



GINKGO

Ginkgo biloba

Family: Ginkgoaceae

Synonyms: Maidenhair tree, Ginkgoblaetter, Arbre aux quarante ecus, Tempeltrae (1), Ginkyo, Ginan, Icho, Ityo, Kew Tree, Pei-wen, Temple Balm, Yin Guo, Yinsing (2), Fossil Tree, Japanese Silver Apricot, Bai Guo Ye, Salisburia (3)

Plant characteristics

Ginkgo is a gymnosperm and the oldest known living tree in the world (4). The ginkgo tree has not changed significantly since the Triassic period (1). This deciduous tree has grey bark and grows to a height of up to 130 feet with a spread of 60 feet (2,5). Its leaves are fan-like, two-lobed, and turn yellow in the fall (2). Growers harvest the leaves of 6-8 year old trees in the fall, just as they are starting to turn yellow.(5) Some growers prune the trees to shrub height and use mechanical picking devices (6).

At maturity (about 30 years), male trees produce naked pairs of anther-like stamen in catkin clusters while female trees bear a naked ovule. When fertilized, the ovule develops into two seeds with a foul-smelling, fleshy outer layer and a hard inner layer (2). The nut is edible, with a bitter seed coat (1).

The ginkgo tree is tolerant of pollution (4), but prefers a rich, well-drained soil and full sun (5). Because of their beauty, ginkgo trees are often added to landscapes, though male trees predominate (5). Ginkgo trees are relatively resistant to pests. Ginkgo's resistance to mutagenic toxins has led researchers to investigate its antioxidant properties (7).

Herbal medicinal properties

Biologically-active chemicals: 22-27% ginkgo flavonol glycosides (quercetin, kaempferol, and isorhamnetin) and 5-7% terpene lactones (2.8-3.4% ginkgolides A, B, C,M, and J) as well as sesquiterpene (2.6-3.2% bilobalide) in a standardized ginkgo product (GBE) (8). The extraction processes reduce the components most likely to result in allergic reactions and other undesirable effects (ginkgolic acids, ginkgotoxin, and sterols) (1,3). The most widely investigated extract is EGb 761, manufactured in Germany by Wilma Schwabe (but available in the U.S. as Ginkgold) using a process protected by U.S. patents.

Activity of herb: Researchers incompletely understand the mechanisms of action of GBE. Studies do support the contention of herbalists that the constituents in the herbal product operate synergistically, at least in the case of GBE.(3) Current ideas about GBE's actions include:

- 1) Anti-oxidant: protects tissues from stress
- 2) Anti- inflammatory
- 3) Reduces chances of blood clots
- 4) Improves circulation
- 5) Regulates neurotransmitters
- 6) Reduces effects of toxicity in Alzheimer's disease
- 7) Active against certain microbes (e.g., Pneumocystis carinii)
- 8) Possibly decreases elevated insulin levels associated with high blood pressure

Affects the metabolism of certain pharmaceutical drugs (3,9-11)

How herb used traditionally	How used today (based on scientific evidence)
<p>In ancient Chinese Medicine, the ginkgo nuts were taken for asthma, bronchitis, heart dysfunction and enuresis (10,12). Later physicians used the leaves for skin ailments, to kill worms, to induce labor and to treat arthritis (2,13).</p> <p>Today, Traditional Chinese medicine practitioners use ginkgo leaves for dressing wounds (14).</p> <p>In 1965, Dr. Schwabe developed a proprietary standardized extract of ginkgo for treatment of cerebral insufficiency (10). Ginkgo is widely used in Europe and increasingly popular in the US with sales comparable to Zantac (7).</p> <p>Preparation and dosage: Most clinical studies have used an extract standardized to 24% ginkgo flavonoid glycosides, 6 % terpene lactones and no more than 5 parts per million ginkgolic acids (9).</p> <ol style="list-style-type: none"> 1. For dementia (in which reversible causes have been excluded): 120-240 mg po (given in 2-3 doses per day) (15). 2. For claudication (calf pain with walking due to blocked arteries in the legs): 60-120 mg twice daily is standard. 3. For vertigo and tinnitus: 60-80 mg twice daily (15). <p>Ginkgold, Gikoba, and Ginkai are the brands in this country equivalent to the preparations used in clinical trials (9).</p>	<p>Effectiveness for treatment of brain impairment (& dementias): Possible. Many researchers have investigated the efficacy of standardized ginkgo biloba extract (GBE) in the treatment of Alzheimer's disease, other dementias and organic brain syndrome (9). In an analysis of 33 studies of the effects of GBE on symptoms associated with dementia or cognitive impairment, the reviewers ascertained that subjects who took GBE demonstrated improvements in cognition, Activities of Daily Living (ADLs), and emotional functioning as compared with placebo controls (10). No information was available on Quality of Life, depression, or dependency measures (10). Positive effects are most apparent for subjects with mild cognitive impairment related to mini-strokes or Alzheimer's disease (7). Some researchers consider the effectiveness of GBE comparable to the synthetic medications often used for Alzheimer's (16,17).</p> <p>Solomon et al., did not find GBE enhanced memory on tests in <i>healthy</i> elderly volunteers (18). Other research with healthy subjects has shown mixed results (7,19).</p> <p>Effectiveness for treatment of peripheral vascular disease: Possible. GBE appears to be effective for the symptomatic treatment of peripheral vascular disease (blocked arteries in the legs) (14). Three clinical trials demonstrated an increase in pain-free walking distance with doses of 120-240 mg/day (8). In animal experiments, GBE treatment post-stroke resulted in improved learning and memory ability (rats, mice) (20). Human studies of this type are rare: in one study in India, researchers found no reduction in stroke brain damage as measured by CT scan in patients given GBE starting 2 days after their stroke (21).</p> <p>Effectiveness for treatment of other conditions: Uncertain.</p> <ul style="list-style-type: none"> • In several small clinical trials, GBE was found to reduce the severity of acute mountain sickness. • A preliminary study of GBE for asthma showed improved lung function - further studies needed (8) • GBE may be useful in the treatment of age-related macular degeneration: one small study indicated a strong benefit (22) • In a small study of patients with glaucoma, GBE reduced visual field damage (23) • Intravenous GBE compared favorably with drugs for acute hearing loss in 20 patients (8) <p>GBE seems to be effective in the treatment of vertigo in preliminary clinical trials (3)</p>

Safety issues	Consumer marketing issues
<p>Side effects: similar to the synthetic drugs available for the treatment of dementias, including stomach problems, headache, constipation, allergy, anxiety, and sleep disturbance, though they occur much less frequently with Ginkgo (14). In large doses, Ginkgo can be associated with restlessness, nausea, vomiting, diarrhea, and weakness (3).</p> <p>Adverse events: In a review of >70 clinical trials, adverse events occurred in <1% of subjects (7) and included rash and bleeding gums (24). Rare case reports suggest serious bleeding complications are possible (20), but studies have failed to show an effect on bleeding tests when used for 7 days at recommended doses (120 mg, twice daily). Serious allergic skin reactions occur rarely (3).</p> <p>Precautions/contraindications:</p> <ul style="list-style-type: none"> • Stop Ginkgo 2-7 days prior to surgery. • Avoid Ginkgo in cases of allergy (25) • Do not combine Ginkgo with any prescription or over-the-counter sedative, including antihistamines • Avoid Ginkgo with blood thinning medication, including aspirin, without medical supervision (25) • Avoid Ginkgo if with a history of seizures (3) • Avoid Ginkgo if with a history of bleeding disorders or nosebleeds (8,26) • Avoid Ginkgo during cancer chemotherapy • Avoid Ginkgo during pregnancy and nursing without medical supervision (8) 	<p><i>Ginkgo biloba</i> grows best in the central regions of North Carolina. In 2001, buyers purchased \$25 million dollars worth of ginkgo. Growers harvested between 4.5 and 5.1 million pounds of ginkgo leaf and sold the herb for \$4-6 per pound.</p> <p>Large-scale cultivation provides most of the ginkgo leaf. 2001 supply and demand were about even, but the demand is expected to increase by 1-5% each year.</p>

References

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These informational monographs are based on our interpretation of current research in the rapidly evolving study of the safety and effectiveness of herbal medicines. This information is intended to serve as a resource and not to be used to diagnose or treat any illness. Patients should consult a licensed health care professional when using any herbal dietary supplements.