Penn State **Extension**

Let's Preserve Newsletter

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Dear Home Food Preserver,

This issue of *Let's Preserve* includes a number of articles about freezing foods. Freezing is relatively easy and is safe as long as the food is kept frozen and thawed properly.

Our garden herbs have been productive this summer. Lots of mint, parsley, and thyme have been harvested. For the first time in several years it looks as if there will be adequate basil to freeze some in oil—maybe even make pesto. These herbs will also flavor zucchini, summer squash, and green beans that are ready for harvest.

June was a busy month. We tested nearly 100 pressure canner dial gauges at five off-site locations. You can still have yours tested by calling the Penn State Extension office to schedule an appointment. Our display at the Oregon Dairy Family Farm Days was well received with over 200 direct conversations in two days, as well as many people picking up the Let's Preserve Fact Sheets. It is encouraging to see so many young people showing an interest in home food preservation.

We look forward to two pressure canner workshops in July. (See page 6.)

Hopefully, you will find the information in this issue of *Let's Preserve* helpful.

Happy preserving,

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What's Inside ....

Feature Food of the Month: Green Beans

Pickling beans in a vinegar solution makes it possible to can this low acid vegetable in a boiling water bath. This easy and quick pickle is delicious on a relish tray or as a garnish for an entrée.

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Dilly Beans

2 pounds green beans
¼ cup canning salt
2½ cups vinegar
2½ cups water
1 teaspoon cayenne pepper divided*
4 cloves garlic, divided*
4 heads dill, divided

Trim ends off green beans. Combine salt, vinegar, and water in a large saucepot. Bring to a boil. Pack beans lengthwise into hot jars, leaving ¼ inch headspace. Add ¼ teaspoon cayenne pepper, 1 clove garlic and 1 head dill to each pint. Add ½ teaspoon cayenne pepper, 2 cloves garlic and 2 heads dill to each quart. Ladle hot liquid over beans, leaving ¼ inch headspace. Remove air bubbles. Adjust two-piece caps. Process pints or quarts 10 minutes in a boiling water canner.
Yield: 4 pints or 2 quarts.
Source: *Ball Blue Book*

**The USDA recipe uses an equal amount of red pepper flakes for the cayenne. It also lists the pepper and the garlic as optional flavorings. These beans shrivel when they first come out of the boiling water bath but take on a smoother texture after sitting in the brine for several weeks. Choose young tender beans for pickling.*

Green Beans—Frozen or Canned

Either method of preserving snap beans yields good results. It's a matter of preference, time available for preserving, and available storage space.

Varieties of green beans suitable for preserving are Blue Lake, Bush Kentucky Wonder, Tenderette. Roma II varieties are good for freezing. Yellow wax beans are canned or frozen the same as green beans. These varieties of wax beans preserve well: Gold Rush, Rocdor, and Indy Gold. Wax Romano 264 freezes well.

It is essential that snap beans be processed in a pressure canner. A boiling water bath cannot adequately raise the temperature inside the jar of beans to insure that botulism spores are killed.

To can green or wax beans, wash, remove the stem and blossom ends, remove any "strings", and snap into 1 inch pieces or leave whole. You can put the clean beans into the jar raw and add boiling water leaving 1inch headspace or you can heat the beans in boiling water for 5 minutes before putting them in the jar and covering them with the liquid they were cooked in. If you pre-cook the beans and pack them into the jar hot, you will find that you can put more beans in the jar. You should still pack the beans loosely in the jar. Allow 1 inch headspace. Process pints for 20 minutes and process quarts for 25 minutes. Process at 10 pounds pressure in a weighted gauge canner and at 11 pounds pressure in a dial gauge canner.

Do not use these directions for canning lima or other shelled beans because procedures and process times differ.

To freeze snap beans, blanch 2 to 4 inch pieces for 3 minutes in boiling water. Remove from boiling water, drain, and chill quickly in ice water or several changes of cold water. It will take as long to cool the beans as it did to blanch them. Drain thoroughly before packaging and freezing at 0°F. To prevent beans from sticking together when frozen, drained beans can be spread on a tray in a single layer and frozen before being packaged. This allows you to remove the amount you want to use at one time and they will cook more quickly than beans frozen as a mass.

Secrets to freezing beans successfully: 1) blanch them adequately to destroy enzymes that make beans tough over time without over-cooking them. 2) chill the beans quickly to stop the beans from continuing to cook and to remove all the heat from the bean before it is put in the freezer. 3) remove as much air from the bag as possible—you can use a vacuum sealer to freeze beans. However, pressing air out of the bag with your hand works well too.

Freeze Food Quickly

The more quickly the produce freezes, the smaller the ice crystals inside the product. Smaller ice crystals do less damage to cell structure.

Freeze small amounts at a time. Never freeze in containers larger than ½ gallon.

If possible, spread the containers or bags out in the freezer until they are frozen. When frozen, they can be stacked to save space.

Avoid fluctuating temperatures in the freezer. Keep the door closed as much as possible. Avoid adding a lot of

food to the freezer at one time. The general guideline is to freeze no more than 2 pounds of product for every square foot of freezer space per day. Avoid adding warm food to the freezer; it will not cause the food to spoil, but it will raise the temperature of the food already in the freezer causing changes in the ice crystals.

Use Crispers to Store Produce

Have you wondered how to use the humidity controls on your refrigerator's crispers? Fruit and vegetable crispers are designed to maintain a higher humidity than the rest of the refrigerator. This helps fresh produce last longer. Because different types of produce need different levels of humidity, some refrigerators allow consumers to control humidity levels by increasing or decreasing the air flow into the bins. Less air flow means higher humidity. Leafy greens such as lettuce, spinach, collard greens, and even green onions do best with higher humidity and cooler settings. In fact, cauliflower likes so much humidity you can wrap it in a damp paper towel to maintain moisture. On the other hand, apples, grapes, bell peppers, summer squash and other thin-skinned fruits and vegetables like slightly less-humid conditions than leafy greens. So open the air vent for these. Citrus fruit prefers even less moisture—so you can store oranges, lemons, and grapefruit in a basket outside of the crispers if you have room. Crispers also allow you to separate foods that don't store well together. Fruits that continue to ripen after harvest such as apples, pears, plums, cantaloupes and peaches release ethylene gas and can affect other produce stored nearby. The ethylene can cause green vegetables to turn yellow, lettuce to be rusty, asparagus spears to toughen, potatoes to sprout, and carrots to turn bitter. Generally, store ethylene producers in separate bins from other produce.

Freezing Fresh Herbs

Try freezing herbs as an easy alternative to drying them. Freezing is especially desirable for herbs that lose their flavor when dried such as basil, dill, tarragon, and parsley. Frozen herbs can be used in cooked dishes, but are usually not suitable for garnishes because they will be limp when thawed. Several methods of freezing herbs work well to preserve flavor.

Wash and drain herbs; pat dry with paper towels or run through a salad spinner. Wrap a few sprigs or leaves in freezer wrap and place in a vapor proof freezer container. Seal and freeze. If the herb has a strong odor, place wrapped herbs in freezer jars or seal in heavy duty aluminum foil to prevent other foods in the freezer from absorbing the odor.

Coarsely chopped herbs can be placed in ice cube trays, covered with water and frozen. When frozen, the herb cubes can be removed to freezer bags or containers. When needed, take out one or two cubes to add to soups or sauces.

Debbie Hartman, a Penn State Master Gardener from Lebanon County, uses this "Flash Freeze" method. Place chopped herbs in a single layer on a piece of wax paper on a cookie sheet and place in the freezer for 45 to 60 minutes. When frozen, remove them from the freezer and use the wax paper like a funnel, funneling the herbs into a freezer container. Immediately return the frozen herbs to the freezer. Because they have been frozen in a single layer, they will not stick together making measuring easy. Don't allow frozen herbs to sit out for long or they will thaw.

Debbie also makes a frozen "Herbal Paste." Place 2 cups herbs in a food processor and with the motor running, add ½ cup oil in a slow stream until all the oil is added. (Use an unflavored oil such as canola, safflower, vegetable, or light olive oil.) Scrape down the sides of the bowl once or twice. Freeze herbal paste in a freezer container. The oil mixture will not freeze totally hard. Herbs frozen in oil tend not to darken through oxidation, and they keep their original green color. (Note: Do not store herbal oils at room temperature and do not can them.)

You can create frozen herbal blends just as you would make a dry herbal blend.

Freezing Oil

When oil is frozen it will become cloudy and may even appear to separate with little beads of solids. No problem; it will clear when it thaws. Freezing oil prevents rancidity.

Dairy

Freezing Milk

Allow room for expansion when freezing milk. When milk is frozen, the water in the milk rises to

the surface and forms ice. The water and milk solids do not remix well after thawing creating a change in the flavor and appearance of the milk. Thawed milk is best used in cooking.

Freezing Cheese

Because most varieties of natural and pasteurized processed cheese will remain fresh for four to eight weeks, cheese is seldom frozen. After opening, fresh cheese such as cottage and cream cheese should be used within two weeks. If it is necessary to keep cheese for longer periods of time, try freezing it.

Hard and semi-hard cheese freeze better than cheeses with a high moisture content. Cheese has a tendency to dry out and become crumbly and mealy when frozen, but it will retain its flavor. Moisture may cause a mottled color. To freeze cheese, cut and wrap in pieces of less than one pound and not more than one inch thick, or grate and freeze in freezer-weight bags or rigid freezer containers. Before using, thaw the cheese in the refrigerator. Use thawed cheese in cooking or crumbled or shredded in salads or as toppings for casseroles.

Process cheeses keep well in the refrigerator because they have been pasteurized. Once they are opened or bought from the deli, keep them tightly wrapped and refrigerated to avoid drying out. For longer term storage, they can be frozen in a loaf or in slices for up to four months.

Moist cheeses such as cream cheese, cottage cheese and ricotta cheese do not freeze well. If you want to use frozen cottage cheese in a cheesecake, blend the thawed cheese in a blender or food processor. Cream cheese will be crumbly after thawing and is especially suitable for dips and spreads.

Do Not Freeze These Dairy Products

The high moisture content of these dairy products causes an icy product when frozen affecting their quality: sour cream, cultured buttermilk, and yogurt. Soft custards, milk puddings, and cream and custard fillings for cakes and pies may separate when frozen. Commercially frozen yogurt contains stabilizers that give a good texture to the frozen product. Likewise, commercially frozen whipped toppings contain stabilizers; regular cream will have a change of texture and appearance as the fat separates. Heavy cream does not whip well after it is frozen.

Dairy products and food containing them cannot be safely canned by the home food preserver.

Blueberries

Plan now to enjoy blueberries throughout the year. Freeze some to add to cereal, muffins, or desserts in the winter. Select berries that are plump and firm with a light silvery "bloom." Bloom is a natural protective wax on the berries. Select ripe blueberries because unripe berries do not become sweeter after they are picked. Freezing berries on a tray first and then packing into containers as soon as they are frozen makes it convenient to take out as many as you want at one time. Water on the berries from washing them results in a tough skinned product. Either wait to wash them before using them or wash and dry them thoroughly between towels before freezing them. Add the frozen berries directly to batters without thawing them.

Blueberries can be sweetened and frozen as a sauce. Crush cleaned berries through a fine sieve or puree in a blender or food processor and mix with 1 to 1⅛ cups sugar for each quart (2 pounds) of prepared berries. Stir until the sugar is dissolved.

Acidity in Home Food Preservation

pH and Acidity

Many articles refer to the acidity of foods as high or low acid. The acidity of a food is based upon the food's pH value. pH is a scientific measure of potential hydrogen. The pH scale measures from strongly acidic at 1.0 to strongly alkali at 14.0. Anything below 7 is acidic, 7 is neutral and above 7 is alkaline. The thing that is confusing is that the lower the pH number, the more acidic the product is. Most foods are acidic ranging from seafood, mushrooms, and chicken which are very low acid in the 6 to 7 range to lemons and apples which have a pH in the low 3 range. The dividing point between high and low acid foods as

defined in canning is 4.6. Most fruits are in the high acid category with a pH between 3 and 4. Most vegetables are in the low acid category in the 5 to 6 range.

The problem foods for canning are those near the border between high and low acid. That includes the ever popular tomato and the less common fig and Asian pear. To insure that these foods are acid enough for processing in a boiling water bath, bottled lemon juice must be added to lower the pH and raise the acidity.

Add 2 tablespoons bottled lemon juice or ½ teaspoon citric acid to each quart of tomatoes, figs, or Asian pears. Add 1 tablespoon bottled lemon juice or ¼ teaspoon citric acid to each pint jar. Just add the lemon juice or acid to the jar and fill the jar with the contents.

Acidity and Botulism

To determine the safest method of canning foods, we must know the ability of the food to resist micro-organism growth. We are especially concerned about controlling the micro-organism that causes the serious and potentially fatal illness called botulism. Botulism is caused by spores produced by a type of bacteria called *Clostridium botulinum.* These bacteria and spores are abundantly present in soil and food. The food safety problem is that the spores, which might be compared to a seed, are the bacteria's method of surviving adverse conditions. Then when conditions are favorable, the spores become active and produce a toxin that causes botulism. This toxin affects the central nervous system which is why it is such a deadly food borne illness.

How does botulism relate to acidity? In order for *Clostridium botulinum* spores to germinate and produce its toxin, certain conditions must exist: low oxygen, room temperature, high moisture, and low acid. When foods are canned conditions are favorable for spore growth: there is very little oxygen in a vacuum sealed jar, canned goods are stored between 50°F and 70°F, canned goods contain a significant amount of moisture, and some foods such as vegetables and meats are low in acid.

If the food is high in acid, *Clostridium botulinum* spores cannot grow. Foods with a pH of 4.6 or lower are rated as high acid foods and may be safely canned in a boiling water canner. Foods with a pH greater than 4.6 are low acid and must be canned in a pressure canner.

Temperature determines bacteria and spore survival. The boiling point of water is insufficient to kill *Clostridium botulinum* spores; but when pressurized steam (which is hotter than boiling water) is heated to 240°F, spores are killed preventing the production of the botulinum toxin.

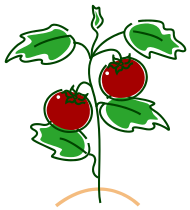
What does pressure canning do? When pressure is applied to the enclosed area in the canner, it raises the temperature. At 10 pounds pressure in a weighted gauge canner or 11 pounds pressure in a dial gauge canner, the temperature is 240°F. (Higher pressures must be used at altitudes 1000 feet or more above sea level.) This is adequate to destroy the Clostridium spores.

So if the food is a low acid food, it must be pressure canned. This includes (but is not limited to) beans, corn, peas, carrots, meat, and combination foods. If the food has adequate acid, it can be processed in the boiling water bath. Acid foods include most fruits (except figs and kiwi), acidified tomatoes, and pickled products. The vinegar added to the pickle changes the pH to increase its acidity. Salsa is another product with many low acid ingredients, but it can be safely processed in the boiling water bath when adequate amounts of bottled lemon juice or vinegar are added. It is important to use research tested recipes for pickled products to have adequate acidity to prevent spore activity.

Acidity of Heirloom Tomatoes

Myth or Fact: Although it is a popular notion that older varieties of tomatoes are more acidic than hybrid varieties, a research study at Utah State University indicates this isn't true. They tested the pH (a measure of acidity) of fifteen tomato varieties. The heirloom varieties tested (Ace, Box Car Willie, and Rutgers) had statistically lower acidity than the hybrid (Celebrity) used as a comparison.

The degree of ripeness influences acidity. Under-ripe tomatoes are more acidic than over-ripe tomatoes. The addition of bottled lemon juice significantly increases the acidity of tomato products making them safe for home canning. We recommend that USDA recommendations be followed to acidify tomatoes and tomato products in home canning. You also want to avoid canning tomatoes that are bruised or damaged including tomatoes with insect damage, affected by frost, or with blossom end rot; these conditions will reduce acidity.



The color of the tomato does not affect its acidity. All tomatoes need to be canned following USDA guidelines to be safe.

Enzymes

Enzymes Defined

Enzymes are naturally occurring substances in foods that promote the normal ripening process. If they continue to work after the fruit or vegetable reaches its ideal maturity, they will cause undesirable changes in color, texture, flavor, and nutrition. Flavor changes are sometimes described as hay-like, bitter, oxidized, or old. Enzymes can be inactivated by heating foods to an internal temperature of 170°F to 190°F. Processing foods when canning or blanching vegetables for freezing stops enzyme reactions. Adding ascorbic or citric acid to fruits for freezing slows enzymatic action.

Enzymatic Browning

Fruit and vegetable surfaces become dark (brown, red, blue, or black) when cut surfaces are exposed to air and react with enzymes. Heating food inactivates the enzymes. Blanching times for freezing vegetables are based on reaching an adequate temperature in the center of the food. However, most fruits are not heated. Other methods are used to prevent enzymatic browning when freezing fruits at home. They include high acid products such as lemon juice, ascorbic acid, and citric acid. Sulfites are not recommended for controlling browning because of health concerns. Additional oxygen can be removed from the bag when using vacuum packaging.

The amount of ascorbic acid to add to fruit depends upon the type—refer to USDA freezing guides. Powdered ascorbic acid is difficult to find in retail stores. It is available in tablet form as vitamin C. Vitamin C tablets must be finely crushed before use and require adequate gentle stirring to dissolve. Fillers in the tablets may make the syrup cloudy, but they are not harmful. One-half teaspoon powdered ascorbic acid is equal to 1500 mg. Add powdered ascorbic acid to cold syrup or liquid before using. In sugar or dry packs, dissolve the ascorbic acid in two or three tablespoons of cold water and sprinkle the mixture over the fruit just before adding sugar. In crushed fruits, fruit purees and fruit juices, add ascorbic acid to prepared fruit and stir well.

Commercial ascorbic acid mixtures such as Fruit Fresh® are special anti-darkening preparations usually made of ascorbic acid mixed with sugar or with sugar and citric acid. Follow the manufacturer's directions for use. Amounts to use differ from directions for pure ascorbic acid.

Resources

You may have noticed that the *Let's Preserve Newsletter* is no longer available on Penn State Extension websites. Portions of the newsletter and announcements of classes are posted as short articles under Penn State Extension News. To find a specific topic do a word search. Otherwise, you will find food preservation articles posted between information on harvesting hay or growing peaches. You can also find food preservation information on the web at http://extension.psu.edu/food/preservation

Food Preservation Classes

Two Pressure Canning Workshops will be offered in July: July 17, 6:00-8:00 PM: "Overcoming the Fear of Pressure Canning" teaches the basics of using a pressure canner with a demonstration of canning green beans. Fee $15.00. July 19, 9:00 AM-Noon "Experience Hands-On Pressure Canning" involves participants in doing the actual canning. Fee $30.00. In August, "Canning Tomatoes and Fruits" teaches the basics of boiling water bath canning. All classes will be held in the Farm & Home Center, Lancaster. Call 717-394-6851 to register.

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