

Curing, Preserving and Eating Olives!

Basic Food Safety

Wash Hands Frequently

- Personal cleanliness is a must. Wash your hands thoroughly and frequently. E. Coli resides in the human nose and intestines. Wash your hands if you rub your nose, wipe your face or skin, use the toilet, change a diaper, touch an animal, or touch raw meat, fish or poultry.
- Bandage any cuts or burns on your hands before handling food, or use disposable gloves.
- 20-second rule: wash hands for 20-seconds or the duration of singing Happy Birthday twice.

Avoid Cross Contamination

- Rinse all fresh fruits and vegetables well under running water before preparing or eating them.
- **ALWAYS** wash your hands, knives, cutting boards, and food preparation surfaces well with soapy water before and after any contact with raw meat, fish, or poultry.
- Run sponges and dish scrapers through the dishwasher several times a week. Change dish cloths daily.
- Use a disinfecting solution of 1½ teaspoon of chlorine bleach to 1 pint of water. Dispense with a spray bottle to disinfect countertops, cutting surfaces, sinks, etc. Make a new solution weekly.

When in doubt, throw it out.

- Never taste food that looks or smells strange to see if it can still be used. **Just discard it.**
- Most bacteria that cause food borne illness are odorless, colorless, and tasteless. Generally, foods that contain bacteria will look, smell, and taste normal. Use – and follow – reputable processing and storage techniques.

Use the Appropriate Canning Process

- The USDA does **not** recommend the open kettle and atmospheric steam canner methods of canning.
- Use a boiling water canner for high acid foods: fruits, pickled and fermented products, jams and jellies.
- Use a pressure canner for low acid foods: meats and vegetables, **and olives.**

Why two different processes?

Low acid foods must be pressure canned because *Clostridium botulinum*, the bacteria that causes botulism, is a spore former. When conditions are not favorable for the organism to grow (high heat, dryness, etc.), the bacterial cell forms a protective structure called a spore. It takes a higher temperature than boiling to destroy the spores: 240° - 250°F. If you do not destroy the spores they may germinate and produce fatal toxins in the food when it is stored on the shelf. High acid foods contain enough acid to block the botulinum bacteria growth, or destroy them more rapidly when heated.

Olives are a low-acid food and must be pressure canned if processed; not a boiling water canner to process olives.

Follow the canning process listed in your recipe. Never can olives for which you do not have a research-tested processing time. Canning time is dependent upon many factors; the amount of starch, tightness of the packed food, microorganisms which contaminate and grow in that type of food, type and size of pieces packed in the container, and temperature at which the food is processed.

Olives

- Olives are harvested at different stages of ripeness: green-ripe, turning color, and naturally black ripe.
- Green-ripe olives release a creamy white juice when squeezed.
- When harvesting, place olives gently in the collection container to avoid bruising.
- You can purchase a de-pitting tool, but it causes bruising at the entry and exit points.

Storing Fresh Olives

- When possible, process fresh olives within a few days after harvest.
- Green-ripe olives generally store better than naturally black ripe olives.
- Store olives between 41°-50°F, preferably in shallow, ventilated crates. Colder temperatures for more than two weeks can cause chill injury, leading to olive browning. More than 6 weeks causes surface pitting and spotting.

Curing Olives

Olives picked off the tree contain a very bitter compound called *oleuropein*. The processes that remove the bitterness are called curing, which leach out the water-soluble *oleuropein* compound from the olives to make them palatable.

The most common curing processes include water, brine, lye treatments and dry salt. Each curing process results in a different texture and flavor.

Several Methods for Curing Olives

Below are the general processing instructions for several curing methods. Be sure to use a reputable recipe for the brine. UC ANR Publication #8267 contains a variety of recipes and additional curing methods.

Containers: Olives can be lye-cured in food-grade plastic containers. Food grade polyethylene and polyvinyl chloride have been used for salt, lye, and acid solutions with no ill effects. Glass containers, crocks, stainless steel, and wooden barrels all work well. Avoid aluminum and galvanized containers; metal poisoning may result.

Water-Cured Olives

Water-cured olives will be ready to eat within a few weeks. Olives will still be slightly bitter because water curing removes less *oleuropein* than other methods.

1. Cut **each** olive so the bitter *oleuropein* can more easily leach out.
2. Soak the cut olives in water in a clean, food-grade container.
3. Change the water daily for at least a week, until the olives are not bitter.
4. After curing, place the olives in a finish brine, which is a vinegar-salt solution that adds the characteristic flavors.
5. A sample finish brine includes dissolving 1 pound (1½ cups) pickling salt in 1 gallon of cool water, then adding 2 cups of white wine vinegar. This amount of solution is enough to treat about 10 pounds of fresh olives. You can add fresh herbs and other seasonings, if desired. Close the container lid and refrigerate – the olives are not shelf stable. The olives are ready to eat after 4 days in the finish brine.

Brine-Cured Olives

This is a fermentation process that converts the sugars in the fruit to lactic and acetic acids. The fermentation breaks down the chemical bond between the *oleuropein* and sugars in the olives, leaching the bitterness into the brine. This process involves very little work and uses only water and salt, but takes a long time and requires monitoring and sufficient storage.

1. Sort the olives according to size and process similarly sized fruits together. Discard bruised or defective fruit.
2. Pack sorted olives into containers that can be made airtight. A 1-quart glass jar is the smallest size recommended.
3. Prepare the brine using ¾ cup (8 ounces) pickling salt per gallon of cool water.
4. Cover the olives with the brine and close the lid(s) loosely. Store the filled containers at about 60°-80°F.

5. After 7 days, replace the brine with a fresh batch of strong brine made with 1½ cups (1 pound) pickling salt per gallon of water. Close the lids firmly. Store the olives in the brine for at least 2 months.
6. For less-bitter olives, replace the brine with a fresh batch of strong brine at 1-month intervals for 2 or 3 months.
7. Check the containers regularly. If gas pressure cause the lids to bulge, loosen the lids to release the gas and firmly close them again.
8. Ferment until they have reached a taste you enjoy. The longer they ferment, the less bitter they will be.

Dry Salt-Cured Olives

- Use small, fully ripe, mature fruit that is dark red to black. (Large olives will soften too much during the process.)
- Salting dehydrates the olive flesh, resulting in a soft, moist, shriveled product.
- Dry salt cured olives will be ready to eat about 5 to 6 weeks after you begin the salting process. These olives are salty and also slightly bitter because dry salt curing removes less oleuropein than other methods.
- Store dry salt cured olives for up to 6 months in a refrigerator, or freeze them.

Preparation

1. Sort the olives and discard any bruised or defective fruit.
2. Prepare a large container that will hold the olives and salt that allows for drainage.
3. Place the container outdoors (under cover) or over a large pan so the draining brine will not ruin your floors. Raise the container on small blocks to improve air circulation around the bottom. (Or use a pillow case suspended within a plastic bucket.)
4. Weigh the sorted olives and place them into the container. Add about 1 pound (1 ½ cups) of pickling salt for every 2 pounds of olives. Mix the salt and olives very thoroughly in the container to distribute the salt and prevent mold from developing. Pour a 1-inch layer of additional pickling salt over the olives. Cover the container with clean cheesecloth and let it stand at about 60° to 80°F.
5. After 1 week, re-mix the salted olives by pouring them into a clean pail and then back into the first container. Add a small layer of salt over the top of the olives. Cover the container with a clean cloth and let it stand.
6. Repeat the mixing process once a week for the next month, until the olives are cured and edible.
7. When the olives are ready, pour them over a coarse screen to sift out any remaining salt. Allow the olives to dry overnight at room temperature.
8. Add 1 pound (1 ½ cups) of pickling salt to each 10 pounds of cured olives. Mix the olives and salt thoroughly and pack them into airtight containers (to minimize surface yeast and mold growth).

Storage & Eating

1. Store in a cool place and use within 1 month, refrigerate for up to 6 months, or store in a home freezer for up to a year. (Olives tend to become rancid if stored longer.)
2. You can use these olives, as is, for cooking.
3. For eating out-of-hand, you can first dip the olives briefly into boiling water to remove salt, allow them to air dry, and then rub them with a little olive oil and add herbs, such as rosemary, before serving.

Lye-Cured Olives

This process quickly breaks the chemical bond between oleuropein and sugars in olives. After curing is complete, you remove all traces of lye with a series of cold water rinses. The rinsing process also removes the bitterness, leaving a neutral, flavored olive that can accept flavors from vinegar and herbs in a brine.

Equipment Needed

- Two or more gallon or ½-gallon glass jars, sturdy food-grade plastic or stainless steel containers.
- Protective equipment (heavy duty rubber gloves, goggles, long sleeves, etc.), long handle plastic or stainless steel spoon for stirring and skimming, plastic measuring spoon, and a mesh cloth (muslin). Never use aluminum containers or utensils.
- One container of granulated lye, to be kept securely locked away when not in use. Always be sure the lye is 100% pure lye (NaOH), **not** Drano or some other product that contains metallic pellets.
- A mixture of one-cup vinegar to one cup of water for rinsing if lye or the lye solution touches your skin.

- A gallon or more of eating olives, such as Mission or Mamzanillo. The small oil olives are not as suitable for processing. The olives should be green or straw-green with a blush of pink to red; not black.

Debittering Olives with a Lye Solution

- **Do not taste the olives during this procedure.**
- Always wear rubber gloves and eye protection when working with the lye solution.
- For convenience start this process in the morning. Wash the olives in cool water. Gently shake off excess moisture. Set aside a few olives. These will be used later for process comparison.
- Pack the olives loosely in the jars or containers leaving 1½-inch headspace.
- Prepare the lye solution. Fill a container with one gallon of cool water. Carefully add 2 ounces (4 level tablespoons of flake lye or 3 level tablespoons of granular lye) to this gallon of water. Always add lye to the water; never add water to the lye; a violent reaction may take place which will splatter the lye all over place.
- Stir to dissolve. Rinse the spoon thoroughly. The solution will get warm. Let it cool about 30 minutes.
- Carefully pour the lye solution over the olives. *Please don't spill or splash.* Stir gently to ensure the solution is thoroughly and evenly distributed. One gallon of solution should cover two gallons of olives.
- Submerge the olives below the top of the lye solution. Place the mesh cloth on the olives and then place a heavy plastic water bag or weighted wooden disc to help hold the olives below the top of the solution. **Important:** Do not allow any olives to float to the surface. If air comes in contact with the olives at this stage they will oxidize and darken.

Lye Penetration

- Stir the olives every 2 hours until the lye reaches the pits. This usually takes about 10-12 hours.
- Remove several olives from near the bottom of your container. Always wear gloves and use a long handle spoon when working with the lye solution.
- Cut an olive in half lengthwise to check the lye penetration. The lye solution turns the flesh of the olives a deep yellowish green color. At this time the lye should be most of the way to the pit. The lye solution will begin to turn a yellowish brown color.
- Compare the treated olive with an untreated olive. If there has been no penetration or a minimal penetration, prepare a fresh lye solution of 1 ounce of lye per gallon of water in a separate container. Carefully pour off the old lye solution and cover olives with the fresh lye solution.
- Penetration to the pits should take 10-12 hours, but could take up to 30 hours if the fruit is very green. Large olives may require an additional fresh solution.

Removing the Lye

- When the penetration is complete to the pit or almost to the pit, pour off the lye solution. This solution will not harm household plumbing or septic systems, in moderate quantities.
- Rinse the olives with fresh cool water twice, then cover them with fresh, cold water.
- Let the olives stand in fresh water for 4 to 5 days. Change the fresh water at least twice daily. This process will draw out the lye. Olives may be safely tasted during the last two days of this stage. Continue rinsing until all of the "soapy" taste has been washed out.
- Keep the olives well submerged during this step to prevent darkening.

Preserving Debittered/Cured Olives

- For short term **refrigeration** storage, olives are usually placed in a light or medium brine, or in oil.
- For longer term storage, you can preserve some cured olives in a very strong brine, or by freezing, drying, or pressure canning.

Olive style	Suitable Preservation Methods				
	Brine	Refrigeration	Freezing	Drying	Pressure Canning
<i>Water-cured</i>	✓	✓			
<i>Brine-cured</i>	✓	✓			
<i>Dry salt cured</i>		✓	✓		
<i>Lye-cured</i>	✓	✓	✓	✓	✓
<i>Lye-cured fermented</i>	✓	✓			✓

1. Concentrated brine:

- Add heavily salted water (4 cups (2 ½ pounds) pickling salt per gallon) to cover olives.
- After two days, add one cup (10 ounces) of pickling salt per gallon.
- After two more days add another cup (10 ounces) of pickling salt per gallon. (This is a total of six cups (3 ¾ pounds) of pickling salt.)
- Cover tightly and store at room temperature; they will remain good for **8 to 9 months**.
- Before eating these olives, remove the salt by soaking the olives in fresh water. Rinse in four changes of fresh water over a period of two days.

2. Freeze the olives.

- Place olives (cured and/or dried) in plastic bags, rigid plastic boxes, or glass jars.
- Freeze for up to **1 year**.
- Once thawed, frozen olives will have a softer texture than before freezing.

3. Dry the olives.

- Place whole cured olives on drying trays.
- Sun drying takes 5 to 6 days. Dehydrator (140°F) takes 20 to 24 hours.
- Pack cool olives in plastic bags or airtight containers. Cover tightly.
- Store at room temperature for **3-4 months** in a cool place; they tend to become rancid if stored longer at room temperature.
- To rehydrate, place in slightly salted water (½ cup salt per gallon) until olives plump, about 8 to 12 hours. Add garlic and spices if desired.

4. Pressure can the olives:

- Prepare a brine using 4 ounces pickling salt (6 level tablespoons) per gallon of water. Heat the brine to boiling.
- Pack olives into pint or quart jars to the shoulder level of the jar. Cover olives completely with the boiling brine, leaving ½-inch headspace.
- Debubble the olives. Wipe rims and adjust lids and rings.
- Process in a pressure canner for one hour for pints, 70 minutes for quarts. Process at 10 pounds pressure in a weighted gauge canner, 11 pounds pressure in a dial-gauge canner. Adjust for altitude, if necessary.

Outwitting the Olives

Softening

The problem of softening of olives is complex and unfortunately cannot always be pinpointed or predicted. One of the major causes of softening is the decomposition of pectin material, which acts as the cementing substance in the cells of the olive. This breakdown is commonly brought about by the growth of microbes that produce a pectin degrading enzyme.

Some microbes, such as molds and certain bacteria that grow on the surface of the storage brine and produce a large amount of these enzymes, cause the olives to rapidly soften usually within two weeks. Therefore, the storage brine should be checked periodically and any scum removed. There are other bacteria which produce smaller amounts of the pectinolytic enzymes and which grow in the brine after the lye has been washed out. In this case, the olives show evidence of softening after longer times in storage, usually after about 4 weeks. Microbial softening of olives is sporadic and may not occur in all containers at the same time. Some preventive measures include keeping the containers covered, using a storage brine with at least 10% salt, pressure canning the olives, or storing in the refrigerator.

Softening can be caused by the decomposition of pectin resulting from the use of a lye solution that is too strong or at too high a temperature. The problem can also result from using olives that are too ripe, larger than usual, or from using a variety that has a tendency to soften, such as the Ascolano and Baroni varieties.

Fish Eye

Some bacteria grow just under the skin of the olive. As they produce gas, they form small blisters. This usually occurs during the washing process that follows the lye soak. Changing the water at frequent intervals until the washing process is finished can prevent this. These olives are safe to eat.

Gas Pockets

Gas pockets are similar to fish eyes in their origin and can be prevented in the same way. The difference is that the bacteria are deeper in the tissue of the olive, and instead of blisters, they form a pocket of gas. These olives are safe to eat.

Foaming

Foaming is generally caused from using olives that are over mature and have an excessive amount of oil which usually causes foaming. This oil reacts with the lye causing the foam. If this happens during the lye soak, replace with a new lye solution.

Resources

- For in-depth information on preserving olives plus recipes, download the 26 page UCCE ANR publication #8267 titled *Olives: Safe Methods for Home Pickling* at <http://ucanr.org/freepubs/docs/8267.pdf>.
- *National Center for Home Food Preservation*, <http://nchfp.uga.edu/>
- *Complete Guide to Home Canning*. 2009. USDA Agricultural Information Bulletin 539. National Institute of Food and Agriculture. Available free online at http://nchfp.uga.edu/publications/publications_usda.html.

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