]

Ginkgo leaves also highly allergic contain long-chain alkylphenols. Therefore, people who are allergic to poison ivy and other plants with alkylphenols should completely avoid taking ginkgo.^[5] The University of Maryland Medical Center also warns that people should not consume the ginkgo fruit or seed.

CONCLUSION

The herb, even though it has been through a number of investigations, its benefits and risks still remain elusive. There are many uses to this medicinal plant that can be incorporated into our general practice.^[16] However, it also poses serious side effects. Therefore, it can be used as an alternative medicine to treat a number of diseases, but proper scientific research has to be done before it is introduced into the mainstream medicine.

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Source of support: Nil; Conflict of interest: None Declared