

# Ginkgo Seed Collection & Preparation

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Ginkgo (*Ginkgo biloba*) seeds require special cleaning and preparation for use as a food product or as use in growing seedling ginkgoes. Most of the preparation concerns revolve around seed collection times and removal of the fleshy seed coat.

## Think Before Eating!

Before trying to process ginkgo seeds for human consumption, purchase commercially processed seed in a specialty food store for an example of taste, texture, and appearance. Raw ginkgo seeds have many chemicals and substances which can be damaging to skin, eyes, mouth, and respiratory systems through inhalation and contact. In addition, green seeds, dry seeds, and cooked seeds can generate a number of allergic reactions. Green seeds should never be consumed. Cooked seeds should not be given to children under six. Older children and adults concerned about allergy problems should limit the number of seeds consumed to no more than five seeds. Vitamin B complex deficiencies will accentuate the negative impacts.

## When Seeds Are Ready

Seeds begin to fall in early Fall with both unfertilized eggs and rapidly developing embryos inside. Any naturally abscised mature seed (with mature male trees in the area) will usually have developing embryos present. From early Fall to late Fall, the embryos develop inside the seed. This development and growth period for embryos is essential for seed viability. Viable seed selection can be made either from on the tree or from on the ground beneath in late Fall or early Winter.

## Safety, Safety, Safety!

The fleshy seed coat of ginkgo contains relatively high concentrations of two chemicals which produce a putrid smell and are corrosive to tissues. These two chemicals are butyric and hexanoic acids. Symptoms of being just exposed to the chemical odor are: nausea; skin, eye, and lung burning; and, severe respiratory tract irritation. These acids are easily absorbed through the skin. The fleshy seed coat also contains several serious allergenic compounds which cause skin dermatitis similar to poison ivy. The chemical names, formulae, and proportion of total allergenic chemical concentration percent in the fleshy seed coat are: ginkgolic acid ( $C_{21}H_{32}O_3 = 80\%$ ); bilobol ( $C_{21}H_{30}(OH)_2 = 18\%$ ); and, ginkgol ( $C_{20}H_{32}OH = 2\%$ ). Personal safety demands the use of gloves, eye protection, and protection of bare skin from contact. Respirator use is recommended for prolonged diffuse exposure and for sensitive individuals.

## Get A Plastic Bucket

Undamaged and full sized seeds should be collected in a plastic bucket. If a food use is planned, early fall (mid-September) collection is suggested for peak starch content. If viable seeds for planting is planned, late fall or early winter collection is recommended. Minimize all skin and clothing contact with the fleshy seed coats. Always wear eye protection and gloves.

## Get Some Water

Fill the plastic collection bucket with water somewhere outside in a grassy area or over native soil. Discard any floating seed during the cleaning process. Due to the chemical nature of the fleshy seed coat, a very small amount of dish washing detergent can be added to the first few batches of wash water. The plastic bucket can be left filled with seeds and water for a few days to a week in order to allow the fleshy seed coat to rot. A combination of setting and waiting, and stirring and squeezing, can be used to remove all traces of the fleshy seed coat from the seeds. Carefully squeeze and scour the seeds, trying not to spill any of the water on your skin or clothing. Long forearm-length dish washing gloves are recommended. Eye and skin protection is essential! Repeat this process with fresh water as many times as needed to remove the fleshy seed coat. Usually 3-4 cleaning passes are needed, plus several rinses. Working with cold or iced water will minimize the odor.



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## Be Careful Where You Dump

Spread the water / seed coat slurry over the soil or grass surface away from public areas, play areas, pet areas, or any area close to standing or flowing water. When seed cleaning is finished, spray the area with fresh water to remove seed coat residue from grass surfaces. Prevent the use of the cleaning area for several weeks until the seed coat residue is decayed. A number of insects will be drawn to this site by the residues.

## Scrub & Dry

For large amounts of seed, some type of metal screening and scrubbing device could be fabricated to aid in processing. The purpose of the seed cleaning is to remove the fleshy seed coat in its entirety and any of its residues. Once you completely remove all the fleshy seed coat, use one last fresh water rinse to cleanse safety equipment and to rinse the seeds. With safety equipment still in place, pour out the seeds in a single layer in the sun and allow to air dry. Beware of animals stealing the drying seeds if placed in the open. Discard any opened seed. Allow the hard seed surface to dry completely (1-7 days). Stirring or turning the seeds (with gloves and eye protection) can facilitate complete drying. Prevent the seeds from being re-wetted by dew or rain.

## Nibbles?

If seed food use is planned, collect seeds in September (early collected seeds) and cook the cleaned seeds immediately to preserve the highest seed quality. Light roasting or boiling are the most common cooking methods, and then salt to taste. Seeds can be boiled, baked, roasted, or steamed. Seeds will start to open upon cooking like pistachios. Because the fleshy seed coat discolors the seed, some commercial seed products are bleached or colored. Prompt harvesting and processing will minimize this staining. Rinse preparation as to minimize any skin or eye irritation. Once cooked, taste one seed and wait four hours before trying another to test your sensitivity. Many people have an allergic reaction (like peanut allergies) to ginkgo seeds. Ginkgo seeds should not be given in any form to children under six. No more than five seeds should be provided older children, or adults who do not know if they are allergic to ginkgo seeds. Ginkgo seeds are a dessert or delicacy used in small portions, not as a heavily consumed main dish. Cleaned and shelled seeds are called white seed or baiguo.

## Seedlings?

If seedling production is the objective, then early collected seeds (early to mid-Fall) should be cleaned and stored at 60°F for six weeks to assure fertilization and proper embryo development has occurred. Late collected seeds (late Fall to early Winter) can be cleaned and go directly into cold storage. Put seeds in moist (not wet) cold (not freezing) conditions for two months. Be observant to prevent fungal growth in cold storage.

## New Trees

Plant cleaned seeds the second week of February in North American winter hardiness zone 8. Delay planting for two weeks for each hardiness zone farther North you plant. Remove cleaned seeds from cold storage and sow seeds two inches apart in a seed bed of good mineral soil. Cover with approximately one inch of mineral soil covered by a thin layer (<1 inch) of coarse organic mulch. Protect seeds from animal theft. Keep soil well watered and well drained. Do not keep soil or seeds saturated. Germination is slow and should occur between 15 - 40 days from sowing. Germination percent is dependent upon effective pollen distribution from surrounding mature male trees, as well as the care given the seeds in cleaning and storage. Germination percent can be as high as 95%, but patience is required to wait for all the seeds to germinate. Survival rates over the first two years can be expected to be 40-50% for all germinating seeds. Fungal attack, seed predation by animals, and drying of newly elongated roots and shoots generate significant mortality. Transplant seedlings to a well-aerated, moist mineral soil in full sunlight without weed and grass competition

## Conclusions

Using the reproductive bounty provided by a female ginkgo, whether for growing new ginkgoes or for human consumption, can be a great experience. Caution is needed with raw, fresh seeds, but the result will be a continued experience with a tree which has survived for the equivalent of seven million human generations. You can grow or taste a tree from the Jurassic.