



El Dorado County  
**MASTER FOOD PRESERVERS**

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University of California Cooperative Extension is committed to helping rural and urban people through teaching, research and extension. Extension takes research-based knowledge and offers it in accordance with the needs of the community.



Cooperative Extension in El Dorado County works by helping people help themselves in its commitment to provide informal, off-campus educational opportunities in food preservation.

The Master Food Preservers Program offers free public classes to teach the art and science of all phases of safe home food preservation.

Program instructors are trained by Cooperative Food Science specialists.

## Master Food Preservers present:

# Food Safety An Introduction to Food Preservation & Basic Water Bath Canning

Contra Costa County Master Gardeners  
Sustainability Fair

September 7, 2013



**Questions? Call the Master Food Preservers at (530) 621-5506 (VoiceMail)**

MFP e-mail: [edmf@ucdavis.edu](mailto:edmf@ucdavis.edu) - MFP Website: <http://cecentralsierra.ucanr.edu/>

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Should you need assistance or require special accommodations for any of our educational programs, please contact us at 530-621-5502.

The University of California working in cooperation with County Government and the United States Department of Agriculture.

### **THE BOTTOM LINE:**

If you prepare or serve food, you are responsible for making sure safe food is served. Throughout our public classes we will be discussing factors affecting food safety. Today is only an introduction to food safety.

### **STAPHYLOCOCCUS AUREUS**

1. Produced when contaminated food is left too long at room temperature.
2. Cooking at 165°F will not kill the toxin.
3. Found in 50% of human noses, throats, hair, and skin.
4. Most common cause of food borne illness.
5. Will grow in meats, poultry, egg products, milk, salads made with meat or eggs, macaroni and potato salads, tuna, puddings, custards, cream pies and pastries.

### **BOTULISM**

1. Widespread in the environment.
2. Only grows in anaerobic (oxygen free) environment of low acidity.
3. May result from inadequate processing of low-acid canned foods such as green beans, fish, corn, beets, spinach, asparagus, chili peppers, and pickled eggs.

### **SALMONELLOSIS**

1. Found in raw meats, poultry, eggs, fish, milk/milk products.
2. Multiplies rapidly at room temperature.
3. A leading cause of foodborne illness.

### **CAMPYLOBACTER JEJUNI**

1. More common in poultry than Salmonellosis.
2. Causes 14% of diarrhea worldwide.
3. Chief food source: raw poultry, raw meats, unpasteurized milk.
4. A leading cause of foodborne illness.

### **E COLI 0157:H7**

1. Very common, found in all animal and human digestive systems, contaminated water, ground meat, and unpasteurized milk.
2. As few as 10 bacterial cells may be enough to cause illness.
3. Can grow in the refrigerator if temperatures are above 40°F.

### **CLOSTRIDIUM PERFRINGENS**

1. Found in the soil.

2. Grows in the absence of oxygen.
3. Spores survive cooking temperatures.
4. Foods most commonly involved include: meat, poultry, stews, soups and gravies.

### **LISTERIA MONOCYTOGENES**

1. Found in soil, vegetation and water.
2. Frequently carried by humans and animals.
3. Can survive for a long period of time under adverse conditions.
4. May be found in raw milk, soft cheese and processed foods (i.e. deli meats).

### **VIRUSES**

1. Smaller than bacteria.
2. Cannot grow in food, needs living host.
3. Can be transmitted to human through food.  
*Hepatitis A, Norwalk Virus, Typhoid*

### **PARASITES**

1. Lives on/in another living host to get its food.
2. Trichinosis: pork, bear, flesh eating animals.
3. Cysticercosis: tape worm.
4. Anisakiasis: fish round worms.
5. Giardia lamblia: fecal contamination of toys, food, and water.
6. Toxoplasma gondii: consumption of raw meat, unwashed or uncooked fruits, and vegetables, in feces of infected cats.

### **FUNGI, MOLDS & YEAST**

1. Is it moldy? The mold you see is only the tip of the iceberg. The poisons which molds can form are found under the surface of the food. You can sometimes save hard cheese, salamis, firm fruit, and vegetables by cutting the mold out and removing at least 1 inch around the mold. **HOWEVER** moldy foods should be discarded.

### **INTERNAL TEMPERATURES & REST TIMES**

1. All poultry products including ground poultry & stuffing: 165°F.
2. Ground meat (beef, pork, veal & lamb), sausages, and bacon: 160°F.
3. Steaks, chops & roast (beef, pork, lamb & veal): 145°F & allow to rest for at least 3 minutes before carving.
4. Fish & shellfish: 145°F (Cook shellfish until the shells open).
5. Eggs: 160°F internal temperature.
6. Casseroles: 165°F.
7. Reheat leftovers to 165°F.
8. Use a thermometer.

## ICE IS FOOD

Always use clean ice to avoid contaminating food.

## CUTTING BOARDS

Always use clean cutting boards. Avoid cross-contamination with meat and poultry by frequently washing cutting boards with hot soapy water.

## FOOD SAFETY TIPS - Wash Hands Frequently

1. After using toilet, after changing baby's soiled diaper, after touching animals, before handling food, and after touching raw meat, fish and poultry.
2. Bandage any cuts or burns on hands, before handling food.
3. Use disposable latex gloves.
4. 20-second rule: wash hands for 20-seconds or the duration of singing Happy Birthday twice.

## AVOID CROSS CONTAMINATION

1. **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.
2. Rinse all fresh fruits and vegetables well under running water before preparing or eating them.
3. When grilling or barbecuing, always use a clean plate to put the cooked meat on.
4. Store raw meat, fish and poultry on the bottom shelf in the refrigerator or on a plate to prevent juices from dripping onto other food items.

## KEEP FOODS AT SAFE TEMPERATURE

1. Keep your refrigerator set at 40°F or below and refrigerate all perishable foods. Thaw frozen perishable foods in a refrigerator overnight, in a microwave oven, or under cold running water. Do not thaw frozen food on your counter.
2. Do not prepare food more than 2 hours before serving without plans for proper storage in a refrigerator then reheating just before serving.
3. Divide leftover hot food into shallow containers to accelerate cooling and refrigerate within 2 hours after preparation.
4. Foods can spoil in as little as 1 hour in the hot sun. Discard any perishable foods from a picnic or potluck that have not been kept

adequately chilled (40°F or below) or kept hot (140°F or above).

## WHEN IN DOUBT - THROW IT OUT

1. **DANGER** - Never taste food that looks or smells strange to see if it can still be used. **Just discard it.**
2. Generally foods that contain bacteria will look, smell, and taste normal.
3. Generally speaking most bacteria that cause foodborne illness are odorless, colorless, and tasteless.

## GENERAL CLEANING TIPS

1. Run sponges and dish scrapers through the dishwasher several times a week.
2. Change dish cloths daily.
3. Use paper towels to mop up spilled juices from meat, fish or poultry.
4. Use a disinfecting solution consisting of 1 tsp chlorine bleach to 1 quart of water. Dispense with a spray bottle to disinfect countertops, cutting surfaces, etc. Make a new solution every week.

## FACTORS THAT AFFECT GROWTH OF MICROORGANISMS

The factors that affect the growth of microorganisms are briefly described here.

### 1. Temperature:

Foodborne pathogens grow best under the same conditions that allow people to thrive. Most foodborne bacteria grow fastest at temperatures from 90° to 110° F. However, foodborne bacteria will grow in the temperature range known as the **Danger Zone**, 40° to 140°F; a few will even grow at temperatures below this range.

### 2. Acidity or alkalinity (pH):

Most organisms grow best under conditions that are not highly acid or alkaline; that is, a neutral pH (very few foods are highly alkaline) Pathogenic bacteria do not grow in high acid foods.

### 3. Moderators:

Microorganisms require moisture for growth. Dehydration preserves foods by removing moisture.

#### 4. Oxygen:

Most microorganisms require oxygen to grow; a few pathogens do not, or may require limited oxygen. However, controlling oxygen content is not useful for controlling bacterial growth for home food preservers.

#### 5. Time

It takes time for microorganisms to grow or multiply in foods. The time required is affected by temperature, acidity, moisture and oxygen levels. Under ideal conditions bacteria can double in number every 10 to 20 minutes.

#### 6. Presence of Inhibitors:

Some natural compounds and food additives have an inhibitory affect on the growth of bacteria.

### SEVEN MAJOR METHODS OF FOOD PRESERVATION

#### 1. Refrigeration

- a) Retards growth of microorganisms.
- b) Slows action of enzymes.

#### 2. Freezing

- a) Prevents growth of microorganisms, but does not necessarily kill them.
- b) Slows, but does not stop enzymatic activity. Therefore, enzymes in most fresh vegetables must be inactivated by blanching before freezing.
- c) For highest quality, lower the food temperature to 0°F as rapidly as possible and maintain 0°F food temperatures.
- d) Freeze only the amount you can use before its shelf life expires. Use packaging that is moisture proof, sealable and oxygen impermeable to retain quality.

#### 3. Canning

- a) With proper canning practices, air is forced from the jars, leaving a vacuum. Heat destroys most heat-resistant microorganisms capable of growing in food stored at room temperature.
- b) Molds and some yeasts are unable to grow in a vacuum. However, there is a very healthy growth environment for anaerobic bacteria in sealed, home-canned foods. Such foods must be heat

processed until a commercially sterile product is achieved, or they must have salts, sugars, acids or other preservatives added.

- c) Yeasts and molds are destroyed when food temperatures reach about 190°F, whereas most bacterial vegetative cells are destroyed in foods heated to a boiling temperature. Bacterial spores are able to survive for a long period at the temperature of boiling water.
- d) Pressure enables the processing of canned foods at temperatures higher than boiling water, where kill rates are greatly increased. Pressure canning is required to safely process foods that may support the growth of bacterial spores.

#### 4. Sweetening and Acidifying Jellies and Jams

Adds sugar and acids that tie up free water and lower pH.

#### 5. Pickling and Fermenting

- a) These methods (and others, such as canning naturally acidic fruits, jams and jellies) use either naturally produced or added acids to inhibit or prevent the growth of *Clostridium botulinum* as well as molds and other pathogens. Fermenting uses bacteria to produce lactic acid and lower the pH in products such as fermented pickles and sauerkraut.

#### 6. Drying

- a) Removes water and prevents growth of microorganisms.
- b) Water in fresh food exists in free and chemically bound forms. Microorganisms require free water for growth. Removal or reduction of free water from a food prevents growth of microorganisms and controls enzyme activity.
- c) Dried foods must be packaged in oxygen and moisture proof containers to prevent oxidation of flavors and moisture gain.

#### 7. Salting

- a) Chemically bonds water, inhibiting growth of some bacteria.

## PACKAGING

- a) The success of all preservation methods depends on using appropriate packages. Airtight packages prevent recontamination of foods by air and microorganisms and are ideally suited for most preserved foods.

## USE THE RIGHT EQUIPMENT

- a) Standard canning jars, lids and rings must be used.
- b) A deep, non-reactive kettle (stainless steel, enameled, or glass) must be used for cooking the product.
- c) Use an approved recipe for the best results, as these recipes have been tested for quality, flavor and safety.
- d) Open kettle canning: The USDA does not recommend this method of canning.
- e) Atmospheric steam canner: The USDA does not recommend the use of an atmospheric steam canner.
- f) **Paraffin**, as a sealing agent, is not recommended.

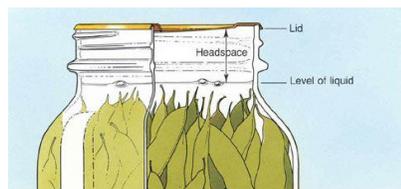
## USE THE BEST INGREDIENTS

- a) Select fruit of good flavor and color, but not fully ripe. For jam and jelly it is better to have some under-ripe fruit as it contains more pectin and acid than fully ripe fruit.
- b) Cane or beet sugar can be used with equal success.

## GETTING READY, BE PREPARED

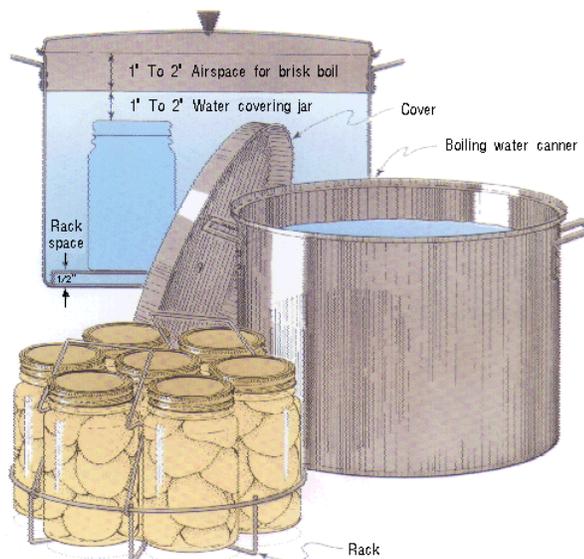
- a) Read the recipe thoroughly before you begin. Read the directions on the pectin package.
- b) Measure out all ingredients.
- c) Do not change the quantities in any recipe that calls for pectin. Follow directions in the pectin package or the finished product will not turn out correctly.
- d) Have all necessary utensils at hand.
- e) Wash jars, lids and rings in hot soapy water and rinse well.
- f) Place clean jars into the boiling water canner and heat them to 180°.
- g) Put lids and rings in a pan of water, heat to simmering, 180°.
- h) Fill hot jars with hot mixture. Leave the headspace specified in the recipe.

- i) Wipe the jar rim.
- j) Place lids and rings on jars. Tighten the rings only finger tight.



## BOILING WATER CANNER PROCESSING

- a) Place jars in a canner with a rack. Water should be very hot but not boiling. Add enough water to cover the tops of the jars by at least 1" to 2".
- b) Place lid on canner. Bring the water to a rolling boil, then reduce the heat to a gentle boil.
- c) Begin to count processing time when the water comes to a boil.
- d) Process for the time indicated in the recipe.



- e) All recipes are developed using sea level as the criteria for processing time. If you are at a higher altitude you must adjust the processing times according to the following chart.

Altitude Chart	
Altitude in feet	Increase processing time
1000 - 3000	5 minutes
3001 - 6000	10 minutes
6001 - 8000	15 minutes
8001 - 10000	20 minutes

- f) Remove the jars from the canner at the end of the time as stated in the recipe.
- g) When you take the jars from the canner after processing, hold upright; do not disturb the seal. Do not retighten the rings.
- h) Place the hot jars on a rack or folded towel away from drafts or cool surfaces. Keep the jars separated so they will cool evenly. Leave the ring bands on the jars until they have cooled thoroughly (approximately 24 hours). Do not try to dump the water off the lids.
- i) **Do NOT invert jars:** Some canning books still recommend inverting the jars after removing them from the boiling water canner. The USDA does not recommend this method.
- j) After the jars have cooled, remove the ring bands. Look at the top of each jar. If the lid is slightly concave, it indicates a seal. Test the seal by pressing on the lid with your finger; the lid should not give. If you are not sure a jar is sealed, carefully lift the jar by the lid after removing the ring band. If not properly sealed, the lid will come off.
- k) Wash and dry bands. Clean the jars with a damp cloth. The ring bands may be replaced on the jars if desired. The ring bands must be thoroughly dry.
- l) Label and date the jars, and store in a cool, dark, dry area.



**Reprocessing** - If a jar did not seal, refrigerate and use within a few days, or it may be reprocessed within 24 hours using a new metal lid. Check the jar for flaws. Process by the method originally advised and for the full length of time.

## STRAWBERRY JAM

5 cups crushed strawberries (about 5 lbs)  
 7 cups sugar  
 ¼ cup bottled lemon juice  
 1 pkg regular pectin

Wash and crush strawberries. Combine strawberries, pectin and lemon juice in a large saucepan. Bring mixture to a rolling boil, stirring occasionally. Add sugar, stirring until all sugar is dissolved. Return to a rolling boil. If foam develops, add ¼ tsp butter. Boil hard for 1 minute, stirring constantly. Remove from heat. Skim any remaining foam. Ladle hot jam into hot jars, leaving ¼" headspace. Remove air bubbles. Wipe jar rims clean. Place lids and rings on jars, tightening rings finger tight. Process in a boiling water canner for 10 minutes.

Yield: About 8 half-pints

Source: Ball

<http://www.freshpreserving.com/recipe.aspx?r=265>



## **RESOURCES:**

For more information on Pressure Canning,  
download this FREE publication:

[http://www.cals.uidaho.edu/edcomm/pdf/PNW/  
PNW0421.pdf](http://www.cals.uidaho.edu/edcomm/pdf/PNW/PNW0421.pdf)

For more information on Dehydration, download  
this FREE publication:

<http://extension.oregonstate.edu/lane/sites/default/files/images/pnw0397.pdf>

Take a FREE, self-paced, course on safe food  
preservation:

<http://nchfp.uga.edu/index.html>

Detailed information on all methods of safe  
home food preservation:

<http://nchfp.uga.edu/index.html>

### **Recommended books:**

So Easy to Preserve

<http://setp.uga.edu/>

Ball Blue Book Guide to Preserving

<http://www.freshpreserving.com/products/kits.aspx#bluebook>

Ball Complete Book of Home Preserving  
(available from many on-line sources)

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# Master Food Preservers of El Dorado County

University of California Cooperative Extension



## 2013 PUBLIC CLASS SCHEDULE

**FREE TO THE PUBLIC:** Classes that teach the art and science of safely preserving food.

All classes will be held at the El Dorado County Fairgrounds in the Board Room unless noted otherwise.

Download a map here: <http://cecentralsierra.ucanr.edu/files/164108.pdf>

Tuesday and Saturdays 10 a.m. to Noon

Please check our website or call to confirm times and locations of classes.

Tuesday		Saturday	
July 9	Food Safety & Basic Water Bath Canning		
July 16	Jams & Jellies	July 13	Food Safety & Basic Water Bath Canning
July 23	Christmas in July: Gifts from the Kitchen <i>Location: Marshall Building, EDC Fairgrounds</i>	July 20	Jams & Jellies
July 30	Pickles, Relishes & Sauerkraut	July 27	Pickles, Relishes & Sauerkraut
Aug 6	Tomatoes, Basic & Fancy	Aug 3	Tomatoes, Basic & Fancy
Aug 13	Pressure Canning	Aug 10	Pressure Canning
Aug 20	Dehydrating & Freezing	Aug 17	Dehydrating & Freezing
Aug 27	Cheese Making	Aug 24	Cheese Making
Sep 10	Meat Preserving	Sep 7	Meat Preserving
Sep 17	Vinegars, Condiments & Chutneys	Sep 14	Vinegars, Condiments & Chutneys
Sep 24	Jerky	Sep 21	Jerky
		Sep 28	Conserves, Butters & Marmalade
Oct 1	Conserves, Butters & Marmalade		
Oct 8	Apples, Pears & More		
Oct 15	<b>Class CANCELED</b>		
Oct 22	Autumn's Harvest		
Oct 29	Olives		

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