While this document contains many links to websites and other files for your learning pleasure, ***all of the answers to the reappointment quiz are in this study guide – use only this document as your reference for the questions.*** *Allow yourself 2 hours of continuing education to study and take the quiz.*

Contents

Equipment and Methods Not Recommended

https://nchfp.uga.edu/how/general/equp_methods_not_recommended.html
Revised August 28, 2020

Open-kettle canning and the processing of freshly filled jars in conventional ovens, microwave ovens, and dishwashers are not recommended, because these practices do not prevent all risks of spoilage. Steam canners are not currently recommended because processing times for use with current models are still being researched. It is not recommended that pressure processes in excess of 15 PSI be applied when using new pressure canning equipment. So-called canning powders are useless as preservatives and do not replace the need for proper heat processing. Jars with wire bails and glass caps make attractive antiques or storage containers for dry food ingredients but are not recommended for use in canning. Neither one-piece zinc porcelain-lined caps nor zinc caps that use flat rubber rings for sealing jars are recommended any longer.

The language above is from the USDA "Complete Guide to Home Canning" (2015 revision).

Update on Steam Canning. You may also want to read our National Center Burning Issue: Using Atmospheric Steam Canners. The National Center collaborated with the University of Wisconsin to have research conducted on appropriate use of atmospheric steam canners. As long as certain critical controls can be maintained at various steps in the canning process, there are many products appropriate for canning in atmospheric steam canners. See the Burning Issue above for more information and a link to the University of Wisconsin directions. It will take some time to integrate advice into the USDA "Complete Guide to Home Canning" or other publications.

"Dry Canning" Not Recommended. There are also some other methods that are not recommended being circulated among home canners. Canning vegetables or any food pieces without the covering liquid that was used in process research can result in under-processing and in the case of vegetables, a risk of botulism. Please read more about this hazardous practice at https://preservingfoodathome.com/2020/06/25/dry-canning-raw-vegetables-is-an-unsafe-practice/.

The USDA and University of Georgia researched and science-based home canning processes are meant to be used with the food preparation and jar filling directions in the recommendation.

Another use of the terminology "dry canning" is what some people are calling a method they promote of storing dry foods by heating them in canning jars in an oven. This is also not a recommended science-based method of storing dry foods. Read more at https://preservingfoodathome.com/2020/04/16/dry-canning-isnt-canning-to-me/.

An Update on Safe Use of Steam Canners

https://fyi.extension.wisc.edu/safefood/2020/08/18/an-update-on-safe-use-of-steam-canners/
Published on August 18, 2020 by Barbara H Ingham

The University of Wisconsin-Madison conducted research showing that **an atmospheric steam canner** may be used to safely can naturally acid foods such as peaches, pears, and apples, or acidified-foods such as salsa or pickles. The steam canner uses only ~2 quarts of water (compared to 16 quarts, or more, in a boiling water canner) so you heat less water and processing can start more quickly. We tested two types of canners in the laboratory, a **Back to Basics** canner (pictured left) and a **Victorio** model (pictured right). **These are the only two types of steam canners that the University of Wisconsin has tested as safe for home canning of acid foods, other canners have not been tested and are not recommended at this time.**

What does a tested steam canner look like? The two types of steam canners that we tested in our laboratory have a shallow base and a tall domed lid. Jars of food sit on a rack in the base, above hot, boiling water, and are covered by the domed lid. There are vents holes in either side of the lid, just above where the lid joins the base, where steam vents during the canning process. The only difference in the two types of canners that we researched is that the Victorio model that we tested had a knob on the top of the lid with a temperature gauge that indicated approximate temperature within the canner; in our research this gauge appeared to be quite accurate.

Can you simply adapt a boiling water canner as a steam canner? I have gotten many calls and emails asking if a consumer can adapt a boiling water canner (BWC) to a steam canner by placing a rack in a boiling water canner, adding a limited amount of water, and waiting for steam to escape from the lid atop the canner. **The University of Wisconsin does not recommend this approach**. In order for any canning process to ensure safe food is produced, there must be enough heat for a long enough time to kill pathogens and spoilage organisms that would make the product unsafe when stored on the shelf. We tested both models of canners using thin thermometers, or thermocouples, tracking temperature at several points inside the canner and inside containers of several types of food to verify that the recommended canners and recipes would produce safe food. We compared our results to a boiling water canner that was used as recommended. For other steam canner styles or adaptations of a boiling water canner to be proven safe, a researcher would need to test the canner in a laboratory to ensure a safe product can be produced.

The University of Wisconsin recommends the following guidelines for using either of the steam canner models that we tested.

Guidelines for using a Steam Canner for Home Food Preservation*

- Foods must be **high in acid**, with a pH of 4.6 or below. Foods may naturally be high in acid (most fruits) or have added acid. Either a Boiling Water Canner or a Steam Canner may be used to safely preserve foods high in acid.
- An **up-to-date**, **research-tested recipe** is used. **Approved recipes** for boiling water canning may be safely adapted for use in a steam canner. Acceptable recipes are available from sources such as the **National Center for Home Food Preservation** or in the Wisconsin **Safe Food Preservation series**.
- Make the following adjustments to an approved recipe for a boiling water canner: **at the processing step, place filled jars on the canner rack above hot/preheated water. Place the lid on the canner and heat, on high, until the canner vents. A full 6-8" column of steam will flow out of the vent holes in the canner. Once the canner continuously produces a full column of steam, start timing.** Process time is based on the time for a boiling water canner. Adjust heat, as needed to ensure the canner vents during the entire process time.
- Jars are processed in **pure steam at 210-212°F**. Steam should flow freely from the canner vent(s) during the entire process, or the food is considered under-processed/unsafe. You may wish to insert a thermometer in the vent port during a test run to check processing temperature.
- **Adjust processing time for elevation**. Add 5 minutes to processing time for each 1,000 feet above sea level. Check your elevation at any location in the world using this **handy tool**.
- Jars must be **heated prior to filling** and filled with hot liquid (raw or hot pack). Jars of **half-pint, pint, or quart size** may be used, **depending on the jar size acceptable in the recipe**.
- Processing time should be limited to **45 minutes or less, including any modification for elevation**. The processing time is limited by the amount of water in the canner base. When processing food, the canner should **not be opened** to add water. Regulate heat so that the canner maintains a temperature of 210-212°. **A canner that is boiling too vigorously can boil dry within 20 minutes**. If a canner boils dry, the food is considered under-processed and therefore potentially unsafe.
- Cool jars in **still, ambient air**. Jars should be cooled on a rack or towel away from drafts.

*These recommendations apply only to the **Back-to-Basics** or **Victorio models of steam canner pictured on this web page**. We did not test the safety of other models or styles of steam canners and can make no recommendation for use of other appliances. For more food safety and food preservation updates, subscribe to the **blog**. Stay well and preserve safe food! Barb

To Peel or Not to Peel?

Fundamentals of Consumer Food Safety and Preservation Master Handbook, 2018

Is it necessary to peel and pit produce before canning?
Always prepare produce as directed in the canning instructions. This generally includes peeling and removing the pits and seeds from fruit before canning. If pits are left in fruits, undesirable flavors can develop during processing. There are a few exceptions, such as pickled peaches and pickled pear tomatoes, which are canned whole. All processing times are specific to the fruit when prepared as directed. Any variation could present a risk for under processing.

Selecting, Preparing and Canning Meat

https://nchfp.uga.edu/how/can_05/chicken_rabbit.html

Chicken or Rabbit

Procedure: Choose freshly killed and dressed, heathy animals. Large chickens are more flavorful than fryers. Dressed chicken should be chilled for 6 to 12 hours before canning. Dressed rabbits should be soaked 1 hour in water containing 1 tablespoon of salt per quart, and then rinsed. Remove excess fat. Cut the chicken or rabbit into its suitable size parts for fitting into your jars leaving required headspace. Can with or without bones. The hot pack is preferred for best liquid cover and quality during storage. Natural poultry fat and juices are usually not enough to cover the meat in raw packs.

Hot pack – Boil, steam or bake meat until about two-thirds done. Add 1 teaspoon salt per quart to the jar, if desired. Fill jars with pieces and hot broth, leaving 1-1/4 inch headspace.

Raw pack – Add 1 teaspoon salt per quart, if desired. Fill jars loosely with raw meat pieces, leaving 1-1/4 inch headspace. Do not add liquid.

Adjust lids and process following the recommendations in Table 1 or Table 2 according to the canning method used.

Table 1. Recommended process time for Chicken or Rabbit in a dial-gauge pressure canner.

			Canner Pressure (PSI) at Altitudes of			
Style of Pack	**Jar Size**	**Process Time**	**0-2,000 ft**	**2,001-4,000 ft**	**4,001-6,000 ft**	**6,001-8,000 ft**
Without Bones:						
Hot and Raw	Pints	75 min	11 lb	12 lb	13 lb	14 lb
	Quarts	90	11	12	13	14
With Bones:						
Hot and Raw	Pints	65 min	11 lb	12 lb	13 lb	14 lb
	Quarts	75	11	12	13	14

Table 2. Recommended process time for **Chicken or Rabbit** in a weighted-gauge pressure canner.

Style of Pack	Jar Size	Process Time	Canner Pressure (PSI) at Altitudes of 0 - 1,000 ft	Above 1,000 ft
Without Bones:				
Hot and Raw	Pints	75 min	10 lb	15 lb
	Quarts	90	10	15
With Bones:				
Hot and Raw	Pints	65 min	10 lb	15 lb
	Quarts	75	10	15

This document was adapted from the "Complete Guide to Home Canning," Agriculture Information Bulletin No. 539, USDA, revised 2009. Slightly revised April 2020.

Selecting, Preparing and Canning Mixed Vegetables

https://nchfp.uga.edu/how/can_04/mixed_vegetables.html

Mixed Vegetables

- 6 cups sliced carrots
- 6 cups cut, whole kernel sweet corn
- 6 cups cut green beans
- 6 cups shelled lima beans
- 4 cups whole or crushed tomatoes
- 4 cups diced zucchini

Optional mix - You may change the suggested proportions or substitute other favorite vegetables except leafy greens, dried beans, cream-style corn, winter squash, sweet potatoes, broccoli, cauliflower or cabbage.
Yield: 7 quarts

Procedure: Except for zucchini, wash and prepare vegetables as described for carrots, corn, lima beans, snap beans or italian beans and tomatoes. Wash, trim, and slice or cube zucchini; combine all vegetables in a large pot or kettle, and add enough water to cover pieces. Add 1 teaspoon salt per quart to the jar, if desired. Boil 5 minutes and fill jars with hot pieces and liquid, leaving 1-inch headspace.

Adjust lids and process following the recommendations in Table 1 or Table 2 according to the method of canning used.

Table 1. Process Times for **Mixed Vegetables** in a Dial-Gauge Pressure Canner.

Style of Pack	Jar Size	Process Time	Canner Pressure (PSI) at Altitudes of 0-2,000 ft	2,001-4,000 ft	4,000-6,000 ft	6,001-8,000 ft
Hot	Pints	75 min	11	12	13	14
	Quarts	90 min	11	12	13	14

Table 2. Process Times for **Mixed Vegetables** in a Weighted-Gauge Pressure Canner.

			Canner Pressure (PSI) at Altitudes of

Style of Pack	Jar Size	Process Time (Min)	0 - 1,000 ft	Above 1,000 ft
Hot	Pints	75 min	10	15
	Quarts	90 min	10	15

This document was adapted from the "Complete Guide to Home Canning," Agriculture Information Bulletin No. 539, USDA. Reviewed July 2020.

Burning Issue: Green Beans and Botulism

https://nchfp.uga.edu/publications/nchfp/factsheets/greenbeans.html
Revised August 2020
Kasey Christian, National Center for Home Food Preservation

How can I can my green beans safely?

Easy to grow in a home garden and delicious year-round, green beans are a popular home-canned food. Just like with any other home-canned food, it is important to always use proper procedures and follow tested recommendations. Yet we have received many concerns about canning green beans this season, including confessions of improper processing. Unfortunately, in multiple situations we've had to recommend discarding entire batches due to under-processing, because there is a risk of botulism from under-processed green beans. Botulism is a potentially deadly food poisoning.

To help you prevent waste, sickness, or worse, here are our responses to the most common questions about canning green beans:

Q: I want to can my green beans in a boiling water bath…is that ok?

No. Green beans are a low-acid food and require the higher temperature from a pressure canning process for a pre-determined length of time in order to destroy the potentially deadly bacterial spores of *Clostridium botulinum*, unless they are adequately pickled. The ONLY processing we can support for non-pickled green beans is under pressure, using the directions and steps found on our website at https://nchfp.uga.edu/how/can_04/beans_snap_italian.html. The correct procedures include the steps for managing the canning process found here: Using Pressure Canners.

Q: My neighbor gave me green beans that were canned using the oven method…is it safe for me to eat them?

A: No. Using the oven method is NOT a recommended method of canning for green beans or any other food. It is dangerous because dry heat is slow to penetrate into jars (so recommended process times would not be enough), temperatures inside ovens vary (so a standard process time would be indeterminable), and no reliable, research-based safe process times have been developed for oven canning. There are also stories that jars heated in a dry oven could explode or break more easily than with recommended canning procedures.

Q: Last month I force cooled the pressure canner with my last batch of green beans, but now I think that may not have been a good idea…what should I do?

A: We recommend that the jars of beans be discarded. This is the safest option when home-canned foods are suspected of being spoiled or improperly canned. The cool-down time of a pressure canning process is calculated into the overall heat treatment required to destroy dangerous bacteria (*Clostridium botulinum*). So, if you do not let pressure canners cool down naturally and slowly to 0

pounds pressure, the jars did not receive a complete canning process. These jars are therefore considered to be under-processed, which means it is not safe to store them at room temperature. If it had been less than 24 hours, you could have refrigerated the jars immediately and eaten them within one week or frozen the green beans for longer term storage. Instructions for discarding suspect jars or detoxifying and cleaning unsealed spoiled jars are available on our website: https://nchfp.uga.edu/how/general/identify_handle_spoiled_canned_food.html .

Q: Last night I pressure canned my green beans using USDA recommendations, but this morning I noticed that 3 of the jars did not seal…can I re-process them?

A: Yes, if the jars received a proper pressure canning process but simply did not vacuum seal, then you can re-process them within 24 hours. Remove the unsealed lids and check the jars for nicks. Replace the jar if needed, and replace the lid with a new, properly prepared lid. Repeat the canning process, using the same processing time for this second process. Another option is to refrigerate the jars and eat the beans within a week, or to freeze the green beans for longer term storage. If more than 24 hours had passed, then we would recommend that you discard the beans.

There are cases of botulism from under-processed home-canned green beans and other vegetables. These two short reports document that this is hazard to be taken seriously.
https://nchfp.uga.edu/publications/Botulism_NCSU_greenbeans.pdf
https://nchfp.uga.edu/publications/botulism_NCSU_beets.pdf

Selecting, Preparing and Canning Fruit

https://nchfp.uga.edu/how/can_02/berries_whole.html
Revised March 18, 2020.

Berries - Whole

Blackberries, blueberries, currants, dewberries, gooseberries, huckleberries, loganberries, mulberries, raspberries. Use these directions only with the berries listed.

Quantity: An average of 12 pounds is needed per canner load of 7 quarts; an average of 8 pounds is needed per canner load of 9 pints. A 24-quart crate weighs 36 pounds and yields 18 to 24 quarts - an average of 1¾ pounds per quart.
Quality: Choose ripe, sweet berries with uniform color.
Procedure: Wash 1 or 2 quarts of berries at a time. Drain, cap, and stem if necessary. For gooseberries, snip off heads and tails with scissors. Prepare and boil preferred syrup , if desired. Add ½ cup syrup, juice, or water to each clean jar.

- **Hot pack** – For blueberries, currants, gooseberries, and huckleberries. Heat berries in boiling water for 30 seconds and drain. Fill jars and cover with hot juice, leaving ½-inch headspace.
- **Raw pack** – Fill jars with any of the raw berries, shaking down gently while filling. Cover with hot syrup, juice, or water, leaving ½-inch headspace. Adjust lids and process.

Processing directions for canning berries in a boiling-water, a dial, or a weighted-gauge canner are given in Table 1, Table 2, and Table 3.
Table 1. Recommended process time for **Berries, whole** in a boiling-water canner.

Process Time at Altitudes of

Style of Pack	Jar Size	0 - 1,000 ft	1,001 - 3,000 ft	3,001 - 6,000 ft	Above 6,000 ft
Hot	Pints or Quarts	15 min	20	20	25
Raw	Pints	15	20	20	25
	Quarts	20	25	30	35

Table 2. Process Times for Some Acid Foods in a Dial-Gauge Pressure Canner.

			Canner Pressure (PSI) at Altitudes of			
Style of Pack	**Jar Size**	**Process Time**	**0-2,000 ft**	**2,001-4,000 ft**	**4,000-6,000 ft**	**6,001-8,000 ft**
Hot	Pints or Quarts	8 min	6	7	8	9
Raw	Pints	8 min	6	7	8	9
	Quarts	10 min	6	7	8	9

Table 3. Process Times for Some Acid Foods in a Weighted-Gauge Pressure Canner.

			Canner Pressure (PSI) at Altitudes of	
Style of Pack	**Jar Size**	**Process Time (Min)**	**0 - 1,000 ft**	**Above 1,000 ft**
Hot	Pints or Quarts	8 min	5	10
Raw	Pints	8 min	5	10
	Quarts	10 min	5	10

Preservation Principles in Chutney

https://nchfp.uga.edu/how/can_06/chutney_principles.html

What is 'chutney'?
'Chutney' is a relish-type condiment; its increasing popularity reflects the inclusion of ethnic world cuisines in the Western diet.

The term 'chutney' includes several different varieties of sauce-type foods, drawn from traditional East Indian cuisine. The main ingredient may be an herb such as cilantro or mint; a flavoring ingredient such as coconut, onion, ginger, tamarind; or, in the most common form, chopped fruit or vegetables, simmered with spices, onion, sugar and vinegar. Fruit-based chutneys are usually cooked, then canned or refrigerated. Other chutneys like cilantro, onion, coconut, etc. are usually eaten fresh, with minimal, if any, cooking.

Fruit chutneys are most commonly available and varieties include mango, apple, apricot, cranberry, date, papaya, peach, pear, pineapple, plum, tomato and mixed fruit, to which raisins and nuts may be added to complement the texture. The result is a sweet-sour-spicy-hot versatile blend—an adventure for the taste buds.

Are there special spices commonly used in fruit chutney?
Chili powder or red pepper flakes are most common, but others include ginger (usually ground or chopped fresh ginger), garlic, turmeric, and curry powder (a mixture of ground spices like cardamom, cinnamon, cloves, coriander seed, cumin, fenugreek, mustard seed, nutmeg). Other seasonings may include salt, pepper, sugar, tamarind paste, vinegar and lemon juice.

What helps preserve the chutney?
Several different factors contribute to the 'preserved' nature of this product:

1. The acidity (low pH) of the chutney prevents growth of several spoilage and pathogenic bacteria, molds and yeasts. This acidity is derived from the added vinegar and the natural acids of the fruit.

2. Cooking the mixture to concentrate it lowers available moisture that is needed for microbial growth. The cooking step also kills most microorganisms that may be present.
3. Processing the filled jars in a canner uses additional heat to kill spoilage organisms that might contaminate the product as jars are filled and to produce a vacuum seal for later storage. If the two-piece canning lid is applied correctly, air is driven out of the headspace while the jars are in the canner and a vacuum seal is formed upon cooling. For most chutneys, a boiling water canning process is adequate, but other foods may require a pressure process.
4. During storage in the sealed jar, oxygen and additional microbial contamination is kept from the product. Too much oxygen left in the jar will cause interactions with food components that lead to quality losses (for example, undesirable changes in color, texture, and flavor).

What problems could arise from improper preparation and processing of chutney?
If the cooking and canning steps are improperly carried out, spoilage microorganisms could grow, leading to product loss. In a worst-case scenario, specifically if the product is not acidified sufficiently (below pH 4.6), and not heat-processed adequately, pathogenic bacterial spores may survive, germinate and form toxin on room temperature storage – such as spores of the potentially fatal *Clostridium botulinum*. Also, if air is not excluded, physical and chemically-induced quality deterioration of the product may occur.

Where can I find recommended procedures for home-canned chutney?
Our tested mango chutney recipe is available at this website:
http://www.uga.edu/nchfp/how/can_06/mango_chutney.html
Since chutneys are essentially pickled condiments, all of our selections are found with pickled products, at this website:
http://www.uga.edu/nchfp/how/chutney.html

Where can I get more information on canning and preserving?
The National Center for Home Food Preservation has several online factsheets and resources on safe home food-preservation. This publication is a good starting point:
http://www.uga.edu/nchfp/publications/publications_usda.html

In particular, this chapter provides general information for the novice food preserver:
http://www.uga.edu/nchfp/publications/usda/utah_can_guide_01.pdf or
http://www.uga.edu/nchfp/how/can_home.html

Refer to this factsheet for information on mangoes, such as how to cut and prepare the fruit:
http://www.uga.edu/nchfp/publications/nchfp/factsheets/the_mango.html

Tips:

1. When cooking with vinegar, lemon juice or acid foods, use a stainless steel stockpot. This prevents leaching of metal into the food, and pitting of the vessel which might occur with other metals such as aluminum and cast iron.
2. *Caution:* Handling green mangoes may irritate the skin of some people in the same way as poison ivy. (They belong to the same plant family.) To avoid this reaction, wear plastic or rubber gloves while working with raw green mango. Do not touch your face, lips or eyes after touching or cutting raw green mangoes until all traces are washed away.

Reprinted with permission of the University of Georgia. E. D'Sa. 2005. Preservation Principles in Chutney. Athens, GA: The University of Georgia, Cooperative Extension Service.

Home Canning Water

https://nchfp.uga.edu/publications/nchfp/factsheets/home_canning_water.pdf

ONLY USE DRINKING QUALITY (POTABLE) WATER THAT HAS BEEN PROPERLY DISINFECTED FOR DRINKING, COOKING, MAKING ANY PREPARED DRINK, WASHING DISHES OR FOR BRUSHING TEETH.

Boiling water canning is a method of preservation that kills vegetative bacterial cells, viruses and parasites, resulting in a shelf-stable product. Canning will not destroy other contaminants that may be in water such as heavy metals, salts, or other chemicals. Boiling water canning may be used as a method for preserving water, but because water is low in acid, certain precautions must be taken.

- Water for canning must be of acceptable drinking quality, i.e., potable, and free of filth or debris. See references at the end of this document for disinfecting water prior to canning.
- Water for canning must be free of nutrients. Boiling water canning does not destroy the spores of Clostridium botulinum, so can pure water only.

Follow standard boiling water canning procedures. The procedure below requires that water be pre-boiled for 5 minutes prior to filling jars; this will help to ensure purity. The boiling water canning process for filled jars will also help to ensure that jars seal, and remain sealed, throughout the storage time.

Boiling Water Canning of Water

1. The boiling water canner must be deep enough so that the filled jars will have 1 to 2 inches of water boiling over the tops of the jars during processing. It must have a rack in the bottom and a lid.
2. Prepare home canning jars by washing in hot, soapy water and rinsing well. Keep warm until ready to use. (You can do this by filling jars with clean hot water or submerging them in warm water in your boiling water canner.) Prepare lids for use by following the manufacturer's directions on the package.
3. Put enough water in the canner and raise the water temperature to 180 degrees F before placing filled jars of hot water (see below) into it for processing.
   https://nchfp.uga.edu/publications/uga/using_bw_canners.html
4. Bring water to be canned to a rolling boil for five minutes regardless of altitude. Fill boiled water into the warm, clean jars, leaving ½-inch headspace. A jar funnel can be used to help prevent spills. Wipe jar rims with a clean, dampened paper towel. Apply and adjust prepared lids and process in boiling water according to Table 1 below. (Start timing the process after the water in the canner comes to a boil around the filled jars.)
5. At the end of the process, turn off the burner and remove canner lid, turning it away from your face to avoid steam burns. Allow the canner to cool 5 minutes, then remove jars from the canner and place on a rack or towel out of cool drafts.
6. Allow jars to sit undisturbed for 12 to 24 hours, until cool and the lids have sealed. Follow your lid manufacturer's directions to determine that the lids have vacuum sealed before storing the jars of water.

Table 1. Recommended process time for **Water** in a boiling-water canner.

		Process Time at Altitudes of		
Style of Pack	**Jar Size**	**0 – 1,000 ft**	**1,001 – 6,000 ft**	**Above 6,000 ft**
Hot Pints or Quarts		10 minutes	15 minutes	20 minutes

IMPORTANT NOTE: The process time is not a known *C. botulinum spore* kill by heat. You should be certain that your water does not contain any added or residual nutrients.

Additional References for Disinfecting Water Supplies in Emergencies

- Environmental Protection Agency (EPA). Emergency Disinfection of Drinking Water. https://www.epa.gov/ground-water-and-drinking-water/emergency-disinfection-drinking-water
- Centers for Disease Control and Prevention (CDC). Making Water Safe in an Emergency. https://www.cdc.gov/healthywater/emergency/drinking/making-water-safe.html

Dry Canning Raw Vegetables is an Unsafe Practice

https://preservingfoodathome.com/2020/06/25/dry-canning-raw-vegetables-is-an-unsafe-practice/
June 25, 2020

Some people are experimenting with canning fresh vegetables their own way instead of following research-based processing from USDA. The USDA home canning procedure is meant to kill spores of *Clostridium botulinum*, the bacteria that cause the potentially deadly botulism poisoning. The latest version of people making up their own method that is potentially **very hazardous** has been brought to our attention through emails and calls to the USDA Hotline. It involves putting raw vegetables (such as corn, green beans, carrots, beets or other vegetables) in canning jars with no added liquid, applying lids and pressure canning for the same amount of time as if you had added the water to cover required in the USDA method.

What is hazardous about this "dry canning" of vegetables?

- In the pressure processes we have to recommend for home canning of vegetable, the liquid covering pieces of vegetables in the jars is **required** for the expected heat penetration throughout the jars during processing. The food must be prepared and jars filled just as described for the USDA process time to work as expected in killing bacteria of concern.
- It is well known that bacteria and bacterial spores are more sensitive to wet heat than dry heat. They will die in hot dry air much more slowly than in hot water. So, if the process was researched with water or other liquid in the jars, it is not expected that the same process time will be long enough heating for a jar without the liquid in it.
- The risk here is botulism, which is a food poisoning disease that can be fatal (or kill people). Botulinum toxin can be present in canned vegetables without any visual changes to the food or odors. Please read what the Centers for Disease Control and Prevention (CDC) has to say about botulism and home canning, and particularly note the section on here called *What is Botulism*: https://www.cdc.gov/botulism/consumer.html

Needs water over carrots to process

Filled and processed correctly with water covering carrots

But people say it works and like the food…

- Someone can get lucky and not get sick from trying this. Bacteria are not distributed evenly throughout our environment. But the next time, *Clostridium botulinum* or other harmful bacteria can be in the jar and botulism poisoning could result.
- And by the way, some people who have made up this method on their own are adding butter or ghee even if no water. These are no substitute for the required liquid in the jars, either. And these should not be added to the jars even with liquid in research-based processes if not called for in the original instructions.

Home canning and creativity

- Canning preservation of food is not a creative activity about how to produce the best quality only. Safety must come first, and the researched processes we have for vegetables require the liquid cover in the jars (and whatever is the type of liquid called for in the described procedure with each process, which is usually water for plain vegetables).
- Again, the USDA low-acid home canning recommended processes are meant to be used with the full procedures as written — how to select and prepare the food, how to fill jars, how to manage the step by step canning process in a recommended pressure canner type, and how to make altitude adjustments.

Be food-safe when home canning, please, and stay with properly researched and tested procedures. Recommended procedures for home canning of vegetables: https://nchfp.uga.edu/how/can4_vegetable.html and read about safe canning here: https://nchfp.uga.edu/ and https://nchfp.uga.edu/how/general.html

2021 Reappointment Quiz Questions

All of the answers to the reappointment quiz are in the 2021 study guide. This document is for study purposes. Take the quiz online at http://ucanr.edu/2021mfpquiz.

1. Which of the following canning and processing methods is acceptable?
    a. Use of jars with wire bails and glass caps
    b. Processing with canning powders
    c. Pressure processes below 15 PSI in new equipment
    d. Processing filled jars in conventional oven

2. Zinc caps with flat rubber rings are safe to use for sealing jars.
    a. Yes
    b. No

3. Dry canning refers to which of the following?
    a. Canning any food without a covering liquid
    b. Storing dry foods by heating them in canning jars
    c. Both a and b
    d. Neither a or b

4. To determine when to start a steam canner processing timer, rely only on the temperature sensor being in the green zone for your elevation.
    a. Yes
    b. No

5. Which ***one*** method is the recommended indication that a steam canner contains pure steam and you can start the processing time? *(The others may be verifications of a pure steam environment.)*
    a. A full 6-8" column of steam flows steadily out of the vent hole(s).
    b. The temperature reading of a thermometer placed in a vent hole reads 210°F
    c. The temperature sensor is in the green zone for your elevation.
    d. The dome lid begins to lift from the base of the canner.

6. Should UC Master Food Preservers use both the dome style steam canners and Victorio's multi-use canner during demonstrations and outreach when teaching how to steam can high acid foods?
    a. Yes
    b. No

7. If a recipe specifically calls for peeled tomatoes but you want to keep the peel on, you should find another reputable recipe that doesn't require peeled tomatoes.
    a. Yes
    b. No

8. Chicken is cooked at an internal temperature of 165°F. Your hot pack recipe says to cook the meat until it is 2/3 done. What is the correct internal temperature to reach to hot pack chicken?
    a. 95°F
    b. 110°F

c. 125°F
d. 140°F

9. Which of the following statements is true?
   A) It is never safe to change the proportions of mixed vegetables.
   B) Cream style and whole kernel corn may be used interchangeably.
   a. Only A is true
   b. Only B is true
   c. Both A and B are true
   d. Neither A or B is true

10. The only recommended canning process for non-pickled green beans is pressure canning.
    a. Yes
    b. No

11. A potential problem when heating jars in a dry oven is that the jars may break or even explode.
    a. Yes
    b. No

12. Pressure canned green beans that have not sealed after 19 hours may be safely:
    a. Reprocessed with new lids, clean hot jars, and hot product
    b. Refrigerated and eaten within a week
    c. Frozen
    d. All of the above

13. According to the NCHFP's canning whole berries, which of the following berries should NOT be canned?
    a. Blueberries
    b. Elderberries
    c. Logan berries
    d. Mulberries

14. Before hot-packing huckleberries, the berries should be heated in boiling water for how many seconds and then drained?
    a. 15
    b. 30
    c. 45
    d. 60

15. Too much oxygen left in jars (eg too much headspace) can lead to quality loss including changes in color, texture, and flavor.
    a. Yes
    b. No

16. Which of the following is/are possible problems from improper preparation and processing of chutney?

a. Product is not acidified sufficiently resulting in the formation of toxins
b. Product includes air resulting in physical and chemically induced quality deterioration.
c. Both a and b
d. Neither a or b

17. Green mangoes belong to the same plant family as:
    a. Poison sumac
    b. Nettles
    c. Poison ivy
    d. Oleander

18. To avoid skin irritation, wear gloves when handling green mangoes.
    a. Yes
    b. No

19. Water is considered a low-acid food.
    a. Yes
    b. No

20. Dry canning raw vegetables is unsafe because:
    a. The liquid is required to achieve expected heat penetration
    b. Bacterial spores die more slowly in hot air as opposed to hot liquid
    c. There is a risk of botulinum toxins being present in dry canned vegetables
    d. All of the above

21. One of the diseases that can result from eating improperly processed foods is called:
    a. Clostridium botulinum
    b. Botulinum
    c. Botulism
    d. None of the above

22. Botulism is found in jars of improperly canned low acid foods.
    a. Yes
    b. No