
The Beginner's Guide to

Preserving

By Dena Harris and Nicole Taylor

-Courtesy of [Homestead Harvest](#)-

Welcome to the rewarding world of preserving where countless generations before you have put up their fresh crops and enjoyed a simpler and healthier way of life. You will quickly discover how preserving your own food can become a hobby, a part-time pursuit, or a way of life. “The Beginner’s Guide to Preserving” will guide you through the early steps of food preparation and launch you into a world filled with wholesome fresh foods, new tastes, and improved health. Play with the different methods outlined here and see which foods appeal to you and your family. Then take a moment and congratulate yourself for taking this important step toward a healthy, happier, and more satisfied you.

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Overview of Preserving

The art of preserving food has existed since the beginning of civilization and has been vital to survival all throughout history. Every culture has utilized one or more methods to maintain fresh food. Often the methods used were dictated by the climate and conditions in which people lived. Foods were preserved in times of abundance to prepare for the desperately lean times that would surely lie ahead. As a result, many innovative techniques and advancements in food preservation were made during these extremely lean times. While we may not face the harsh living conditions of our forefathers, we have inherited from them a desire for fresh, wholesome food. It's no coincidence that in these modern times the lost art of preserving is being rediscovered.

The motives for preserving today are not quite the same as those of yester-year. Today preserving home grown food straight from the garden is becoming as much of a passion as gardening itself. It's incredibly rewarding to place food on the table which we've grown and preserved ourselves. Or better yet, to share with friends and family. And knowing exactly what goes in – or more importantly – what is *not* going into our preserved goods gives an added measure of control. You decide what you and your family will eat.

But how does preserving work? Fresh food is perishable for several reasons. Because of its high water content – an increased growth of undesirable microorganisms, an increased activity of food enzymes, increased reactions with oxygen, and adverse effects from moisture loss all result in the breakdown and spoilage of food. The process of preserving slows down or stops the activity of microorganisms and keeps food fresh.

Each method of preserving comes with its own set of benefits. Dabble in the different types – canning, drying, freezing, pickling, salting, or fermenting – to discover which suits and works best for you. Many of the methods compliment one another and you'll find unique and subtle taste differences in both taste and texture. Surely one will strike a passion.

Equipment for preserving food can range from simple and cost nothing all the way to complex and can cost as much as you're willing to spend for your hobby. Always keep equipment up-to-date, clean, and working properly.

Safety is essential when undergoing any preserving endeavor. Some preserving methods have strict guidelines that must be followed and require that you follow instructions exactly or dangerous results can occur. Be sure to follow updated recipes carefully and always use up-to-date equipment.

Always choose food of the highest quality when preserving. Foods do not improve with preserving and will only be as good as that which you have picked. Choose food that is free of bruises, discoloration, and defects. Most foods begin losing vitamins fairly quickly. Preserve as quickly as possible after harvesting - preferably within 12 hours. Wash and scrub food thoroughly before processing and always maintain proper sanitation to prevent the spread of bacteria.

When storing preserved foods, be sure to clearly label the foods you have preserved both with contents and date preserved. Preserved food will not last forever. It is important to know when your products shelf life has expired and when foods should be discarded. Labeling also helps to keep current when rotating the preserved food supply.

Canning

History of Canning

“An army marches on its stomach,” declared French emperor Napoleon Bonaparte, as his legendary army wound its way through Europe two hundred years ago. Mid-eighteenth century marching conditions were brutal, long, cold hauls with little if any fresh food. Napoleon’s armies were exhausted and breaking down both mentally and physically from a limited and inconsistent diet. Scurvy, malnutrition and starvation ran rampant through the troops. Desperate to see his armies flourish, Napoleon offered the breathtaking sum of 12,000 francs to the first person to discover a new—and reliable—method for keeping France’s armies fed.

One man, an expert confectioner, distiller, and chef, devoted himself to answering Napoleon’s call. Finally in 1795, after fourteen years of experimentation, Nicolas Appert hit upon the first known method for canning. Placing food in glass jars sealed with wax and reinforced with wire, and then heating the jars, Appert was the first to successfully can meats, fruits, and vegetables.

The French Navy received a trial of Appert’s first canned goods. They were an overwhelming success and quickly afforded top-secret military status. The benefits were transforming. Armies could now be fed far from home, sailors could take a journey’s worth of food with them, and a healthier diet meant soldiers better equipped for fighting. Appert’s sealed jars earned him Napoleon’s 12,000 francs, the honor of his country, and a place in food preservation history.

But it wasn’t long before the secret leaked. Other countries began working to “invent” canned goods and in 1810 Peter Durand, an Englishman, patented a tin can packaging process. The tin cans were lighter, easier to seal, and could take more of a beating on long journeys than Appert’s fragile glass bottles. Three years later Bryan Dorkin and John Hall, also of England, set up the first commercial canning factory and shortly thereafter canned foods were being sent to distant colonies.

Yet for all its success, no one knew why canning worked. The world would have to wait another fifty years before the famous Louis Pasteur explained the growth of microorganisms as the cause of food spoilage.

Until the 1920’s, canned foods remained primarily for military usage. It was during WWI that the American government campaigned citizens to grow and can food at home so more supplies would be available to the armed forces fighting overseas. From this came the slogan, “Back up the cannon with the canner.”

Today, people think nothing of seeing grocery aisles stacked with row upon row of canned goods. Long gone are the days when it took a tinsmith all day to produce 6-10 heavy cans. Now, automated machines serve up over 1,500 cans per minute. Soups, salsas, jellies, and canned fruits and vegetables are all staples in our homes. Jars are lighter, tighter, and come in a variety of shapes and sizes. Commercial canning is now so commonplace it's easy to forget that it was borne out of necessity because, once upon a time in the cold and ruined eighteenth century countryside, an army was starving.

Benefits of Canning

Why can your own food? After all, the stores are already filled with pre-prepared canned goods, all neatly labeled and just awaiting a twist of the can opener to be devoured.

No Additives

Health is the number one reason to grow and can your own food. In these days of growth hormones, steroids, chemical sprays and additives, you can rejoice in the knowledge of knowing *exactly* what you're eating when you reach for a can of fresh fruit or vegetable preserves you've put up yourself. There's a comfort found in knowing that through canning you're watching out for the health of your family.

Taste

If you've ever dipped into a jar of strawberry preserves or pulled out a can of fresh green beans during the cold winter months, you know home-canned food simply tastes better. Indeed, one of the greatest benefits of canning your own food is being able to offer your family and friends fresh tasting, all natural food throughout the year.

Enjoyment

Canning is a must if you're one of the many people using gardening as a source of fun or stress relief. Now, instead of hauling bushels of zucchini and tomatoes to your neighbor's tables, you can spend a day in your kitchen and preserve your harvest for your year-round enjoyment. No matter if you're a busy business executive living in New York or a rural housewife on the plains of Iowa, people of all ages and backgrounds are discovering the simple joys canning offers.

If you're worried about needing to be an expert to do canning, don't be concerned. Home canned foods have been around a long time and today we have equipment, methods and recipes to make it all easier. In fact, many people enjoy canning because it is such a logical, step-by-step process. And there is no

greater sense of accomplishment than that which comes from opening the door to a well-stocked pantry, shelves lined with sparkling jars all sealed, labeled, and put there by your own two hands.

And who knows? Once you discover the joys of canning you may quickly move beyond traditional canning into the world of gourmet foods. Not only will this save your family tons of money, you'll be the envy of the neighborhood with your exquisite homemade salsas, pestos, sauces and more.

How it Works

Canning is the process of using heat to destroy microorganisms responsible for the spoilage of food. Not only are microorganisms destroyed during this process, but the expansion of the jar contents causes a greater pressure outside of the jar than the pressure inside. At this time, air and gases are vented from the jar pulling the lid down and forming a vacuum. As the jar cools, a seal is formed preventing microorganisms from entering and contaminating the food.

Methods

Although many methods are used, only two are considered safe.

Water Bath Canning

Food is processed in a kettle or pot filled with boiling water. Water temperatures reach 212 degrees F. Processing food at this temperature is safe when canning high acid foods.

Pressure Canning

Food is processed in a [pressure cooker](#). Water temperatures reach 240-250 degrees F. Processing food at these temperatures is the only safe method for canning low acid foods.

Equipment

- **Water Bath Canner** – A large covered cooking pot. Any large container may be used as long as 1 inch of boiling water covers the jars at all times. To ensure sufficient heat to all jars, the canner's diameter should be no larger than 4 inches past the stove burner.
- **Pressure Canner** – A cooking pot with a locking, airtight lid and valve system to regulate internal pressure.
- **Rack** – Holds the jars in the canner.
- **Funnel** – Used to fill jars to prevent spilling on the rims.
- **Jar Lifter** – Tongs used for removing hot jars from the canner.
- **Lid Wand** – A tool with a magnetic end to remove sterilized lids from hot water.
- **Bubble Wand** – Used to remove air bubbles from jars.
- **Mason Jars** – Standard canning jars made of tempered glass designed to withstand the high temperatures of canning.
- **Lids** – Metal disc which contains a sealing compound around the edges that fits on top of mason jar.
- **Screw Bands** – Holds the lid firmly against mason jar.

Proper Safety

Improper canning can result in the presence of botulism, a deadly poison caused by a toxin from the bacteria spores, Clostridium Botulinum. It takes a specific amount of heat for a specific amount of time to kill the bacteria.

There are two categories of food to be noted when implementing proper safety measures for canning.

High Acid Foods

Foods with a high acid content create an unlikely environment for bacteria to thrive in. These foods have a PH of 4.5 or lower and include produce such as apples, apricots, berries, cherries, peaches, and tomatoes.

Low Acid Foods

Foods with a low acid content can be a dangerous breeding ground for bacteria. These foods have a PH balance of 4.6 or higher and include produce such as asparagus, beans, beets, carrots, corn, potatoes, pumpkin, squash, and sweet potatoes.

The USDA recommends pressure canning as the only safe method for canning low-acid foods such as meat, poultry, seafood, and vegetables. A water bath canner only reaches a temperature of 212 degrees F which is not high enough to kill bacteria found in low acid foods. A [pressure canner](#) must be used.

Research on canning has changed and the composition of today's fruits and vegetables has changed, as well. Lower acid levels can now be found in newer varieties of tomatoes. To keep up with these changes and ensure safety, use current recipes and recipe books. Always follow exact directions. Modifying recipes may cause dangerous results.

Preparing Equipment

Pressure Canner

Make sure your pressure canner has a tight fitting cover. Clean the petcock/exhaust vent and safety valve. Check to see that the pressure gauge is accurate. Weighted gauges need to be cleaned before using. Dial gauges need to be checked for accuracy once a year. Contact your local extension office for information on checking dial gauges.

Remove and replace any rubber gaskets that have cracked, dried out, hardened, or stretched. A pressure canner will not maintain proper pressure if the gasket is in this condition.

Jars and Lids

Check jars and lids for cracks, chips, dents, and rust. Defects prevent proper sealing. Sterilize jars in boiling water for 15 minutes. Replace jars periodically.

Lids are intended to be used only one time so buy new ones each year. Prepare lids as directed by the manufacturer.

Preparing Food

Prepare food as directed by peeling, pitting, or slicing. Scald to remove skins from fruits and vegetables when necessary.

Two methods are used when packing the jars for the canning process:

Hot Packing

When hot packing, food is heated thoroughly before it is packed into jars. It should be packed loosely, since hot packed food does not shrink. This method naturally removes air. When hot packed jars are put into the canner, the water should be boiling to avoid jar breakage.

Cold Packing

When cold packing, raw food is placed into the jars. It should be packed tightly since the food shrinks using this method. When cold packed jars are placed into the canner, water should be hot. Bring to a boil only after the jars are placed to avoid glass breakage.

Once jars have been packed, remove air bubbles with a bubble wand or spatula. Wipe rims of any spillage to ensure proper sealing.

Head Space

The space between the food and the lid is called headspace. Proper headspace is required for the expansion of food and the bubbling up of liquids during processing. It is also necessary for forming vacuums in cooled jars. Too little headspace can force food out during processing creating an improper seal. Too much headspace can leave remaining air within the jar causing the food at the top of the jar to darken.

For jams and jellies, provide $\frac{1}{4}$ inch of headspace. For high acid foods leave $\frac{1}{2}$ inch. For low acid foods, 1- $1\frac{1}{4}$ inches is needed.

Cooking Times for Specific Foods

During the canning process, each type of food has a specific amount of time at which it must be cooked in order to be safe. These times are from the USDA's "The Complete Guide to Home Canning."

Vegetable		Processing Times (Minutes) 240 Degrees F	
		Pints	Quarts
Asparagus		30	40
Beans, lima		40	50
Beans, green		20	25
Beets	Hot Pack Only	30	35
Carrots, sliced or diced		25	30
Corn, cream-style		85	Not Recommended
Corn, whole kernel		85	85
Green	Hot Pack Only	70	90
Mushrooms	Hot Pack Only	40	Not Recommended
Peas		40	Not Recommended
Peppers	Hot Pack Only	35	Not Recommended
Potatoes	Hot Pack Only	35	40
Potatoes, Sweet	Hot Pack Only	65	90
Pumpkin	Hot Pack Only	55	90

Adjusting for Elevation

Adjustments must be made for different altitudes when canning food. Boiling points are different at every elevation. Water begins to boil quicker and at a lower temperature as altitude increases. These lower boiling temperatures will not kill bacteria effectively. To ensure pressure reaches the required 240 degrees F, these adjustments must be made:

Elevation	Pounds of Pressure	
	Dial Gauge	Weighted Gauge
Sea Level	10	10
1,000 ft	10 1/2	15
2,000 ft	11	15
3,000 ft	11 1/2	15
4,000 ft	12	15
5,000 ft	12 1/2	15
6,000 ft	13	15
7,000 ft	13 1/2	15
8,000 ft	14	15
9,000 ft	14 1/2	15
10,000 ft	15	15

Processing the Food

Using a Water Bath Canner

1. Fill canner half full with water.
2. Heat water to boiling if jars have been hot packed. Have the water hot, if jars have been raw packed. Then boil.
3. Have 4 quarts of water boiling in a separate pot.
4. Lower jars onto rack.
5. Add boiling water to cover the tops of the jars by 1-2 inches. If water drops below this level, add more.
6. Cover canner and heat on high until water boils.
7. Reduce heat but keep at a slow boil.
8. Start timing when the water begins to boil.
9. Turn off heat when processing is complete.
10. Tilt lid away from face to let steam escape.
11. Carefully lift jars from container.

Using a [Pressure Canner](#)

1. Put 2-3 inches of hot water in pressure canner.
2. Place filled jars on rack.
3. Fasten lid securely.
4. Open petcock/exhaust vent.
5. Exhaust steam for 10 minutes while maintaining a high heat setting.
6. Close petcock.
7. The canner will pressurize in 3-5 minutes. Start timing when pressure reading on gauge indicates the proper pressure for your altitude has been reached.
8. Turn off heat when processing is complete. If possible, remove from heat.
9. Let canner depressurize. When pressure reaches zero, wait a minute or two, then slowly open petcock.
10. Unfasten cover.
11. Carefully remove jars from canner

Cooling

The canning process is not complete until the jars are allowed to cool down slowly. Place them in a spot where they will not be touched. Handling a jar improperly before it cools down can cause a seal to break. Keep jars away from drafts so that they do not cool down too quickly. Leave enough space between jars to allow for adequate air circulation. After 12-24 hours of cooling, they are ready for seal testing.

Testing the Seal

Once the canning process is complete and the finished product has cooled, jars should be inspected. Visually, your jars should pass this test:

- Jars have retained proper head space.
- Jars are free of air bubbles.
- Liquids just cover solids.
- Produce is free of imperfections as well as, stems, cores, and seeds.

To physically test the seals, press the center of the lid down. If the lid does not move, it is sealed. If it pops up, it is not sealed. Another way to test seals is to tap the center of the lid with a spoon. A good seal will produce a ringing sound. A thudding sound may indicate a poor seal.

If you feel any of your jars have not sealed properly the food inside must be eaten immediately, refrigerated, or reprocessed.

Storing Canned Food

Home-canned food should be stored in a cool, dark, place at a temperature between 50-70 degrees F. Storing in temperatures that are higher can lower the quality of the food.

When opening canned food, listen for a “popping” sound which indicates a proper vacuum and seal was maintained.

Look for these signs of spoilage after opening any home-canned food:

- Cloudy or frothy liquids
- An “off” color deterioration
- Slimy texture
- An odor that does not smell fresh

Any home-canned foods that display any of these signs of spoilage should be discarded immediately. Never taste food when an improper seal is suspected.

For an extra measure of safety, once low-acid and tomato food jars are opened and ready for use, boil contents for 10 minutes when at an altitude of 1,000 feet. Add an additional minute for every increase of 1,000 feet in altitude.

Shelf Life

Can the amount of food you would use in one year's time. Stored in a cool, dry place, canned food should last 1 year.

FAQ

Is it safe to can food without salt?

Yes. Salt is not used to prevent spoilage but rather for flavor.

Which vegetables expand as opposed to shrinking during canning?

Peas, corn and lima beans expand during canning due to their starchy content and should be packed loosely.

Should liquid lost during processing be replaced?

Liquid loss will not cause spoilage, but the food at the top of the jar may darken. If half the jar has lost liquid, refrigerate and use within 2-3 days.

Why do the undersides of lids sometimes discolor?

The natural compounds of some foods can sometimes cause a darkened deposit which is harmless on sealed jars.

Should ring bands be tightened after canning if they have come loose?

No. Bands are meant to keep lids in place and help jars to seal. Retightening may actually break the seal.

Can jars cool down in the water in which they were processed?

No. The food will continue to cook and result in over-cooked food.

Why is my jelly stiff?

Sometimes this happens when too much pectin, or fruit that is not yet ripe is used.

Recipes

The following canning recipes are from the recipe file of Alltrista Consumer Products Company, marketers of Ball brand and Kerr brand home-canning products.

Strawberry Jam

2 quarts strawberries
1 package powdered pectin
¼ cup lemon juice
7 cups sugar

Wash strawberries; drain. Remove stems. Crush strawberries one layer at a time. Combine strawberries, powdered pectin, and lemon juice in a large saucepot. Bring to a boil, stirring occasionally. Add sugar, stirring until dissolved. Return to a rolling boil. Boil hard 1 minute, stirring constantly. Remove from heat. Skim foam if necessary. Ladle hot jam into hot jars, leaving ¼ inch headspace. Adjust two-piece caps. Process 10 minutes in a boiling-water canner.

Yield: About 8 half-pints.

Prickly Pear Marmalade

1 quart chopped, peeled, seeded prickly pears (about 9 medium)
3 cups chopped and seeded oranges (about 2 large)
1 cup thinly sliced and seeded lemon (about 2 medium)
1 quart water
6 cups sugar

Combine oranges, lemon, and water in a large saucepot; simmer 5 minutes. Cover and let stand 12-18 hours in a cool place. Cook rapidly until peel is tender. Stir in prickly pears. Add sugar, stirring until dissolved. Bring to a boil over high heat, stirring constantly. Cook rapidly almost to gelling point. As mixture thickens, stir frequently to prevent sticking. Remove from heat. Skim foam if necessary. Ladle hot marmalade into hot jars, leaving ¼ inch headspace. Adjust two-piece caps. Process 15 minutes in a boiling-water canner.

Yield: About 6 half-pints.

Apple Butter

4 lbs. apples (about 16 medium)
4 cups sugar
2 teaspoons cinnamon
¼ teaspoon cloves

To Prepare Pulp: Wash apples. Core, peel and quarter apples. Combine apples and 2 cups water in a large saucepot. Simmer until apples are soft. Puree using a food processor or food mill, being careful not to liquefy. Measure 2 quarts apple pulp.

To Make Butter: Combine apple pulp, sugar and spices in a large saucepot. Cook slowly until thick enough to round up on a spoon. As mixture thickens, stir frequently to prevent sticking. Ladle hot butter into hot jars, leaving ¼ inch headspace. Remove air bubbles. Adjust two-piece caps. Process 10 minutes in a boiling-water canner.

Note: If butter becomes too thick, add water or apple juice for desired consistency.

Yield: About 3 pints.

Peach Preserves

8 cups sliced, pitted, peeled peaches (about 4 lbs.)
1 package powdered pectin
2 tablespoons lemon juice
7 cups sugar

Combine peaches, powdered pectin and lemon juice in a large saucepot. Bring to a boil, stirring gently. Add sugar, stirring until dissolved. Return to a rolling boil. Boil hard 1 minute stirring constantly. Remove from heat. Skim foam if necessary. Ladle hot preserves into hot jars, leaving ¼ inch headspace. Adjust two-piece caps. Process 10 minutes in a boiling-water canner.

Yield: About 9 half-pints.

Applesauce

2 ½ -3 ½ lbs. apples per quart

Water

Sugar – optional

Wash apples; drain. Core, peel and quarter apples. Cook apples until soft in a large covered saucepot with just enough water to prevent sticking. Puree using a food processor or food mill. Return apple pulp to saucepot. Add ¼ cup sugar per pound of apples or to taste, if desired. Bring applesauce to a boil (212 degrees F), stirring to prevent sticking. Maintain temperature at a boil (212 degrees F) while filling jars. Ladle hot sauce into hot jars, leaving ½ inch headspace. Remove air bubbles. Adjust two-piece caps. Process pints and quarts 20 minutes in a boiling-water canner.

Recipe Variation: Spiced applesauce can be made by adding ground spices such as cinnamon, nutmeg or allspice, to the sauce during the last 5 minutes of cooking. For a chunky sauce, coarsely crush half of the cooked apples; process remaining apples through a food processor or food mill. Combine crushed and sauced apple mixtures; continue as for Applesauce.

Tomato Sauce

45 pounds tomatoes

Bottled lemon juice

Wash tomatoes; drain. Remove core and blossom ends. Cut into quarters; simmer 20 minutes in a large saucepot, stirring occasionally. Puree tomatoes in a food processor or food mill. Strain puree to remove seeds and peels. Cook pulp in a large, uncovered saucepot over medium-high heat until sauce thickens, stirring to prevent sticking. Reduce volume by one half. Add 1 tablespoon bottled lemon juice to each pint jar, 2 tablespoons bottled lemon juice to each quart jar. Ladle hot sauce into hot jars, leaving ½ inch headspace. Adjust two-piece caps. Process pints 35 minutes, quarts 40 minutes in a boiling-water canner.

Yield: About 14 pints or 7 quarts.

Zesty Salsa

10 cups chopped, seeded, peeled, cored tomatoes (about 6 pounds)
5 cups chopped and seeded long green peppers (about 2 pounds)
5 cups chopped onions (about 1 ½ pounds)
2 ½ cups chopped and seeded hot peppers (about 1 pound)
3 cloves garlic, minced
2 tablespoons cilantro, minced
3 teaspoons salt
1 ¼ cups cider vinegar
1 teaspoon hot pepper sauce – optional

Combine all ingredients in a large saucepot, adding hot pepper sauce, if desired. Bring mixture to a boil. Reduce heat and simmer 10 minutes. Ladle hot salsa into hot jars, leaving ¼ inch headspace. Adjust two-piece caps. Process 15 minutes in a boiling-water canner.

Note: When cutting or seeding hot peppers, wear rubber gloves to prevent hands from being burned.

Yield: About 6 pints.

Cream-Style Corn

1-1 ½ pounds ears of corn per pint
water
Salt – optional

Husk corn; remove silk. Wash. Cut kernels from cob, leaving tip ends. Scrape cob to extract pulp and milk. Measure kernels, pulp and milk together. Add ½ teaspoon salt and 1 ¼ cups boiling water to each pint of cut corn. Boil 3 minutes. Only process in pints. Ladle hot corn and liquid into hot jars, leaving 1 inch headspace. Remove air bubbles. Adjust two-piece caps. Process pints 1 hour and 25 minutes at 10 pounds pressure in a steam-pressure canner.

Carrots

2-3 pounds carrots per quart, 1-1 ½ inch diameter
Water
Salt – optional

Raw Pack: Wash carrots; drain. Peel carrots. Wash again. Slice, dice or leave carrots whole. Pack carrots tightly into hot jars, leaving 1 inch headspace. Add ½ teaspoon salt to each pint jar, 1 teaspoon salt to each quart jar, if desired.

Ladle boiling water over carrots, leaving 1 inch headspace. Remove air bubbles. Adjust two-piece caps. Process pints 25 minutes, quarts 30 minutes, at 10 pounds pressure in a steam-pressure canner.

Hot Pack: Wash carrots; drain. Peel carrots. Wash again. Slice, dice or leave carrots whole. Cover carrots with water; bring to a boil. Reduce heat; simmer 5 minutes. Pack hot carrots into hot jars, leaving 1 inch headspace. Add ½ teaspoon salt to each pint jar, 1 teaspoon salt to each quart jar, if desired. Ladle boiling water over carrots, leaving 1 inch headspace. Remove air bubbles. Adjust two-piece caps. Process pints 25 minutes, quarts 30 minutes, at 10 pounds pressure in a steam-pressure canner.

Spiced Honey

1 lemon
12 whole cloves
3 sticks cinnamon
2 2/3 cups honey

Cut lemon into 6 thin slices. Poke 2 cloves in every slice. Bring lemon slices, cinnamon sticks and honey to a boil in a saucepan. Stir occasionally. Place 2 lemon slices and 1 cinnamon stick in each jar. Pour hot honey into hot jars, leaving ¼ -inch headspace. Adjust two-piece caps. Process in a boiling water canner for 10 minutes.

Makes 3 half-pints.

Drying

History of Drying

Believed to be the oldest method of controlled food preservation, drying has been used across cultures as a means of successfully preserving food. Many ancient cultures harnessed the power of their hot, arid, climates to dry and preserve their food. As early as 12,000 BC, Middle East and Oriental cultures were laying their food in the baking sun to dry. Other near eastern cultures wrapped food in palm leaves then buried them in the blistering desert sand until all traces of moisture were removed. In more recent times, Native and Colonial Americans used sun, fire, smoke, and wind to preserve meats, fish, fruits, and vegetables.

Dried food was essential to the advancement of civilization. In a time when most food had to be hunted, gathered, then immediately eaten, drying allowed remaining food to be kept for future use. These lightweight and easily transportable stockpiles fed tribes and armies as they traveled across lands. Dried food ensured colonies were better able to survive harsh winter months when food was scarce. Without supplies of dried food, sailors, troops, pioneers and explorers would have surely perished.

Drying methods relied on smoke or sun until 1795 when France unveiled the first mechanical dehydrator used to dry fruits and vegetables. The use of dehydrated foods grew through each of the two World Wars as the military searched for ever more lighter, convenient, and nutritious food supplies for its troops. The first instruction manual for drying foods at home was published by the USDA in 1917, although the instructions given don't come close to today's standards for safely preparing food.

Today, our modern-era military and astronauts still rely on dried food. And drying—the oldest of arts in food preservation—is once again becoming popular.

Benefits

Drying food isn't difficult, but it does take time and attention. If you're new to food preservation, the simplicity of creating dried foods is a great starting place to kick off your new healthy habits.

Convenience

The biggest benefit to dried foods is the convenience factor. Dried foods such as beef jerky, banana chips, pumpkin seeds, fruit roll-ups, etc. are lightweight, easy to store, and fun to munch on. Hikers, backpackers, and campers especially

appreciate the convenience of carrying around dried food versus trying to haul jars of canned food. Plus, the foods keep anywhere from four months to a year.

Cooking Aids

Dried foods are great fun to cook with. The food returns to its normal shape once water is added. Try tossing some dried vegetables into your next pot of spaghetti sauce, as part of a hearty stew, or in any recipe requiring vegetables. Re-hydrate dried fruits in juice and add to sauces, jams, and syrups.

Minimal Storage Space

The family cook may especially appreciate working with dried food simply for the storage benefits. Unlike canning and freezing, dried foods require minimal space. Plus, there's the "grab bag" benefit. Reach into any bag of dried food, pull out what you need, then seal it right back up with no worries over contamination or spoilage.

Nutrition

Dried foods lose only 3-5% of their nutritional value, keeping them high on the list for healthy snacks. The foods are high in fiber and carbohydrates, low in fat, and nutrient-dense. A single cup of cooked dried peas, for example, provides approximately 81% of the USDA's daily value for fiber.

How it Works

The high water content of fresh food provides a breeding ground for the growth of microorganisms such as mold, yeast, and bacteria. By drying foods, we reduce the high volume of water, thus preserving them.

Methods

Sun

Sun drying uses the heat of the sun and the natural flow of air to remove moisture from food. A hot, arid climate with temperatures around 100 degrees F is required for food to dry properly. With the exception of a few pieces of equipment, the use of sun and air make this the most economical method of drying.

Oven

Since most homes have an oven, oven drying is a convenient method for drying food. However, attention must be given and foods must be checked regularly to prevent unwanted scorching. Electric ovens do not provide air ventilation. So for removal of moisture, oven doors must be propped open slightly and adequate racks must be purchased.

Dehydrator

[Dehydrator](#) drying provides a desirable environment of controlled heat and ventilation. [Dehydrators](#) are designed to dry foods using a combination of heat and horizontal or vertical air flow. This method uses less electricity than the oven method.

Equipment

Drying Racks

Proper ventilation is essential when choosing a drying rack. Cookie sheets are inadequate because air cannot reach the undersides of food. Choose racks made from wood slats or stainless steel mesh.

Do not use racks made of galvanized screen, aluminum, copper, fiberglass, or vinyl. The metals in these may cause an acid reaction that forms harmful components.

- Copper – Destroys vitamin C
- Aluminum – Causes an off-flavor in sulfured fruit.
- Fiberglass – May leave dangerous splinters.
- Vinyl – Will melt when heated

Storage Containers

Use containers that are moisture and vapor-proof with tight fitting lids. [Vacuum sealers](#) and [vacuum sealable bags](#) are ideal. You may also use glass jars, plastic freezer bags, or coffee cans.

Preparing the Food

Peel, core, pit, and crack skins as necessary. Tough skins will hamper the drying process because moisture cannot be released. To crack skins, place fruit in boiling water for 30-60 seconds. Then dip in very cold water.

Food that is being dried simultaneously should be cut in uniform and equal sizes to ensure that all pieces will dry at the same time. Treat light colored fruit with an antioxidant to prevent it from turning brown.

- **Ascorbic Acid** – A temporary treatment that prevents light colored fruits from turning brown.
- **Sulfuring** – A permanent antioxidant treatment that keeps fruit from turning brown. It also helps prevent the loss of vitamins A and C.

Processing the Food

Sun Drying

Cover food with cheesecloth to keep out insects and animals. Take food in at night to prevent night dew which will add moisture back into the drying foods.

Oven

Preheat oven to 140 degrees. Use an oven thermometer to keep the oven between 140-160 degrees F. Stack trays of food into oven. Keep oven door slightly open so that moisture may escape. Rotate trays to provide even drying. Stir food every half hour. Do not use a broiler as food will dry too quickly.

Dehydrator

Preheat to 125 degrees F. Stack trays of food into the [dehydrator](#). Slowly increase temperature to 140 degrees F.

Be sure to allow for slow drying. Drying too rapidly can result in an outside that dries quickly and becomes hard. This hardened outside keeps moisture locked in the food.

Drying Times

Drying times vary upon the method used, the size of cut pieces, and the food being dried.

Sun drying can take 3-7 days for food to fully dry. Oven drying can take 8 hours or more. Drying food in a [dehydrator](#) usually takes 4-12 hours.

Foods that are dried in a batch should be cut into uniform, equal sizes to ensure that they dry at the same rate of time.

Foods with low water content will dry quicker than those with high water content.

Check food for dryness by the following signs:

- Vegetables - Leathery or brittle.
- Fruit leather - Not sticky to the touch
- Jerky – Cracks when bent but does not break
- Fruits – Pliable, springy, and do not stick together. No moisture is left on the hand when squeezed.
- Herbs – Crisp, brittle

Conditioning

After it has been dried and before it is packaged, dried food should be conditioned.

1. Let dried food cool on a tray.
2. Put pieces in a large closed container. Be sure that the food is cooled. If it is still warm it will sweat inside the container.
3. Stir the food once a day for 7-10 days. This process allows the moisture from the under-dried pieces to be absorbed by the over-dried pieces. If moisture appears on the lid or sides, the food is not dry enough.

Storing

Dried foods should be packaged in small quantities. Once they are adequately dried, package the food in smaller, air-tight containers. Containers that keep light out are best. Force out air before sealing it. Keep packages in a cool, dry, dark place.

Shelf Life

Cooler temperatures will encourage a longer shelf life. Jerky and vegetables will keep for about 6 months if dried and stored properly. Fruits and herbs will keep for up to 1 year.

FAQ

What types of foods can be dehydrated?

Almost all fruits, most vegetables, herbs, meats, and some dairy products can be dehydrated. Foods that have a high oil content, such as tuna, do not dehydrate well.

How can I keep fruit from sticking to trays?

Trays can be sprayed with vegetable cooking spray. Also remember to lift gently with a spatula after one hour of drying.

Why do I have brown spots on my dried vegetables?

This is often due to over-drying. Prevent over-drying by checking vegetables periodically during the drying process. Be sure that the temperature setting is not too high.

Recipes

Sun Dried Tomatoes

Tomatoes
Salt
Optional Herbs

Slice tomatoes in half, place on screen. Sprinkle with salt and optional herbs.

In dry, arid climates, place in the sun until dry. This could take 4 days-2 weeks. Keep covered with raised cheesecloth that does not touch the tomatoes. This will keep out insects and animals while still providing ventilation. Bring tomatoes in at night to avoid the moisture of evening dew.

In cooler, humid climates dry tomatoes in a dehydrator for 8 hours or in an oven for 6-12.

Properly dried tomatoes should feel dry and leathery, but not crisp and crumbly. They should look deep red in color.

Seal tomatoes in an air tight bag or container. Will last 6-9 months in the freezer.

Honey Banana Chips

Bananas

¼ cup honey

¼ lemon juice

Nutmeg

Slice bananas 1/8-1/4 inch thick. Combine honey and lemon juice. Mix thoroughly. Dip banana slices into honey mixture. Pat dry. Sprinkle with nutmeg.

Place on trays and dry at 135 degrees F for 16-40 hours until chewy.

Beef Jerky

1 ½ pounds boneless chuck roast

½ cup soy sauce

½ cup Worcestershire sauce

½ cup packed brown sugar

1 tablespoon liquid smoke (optional)

½ teaspoon garlic powder

½ teaspoon pepper

½ teaspoon extra spicy seasoning (Mrs. Dash®)

1 tablespoon onion powder

For easier slicing, partially freeze roast for 2 hours. Slice across the grain and remove excess fat. Cut meat into 3/16 – ¼ inch strips. Combine the remaining ingredients in a shallow glass container or a heavy duty re-sealable plastic bag. Add beef. Covered tightly, refrigerate for 6-8 hours.

In a single layer, place meat on a foil lined baking sheet. Bake for 8-10 hours at 140 – 160 degrees F, occasionally blotting beef with paper towels. Let a piece cool to test for dryness. Properly dried jerky should crack when bent but not break. There should be no moist spots. Cool; and then cut jerky into pieces with scissors.

In an airtight container, jerky can be stored at room temperature for up to 2 weeks. In a refrigerator, it can be stored for up to 3 weeks. In the freezer, store for up to 2 months.

Fruit Leather

Any choice of fruit

- strawberries
- raspberries
- cherries
- lime
- mango
- apples
- lemons
- blueberries

Honey (optional)

Wash and pit fruit. Puree in a blender. For sweetening, add 1 tablespoon of honey for every 1 cup of puree. Line a cookie sheet or trays with Saran Wrap or wax paper. Evenly fill and spread puree ¼ inch deep. Place in the sun, oven, or a dehydrator to dry. Takes 4-10 hours. Ready when edges are not sticky to the touch.

Pull from Saran Wrap while still warm and roll in plastic wrap.

Can be stored for 30 days at room temperature; months in the refrigerator; years in the freezer.

Dried Fruit Trail Mix

- ½ cup dried papaya slices
- ½ cup unsweetened shredded coconut
- ½ cup dried banana chips
- ¼ cup dark raisins
- ¼ cup golden raisins
- 1/3 cup pitted dates
- ¼ cup dried chopped apricots

Break banana chips and cut papaya into bite size pieces. Mix all ingredients in a bowl and toss until blended. Store trail mix in air tight bags or containers. Keep in a cool place for up to 2 weeks.

Makes 3 cups.

Sunflower Seeds

Using 1/4 to 1/2 cup of salt per two quarts of water, cover unshelled seeds with salted water. Soak seeds in the salt solution overnight. Drain water the next morning and pat the seeds dry to remove excess moisture.

Preheat oven to 300 degrees F. Spread the sunflower seeds evenly on a cookie sheet or shallow pan and bake for 30 to 40 minutes or until golden brown. Stir occasionally. The seeds will often develop a small crack down the center as they roast. After each stirring, test to see if the seeds are completely roasted by tasting. After roasting, remove seeds from the oven and allow them to cool completely. Store the seeds in an airtight container for future snacking.

Freezing

History of Freezing

Throughout history the earth and its elements—snow, ice, streams, caves, springs, wind, and cellars—have been used to freeze and preserve food.

In pre-historic times, Arctic cultures utilized the harsh polar climates of their environment to freeze and keep food from spoiling. Peruvian Incas ventured into the icy mountains, high above Machu Picchu, where potatoes and other crops were stored for future consumption under frigid conditions.

The Chinese were the first we know of, in 1,000 BC, to create ice cellars and hoard frozen food long after the winter months had passed. The Ancient Egyptians, with no easy access to snow or ice, had to find other means. In 500 BC they discovered that setting out boiled water in earthenware jars at night, and keeping the jars wet, created ice-crystals in the water.

Ancient Greeks and Romans transported snow and ice down from the tops of mountains and piled the compacted snow in storage pits, covering the pits with insulated material. Early pioneers did the same, collecting ice in icehouses and then packing the ice in salt, sawdust, or even seaweed to keep temperatures cool.

A taxidermist named Clarence Birdseye changed all that. After observing fresh fish being preserved in barrels of Arctic seawater, Birdseye took a \$7 investment and transformed the modern world. In 1923, using waxed cardboard boxes and high pressure flash-freezing, Birdseye invented the first commercialized means for freezing foods. Postum Co (later to become General Foods Company) acquired Birdseye's patents and in 1930 Birdseye Frosted Food Company launched its first line of frozen foods which included meats, fruits, vegetables, fish, and oysters.

The food didn't sell well, mainly because retailers weren't willing to invest in the expensive refrigerated counters needed to store the food. WWII changed all that. When Japan captured Southeast Asia, access to tin became limited and all canned goods were rushed off the shelves and shipped to the war effort. Retailers turned to frozen food to fill the gap. Consumers also embraced frozen goods as they didn't use as many ration points as canned.

By the 1950's, airlines were serving frozen meals, Swanson had transformed the American living room with their TV dinners, and frozen food sales exceeded the \$1 billion dollar mark.

The growth continued. In the 1980's, as women marched to work in record numbers, Americans fell in love with their microwaves. The low-fat craze arrived, sparking Weight Watchers and Lean Cuisine frozen meals. Consumers today enjoy everything from freeze-dried coffee to exotic, organic frozen meals.

Birdseye couldn't have known his ideas would revolutionize the way the world used food. It's astonishing to think the modern frozen food era is only seventy-five years old. But whether through earth, wind, or mechanized freezers, frozen foods have remained a constant throughout the ages.

Benefits

The beauty of freezing is that it's a simple, convenient, and a nutritious option that saves you both time and money.

Nutrition

Did you know the "fresh" fruits and vegetables on the grocery stores shelves aren't really all that fresh? That's because store-bought produce is picked early and allowed to ripen, "off-the-vine." Once you add in transportation and storage time, even the healthiest of fruits and vegetables have lost valuable nutrients.

Much healthier produce is grown right in your own garden. You can harvest your vegetables at the peak of perfection and spend a day cooking and freezing to create months' worth of healthy meals. By freezing food at the height of ripeness you preserve freshness, flavor, vitamins and minerals. Eating fresh produce year-round leads to a healthier and more-balanced diet.

Stay-At-Home Value

If you're like most people, you probably feel you don't have the time to prepare satisfying homemade meals every day of the week. But that doesn't mean you and your family don't still crave them. Today more than ever, Americans are eating out at fast-food restaurants and yet, when polled, most eat out only for the convenience factor and not for the taste.

Why sacrifice taste for convenience when you can have both? Instead of jumping in the car for fast food, think how much more satisfying it would be to dip crusty French bread into a bowl of warm homemade soup. Or how about heating up a spicy spaghetti sauce in mere minutes? And don't overlook the luxury of fresh berries and peaches sprinkled over your cereal or oatmeal in the morning, even during the winter months. All made possible with frozen foods.

You're In Control

Read the labels on store-bought frozen foods and you may be appalled at the amount of sugar, salt, and additives found there. Freezing your own food puts *you* in the driver's seat, especially important for those with special dietary needs. Experiment with freezing and you'll soon be creating variations on traditional dishes your family has always enjoyed. Freezing cuts down on prep time when cooking and—most important in this decade of the ever-expanding waistline—allows you fat, salt, and portion control. Not having to buy lesser quality processed food will also save money in the long run.

How it Works

Microorganisms are not destroyed, but the extreme cold significantly slows the growth and chemical changes that cause spoilage.

Equipment

Freezer

Any of three types of freezers can be used to freeze food.

- Freezer-Refrigerator
- Upright Freezer
- Chest Freezer

Freezers should be located in a dry, cool, well ventilated location.

Storage Bags and Containers

All storage bags and containers should be made from durable moisture-proof materials. All packages should have an air-tight seal before being placed in the freezer. [Food vacuum sealers](#) are ideal for removing air and forming an air-tight seal.

Preparing Food

Treatment of the food is essential for high quality frozen produce.

Preparing Vegetables

Blanch or steam all vegetables, except for peppers and onions, before freezing.

Blanching is the process of heating food quickly, with water or steam, to inactivate enzymes that cause spoilage. Microorganisms are also reduced at this time. Once the food is heated, it is immediately placed in ice water to stop any further cooking of the food.

Blanching Instructions:

1. Fill a pot 2/3 with water.
2. Add 2 tablespoons of salt.
3. Bring Water to a boil.
4. Add food to water. Do not cover.
5. Boil for 3-5 minutes.
6. Remove and quickly submerge in ice water.
7. Drain excess water to prevent the formation of ice crystals on frozen food.

Over-blanching will result in a cooked product that has a loss of nutrients, flavor, and color. Under-blanching stimulates enzyme activity and is actually worse than not blanching at all. Produce that is blanched properly will maintain its resistance when pinched between the fingers.

Vegetable	Preparation	Blanching
Asparagus	Trim; cut to package length or in 2 inch pieces.	3-4 minutes in boiling water
Beans, green	Remove ends; cut to 1 Or 2 inch pieces.	Cut – 2 minutes Whole – 2 ½
Beans, lima	Shell or leave in pods and shell after blanching.	1-2 minutes
Beets	Leave ½ inch stems. Cook till tender. Peel and cut.	Small – 25-30 minutes Medium – 45-50 minutes
Broccoli	Cut into medium pieces 5-6 inches long. No more than 1 ½ inches in thickness.	3 minutes
Brussels Sprouts	Remove outer leaves. Sort according to size.	Small – 3 minutes Large – 5 minutes
Carrots	Cut into ¼ inch slices.	Sliced – 3 minutes

	Leave whole if small	Whole – 4 ½
Cauliflower	Cut into 1 inch pieces	3-4 minutes
Corn on cob	Blanch on ears. Cool and cut off corn	7 – thin ears 9 – medium ears 11 – large ears
Corn kernels	Blanch on ears. Cool and cut of corn.	4 minutes
Greens	Cut and discard thick stems and damaged leaves.	2 minutes
Peas	Shell, discard starchy peas.	1-2 minutes
Potatoes, sweet	Cook with jackets on till almost tender. Cool, peel, and slice.	30-40 minutes
Spinach	Wash leaves and cut off heavy stems.	1 ½ minutes
Squash	Cut into ½ inch slices. Cut into pieces. Remove seeds. Cook until soft. Remove pulp and mash. Cool quickly.	Approximately 20 minutes

Preparing Fruit

Treating

Treat light colored fruit with an antioxidant such as ascorbic or citric acid to prevent it from turning brown.

Packing

There are several ways to pack fruit for freezing.

- **Dry Pack** - Fruit is put into a sealed container.
- **Syrup Pack** - Fruit is covered with a syrup mixture. Best used for sauces or desserts.
- **Sugar Pack** - Sugar is sprinkled over fruit and mixed gently until juice is drawn out and sugar dissolves. Works well with juicy fruits. Best for cooking purposes like pies or crisps.
- **Unsweetened Pack** - Fruit is covered with water containing ascorbic acid.

Syrup Packing Mixtures

Syrup Type	Cups of Sugar	Cups of Water	Yield Syrup
Very Light - 20%	1 ¼	4	4 2/3
Light – 30%	2	4	5
Medium – 40%	3	4	5 ½
Heavy – 50%	4 ¾	4	6 ½
Very Heavy – 60%	7	4	7 ¾

Press fruit into syrup or sugar. Cover with syrup in syrup packs. Leave headspace then seal and freeze.

Fruit	Syrup Pack	Sugar Pack
Apples	Use 40% syrup. Add ½ tsp. crystalline ascorbic acid to each qt. syrup to prevent browning. Press fruit down and cover with syrup.	Mix with ½ cup sugar with every 1 quart of fruit.
Apricots	Use 40% syrup.	Mix with ½ cup sugar for every 1 quart of fruit.
Avocado	Puree and add 1 tbsp. lime juice for 2 avocados.	
Bananas	Mash and add 1 tsp. lemon juice per cup of banana.	
Cherries	Sour, use 60% syrup. Sweet, use 40% syrup.	Sour, mix with ¾ cups sugar for every 1 qt. cherries.
Cranberries	Use 50% syrup	
Figs	Use 50% syrup	
Grapefruit	Use 30% syrup.	
Grapes	Use 40% syrup.	
Lemons/Limes	Use 40% syrup	
Mangoes	Use 30% syrup.	
Melons	Use 30% syrup.	
Nectarines	Use 40% syrup	
Oranges	Use 40% syrup.	
Peaches	Use 40% syrup.	Mix with 2/3 cups sugar for each quart of fruit.
Pears	Use 40% syrup. Heat in boiling syrup for 1-2 minutes. Drain and cool. Pack and cover with syrup.	

Pineapples	Use a 30% syrup made with pineapple juice. Or use unsweetened pineapple juice.	
Plums	Use 40-50% syrup.	
Raspberries	Use 40% syrup.	Mix with $\frac{3}{4}$ cups sugar for every 1 quart of berries.
Rhubarb	Use 40% syrup	Mix $\frac{1}{2}$ cup sugar for every 1 quart of
Strawberries	Use 50% syrup.	Mix with $\frac{3}{4}$ cups sugar to every 1 quart of strawberries.
Tomatoes	Freeze only as sauce, puree, or paste.	

Processing the Food

Freeze food quickly to produce tiny ice crystals which protect food as it thaws and leaves food with a better texture.

To ensure a quick freezing time:

- Place packages close to the sides of the freezer where it is the coldest.
- Provide enough space between newly packaged foods to allow for adequate air circulation.
- Lower the temperature of the freezer until food is completely frozen.
- Do not overload freezer during initial freezing. Fewer items in the freezer will allow for a quicker freeze.

Once food is frozen, packages can be moved from the sides of the freezer and packed closer together.

Keep the freezer at 0 degrees or lower to protect quality. Use a freezer thermometer to regulate proper temperatures.

Storing Food

Food should be stored in packaging material that will prevent air contact. Contact with air will cause moisture loss and freezer burn.

Semi Fluids

Semi-fluid foods should be stored in rigid plastic or glass wide-mouth containers that can be closed tightly.

Solids

Solids should be stored in durable, moisture-proof bags.

* For best results, store food in [vacuum sealable bags](#).

Shelf Life

Fruits, vegetables, beef, and pork will last 8-12 months in the freezer. Pork will last 4-6 months.

FAQ

How long will food stay frozen if the power goes off?

Food will stay frozen longer if the freezer is not opened, if the freezer is full, and if it is in a cool place. Generally, a full freezer will keep food frozen for 2-4 days, depending on the size. A half filled freezer will keep food frozen for about 24 hours.

Can food be re-frozen after it thaws?

Foods may be refrozen if they are only partially thawed and still have ice crystals on the package or if the freezer temperature has remained at 40 degrees F or below.

What causes freezer burn?

It is caused by food that is not properly wrapped and comes in contact with air. Dehydration occurs on the surface of the frozen product.

Are there any foods that should not be frozen?

Because ice crystals can cause breakage of cell membranes in some foods, freezing them should be avoided. Mushrooms, soft fruits, and salad vegetables tend to lose crispness and firmness when frozen. Raw grapes and apples become mushy. Tomatoes become watery and limp.

Recipes

Baby Food Ice Cubes

Any choice of fruit or vegetable

- Apples
- Bananas
- Butternut Squash
- Carrots
- Peaches
- Peas
- Plums
- Potatoes
- Sweet Potatoes

Steam or boil your baby's favorite fruits or vegetables until mushy. Puree or leave a little bit coarse depending on your child's age. Mix foods if desired. Spoon into ice cube trays, cover with a plastic wrap, and freeze. When frozen, store in air tight freezer bags in your freezer.

To serve, thaw at room temperature or in the refrigerator for 4 hours.

Lemon Ice

1 Small Lemon
Water
Sugar
Salt

Remove the zest/colored part of peel and cut into 1/2 inch pieces. Combine zest and 1 cup of sugar in a blender or food processor. Process until finely chopped. Place mixture into a 3 quart pan. Add 4 cups water and a dash of salt. Heat until sugar dissolves. After it has cooled, add 2/3 cup of lemon juice and stir. Freeze.

To serve, process in a blender/food processor until it is slush. Makes 4 1/2 cups.

Fruit Mixes

Combine any of these mixtures for a frozen fruit mixture.

Peaches

4 Cups sliced and peeled Peaches
2 cups firmly packed Brown Sugar

2 tbsp. Vanilla
3 tbsp. Lemon juice
 $\frac{3}{4}$ tsp. Ground Nutmeg
 $\frac{3}{4}$ tsp. Cinnamon

Raspberries

4 cups lightly packed raspberries
2 cups sugar
4 tsp. lemon juice
4 tsp. vanilla

Banana

4 cups thinly sliced, then mashed bananas
1 $\frac{1}{4}$ cups sugar
 $\frac{3}{4}$ cups honey
3 tbsp. lemon juice
2 tbsp. vanilla

Apricot-Orange

4 cups unpeeled, thinly sliced apricots
 $\frac{1}{2}$ cup orange juice
1 tsp. grated orange peel
2 cups sugar
2 tbsp. lemon juice
4 tsp. vanilla

Juicing

History of Juicing

Even though juicing is a relatively new phenomenon, what it lacks in historical depth it makes up for by taking its place in the modern era as a direct and simple path to healthy eating. Due in part to the popularity and profusion of juice bars which began appearing in the 70's, people started setting up their own home-juice bars. Today, juicing fruits and vegetables as part of your morning routine is as simple as making toast.

It's to Dr. Norman Walker, Ph.D. that we attribute the modern juicing craze. Living in London as a young man before the turn of the twentieth century, Dr. Walker was overworked and filled with stress. As a result, he became seriously ill. Determined to overcome his illness, Dr. Walker embarked on a life-long healthy eating program where he ate only raw (uncooked) foods, which he called "Living Foods." After recovering from his illness, Dr. Walker went on to become a leading nutritionist, writing numerous books on healthy living and developing, in 1930, what would become known as the Norwalk Press Juicer.

Although the Norwalk is still sold today, consumers now have a wide range of options in the juice-making department. The world's first masticating juicer—The Champion Juicer—was invented in 1954. (Masticating juicers introduce lower amounts of oxygen so juice retains its nutrients over a longer period of time.) Centrifugal, low speed/high speed masticating, and hydrolic presses all offer different benefits for those interested in juicing.

Dr. Walker went on to become known as the longest-lived raw-foodist of our time, having died in 1984 at the ripe age of 118. And while all of us may not be willing to follow Dr. Walker's example and forgo *all* cooked foods, we can sample what he had to teach us about the healing powers of raw fruits and vegetables and enjoy the wondrous benefits provided by juicing.

Benefits of Juicing

The National Cancer institute and the USDA recommends Americans eat at least 2-4 servings of fruit and 3-5 servings of vegetables each and every day. Most people don't even come close. Juicing is a convenient way to make sure you and your family take in the nutrients needed to strengthen your heart and bones, cleanse your system, and contribute to the reduction of various cancers.

Why Juicers?

[Juicers](#) are different from blenders or food processors, which don't separate a fruit from its fiber. By removing the fiber, juicing eliminates a separate digestive process your body would normally have to go through, and allows for the almost immediate assimilation (20-30 minutes) of nutrients directly into your bloodstream. These nutrients aren't found in commercial juices, which have been pasteurized. Juicing at home is the most efficient way to obtain large quantities of vitamins and minerals in a form most readily available for your body to use.

More Bang for Your Buck

Consider this. Drinking one cup of carrot juice is the equivalent of eating four raw, chopped carrots. When is the last time you sat down to enjoy four carrots? Juicing your vegetables offers a great way to get your nutrients without feeling like Peter Rabbit. And, with the fiber removed, the nutrients pack more of a wallop than if you'd eaten the fruit or vegetable whole.

Let's look at our carrot example again. When you eat a carrot, your body takes in about 1% of the available beta-carotene. However, if you juice that carrot, your body is now taking in close to 100% of the available beta-carotene. Again, that's because the indigestible fiber has been removed.

Would You Eat This?

Try feeding your kids a plate of beets and see how far you get. Juicing is a fun way to get your family to eat produce they may otherwise never touch – beets, celery, cabbage, grapefruit, kale, and dandelions, just to name a few.

Of course, there are also the much loved fruit drinks – apple, orange, kiwi, pineapple. The beauty of juicing is that you can experiment with flavors and find combinations your family loves. Just remember to keep one ingredient as the main flavor, and let the others act as enhancers.

A Caution

Juicing is not meant to be a total replacement for eating fruits and vegetables. Also, if you're new to juicing, go slow at first to avoid digestive upsets. And if you're not juicing with your own food, buy organic produce to cut back on the amount of chemicals residues that may find their way into your juice.

How it Works

The process of juicing releases vitamins that are locked in the fiber of fresh fruits and vegetables. These vitamins, which would be discarded by the body, can now be easily absorbed within 20-30 minutes.

Methods

Centrifugal

Fibers are broken up with a cutting disc or grater while a high speed, centrifugal/circular revolving motion forces the pulp against the wall of the basket and juice is extracted through holes. [Centrifugal juicers](#) add oxygen to the juice causing oxidation. Over time, oxidation degrades nutrients. Juice made in a centrifugal juicer should be consumed as soon as it is made.

Masticating

Fibers are chewed by the machine. [Masticating juicers](#) operate at a lower speed which reduces oxidation. This method is ideal for wheat grass and leafy vegetables.

Pressing

Juice is squeezed from fibers with the force of pressure. [Fruit presses](#) create the least amount of oxidation. A pulp-free juice is created when strained through a cheese cloth.

Equipment

There are several types of tools available for extracting the juice from fresh fruits and vegetables.

Juicer

Juice is extracted by a rotating blade while pulp is pushed against sides of walls and juice is extracted through holes.

Fruit Press

Food is pressed and juice is extracted by pressure.

Blender

Food is cut up and juice is extracted by a rotating stainless steel cutting blade.

Preparing the Food

How food is to be prepared depends largely on the recipe being used. Some recipes will require food to be cut while others may use whole foods. Many will call for skins and peels to be left on for optimal nutritional value. Typically, citrus peels are removed.

Storing the Juice

Fresh juices lose flavor and nutrient content quickly and are best when consumed immediately. When storing, it is best to keep juice in an air-tight container and use within 24 hours.

FAQ

Do I have to peel or remove seeds before juicing?

Citrus fruits must be peeled, but it is not necessary for other fruits. Pits, like the ones found in peaches must be removed.

Can I use frozen fruits and vegetables?

Thawed fruits and vegetables will produce more juice and provide optimum juicing.

What can I do with all the pulp I get when juicing?

You may want to run pulp through your machine twice to extract any additional juice. Some pulp can actually be added to recipes for soups and breads.

Is there anything I should be aware of when juicing?

To avoid consuming too much sugar, always drink as many vegetable juices as fruit juices.

Recipes

Lemon-Lime Ginger Ale

1 apple, cored and sliced
½ inch fresh ginger (less if you find the taste too strong)
handful of grapes
1/4 lemon
1/2 lime
sparkling mineral water

Juice apple and ginger in a juicer. Add remaining ingredients and juice. Pour into a large glass and fill to the top with sparkling water. Serve with ice.

Serves 1.

Homemade V8 Juice

15 pounds fully ripe, chopped tomatoes
2 cups chopped celery
3 large chopped onions
3 cloves minced garlic
¼ cup sugar to taste
Salt
¾ teaspoon pepper
2 teaspoons prepared horseradish
1/3 cup lemon juice
Worcestershire to taste

Bring vegetables to a boil over a medium high heat. Boil gently for 20 minutes. Drain water. Put vegetables through a blender or food processor until smooth. Strain pulp and discard. Add seasonings and chill. If canning, bring to just under a boil.

Carrot Juice

Beet with greens
1 stalk celery
1 large handful spinach
1 large handful parsley
1 green pepper
1 clove garlic
1 slice ginger

2 1/2 pounds carrots to make a quart of juice

Scrub organic carrots; peel inorganic carrots. Clean and slice beet into thin wedges. Wash and dry spinach leaves and parsley. Juice half of the carrots and beet. Add remaining ingredients using the remaining carrots to push them through. Complete by juicing carrots.

Makes 1 Quart

Blueberry Smoothie

1 ripe banana
3/4 cup blueberries
1/4 cup nonfat vanilla yogurt
3/4 cup skim milk
Pinch of cinnamon
1/2 cup crushed ice

Combine in a blender and puree until smooth.

Makes 1 large serving.

Fruit Punch

1 Apple
6 Strawberries
1/2 Orange

Core and slice apple. Peel and divide orange into sections. Process fruit through a juicer and serve.

Serves 1.

Monkey Shake

1/2 orange, peeled (leave white pithy part on)
1/2 papaya peeled
1 banana
Orange twist for garnish

Juice orange and papaya in a juicer. Combine juice and banana in a blender or food processor. Blend until smooth. Garnish with orange twist.

Milling

History of Milling

Stone-age humans figured out that by crushing wheat kernels and berries between two rocks they could produce flour that could be used for food. In 8000 BC, ancient Egyptians graduated from flat rocks to stone rollers to grind their grain. Still, milling flour by hand in the early ages was anything but easy—it took several hours to produce enough flour for one meal and the stone particles that found their way into the flour damaged teeth.

In 100 BC the Romans were the first to use waterpower, but still also used animals and slave labor to turn the arms of the heavy millstones that produced their flour. The Romans transformed the milling process in 50 BC with the vertical water wheel. Although eventually brought to England and other countries, the vertical wheel was at first slow to catch on, perhaps due to the displeasure of the Roman emperors. Emperor Vespasian, 69 AD, especially disapproved of the new-fangled contraption. He worried it gave women and slaves too much free time.

Windmills showed up around the 12th century and began grinding up to 1,000 bushels of grain per week. The miller was quickly elevated to a high position in society. That doesn't mean they were trusted, however. Millers were known for their "gold thumb" which they pressed on scales when weighing milled grain to increase the price.

American colonists originally ground grain by hand, but windmills soon arrived and commercial milling operations were off and running by the mid 1600's. Still, the milling process remained basically unchanged for centuries, until a young American inventor named Oliver Evans developed the first high-powered steam engine.

Using his engine, Evans built the first automated mill in 1782 near his birthplace of Newport, Delaware. Thomas Jefferson became an early investor, requesting and granted a license from Evans in 1808 to use Evan's mill improvements. Due to Evans automation process, the United States boasted over 23,000 commercial mills by 1873.

Today we don't worry about using sieves to separate stone particles from our flour and long gone are the days when every household *had* to grind its own grain. Instead, today we choose to grind our own grain in order to experience the fresh wholesomeness of home-baked goods and, with them, a brief return to earlier times.

Benefits of Milling

Whole grains contain almost 90% of all the vitamins, minerals, and protein you'll ever need. But commercially milled products don't offer you those nutrients. Why? A whole grain is comprised of three parts, two of which—the bran and germ—contain all the vitamins, minerals, and proteins. However, once milled, the oils found in the bran and germ, begin to oxidize and turn rancid within 72 hours. So for commercial purposes, both the bran and germ—and all the nutrients contained within them—must be removed in order to give products a shelf life. Commercial products use only the endosperm, the starchy white center that contains no nutrients.

High Fiber Health Benefits

Fresh whole grain products are low in fat, high in protein, and provide energy for your muscles and body. High fiber found in whole grains helps in the management of obesity, diabetes, hemorrhoids, stroke, and heart attacks. Eating whole-grain foods on a regular basis has been shown to decrease your risk for heart disease and high cholesterol, and is thought to lower your risk of breast and colon cancer.

Consumer Alert

Have you seen breads and cereals claiming to be “enriched with vitamins and minerals?” Don't be fooled. The fact that a product needs enriching is a sign of how much of its health value has been diminished. Besides, once the nutrients are removed, usually only 2-4 of the missing vitamins and minerals can be replaced and nothing can be done to restore the fiber and protein.

Do-It-Yourself Goodness

After eating bread prepared from grain you mill yourself, there is no going back. Commercial products will taste stale, even if they're “fresh” off the shelf. Freshly milled breads and pastries are lighter, moister, fluffier, and can have a variety of taste depending on which grains you chose to mill. Plus, these days grain mills are simple to use, are available in a variety of sizes and are adaptable to the average household. Give milling your own grains a try and be prepared to be amazed at the taste difference.

How it Works

Milling grain at home allows for the full value of nutrients contained in grains. To ensure that today's store bought flour will last on shelves, all traces of the grains bran and germ must be removed. Milling allows you to grain the amount needed and use it within the 72 hour period before it goes rancid.

Methods

Manual

Grain is milled manually with by a [grain mill that cranks by hand](#) or another non-electric method.

Electric

Grain is milled in an [electric grain mill](#).

Motorized

Grain can be milled with a manual grain mill that has been attached to a gas or electric motor by a pulley system.

Equipment

- **Stone Grain Mill** – 2 circular grinding stones. One stone turns against a stationary stone.
- **Burr Grain Mill** – Almost identical to stone mills except the grinding wheels are made from steel with small burrs protruding from the sides.
- **Impact Grain Mill** – Similar to stone mills except it uses rows of blades formed in circular rows.
- **Manual Grain Mill** – A mill that is operated by hand.

Storing Food

Un-Milled Grain

Grain that has not been milled must be stored in a cool, dry, well ventilated location.

Milled Grain

Grain that has been milled must be stored in an air-tight container.

Shelf Life

Un-milled Grain

Grains that have not been milled will typically last for a year if three conditions are met.

1. The grain is kept dry.
2. It is stored in a well ventilated place. Air-tight containers should not be used.
3. Temperatures cannot be higher than 68 degrees F.

Milled Grain

Grain that has been milled will only last 72 hours before it begins to go rancid.

Recipes

Whole Wheat Bread

Hand Method (2 loaves)

1/3 C honey
1/3 C oil
2 1/2 C Warm Water
1 1/2 TB SAF Instant Yeast
2 1/2 tsp salt
6-7 C Fresh whole wheat flour
1 1/2 TB Dough Enhancer

Large Mixer Method: (yields 5-6 loaves)

2/3 C honey
2/3 C oil
6 C warm water
3 TB SAF Instant Yeast
1 1/2 - 2 TB salt
16-20 C fresh whole wheat flour
3 TB Dough Enhancer

Zojirushi (Auto-Bakery) Method:

2 TB honey
2 TB oil

1 1/2 C water (90 - 100F)
1 1/2 tsp salt
3 1/2 C fresh whole wheat flour
2 tsp Dough Enhancer
3 TB Vital Gluten
1 1/2 tsp SAF Instant Yeast

In a large mixing bowl, combine 2 cups of fresh whole wheat flour, yeast, and the warm water. Let sponge for 15 minutes. Add oil, dough enhancer, honey, salt, and 4-5 cups additional flour (12-16 cups for the mixer method) until dough begins to clean the sides of the mixing bowl. Dough should be smooth and elastic; do not allow it to get too dry and stiff by adding too much flour.

Knead for 7-10 minutes or until it is elastic, smooth, and small bubbles/blisters appear beneath surface of dough. When using fresh flour, 6-10 minutes should be sufficient to develop the gluten.

Form 2 loaves of bread if using the hand method or 5-6 loaves if using the large mixer method. Let rise in a slightly warm oven or warm place until it doubles its size. About 30-60 minutes.

Bake for 25-30 minutes at 350 degrees. Top and sides will turn a golden brown when done. A hollow sound when tapping the bottom indicates that the bread is cooked through.

7 Grain Bread

Hand Method

1/3 C. honey
1/3 C. oil
2 1/2 C. warm water
1 1/2 TB Saf Instant yeast
4 tsp. salt
5-7 C. fresh milled whole wheat flour
1TB dough enhancer
1 C. Bread Flour
1 C. 7-Grain Cracked
2 tsp sesame seeds (opt.)
2 tsp. flax seeds (opt.)
4 TB sunflower seeds (opt.)

Large Mixer Method

2/3 C. honey

2/3 C. oil
6 C. warm water
1 1/2 to 2 TB salt
3 TB Saf Instant yeast
14-16 C. fresh milled whole wheat flour
2 TB dough enhancer
2 C. Bread Flour
2 C. 7-Grain Cracked
1 TB sesame seeds (opt.)
1 TB flax seeds (opt.)
2/3 C. sunflower seeds (opt.)

In a large mixing bowl, combine 2 cups of the whole wheat flour, Bread Flour, 7-Grain Cracked, dough enhancer, yeast, warm water, oil, and honey. Add salt and 4-5 cups (14-18 cups for large mixer method) additional flour until dough becomes stiff and cleans the side of mixing bowl. By hand, knead bread for 7-10 minutes when it becomes elastic and smooth with small bubbles/blisters beneath the surface. In a large mixer, knead on speed number 1 for 5-6 minutes.

For the hand method, form into 2 loaves. For the mixer method, form into 5-6 loaves. Let rise in a slightly warm oven or warm place until it doubles it's size. About 30-60 minutes. Bake at 350 for 25-30 minutes. Top and sides will turn a golden brown when done. A hollow sound when tapping the bottom indicates that the bread is cooked through.

Stone Ground Grits

1 ¼ cups stone-ground grits
1 ½ cups whole milk
½ cup butter
1 ½ cups water
Salt to taste
Pepper to taste
½ cup heavy cream

Heat milk and butter in a large pot until simmering. Add grits and whisk to prevent sticking. Add salt and pepper. Add water as soon as grits begin to bubble. Cook until thick. Add cream and stir.

Oatmeal Chocolate Chip Cookies

2 cups packed brown sugar
2 eggs
1 teaspoon vanilla

1 cup shortening
1 $\frac{3}{4}$ cups freshly milled flour
1 teaspoon baking soda
 $\frac{1}{2}$ teaspoon salt
3 cups quick –cooking rolled oats
1 cup chocolate chips

Cream brown sugar, eggs, vanilla, and shortening. Blend in flour, baking soda, and salt. Stir in chocolate chips and rolled oats. Using greased baking sheets, evenly place spoonfuls of cookie dough. Bake for 8-10 minutes at 350 Degrees.

Makes 5 dozen.

Whole Wheat Pancakes

1 $\frac{1}{4}$ cups whole wheat flour
2 teaspoons baking powder
1 Tablespoon sugar
 $\frac{1}{2}$ teaspoon salt
1 egg
1 cup milk
2 tablespoons vegetable oil

Combine ingredients and pour onto hot griddle or skillet.

Salting/Curing

History of Salting

Salt is so essential to human life that it's been used by some cultures in place of currency. Governments have levied heavy taxes on salt. Ancient Greeks traded slaves for salt, bearing forth the phrase, "he's not worth his salt." Salt has been used as a bargaining tool in warfare, nowhere more so than in America. British troops strove to deny access to salt to the American rebels during the Revolutionary War, and salt supply was a major problem for the South during the American Civil War.

The earliest known treatise on salt was published in China in 2700 BC and discussed more than 40 different kinds of salt. Ancient Egyptian art from 1450 BC depicts salt-making and there are more than 30 references to salt in the Bible.

There is no one record that pinpoints exactly when salt began to be used as a preservative. At some point people must have noticed that fish washed in seawater kept longer than fish washed in fresh water. From there it wouldn't have taken long to make the connection that salt acts as a preservative by drawing out moisture, making it difficult for bacteria to survive.

We do know ancient Egyptians, Chinese, and early Romans used salt to preserve their meat. Fisherman in the Middle Ages who had to get their catch back to shore would gut their fish while still at sea and pack the fish in barrels of brine or salt.

Salted foods made the difference in expanded European explorations. Without the stability of salted foods—which if salted and stored properly could last for years—Europeans might not have embarked on the lengthy journeys that eventually led to the discovery of the "New World." Christopher Columbus set sail with salted sardines, anchovies, cod, and salted beef and pork, among others.

Salted meat was a common staple for Colonial Americans, even though it took excessive amounts of salt to properly cure meat. Salt was used to preserve eggs and butter, the latter at the rate of one pound of salt per ten pounds of butter.

Salted meat was also common along the trails leading west to America's "gold rush." Since most fresh meat couldn't be eaten immediately, it had to be "jerked" or salted to prevent spoilage.

Canning and refrigeration eventually came to take the place of salted meats, and salting quickly lost favor in light of the newer and more convenient techniques.

Benefits of Salting

Times have changed and today we're no longer able to tolerate the level of salt required by our ancestors to preserve their meat—at least, not without hours and hours of soaking to get the salt out.

You Need Salt

Still, salt is a biological necessity and an essential part of any diet. Today however, we get all the salt we need—and more—from the foods we grab off the supermarket shelves. Check out the nutrition labels on the foods you eat and make note of the sodium content. Salt is an easy way to add texture and flavor but it's too often used in overabundance.

Salting Today

We still enjoy salted foods today but they are more often found in pickled or cured form – such as salt-cured country ham or dried beef or pickled cucumbers. Thanks to freezing, canning, and refrigeration, we no longer need concern ourselves with drawing the moisture out of foods with salt. Instead, we get to enjoy salt the way our ancestors surely wished they could have done--solely as an additive to savory cooking.

How it Works

During the salting process moisture is drawn out by the salt making it less likely for bacteria to thrive.

Methods

Dry Salting

Preserving food by alternating one layer of salt with one layer of food. Best for preserving vegetables, roots of vegetables, fish, and some meat.

Corning

Preserving in a brine made of salt, water, condiments, chemical ingredients, and seasoning. This method is best for preserving meat.

Choosing the Food

Some vegetables that are easily preserved by dry salting include:

- Brussel Sprouts
- Okra
- Cabbage
- Green Peppers
- Red Peppers
- Carrots
- Radishes
- Horseradish
- Spinach
- Mushrooms
- String Beans

Recipes

Mocetta

11 lbs. lean sheep or beef, cut into 2 lb. pieces
3 large cloves garlic, minced
A bunch of parsley, minced
Leaves from a sprig of rosemary
A few bay leaves
½ lb. coarse sea salt
A sprig of thyme
A few juniper berries
Some peppercorns, crushed

In a bowl, combine salt, garlic, and herbs. Line the bottom with a little of the salt mixture and place meat on it, salting between layers. Cover with a wooden board and place weight on it to keep meat pressed down. Leave in a cool place for 8-10 days. Drain off liquid that the meat excretes.

Once salted, hang to dry in a dark, cool place that is well ventilated. It will be ready in a month.

Pickling

History of Pickling

Our love affair with pickled food traces back to ancient Mesopotamia. While pickling foods began as a practical way to preserve the summer harvest through the winter months, our ancestors quickly realized they enjoyed the taste of pickled foods.

Foods such as herring, melons, cabbage, peppers, mushrooms, and beef were first pickled using primarily a brine solution. However, recipes dating back to medieval Europe and the Chinese Ming Dynasty show creative picklers using combinations of salt, brine, spices, herbs, vinegars, and oils when they pickled. “Pickles” themselves arrived on the culinary scene some 4000 plus years ago (2030 BC) when tribes from Northern India first brought cucumbers seeds to the Tigris Valley.

Pickling has had its share of famous supporters, the most intriguing being Cleopatra. The Queen of the Nile claimed pickles enhanced her beauty. Before you stock up however, note that historians are not clear whether cured cucumbers were even available in Egypt during Cleopatra’s time. Several historians theorize Cleopatra’s “pickles” were in fact watermelons that had been soaked in brine.

Cleopatra was not alone in her love of pickled products. Aristotle spoke eloquently of the healing powers of cured cucumbers. Julius Caesar and Napoleon Bonaparte both thought pickles had strength-enhancing powers (which they do, in terms of strengthening the immune system) and fed them to their armies. Queen Elizabeth I had a taste for pickles, as did Presidents George Washington, Thomas Jefferson, and John Adams.

Pickled cucumbers even claim a part in the history of America. Christopher Columbus carried pickles to the New World. And America was named after Amerigo Vespucci—a pickle peddler. Before becoming an explorer himself, Amerigo’s duties included stockpiling food on ships bound for long trips. Amerigo crammed the ships full of pickled vegetables rich in Vitamin C, thereby saving innumerable seamen from bouts of often-deadly scurvy.

Caesar and Napoleon perhaps weren’t the only leaders who saw strength in pickles. During WWII, the U.S. government earmarked 40% of all pickled products for the military. Pickling enjoyed its heyday in the 1960’s and 70’s when Vlasic pickles launched their popular advertising campaign with the Vlasic Pickle Stork. Vlasic niche-marketed themselves as “*the pickle pregnant women crave...after all, who’s a better pickle expert?*”

Today, Americans consume roughly 9 pounds of pickle per person per year, or over 29 billion pickles.

Benefits of Pickling

Although pickling your own foods will save you money and make your summer harvest last for months, you'll most likely find yourself drawn to pickling simply because you "relish" the taste.

Pickling food is not an exact science, which works to the advantage of the home pickler. All it takes is an adventuresome spirit and a willingness to experiment for you to create personalized pickling recipes that have the exact right amount of salt, oils, spices, and produce to best suit your family's taste buds. You can even come up with slightly different combinations to suit the palate of different family members.

Unlike commercial pickling, which primarily uses lye-dyeing to achieve uniformity of taste, traditional pickling done in your own kitchen relies on healthy, active, fermented bacteria. Raw lacto-fermented vegetables aid in your digestive and cardiovascular health, as well as being a strong boost to your immune system. In fact, almost any alive, cultured food will bolster your immune system. That's why it's important to pickle your own food. Pickled foods found on the shelves are usually pasteurized instead of fermented. So they're filled with additives and preservatives and few of the vitamins and healthy enzymes found in traditionally fermented foods.

Another reason to pickle your own food is that pickling also often increases the potency of vitamins found in certain foods. For example, compare sauerkraut and raw cabbage and it's sauerkraut that has the higher levels of vitamin C.

Pickling is quick, fun, inexpensive, and a great way to spend time with family and friends. Hold a pickling party and give away some of your harvest. Stock your shelves with a variety of pickled products that will remind you of fresh summer produce every time you pop open a jar November or January. If you plan on pickling, it's important you start with the highest quality ingredients. Quality affects taste so grow your own cucumbers, cabbage, cauliflower, or carrots, or try to buy organic.

Thomas Jefferson perhaps best summed up the joys of pickling:

"On a hot day in Virginia, I know nothing more comforting than a fine spiced pickle, brought up trout-like from the sparkling depths of the aromatic jar below the stairs of Aunt Sally's cellar."

Bon Appetit!

How it Works

During the pickling process, food is preserved in brine or vinegar creating an undesirable environment for the growth of bacteria.

Methods

Quick Pack/Fresh Pack

Food is covered with boiling hot vinegar, spices, and seasonings. The acetic acid from the vinegar preserves the food.

Fermenting

Food undergoes a curing process in a brine solution for 1 or more weeks and may take up to 5 weeks to cure. The lactic acid produced during this process helps preserve the product.

Equipment

- **Large Non-Metal Bowls** – to prepare ingredients by salting which will extract excess water.
- **Dinner Plates** – to weigh down vegetables and keep them covered in brine.
- **Sieve** – to rinse vegetables after salting.
- **Mason Jars and Lids**

Avoid metallic equipment as vinegar will corrode them and affect flavor of pickled foods.

Safety

Both methods of pickling require sufficient acidity to prevent the growth of toxin production and *Clostridium botulinum*. Never dilute vinegar or use vinegar with unknown acidity.

Processing the Food

Salting

Some recipes will require salting to remove excess moisture and allow the vinegar to effectively preserve the food. Once the salting process is complete, rinse food thoroughly to remove all salt and blot dry with a paper towel.

Packing

Pack the prepared vegetables loosely into sterilized containers. Cover with vinegar and tap sides to release air bubbles. If necessary, use crumpled grease-proof paper to push food down under the liquid. This can be removed after 2 weeks. Tightly seal lids.

Storing

For best results, keep pickled foods in a well ventilated cool, dark place.

Shelf Life

Quick Pack pickles generally have a shelf life of about 18 months. Fermented pickles can last up to 2 years.

FAQ

Does hard or soft water affect crispness?

Yes, it could. The minerals in hard water could interfere with the pickling process. The acidity of the pickle may be affected by a water ph of 8.0 or higher resulting in mushy pickles.

When are pickles ready to eat?

Wait at least 6 weeks. Pickles reach their full flavor 6 weeks after processing – sometimes longer.

How do I know which type of vinegar is best when pickling?

White distilled vinegar is used for onions, beans, and eggs when a clear color is desired. Cider vinegar has a good aroma and flavor but can darken very light colored vegetables and fruit. Never dilute vinegar unless it is called for in the recipe. It must maintain the required acidity.

Recipes

The following pickling recipes are from the recipe file of Alltrista Consumer Products Company, marketers of Ball brand and Kerr brand home-canning products.

Bread and Butter Pickles

4 pounds 4-6 inch cucumbers, cut into ¼ inch slices
2 pounds onions, thinly sliced (about 8 small)
1/3 cup canning salt
2 cups sugar
2 tablespoons mustard seed
2 teaspoons turmeric
2 teaspoons celery seed
1 teaspoon ginger
1 teaspoon peppercorns
3 cups vinegar

Combine cucumber and onion slices in a large bowl, layering with salt; cover with ice cubes. Let stand 1 ½ hours. Drain; rinse; drain again. Combine remaining ingredients in a large saucepot; bring to a boil. Add drained cucumbers and onions and return to a boil. Pack hot pickles and liquid into hot jars, leaving ¼ inch headspace. Remove air bubbles. Adjust two-piece caps. Process 10 minutes in a boiling-water canner.

Yield: About 7 pints.

Dill Pickles

8 lbs. 4-6 inch cucumbers, cut length-wise into halves.
¾ cup sugar
½ cup canning salt
1 quart vinegar
1 quart water
3 tablespoons mixed pickling spices
Green or dry dill (1 head per jar)

Wash cucumbers; drain. Combine sugar, salt, vinegar and water in a large saucepot. Tie spices in a spice bag; add spice bag to vinegar mixture; simmer

15 minutes. Pack cucumbers into hot jars, leaving $\frac{1}{4}$ inch headspace; put one head of dill in each jar. Ladle hot liquid over cucumbers, leaving $\frac{1}{4}$ inch headspace. Remove air bubbles. Adjust two-piece caps. Process pints and quarts 15 minutes in a boiling-water canner.

Recipe Variations: For Kosher-Style Pickles add 1 bay leaf, 1 clove garlic, 1 piece hot red pepper, and $\frac{1}{2}$ teaspoon mustard seed to each jar. Process as recommended. Note: When cutting or seeding hot peppers, wear rubber gloves to prevent hands from being burned.

Yield: About 7 pints or 3 quarts

Sweet Pickle Relish

1 quart chopped cucumbers (about 4 medium)
2 cups chopped onions (about 2 medium)
1 cup chopped sweet green pepper (about 1 medium)
1 cup chopped sweet red pepper (about 1 medium)
 $\frac{1}{4}$ cup salt
3 $\frac{1}{2}$ cups sugar
1 tablespoon celery seed
1 tablespoon mustard seed
2 cups cider vinegar

Combine cucumbers, onions, green and red peppers in a large bowl; sprinkle with salt and cover with cold water. Let stand 2 hours. Drain; rinse and drain thoroughly. Combine sugar, spices, and vinegar in a large saucepot. Bring to a boil. Add drained vegetables; simmer 10 minutes. Pack hot relish into hot jars, leaving $\frac{1}{4}$ inch headspace. Remove air bubbles. Adjust two-piece caps. Process 10 minutes in a boiling-water canner.

Yield: About 8 half-pints.

Corn Relish

2 quarts cooked corn (about 18 ears)
1 quart chopped cabbage (about 1 small head)
1 cup chopped onion (about 1 medium)
1 cup chopped sweet green peppers (about 2 small)
1 cup chopped sweet red peppers (about 2 small)
1-2 cups sugar
2 tablespoons dry mustard
1 tablespoon celery seed
1 tablespoon salt

1 tablespoon turmeric
1 quart vinegar
1 cup water

Combine all ingredients in a large saucepot. Bring to a boil; reduce heat and simmer 20 minutes. Pack hot relish into hot jars, leaving $\frac{1}{4}$ inch headspace. Remove air bubbles. Adjust two-piece caps. Process 15 minutes in a boiling-water canner.

Recipe Variation: To make corn relish without cabbage, substitute 1 cup chopped celery for cabbage. Add 1 clove garlic, minced. Follow directions in recipe.

Yield: About 6 pints.

Pickled Peppers

4 quarts long red, green, or yellow peppers
1 $\frac{1}{2}$ cups canning salt
4 $\frac{1}{2}$ quarts water, divided
 $\frac{1}{4}$ cup sugar
2 tablespoons prepared horseradish
2 cloves garlic
2 $\frac{1}{2}$ quarts vinegar

Cut 2 small slits into each pepper. Dissolve salt in 4 quarts water. Pour over peppers and let stand 12-18 hours in a cool place. Drain; rinse and drain thoroughly. Combine 2 cups water and remaining ingredients in a large saucepot. Simmer 15 minutes. Discard garlic. Bring pickling liquid to a boil. Pack peppers into hot jars, leaving $\frac{1}{4}$ inch headspace. Ladle hot liquid over peppers, leaving $\frac{1}{4}$ inch headspace. Remove air bubbles. Adjust two-piece caps. Process half-pints and pints 10 minutes in a boiling-water canner.

Yield: About 16 half-pints or 8 pints.

Dilly Beans

2 pounds green beans
 $\frac{1}{4}$ cup canning salt
2 $\frac{1}{2}$ cups vinegar
2 $\frac{1}{2}$ cups water
1 teaspoon cayenne pepper, divided
4 cloves garlic
4 heads dill

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

Yield: About 4 pints or 2 quarts.

Watermelon Rind Pickles

4 quarts 1-inch cubed watermelon rind (white portion only)
1 cup canning salt
2 gallons water, divided
3 sticks cinnamon
1 tablespoon whole cloves
1 tablespoon whole allspice
¼ teaspoon mustard seed
7 cups sugar
½ cup thinly sliced lemon (about 1 medium)
2 cups vinegar

Cover watermelon rind with salt and 1 gallon water, stirring to dissolve salt. Let stand 12 hours or overnight. Drain; rinse. Cover rind with 1 gallon water in a large saucepot. Cook until tender. Drain; set aside. Tie spices in a spice bag. Combine spice bag, sugar, lemon slices, and vinegar in a large saucepot. Bring to a boil. Reduce heat and simmer 10 minutes. Add rind, simmer until rind is transparent. Remove spice bag. Pack hot rind and liquid into hot jars, leaving ¼ inch headspace. Remove air bubbles. Adjust two-piece caps. Process 10 minutes in a boiling-water canner.

Yield: About 6 pints.

Plum Chutney

4 quarts chopped and pitted plums
3 cups brown sugar
2 cups raisins
1 cup chopped onion
2 tablespoons mustard seed
2 teaspoons ginger
1 teaspoon salt

3 cups vinegar

Combine all ingredients in a large saucepot. Bring mixture to a boil; reduce heat. Simmer until thick. Stir frequently to prevent sticking. Ladle hot chutney into hot jars, leaving $\frac{1}{4}$ inch headspace. Remove air bubbles. Adjust two-piece caps. Process 10 minutes in a boiling-water canner.

Yield: About 6 pints.

Fermentation

History of Fermentation

Although smoking, drying, and freezing are all historic, time-tested techniques for preserving food, fermentation wins the prize for being the most ancient of these practices. Why? Fermentation is a naturally occurring process, which means it predates even the earliest human civilizations. Fruits were fermenting on the ground long before we arrived on the scene.

In fact, humans seem to have stumbled into their discovery of fermented foods quite by accident. For millennia they prepared and ate fermented food without understanding how or why the properties of the food changed. Many cultures believed it was the work of the gods—especially when foods fermented into liquor. Early Egyptians thanked Osiris for their beer, while the Romans worshipped at the foot of Bacchus, the Roman god of wine. The fermentation of grapes into wine by the Egyptians has been recorded as far back as 5000 BC.

Given that it's naturally occurring, fermented food is found in the history of every traditional culture. Many early civilizations chose to ferment their food by burying it underground—which while practical, made for an interesting odor when it was unearthed. Even still, eggs buried by the Chinese were considered a delicacy. And Inuit peoples buried whale and seagull meat while Islandic peoples buried shark meat in the sand. Kegs of butter were buried in peat bogs for 7 years by the Scottish before consumed.

In the early history of Fiji, a woman was not permitted to marry until her parents inspected her fiancé's fermentation pits and then—assuming they found the pits in good order—gave their blessings for marriage. It was also a medieval custom that in the first month of marriage, a young couple would drink only mead - alcohol fermented from honey - in the hopes of establishing a “fruitful” life together. From this practice we derive the term “honeymoon.”

Thanks to Louis Pasteur, we have unraveled the mystery and now know yeast and microbes are responsible for fermentation. And modern methods ensure we no longer have to bury our food in underground pits. But whether buried underground, stored in a barrel or basement, or soaking in a brine solution, fermented food is a timeless tradition assured of always being available to bring us health, taste, and variety in our diets.

Benefits

Fermentation suffers from a lack of good P.R. It's one of the easiest, healthiest, most efficient, and most effective way to preserve food. Yet who among us wants to admit to spending hours in the kitchen "fermenting" food? Yuck, right?

Not so fast. It's up to you to educate family and friends about the true nature of fermented foods. Healthy? Yes. Tasty? You bet. And lose the idea that sauerkraut is your only option. Far from it. Ready to indulge in some fermented food? Try nibbling on some cheese, yogurt, pickles, mushrooms, or olives. Or how about sourdough bread, coffee, chocolate, miso, or certain Italian sausages? And don't forget about buttermilk, beer, vinegar, wine, and even vanilla. Sound tempting? We're just getting started. The above is but a partial list of some of the fermented foods enjoyed by people today.

However, before you dash off to the dairy counter, understand that to receive the health benefits of fermented foods, you're better off preparing them yourself. Almost all fermented foods on the market are heat-treated, which means all the beneficial bacteria found in them is destroyed. If you do buy off the shelves, look for products that contain "live" or "active" cultures.

Our bodies need the nutrients and enzymes found in fermented foods. The primary health benefit from fermented foods comes from the live bacteria found in them. This bacteria is the same healthy bacteria that can be found in your body. So when you eat a helping of fermented vegetables, you're putting beneficial enzymes and bacteria in your body that strengthen your immune system, help ward off disease, and maintain vitamin levels in your body.

Fermented foods are also extremely beneficial to the digestive process. That's because the bacteria has already started breaking the food down for you before you eat it. For this reason, eating fermented foods will also help you digest other foods you eat along with them.

Some people swear by fermented foods as an appetite suppressant, although most people eat the food simply for its taste. Although not as revered a food preservation technique as others, fermentation is quick, easy, and the health benefits to you and your family are long lasting. For so many wonderful gains, it's certainly worth a try.

How it Works

During fermentation, "good" micro-organisms are encouraged to grow, preventing the growth of spoilage causing micro-organisms. Breakdown of organic matter

by anaerobic means. The breakdown of complex organic substances into simpler ones.

Special ingredients may be necessary to control pH and carefully controlled conditions to control temperature.

Methods

Lactic Acid

Lactic acid fermentation is the anaerobic breakdown of sugar into lactic acid.

Alcohol

Alcohol fermentation is the anaerobic breakdown of sugar into ethyl alcohol and carbon dioxide gas.

Equipment

Wine Making Equipment

- **Large Nylon Straining Bag**
- **2-4 Gallon food grade pail and lid**
- **Cheesecloth**
- **Hydrometer**
- **Thermometer**
- **Acid Titration Kit**
- **Clear ½ inch diameter plastic tubing**
- **2 – 1 gallon glass jugs**
- **Fermentation lock and Bung**
- **Wine Bottles**
- **Corks**

Recipes

Sauerkraut

5 lbs cabbage
3 tbsp. salt

Mid-late season cabbage varieties are best for kraut. Early varieties are lower in sugar and are less desirable for making kraut.

Grate or chop cabbage. Sprinkle salt over one layer of cabbage at a time. Salt pulls water out of the cabbage and creates the brine in which the cabbage will ferment. Rub and work salt into the cabbage and pack firmly with fists or a masher into 1 gallon crock.

Cover cabbage with a heavy plate that fits snugly into crock and will cover completely. Fill glass jars with water and place on top of plate to weigh down the plate. During the first 24 hours, press firmly down on the plate every few hours to help extract juices. If brine does not rise above plate level by the following day, add salt water – 1 tsp. of salt for every cup of water. Stir until dissolved.

Keep crock at a consistent temperature between 70-75 degrees F for ideal fermentation which will take 3-4 weeks. Fermentation will take 5-6 weeks at 60-65 degrees F. Cabbage might not ferment at temperatures lower than 60 degrees F and may become soft and spoil at temperatures above 75 degrees F.

Skim “scum” from the top surface of brine. This results as the top surface comes into contact with air. Not to worry, the kraut is under the anaerobic protection of the brine.

Glossary

Ascorbic Acid: Crystalline form of vitamin C which prevents discoloration of fruit and vegetables.

Altitude: A location's vertical elevation above sea level.

Blanching: Scalding vegetables in boiling water to slow down enzyme activity and then submerging in ice water to prevent further cooking.

Botulism: A deadly form of food poison caused by the growth of the bacterium *Clostridium botulinum*.

Canning: Preserving food by heating to destroy harmful bacteria and creating a vacuum seal to keep bacteria out.

Canning Salt: Table salt without the anti-caking or iodine additives.

Citric Acid: A form of acid used in canning that raises the acid levels in low acid foods.

Cold Pack: Filling unheated jars with uncooked food before processing, also known as "raw pack."

Dry Sugar Pack: Fruit packed with sugar for freezing.

Enzymes: Proteins which accelerate nutritional, color, texture, and flavor changes in food.

Exhausting: Removing air from within and around food.

Fermentation: The breakdown of sugar into alcohol and biogas.

Freezer Burn: Loss of moisture due to exposure to air

Head Space: The space required between the food and the lid to allow for expansion of food.

High Acid Foods: Have a high acid content making it less likely for bacteria to thrive.

Hot Pack: Filling hot jars with hot, precooked food before processing.

Jell Point: 8 degrees F higher than the boiling point of water. Jelly slides off a spoon in a sheet.

Liquid Pack: Fruits or vegetables packed in liquid for freezing.

Low Acid Foods: Have a low acid content which can be a dangerous breeding ground for bacteria.

Oxidation: Darkening of cut fruit caused by exposure to oxygen in the air.

Pectin Pack: Fruit packed in syrup made from powdered pectin, sugar, and water for freezing.

Pickling: Preserving food in brine or vinegar.

Salting: Drawing out moisture with salt making it less likely for bacteria to thrive.

Shelf Life: The amount of time food will maintain quality.

Sulfiting: Soaking cut pieces of fruit in a solution of water and sodium metabisulfite to pre-treat.

Sulfuring: Pre-treating fruit by exposing cut pieces to fumes of burning sulfur.

Syrup Pack: Fruit packed in sweetened syrup for freezing.

Venting: Allowing excess air to escape from inside a pressure canner through the vent before closing the petcock.

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