

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.

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## Let's Preserve: Freeze Drying

<https://extension.psu.edu/lets-preserve-freeze-drying>

Home freeze dryers have become a popular food preservation method to extend the shelf life of food. Many curious food preservers are now investing in these machines.

Freeze-dried food lasts longer and is more lightweight than dehydrated food. Freeze-dried food also retains its color and shape better than dehydrated food. Additionally, more types of food such as ice cream, milk, eggs, and complete meals can be freeze-dried. Despite these advantages, freeze-drying systems are an expensive initial investment, take up a lot of counter space, and use more electricity than a dehydrator.

*The following information is based on using the Harvest- Right® medium home freeze dryer and reference materials provided by the manufacturer.*

### Freeze-Drying Process

Trays of food are placed in the freeze dryer's chamber. The machine freezes the food to a temperature between -30°F and -50°F. Next, a vacuum pump pulls the air out of the chamber and the trays are slightly heated. As the water in the food heats, it sublimates (ice is directly converted from solid to water vapor) and is removed from the product. This process automatically removes up to 98 percent of the water in the food.

### Appliance Location and Setup

A freeze dryer consists of two main components: the vacuum pump and the freeze dryer. Those components weigh 35 pounds and over 100 pounds, respectively, so you will need a sturdy location to set up your system, such as on a countertop, sturdy cart, or table. The vacuum pump and the freeze dryer both make a droning noise when they are running— similar to a vacuum cleaner. The system beeps when the cycle is complete or if there is an error, which may be distracting if it happens in the middle of the night. The optimal room temperature range for freeze drying is 45–75°F. Consider these factors when choosing a location for your freeze dryer.

Some vacuum pumps use oil that must be filtered, while other vacuum pumps are oil free. If the pump you choose uses oil, it is a good idea to purchase extra oil before your initial setup in case you spill any when filling it. Additionally, as the oil is filtered and consumed by the running pump, it will need to be replenished. It is also helpful to purchase a funnel to use when filling the pump with oil.

### Preparation of Food

Some foods need to be pretreated before they can be freeze-dried to prevent browning. This color change is due to the action of enzymes that act like chemical scissors and cause the food to break down. An example of this process is when an apple is sliced; the exposed flesh turns brown and begins to soften. To control enzymes, follow the same process to pretreat fruits and vegetables for dehydrating as described in "[Let's Preserve: Drying Fruits and Vegetables](#)." Food should also be cut into equal-sized portions so that the product freeze-dries at the same rate. The rate at which food freeze-dries should also be considered, and foods with a similar drying time should be processed together. Drying times can vary from approximately 24 to 48 hours. Consult your machine's manual for average drying times. When loading the trays, make sure the food is evenly spaced and does not come above the edges of the pan, as some products expand when freeze-dried.

### Food Safety

Raw and cooked meat and eggs can be freeze-dried. However, the freeze-drying process does not kill harmful bacteria that can cause foodborne illness. Therefore, it is important to carefully label raw meat and handle it appropriately before and after freeze-drying.

1. Wash hands with soap and warm water for at least 20 seconds after handling raw meat or eggs.
2. Wash utensils, mixing bowls, and countertops that come in contact with raw meat or eggs.
3. Clean and sanitize the freeze dryer trays once the freeze-drying process is complete.
4. Store and prepare raw meat away from ready-to-eat food to avoid cross-contamination.
5. Cook meat and eggs to the proper internal temperature before consuming them. For safe cooking temperatures, see Penn State Extension's [Cooking Temperatures Magnet](#).

### Storage

After taking the time and resources to freeze-dry your food properly, be sure to package it correctly so it lasts long enough for you to consume. Freeze-dried items can be stored safely for many years under the right conditions and with the correct packaging. To increase shelf life, include properly sized single-use oxygen absorbers—small packets that attract and retain the oxygen in a package—in whatever type of packaging you choose.

- Zip-top bags or food storage containers can be used for short-term storage (a few months).
- Glass canning jars can be used to store freeze-dried food. To get the longest shelf life, put an oxygen absorber in the jar or remove the air from the jar using a vacuum sealer.
- Vacuum packaging removes most of the oxygen from the bag. This would be better for more midterm storage (about two to three years) since water and oxygen can still pass through plastic bags.
- Mylar® bags (multilayer, metalized, sealable bags) block out air and light during storage but must be used with an oxygen absorber and heat-sealed with an impulse (heat) sealer. Bags can be resealed once opened and take up less space than glass jars or cans.

- Metal cans provide airtight, dark storage of food, but all the food should be used as soon as possible once the can is opened.

Store freeze-dried and packaged products in a cool, dry place that does not get a lot of exposure to light, such as a basement, dark cupboard, pantry, or closet.

## Usage

Freeze-dried food has many uses, including fast meal prep, emergency preparedness, harvest preservation, and outdoor recreation. The food can be eaten “as is” (except for raw meat, poultry, seafood, and eggs), added directly to recipes, or rehydrated and used the same as you would fresh food.

When eating freeze-dried food as is, be sure to drink water since freeze-dried food has a very low water content. Freeze-drying concentrates the flavor of most fruits and vegetables, making them great snack in their freeze-dried state.

Vegetables can be rehydrated and prepared by adding them to a bowl of hot water (or warm water that you microwave or cook on the stovetop). They can also be used directly in cooking, especially when making something like a soup or stew. Do not soak leafy greens because they may get mushy. You can either spray them with some water to rehydrate them or crush them up to be included in sauces, meatballs, or smoothies for added nutrition.

Fruit can be rehydrated by either soaking in a bowl of water or spraying it with water. Fruit is great to use in pies and smoothies, on cereal or oatmeal, or cooked in recipes that call for fresh fruit.

Milk and dairy products can be rehydrated with water or added to smoothies, baked goods, or dips.

Full meals such as casseroles can be rehydrated by mixing in water in 1/3 cup increments to reach the desired consistency and then heated in the oven or microwave.

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## Raw Milk May Do More Harm Than Good

*Not Properly Stored, It's a Source of Antibiotic-Resistant Microbes*

by Amy Quinton, June 29, 2020

<https://www.ucdavis.edu/food/news/raw-milk-may-do-more-harm-good>

Raw or unpasteurized cows' milk from U.S. retail stores can hold a huge amount of antimicrobial-resistant genes if left at room temperature, according to a new study from researchers at the University of California, Davis. The study also found bacteria that harbored antimicrobial-resistant genes can transfer them to other bacteria, potentially spreading resistance if consumed. The study was published in the journal *Microbiome*.

“We don’t want to scare people, we want to educate them. If you want to keep drinking raw milk, keep it in your refrigerator to minimize the risk of it developing bacteria with antibiotic-resistant genes,” said

lead author Jinxin Liu, a postdoctoral researcher in the Department of Food Science and Technology at UC Davis.

### **Lacking in probiotics**

An estimated 3 percent of the U.S. population consumes unpasteurized, or raw, milk, which has not been heated to kill pathogens and extend shelf life. Raw milk is often touted to consumers as having an abundant supply of probiotics, or healthy bacteria, compared with pasteurized milk. UC Davis researchers did not find that to be the case.

“Two things surprised us,” said Liu. “We didn’t find large quantities of beneficial bacteria in the raw milk samples, and if you leave raw milk at room temperature, it creates dramatically more antimicrobial-resistant genes than pasteurized milk.”

Bacteria with antimicrobial-resistant genes, if passed to a pathogen, have the potential to become “superbugs,” so that pharmaceuticals to treat infection or disease no longer work. Each year, almost 3 million people get an antibiotic-resistant infection, and more than 35,000 people die, according to the Centers for Disease Control.

### **The longer it sits, the worse it gets**

UC Davis researchers analyzed more than 2,000 retail milk samples from five states, including raw milk and milk pasteurized in different ways. The study found raw milk had the highest prevalence of antibiotic-resistant microbes when left at room temperature.

“Our study shows that with any temperature abuse in raw milk, whether intentional or not, it can grow these bacteria with antimicrobial resistance genes,” said co-author Michele Jay-Russell, research microbiologist and manager with the UC Davis Western Center for Food Safety. “It’s not just going to spoil. It’s really high risk if not handled correctly.”

Some consumers are intentionally letting raw milk sit outside of the refrigerator at room temperature to ferment, in order to make what’s known as clabber. Co-author and Peter J. Shields Chair of Dairy Food Science David Mills said if consumers eat raw milk clabber, they are likely adding a high number of antimicrobial-resistant genes to their gut.

“You could just be flooding your gastrointestinal tract with these genes,” said Mills. “We don’t live in an antibiotic-free world anymore. These genes are everywhere, and we need to do everything we can to stop that flow into our bodies.”

While more work is needed to fully understand whether antibiotic-resistant genes in raw milk translate into health risks for humans, Mills suggests that consumers instead use a starter culture if they want to ferment raw milk, which carries specific strains of bacteria to inoculate the milk.

Other authors include Yuanting Zhu of UC Davis and Danielle Lemay of USDA ARS Western Human Nutrition Research Center. This study was funded with support from the National Institutes of Health and the Peter J. Shields Endowed Chair in Dairy Food Science.

## Safe substitutions when canning

<https://fyi.extension.wisc.edu/safefood/2020/07/15/safe-substitutions-when-canning/>

Published on **July 15, 2020** by BARBARA H INGHAM

*The safety of the food that you preserve for your family and friends is important to you. The University of Wisconsin Division of Extension supports using up-to-date, research-tested recipes so that you know that the food that you preserve is both safe and high in quality. Here are a few quick tips on changes and substitutions that **are acceptable when using tested/approved recipes for canning fruits, meat, and vegetables** that will keep your home preserved food safe to eat.*

**Canning Fruits.** Sugar is added to canned fruits help preserve color, help firm texture, and for flavor.

- Choose a light fruit juice such as white grape juice for canning if you wish to **reduce sugar** in home-canned fruit.
- You may safely **eliminate sugar** altogether when canning fruits at home, if you prefer. However, fruit canned in water is generally considered unappealing, and will spoil more quickly once opened.
- There are **no tested recipes** for using sugar substitutes such as Sucralose in home canning. Refer to the **manufacturer** for directions for home canning using a sugar substitute.

**Canning Meat.** Meat is low in acid and must be canned in a pressure canner.

- You may add **a small amount of seasoning, onions, or garlic** when home-canning meat using a tested recipe without changing the processing time.
- Canned meat products must **never** be thickened with flour or cornstarch; rice, pasta or barley must **never** be added; and fat must **not** be added – any of these changes can result in an unsafe product.
- Only add meat when called for in a tested recipe. For example, don't add meat to spaghetti sauce unless the recipe allows this addition.

**Canning Vegetables.** Vegetables are also low in acid, unless they are pickled, and must be canned in a pressure canner.

- You may create **vegetable mixtures** as long as there is a tested recipe for each vegetable that you are combining **and** you follow the processing time for the vegetable that has the longest time listed.
- You may add **a small amount of garlic** (up to 1 clove per jar) to canned vegetables without impacting the processing time in an approved recipe.
- **Do not thicken** canned vegetables with flour or cornstarch, or add rice, pasta or other starchy ingredient, an unsafe product will result.

Recommended recipes for safe canning of fruits, meats, or vegetables are available from the **University of Wisconsin** Division of Extension or the **National Center for Home Food Preservation**.

In addition to fruits, meats, and vegetables, additional safe substitutions are available for **canned salsa and other tomato products, homemade pickles and relishes, and tested/approved jam and jelly recipes**. A full list of safe substitutions for home canning can be found [here](#).

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## The Laws of Salsa

[The Laws of Salsa \(SP-1003\) | OSU Extension Service \(oregonstate.edu\)](#)

### Guidelines for preparing and preserving safe, healthy salsas

1. Obtain current, tested recipes and instructions and follow them.  
<https://extension.oregonstate.edu/mfp/publications>
2. Use high-quality, just-ripe tomatoes, peppers, onions and garlic. Do not use tomatoes that are overripe or from frost-killed vines.
3. Use the amount of tomatoes the recipe calls for. You can use or combine red, green or heirloom tomatoes or tomatillos as long as the amount remains the same.
4. Use the amount of peppers the recipe calls for. Mix and match peppers to vary heat, appearance and flavor. Handle peppers with gloves.
5. Use the amount and type of acid the recipe calls for. Vinegar or bottled lemon/lime juice ensures the safety of the product. **Breaking this law could be life threatening.**
6. Dried spices may be added or deleted as desired. These may include salt, ground pepper, dried chili pepper, coriander, cumin and oregano.
7. Don't add more vegetables or fresh herbs than the recipe calls for.
8. Don't add thickeners.
9. Use the processing method for the length of time specified in the recipe. Salsa can be safely stored in the refrigerator for several weeks or frozen for months without processing.
10. It's not safe to can your own original salsa recipe. Refrigerate or freeze it instead.

**Caution: Wear plastic or rubber gloves and do not touch your face while handling or cutting hot peppers. If you do not wear gloves, wash hands thoroughly with soap and water before touching your face or eyes.**

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## Put a Lid on It! Lids for Home Canning

<https://fyi.extension.wisc.edu/safefood/2021/04/19/put-a-lid-on-it-lids-for-home-canning/>

By far the most important step in safe home canning is to follow an up-to-date, research tested recipe. Research-tested recipes recommend metal 2-piece lids for home canning. Two-piece lids are sold to fit regular and wide-mouth glass canning jars and are made up of a flat metal lid and a metal screw band. The lid contains a sealing compound that, when properly used, softens during the canning process and forms an airtight seal as the container cools.

**Traditional metal lids** are designed to be used only once. Reusing traditional lids will result in seal failure; the indentation left in the sealing compound on the first use will prevent an airtight seal from forming the second time. Unused lids should be stored in a cool, dry location and **may be good for up to 5 years from the date of manufacture**. Over time the sealing compound will degrade and the lid may fail to seal.

**Best practices for ensuring a safe seal on canning jars.** These tips will help ensure that your jars seal and stay sealed.

- Follow the manufacturer's directions for **preparing lids**. Traditionally, lids were simmered or boiled prior to applying to jars, but this is generally **not** the case now. Check the directions.
- Always **wash and rinse** lids and bands prior to use.
- Leave the proper **headspace**.
- **Clean the jar rim** (sealing surface) prior to applying the lid. Food or debris trapped on the jar rim can cause seal failures.
- Place the metal screw band over the flat lid and apply **finger-tip tight**. Screw bands that are applied too loose, or too tight, can cause jars not to seal properly.

After processing, remove jars from the canner and allow to cool, undisturbed. Do not **re-tighten screw bands**. Once jars are completely cool, check for seal. **It's a good idea to remove screw bands for storage**. When removed, washed, dried, and stored in a dry area, screw bands may be used many times. If left on stored jars, they become difficult to remove, often rust, and may not work properly again.

**Are reusable lids safe for home-based canning?** Recent research suggests that reusable lids such as the Tattler-brand\* will safely seal jars when used for home-based canning. This type of reusable lid is used with a thin rubber gasket. A metal screw band is also needed during canning!

**What do I need to know if I used a reusable canning jar lid?** Follow these tips:

- Follow the manufacturer's instructions for use.
- Follow 'best practices' for using a metal lid and screw band, applying the lid, gasket **and metal screw-band** when sealing the jar.

Note, manufacturer's instruction **may** instruct the user to **tighten the metal band immediately upon removal from the canner. If instructed, you should do so**. Tightening the screw band ensures that the gasket forms a seal. The metal screw band is removed once the container is cooled and a seal has formed. \*Reference to a brand name is not to be seen as an endorsement for this product.

Any canning supplies will show wear and tear over time. Some home preservers have found that it helps to tally each use by placing a mark on a reusable jar lid. Follow the manufacturers' recommendations for use, generally 10 to 15 years or 'canning seasons'. Along the way, always replace reusable lids and gaskets if you notice cuts or tears or other signs of wear in the material.

### Information on Tattler Reusable Canning Lids

<https://www.reusablecanninglids.com/pages/information>

Tattler Lids do require a bit of variation from conventional metal lids. Being a two piece combination with a rubber gasket ring, Tattler Lids must remain a bit loose during processing in order for the jar to vent the pressure that has built in the jar during processing.

For Best Results when Using Tattler Reusable Canning Lids, Follow Instructions Closely (**especially #3, #5, and #7**)

1. Inspect top of jar for cracks and nicks.
2. Wash, rinse and sterilize jars. (UC MFP Note: Jars only need to be sterilized if processing time is less than 10 minutes.) Scald lids and rubber rings. Leave in water until ready to use.
3. Headspace: Follow USDA/NCHFP guidelines for proper headspace.
4. Wipe top of jar after filling. Place lid and rubber ring combination on jar.
5. Screw band on jar loosely. Center lid on jar and hold in place with finger while tightening the metal screw band finger-tip tight. To get a “feel” for the correct tightness prior to processing, place the jar on a counter top or other smooth surface, place your finger on the lid, not too much pressure, while tightening the metal band. Screw the metal band on until the jar begins to pint on the counter top. This is perfect for processing!!! DO NOT OVER TIGHTEN!!! Product must be allowed to vent during processing.
6. Process as per instructions for various foods.
7. Once the process is completed and the jars are removed from the pressure canner or water bath, wait 3-5 minutes for the bubbling to die down (this is pressure releasing from the jar). Place a towel over the still hot jar (for safety) and finish tightening the metal band. Now just let the jar cool naturally. When cool, remove the metal band and lift the jar slightly by the lid. It should be well sealed.
8. When the jars have cooled, remove metal band and determine by feel if lids are securely sealed. Gently lifting on the lid will reveal any seal failures. Sealed jars may be stored without metal bands if desired.
9. When removing lid, gently insert table knife between rubber and jar to release seal. DO NOT USE SHARP KNOFE.
10. Wash plastic lids and rubber rings, rinse, dry and store for future use. Do not save any rubber ring with is cut or deformed.
11. Reusing Rubber Rings: When reusing your rubber ring the next canning session, look to see if there are sealing grooves indented into the ring from the last time you canned. Place the side with the sealing grooves next to the rim of the jar and the smooth side next to the plastic lid. This will help prevent ‘cross threading’ and ensure a good seal.

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## **MFP Volunteer Resources**

[https://mfp.ucanr.edu/Resources/\\_Volunteers/](https://mfp.ucanr.edu/Resources/_Volunteers/)

On the statewide website is an updated Resource page for volunteers. (See link above.) In it are the following sections. Please review each one.

1. Internal Resources and Recipe List
2. Annual Reappointment
3. MFP Safety Notes
4. UC Master Food Preserver Program Administrative Handbook
5. Volunteer Management System (VMS) User’s Guide
6. Collaborative Tools (CT) Administration Help Document



**2023 Reappointment Quiz Questions**

*All of the answers to the reappointment quiz are in this 2023 study guide. This document is for study purposes. Take the quiz online at <http://ucanr.edu/2023mfpquiz> by June 30, 2023.*

- 1 A home freeze dryer freezes food to what temperature?
  - A. -10 to -30 degrees F
  - B. -30 to -50 degrees F
  - C. -50 to -70 degrees F
  - D. -70 to -90 degrees F
  
- 2 Which of the following are steps in freeze drying food? (Select all that apply.)
  - A. A vacuum pump pulls the air out of the chamber
  - B. The trays are slightly heated
  - C. Ice is directly converted from a solid to a vapor
  - D. 65% of the water in the food is removed
  
- 3 The shelf life of freeze dried foods can be increased by adding which of the following to the storage container?
  - A. Paper towel
  - B. Oxygen absorber
  - C. Tin foil
  - D. Aspirin tablet
  
- 4 Which of the following is **not** an accurate step to ensure freeze drying food safety?
  - A. Wash hands for 10 seconds
  - B. Handle raw meat appropriately before and after freeze drying
  - C. Clean and sanitize the freeze dryer trays after use
  - D. Wash utensils, mixing bowls, and countertops that come in contact with raw meat or eggs
  
- 5 Consuming clabber made with raw milk can have the following effect on one's gastrointestinal tract:
  - A. Increasing lactose intolerance
  - B. Adding a high number antimicrobial-resistant genes
  - C. Boosting beneficial bacteria
  - D. Reducing uptake of Vitamins A & D
  
- 6 A client contacts your MFP helpline who intends to ferment raw milk. What is one piece of advice you could share that would reduce the risks involved with the process?
  - A. Freeze dry the final product
  - B. Lower the humidity in the location where fermentation will occur
  - C. Inoculate with a starter culture for milk
  - D. Add up to 1 clove of peeled garlic in the fermenter

- 7 When canning fruits, which of the following are acceptable changes that have been tested?  
(Select all that apply.)
- A. Using white grape juice instead of syrup
  - B. Eliminating sugar completely
  - C. Using Sucralose instead of sugar
  - D. d. Canning in water
- 8 To reduce the heat of a tested salsa recipe that will be canned by 1/2 you can safely do the following:
- A. Use the same total amount of peppers called for, but replace half with sweet peppers
  - B. Reduce the number of peppers by 1/2 and increase the tomato amount to compensate
  - C. Add 1 teaspoon neutral-flavored alcohol such as vodka per jar to dissolve the capsaicin
  - D. d. Eliminate peppers from the recipe and add dried spices to achieve the desired level of spiciness
- 9 The recommended way to prepare lids and bands (rings) for canning is
- A. Wash the lids and rings in warm soapy water.
  - B. Boil the lids and rings for 20 minutes to sterilize them.
  - C. Wash them in warm soapy water and then boil them for 10 minutes.
  - D. Follow the manufacturer's directions.
- 10 Tattler (reusable) lids are a convenient reusable alternative to metal lids and bands because they are used exactly the same way as traditional metal 2 piece lids and bands.
- A. Yes
  - B. No
- 11 When reusing a Tattle rubber gasket, be sure to flip the gasket each time you use it so the flat side is against the rim so you can flatten the indentation from the previous use.
- A. Yes
  - B. No
- 12 According to the UC MFP Internal Recipe Source List, the reason UC Master Food Preserver Volunteers don't use recipes from the 2016 edition Ball Book of Canning is:
- A. We don't endorse non-government or non-university products
  - B. It was replaced by the 2020 Ball Canning Book
  - C. It includes meal idea recipes instead of only canning recipes
  - D. Multiple recipe ingredients/processing instructions conflict with current USDA testing.

- 13 According to the UC MFP Internal Recipe Source List, the fermentation recipe list currently available includes all but which single vegetable products?
- A. Cucumbers
  - B. Cabbage
  - C. Beets
  - D. Collard Greens
- 14 Your program is offering a citrus themed class and you offer to lead a demo on making lemoncello. What do you think your program coordinator will say when reviewing the class recipe list?
- A. Yum! Save me a bottle!
  - B. Nope. It has alcohol in it. We can't demonstrate anything including alcohol.
  - C. Sorry, we don't demonstrate recipes that use alcohol as the primary preservative.
- 15 MFP Safety Note #13: Portable Butane Stove Safety. Which of the following statements are part of using a portable butane burner safely?
- A. Butane stoves must be used in well ventilated areas or they can present a carbon monoxide hazard.
  - B. Keep a fire extinguisher nearby when using portable butane stoves.
  - C. Never keep dish towels, paper towels, aprons or pot holders near the stove.
  - D. Do not store butane canisters in a hot closed vehicle, including the trunk.
  - E. All of the above.

*We need your input! To help with statewide and local program planning, your responses to the following questions will help with local program development and statewide strategic planning.*

- 16 What are you goals for volunteering/participation this next year?
- 17 What are your plans to maintain/improve your food preservation knowledge and experience?
- 18 How do you plan to reach your goals for next year, and what support do you need to accomplish your goals either from other volunteers or your coordinator?