Play it safe when preserving elderberries

Why berry type matters

Nellie Oehler, Joy Waite-Cusic and Jared Hibbard-Swanson

CONTENTS

Elderberry bushes are native to North America, and they are also a popular home landscaping shrub, with plants readily available at nurseries. Elderberries have a long history of medicinal use in various cultures, and many people make elderberry preserves, fruit leathers and other tart treats. However, elderberry products may be unsafe if prepared improperly. Here's what to know about elderberries and how to safely preserve them.

Researchers have found that many varieties of elderberries contain toxic compounds called cyanogenic glycosides. People consuming improperly prepared elderberry products have been poisoned. **Because raw elderberry products may contain elevated levels of toxic compounds, you should always cook elderberries before eating them.**

Preservation instructions also vary by type of elderberry, depending on the acid content of the fruit. There are four major types of elderberries. Some species have a pH above 4.6, which makes them unsafe for water bath canning except in specifically formulated, high-sugar recipes. You can safely preserve all varieties by freezing or drying, but you always need to cook them before consuming to reduce the level of toxic compounds.

Oregon State University

EM 9446 | November 2024

View online: https://extension.oregonstate.edu/catalog/pub/em9446

Types of elderberries

Blue elderberry (*Sambucus nigra* ssp. *cerulea*)

Blue elderberries are native to the western United States and can be found in the wild as well as in home gardens. Ripe blue elderberries are a dusky blue with a powdery appearance that distinguishes them from other elderberry varieties. All available data indicates that blue elderberries are high in acid, with a pH of less than 4.6. These berries can safely be processed using recipes for any other high-acid berry, such as blackberries, blueberries, or strawberries. Blue elderberries are safe to can as juices, syrups and fruit spreads using standard canning recipes. They can also be frozen or dried.

Blue elderberries are native to the West. Process them using recipes for any other high-acid berry, such as blackberries, blueberries or strawberries.

Credit: Hakeem, stock.adobe.com

American elderberry (*Sambucus nigra* ssp. *canadensis*)

American elderberries are native to the eastern United States. They have been domesticated, and many different cultivars are available at nurseries. Cultivar names include Alesso, Bob Gordon, Golden, Johns, York, Netzer, Norma, Nova, Samdel and Scotia. Goldbeere is a variety of American elderberries that is greenish yellow when fully ripe. The American elderberry plant is shrublike and can grow up to 10 feet high. The berries are a dark purple, and they lack the powdery coating distinctive to the blue variety.

Research in both Oregon and Missouri has shown American elderberries vary in acid content and are not consistently below 4.6, so they are considered a low-acid food. These berries are safe to freeze and dehydrate, but they should not be canned using standard recipes for high-acid berries. Researchers have published one safe recipe for canning that uses a high sugar ratio to achieve a safe product (see below).

American elderberries lack the powdery coating of blue elderberries. These berries are safe to freeze and dehydrate, but be careful not to use canning recipes for high-acid fruit.

Credit: Sunflower Shots, stock.adobe.com

European elderberry (*Sambucus nigra* ssp. *nigra*)

This subspecies of elderberry is native to Europe but has also been domesticated and is available in the U.S. The European black elder is a small tree up to 20 feet high. Cultivars include Haschberg and Korsor. The berries of this variety are dark purple, like the American elderberry. Limited published data available on European elderberries indicates that these are high acid. Since European elderberries are difficult to distinguish from American elderberries, follow recommended recipes for American elderberries using high-sugar ratios when canning (see below). European elderberries are safe to freeze and dehydrate.

European elderberries are also grown in the U.S. When canning, follow recipes for American elderberries using high-sugar ratios.

Credit: Volodymr, stock.adobe.com

Red elderberries *(Sambucus racemosa)*

Red elderberries are a different species from the elderberries described above. They are easily distinguished by the bright red color of the ripe berries. Little research has been done on red elderberries, but they may have a higher toxin concentration, particularly in the seeds. Because of their higher toxicity, food preservers should avoid using these to create food products.

Red elderberries may contain a higher concentration of toxins. Avoid creating food products from red elderberry.

Credit: stock.adobe.com

Harvesting

To harvest the flowers of elderberry shrubs, pick whole clusters (cymes) when they are white and open. Place the clusters on a piece of parchment paper and dry at a low temperature (80ºF or less) to preserve the best flavor. Remove the flowers by rubbing them in a bowl, being careful to discard any stray pieces of leaf or stem, which contain higher levels of toxins.

Harvest elderberries when the fruits are fully ripe. Ripe berries have a deep, rich color or, in the case of blue elderberries, a waxy bloom. Not all berries on the plant will ripen at the same time, so you may have to harvest multiple times.

Elderberries spoil quickly. Harvest them during the cooler part of the day and process the fruit as soon as possible. Refrigerate berries at 35–40ºF for short-term storage or freeze them if you cannot process your harvest immediately.

Stems and leaves contain higher levels of toxins, so it is important to remove these before processing. Hand-picking the berries off the stems can be tedious and time-consuming.

One fast way to separate the berries is by "screening." Place a wire cooling rack over a baking pan and gently rub the berries over the rack. The berries will drop from the stems into the pan below. It can help to freeze the berries before screening.

Elderberries and cyanide poisoning

Some varieties of elderberry are known to contain high level of toxic compounds called cyanogenic glycosides. For other varieties, the levels of these toxic compounds are unknown.

Cyanogenic glycosides are naturally occurring plant molecules which are part of the plant's defense against predation. During digestion, these compounds release cyanide, which goes into the bloodstream and prevents proper oxygen utilization.

Eating raw elderberries or drinking raw elderberry juice can cause nausea, and in some instances has led to serious illness and hospitalization. Symptoms of cyanide poisoning include nausea and vomiting, abdominal cramps and weakness. Severe cyanide poisoning can result in dizziness, seizures and even death.

Fortunately, cooking elderberries eliminates this risk and makes them safe for eating.

Preserving elderberries

Elderberries can be preserved in several ways, but not all varieties of elderberries can be used in all canning recipes because of differences in their acid content. Blue elderberries are naturally higher in acid and can be preserved using standard recipes for high-acid berries and fruits. Because blue elderberries are naturally low in pectin, adding regular or low sugar pectin is recommended. American and European elderberries are not high in acid, and you must use only specific high-sugar ratio recipes for water bath canning these berries. If unsure of the type of elderberries, use only the high sugar ratio recipes or freeze or dehydrate for preservation.

Freezing and drying elderberries

Caution: All varieties of raw elderberries should be cooked before consuming.

Caution: All varieties of raw elderberries should be cooked before consuming.

Elderberries can safely be frozen and dried raw but must be cooked before being consumed to prevent risk of cyanide poisoning. The cooked elderberry pulp can be dried and made into fruit leather. Elderberries are very tart, so they are often combined with a sweeter fruit such as peaches and apples to make into leathers. You can also freeze elderberry juice and syrups for long-term storage.

High-sugar jams and jellies

Yield: Approximately 3 half-pint jars

American and European elderberries can be low in acid (with a pH greater than 4.6), so they can only be safely canned using a recipe with a specific high-sugar ratio. This high amount of sugar reduces the water activity (available moisture) to a level that prevents *Clostridium botulinum* from growing. Carefully follow the recipe below to preserve American and European elderberry jams, jellies and syrups. Ingredients **MUST** be weighed to get the correct sugar ratio. Jams and jellies may be made with or without added pectin. If you are using added pectin, replace the manufacturer's sugar ratios with the weights in this recipe. Do not use low-sugar pectin.

INGREDIENTS

- 16 ounces berry pulp or juice by weight
- 19.5 ounces granulated sugar, or more. Use only granulated sugar for this recipe. Do not use an alternative sweetener such as honey.

You can adjust these amounts for larger batches, so long as you maintain the correct ratio of pulp or juice to sugar.

1. Wash jars and keep them warm. If processing at an elevation of less than 1,000 feet, sterilize jars by boiling for 10 minutes. Wash lids and rings.
2. Combine berry pulp or juice with sugar in a saucepan. Slowly bring the mixture to a boil, stirring occasionally until the sugar dissolves.
3. Continue cooking over high heat until mixture reaches gelling point, 8 degrees above the boiling point of water, or until mixture sheets from a spoon. If adding pectin, follow cooking instructions on label.
4. As mixture thickens, stir frequently to prevent sticking.
5. Pour hot mixture into hot jars, leaving ¼-inch headspace. Wipe rims and adjust lids.
6. Process in a boiling water canner or steam canner, adjusting the time for your elevation.
   - Below 1,000 feet: Process 5 minutes.
   - 1,001–6,000 feet: Process 10 minutes.
   - Above 6,000 feet: Process 15 minutes.
7. Start processing time only once water returns to a boil after submerging jars.
8. After processing, take canner off heat and remove the lid. Wait 5 minutes before removing jars.

Note: Blue elderberries can safely be made into jams and jellies using standard recipes for both regular and low-sugar spreads. They can also be canned as whole berries and syrups.

Blue elderberry syrup

Yield: Approximately 4 half-pint jars

INGREDIENTS

- 2½ cups strained elderberry juice
- 3½ cups sugar
- Optional: 1 teaspoon grated ginger or lemon zest

1. Wash jars and keep warm. Wash lids and rings.
2. Put juice and sugar into a large saucepan. Mix well.
3. Bring to a boil and simmer for 3 minutes.
4. Remove from heat and skim off foam.
5. Fill hot jars, leaving ½ inch head space. Wipe rims and adjust lids.
6. Process in a boiling water canner or steam canner, adjusting the time for your elevation.
   - 1,000 feet and below: Process 10 minutes.
   - 1,001–6,000 feet: Process 15 minutes.
   - Above 6,000 feet: Process 20 minutes.
7. Start processing time only once water returns to a boil after submerging jars.
8. After processing, take canner off heat and remove the lid. Wait 5 minutes before removing jars.

Note: Syrup can be made with American and European varieties using this recipe, but it must be refrigerated or frozen. If frozen, leave 1-inch headspace to allow for expansion. It is not safe to can syrup from American and European varieties using this recipe.

Blue elderberry vinegar

Yield: Approximately 2 half-pint jars

Great to add to drinks, marinades, salad dressing, shrubs and teas.

INGREDIENTS

- 2 cups fresh blue elderberries (or 1 cup dried berries)
- 2½ cups vinegar
- 2–3 tablespoons honey or sugar (to taste)

1. Combine ingredients in a heavy-bottom stainless steel pan.
2. Bring to a boil and simmer for at least 10 minutes. Mash the berries if you like, to release the juice.
3. Remove from heat and let cool.
4. Pour into sterilized clean glass jar. Seal with a plastic lid to prevent corrosion.
5. Let condition for 3–4 weeks in a cool, dark location.
6. Strain vinegar through a fine mesh strainer lined with a coffee filter or through cheesecloth.
7. Press the berries in the strainer to get as much juice out as possible.
8. Pour into sterilized bottles with cork or noncorrosive lids. Store in a cool, dark location.

Elderflower syrup

Yield: Approximately 3 pint jars

INGREDIENTS

- 2 cups water
- 2 cups granulated white sugar
- 2 large lemons (one for zest and juice; one for thin slices)
- 15–20 elderflower clusters (cymes)
- 1.5 teaspoons citric acid

1. Clean preparation surfaces and all equipment well.
2. Prepare the harvested elderflowers by shaking and removing stems, any insects and dirt. Do not rinse, as that will remove much of the flavor.
3. Add the sugar and water to a medium to large pot. Stir and bring to a boil until dissolved. Simmer for 10 minutes.
4. Add the zest and juice from one lemon and the citric acid to the sugar syrup.
5. In a large container that has a cover, combine the elderflowers and one thinly sliced lemon.
6. Pour the syrup onto the elderflowers. Cover, place in the refrigerator, and let the flavors infuse for one to three days.
7. Pour the infused syrup through a colander lined with cheesecloth. Pour the clear syrup into a bottle and store in the refrigerator. Use within a few weeks or freeze for later.

Note: Elderflower syrup made from this recipe cannot be safely consumed after being stored at room temperature or canned.

Source: Penn State Extension, Elderberry in the garden and in the kitchen (https://extension.psu.edu/elderberry-in-the-garden-and-the-kitchen)

Dried blue elderberries

Crispy dried elderberries can be ground into powder to add to hot drinks. Dried elderberries can also be used to make flavored vinegars.

- Dry only dark blue ripe berries.
- Remove any stems, leaves or flowers.
- Wash and dry on a paper towel.
- Place berries in a single layer on mesh dehydrator trays.
- Dry at 135°F for 6-8 hours or until there are no more moisture pockets and berries are crispy.
- Store in airtight containers in a cool, dark location or freeze.

Note: Dried elderberries should be rehydrated in water or juice and cooked before consuming to destroy the toxins.

Acknowledgments

The authors would like to thank Jill Bushakra, Ph.D., and the USDA National Clonal Germplasm Repository for allowing us to collect berry samples from their collection, as well as the OSU North Willamette Research and Extension Center for allowing us to harvest blue elderberries. Lastly, the authors are grateful to Sam Kilgore of Oregon State University for harvesting and transporting samples.

References

Andress, E., and J. Harrison. (2016). Jellied Product Ingredients. (https://nchfp.uga.edu/how/make-jam-jelly/jams-jellies-general-information/jellied-product-ingredients/) National Center for Home Food Preservation.

Appenteng, M.K., R. Krueger, M.C. Johnson, H. Ingold, H., R. Bell, A.L. Thomas and C.M. Greenlief. (2021). Cyanogenic Glycoside Analysis in American Elderberry. (https://doi.org/10.3390/molecules26051384)*Molecules*, *26*(5), 1384.

Centers for Disease Control. (1984). *Poisoning from Elderberry Juice — California*. (https://www.cdc.gov/mmwr/preview/mmwrhtml/00000311.htm)

Fyhrie, K., S. Brodt, G. Engelskirchen, G., K. Uhl and A. Mitchell. (2021). *Producing Blue Elderberry as a Hedgerow-Based Crop in California*. University of California Agriculture and Natural Resources.

Ingham, B. (2020). *Canning Fruit Safely*. (https://fyi.extension.wisc.edu/safefood/2020/06/05/elderberries-beautiful-to-look-at-not-for-canning/)

Oehler, N. (2020). Making Berry Syrups at Home (https://extension.oregonstate.edu/food/preservation/making-berry-syrups-home-sp-50-632) (SP 50-632). OSU Extension Service.

Oehler, N. (2022). Flavored Vinegars (https://extension.oregonstate.edu/food/preservation/flavored-vinegars-sp-50-736) (SP 50-736). OSU Extension Service.

Osman, A.G., B. Avula, K. Katragunta, Z. Ali, A.G. Chittiboyina and I.A. Khan. (2023). Elderberry Extracts: Characterization of the Polyphenolic Chemical Composition, Quality Consistency, Safety, Adulteration, and Attenuation of Oxidative Stress- and Inflammation-Induced Health Disorders. (https://doi.org/10.3390/molecules28073148) *Molecules*, *28*(7), Article 7.

Pogorzelski, E. (1982). *Formation of cyanide as a product of decomposition of cyanogenic glucosides in the treatment of elderberry fruit (Sambucus nigra)*. (https://scijournals.onlinelibrary.wiley.com/doi/abs/10.1002/jsfa.2740330516) Journal of the Science of Food and Agriculture.

Senica, M., F. Stampar, Veberic, R., and M. Mikulic-Petkovsek. (2016). Processed elderberry (*Sambucus nigra* L.) products: A beneficial or harmful food alternative? (https://doi.org/10.1016/j.lwt.2016.04.056) *LWT — Food Science and Technology*, *72*, 182–188.

Smith, M., and S. Marquesen. (2022). *Elderberry in the Garden and the Kitchen*. (https://extension.psu.edu/elderberry-in-the-garden-and-the-kitchen) Penn State Extension.

Swanson, M., and S. McCurdy. (2014, December 18). *Drying fruits and vegetables.* (https://extension.oregonstate.edu/catalog/pub/pnw-397-drying-fruits-vegetables) OSU Extension Service.

Thomas, A.L., P Perkins-Veazie, P.L. Byers, C.E. Finn and J. Lee. (2013). A comparison of fruit characteristics among diverse elderberry genotypes grown in Missouri and Oregon. (https://doi.org/10.3233/JBR-130054)*Journal of Berry Research*, *3*(3), 159–168.

UC-SAREP. (2024). *Elder Processing.* (https://ucanr.edu/sites/Elderberry/HarvestMarket/Process/)

Uhl, K., K. Fyhrie, S. Brodt and A. Mitchell. (2022). *Blue Elderberry (Sambucus nigra ssp. Cerulea): A Robust and Underutilized Fruit for Value-Added Products (https://pubs.acs.org/doi/abs/10.1021/acsfoodscitech.1c00436).* *ACS Food Science & Technology*.

About the authors

Nellie Oehler (https://extension.oregonstate.edu/people/nellie-oehler)

Master Food Preservers/Family & Community Health

Joy Waite-Cusic (https://extension.oregonstate.edu/people/joy-waite-cusic)

Professor of Food Safety Systems, Statewide Specialist for Home Food Safety and Preservation Program

Jared Hibbard-Swanson (https://extension.oregonstate.edu/people/jared-hibbard-swanson)

Food Security and Safety Manager