



# FREE GUIDE TO FREEZE DRYING

*The Miracle of Food Preservation*

  
**HARVESTRIGHT**  
Long Live Your Food™



Today, almost half of all the food we produce in the world never makes it to a plate. We allow a staggering two billion tons of food to go to waste each and every year. If we eliminated this unnecessary food waste, we could potentially provide 60-100 percent more food to feed the world's growing population.

In America there is another problem. We don't just waste food that never makes it to our kitchens and tables, we end up discarding 40% of what we purchase. Ira Sager at BusinessWeek recently described this problem: "I am not alone in my wasteful habits. I live in the United States of Food Waste. On average, my fellow citizens throw away 20 pounds of food each month, which amounts to \$2,275 a year for a family of four, according to the U.S. Department of Agriculture."



**\$2,275**  
AVERAGE AMERICAN FAMILY  
FOOD WASTE PER YEAR

For thousands of years mankind has had ample reason to waste less and prepare for devastating tomorrows. Our ancestors would likely be amazed at our abundance, appalled at our wasteful behavior, and shocked at our lack of foresight.

Some of you may think, like our progenitors did, that we face an uncertain future. It raises a question, "Is there a need to prepare for some sort of minor or major calamity?" What is the chance that such an occurrence will be in the form of one of the following: loss of employment, economic collapse, earthquake, civil unrest, drought, disease or a host of other things?



According to a recent Arizona State University study there is already a major, four year drought that is affecting our lives. It is in California and shows few signs of abating. This drought has wiped out nearly 20% of California crops. With water supply problems expected to persist for years, California farmers will have some difficult choices to make. They'll need to determine which crops should receive the limited amount of available water, and which should be allowed to fall away. "We could be looking at a future," said the author of this study, "where California is no longer the bread basket for the country."

Preparation for droughts and similar disasters requires thought and preparation. We live in a country where nearly every basic need is provided: food, water, sanitation, electricity, fuel, transportation, clothing, medicine, furniture, education, and so on. Granted, many of us have to work and pay for these things; but, overall, life's necessities have generally been available to everyone.

Of course, the most fundamental of needs is food. What will we do if, for some reason, we can't go to a grocery store and bring home dinner? Does each of us have a fallback plan?



Yes, we live in a remarkable age. We have wonderful, reliable, spacious freezers and refrigerators, where we can temporarily save our leftovers and put in a small supply of food. But, anyone who wants to waste less and preserve food for more than a few days or weeks needs a better solution.

Unless a person wants to spend a small fortune to purchase significant quantities of commercially canned or freeze dried food to help one get through short or long-term emergencies, the burden is on each of us to select the nutritious food we prefer and preserve it ourselves. It isn't a question of just having something



available to eat, it is about making sure that the food preserved is nutritious, tastes good, and is free of additives and preservatives.

A modern solution, Home Freeze Drying may be the best preservation approach. Canning and dehydrating are good ways to preserve food; however, for the first time ever, it is possible for families and individuals to access superior freeze drying technology at a reasonable price.

## HISTORY OF FOOD PRESERVATION

From the dawn of mankind, food preservation has been part of life, and in many cases the key to survival. Food, whether it is in the form of vegetables, fruit, meat, or nuts, begins to spoil the moment it is harvested. In past centuries, to make it unnecessary to consume the food immediately, at least some of it had to be preserved by the best available methods, which varied depending on where the people lived.



In much of the world, natural drying was the most common preservation method, using the power of the sun and wind. In the Middle East and the Orient, food drying has been traced back thousands of years. In colder regions, people took advantage of the longer winters to freeze their food, then store it in cool caves.

As mankind advanced, various techniques were refined, most of which are still used today. Smoking became a dominant way to preserve meats. Pickling, preserving the foods in vinegar or other acidic liquids, was developed and then refined by the Romans.

In 1795 the French military offered a cash prize of 12,000 francs for a new method to preserve food. In response to that challenge, Nicolas Appert, a confectioner and chef in Paris from 1784 to 1795, began experimenting with ways to preserve foodstuffs. He had success with soups, vegetables, juices, dairy products, jellies, jams, and syrups. Appert placed the food in glass jars, sealed them with cork and sealing wax and placed them in boiling water. Sounds a lot like canning doesn't it? Finally, fifteen years later, in 1810, Appert was awarded the Navy's prize by Count Montelivert, a French minister of the interior.

And of course, for more than half of the past century the most popular method of short term food preservation has been refrigeration and especially freezing.



## FREEZE DRYING: THE NEWEST AND BEST METHOD

Freeze drying was developed during World War II as a way to keep vaccines for the wounded from spoiling due to uncertain refrigeration while being transported to war zones. The technology was refined and used extensively during the NASA space program, providing varieties of freeze dried food for astronauts.

The outstanding advantage of freeze dried food is its long shelf life. When properly stored, many freeze dried foods can be eaten 15 to 25 years after they have been prepared. Even after that length of time the food's flavor and nutritional value is almost as good as it was the day it was preserved.





Because of its long shelf life and nutrition preservation, numerous commercial companies produce freeze dried food for families, as well as for the military, with their well-known MREs (Meals Ready to Eat). By just adding water, the food is quickly rehydrated and ready for consumption.

## HOW FREEZE DRYING WORKS

During the freeze drying process, food is initially frozen to -40 to -50 degrees Fahrenheit. Once the food is frozen, the appliance creates a powerful vacuum around the food. In this environment the food is gradually warmed, even though it continues to stay very cold. When the temperature of the food gets a little above zero Fahrenheit, the water that is in the form of ice changes to a gas without ever becoming a liquid.

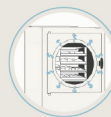
That is why the vacuum environment is so important. As was just mentioned, in that environment, water sublimates (evaporates) out of the food at just 5 degrees Fahrenheit. Water cannot exist as liquid in a vacuum and, as it warms, is drawn out of the solid frozen food as a gas. When done properly, freeze drying virtually removes 100 percent of the water from the food. This water freezes to the stainless steel cylinder of the freeze dryer and is then defrosted at the end of the process.

The freeze dried food should then be properly sealed to remove the oxygen and prevent reabsorption of moisture. The food can be stored at room temperature for long periods (up to 25 years), with no need for refrigeration. This is possibly because the almost non-existent water content in the food inhibits the normal process of deterioration and spoilage.

## HOW IT WORKS



Fresh or cooked foods are placed in the dryer and frozen to -40° F.



Once frozen, the food is enveloped in a powerful vacuum and the frozen moisture in the food quickly evaporates.

The whole process takes about 24 to 36 hours.



The freeze-dried food is then sealed in moisture and oxygen proof packaging to ensure freshness.

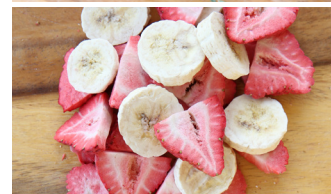
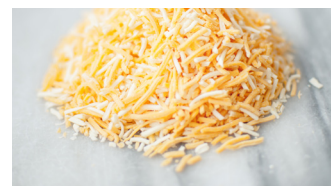


When water is added to the food it regains its original fresh taste, color, appearance, and nutrition.

One simply adds water to rehydrate the food, and it is ready to be eaten, retaining its original fresh flavor, aroma, and appearance. Freeze-dried food rehydrates quickly and easily because the freeze drying process leaves microscopic pores in the food—pores that were caused by ice crystals that sublimated out of the food in the drying process.

## ADVANTAGES OF FREEZE DRYING

This method of food preservation causes little damage to the nutritional value of the food being preserved compared to other methods that use higher temperatures, such as canning or dehydration. Freeze drying does not shrink or toughen the food, and it retains its aroma, flavor, and nutritional content. The following pictures were taken of food that has already been freeze dried. As you can see, the meat, cheese, vegetables and fruits still look fresh. And, in reality they are. Simply add water—it is delicious.



In comparing the various methods of food preservation, it is important to remember that there are three things that cause food to deteriorate: heat, water, and oxygen. Freeze drying and proper packaging overcome all of those factors to allow long-term storage (15 to 25 years).



Other food preservation methods require heat to be used. For example, during canning, typically 50 to 60 percent of the nutritional value is lost; and in dehydrating, about 40 percent is lost. Whereas, only 3% of the food's nutritional value is lost during freeze drying because it is done in an extremely cold environment. As has been mentioned, heat

also affects taste, color and texture. Both dehydrating and canning cause food to taste different than fresh food. Freeze dried food, in contrast, looks and tastes like it did when fresh.



As was just mentioned, water limits the shelf life of food; and since virtually 100 percent of water is removed in freeze drying, the shelf life of the food is approximately six to eight times as long as other forms of food preservation.

As you will recall, oxygen causes food to deteriorate too. Once something is freeze dried, nearly all the oxygen can be

removed through sealing the food in an oxygen-proof container, such as a can or a Mylar bag, with an oxygen absorber. Oxygen absorbers are better than vacuum sealing when used in a sealed container. They will greatly extend the shelf life of the food.

As a general rule of thumb, the shelf life of canned and dehydrated food is approximately two to three years, while freeze dried food easily lasts eight to ten times as long. Additionally, freeze dried food is very light, since all the water is removed, and can be easily transported for hiking and camping or when used during longer-term emergency needs.

## **FREEZE DRYING NOW POSSIBLE AT HOME**

Harvest Right has created the world's first high-quality, affordable Home Freeze Dryer. It is less than one quarter the cost of comparable freeze drying systems, and is easier to use than a microwave. The entire freeze drying process is automated and will go through its entire process of freeze drying without requiring human interaction, thanks to highly intelligent built-in sensors that know exactly when the food is properly freeze dried.

Harvest Right's compact and efficient Home Freeze Dryer allows a large volume of food to be freeze dried at any one time. On its four shelves – which can be used to dry any combination of types of food at the same time – it can produce as much as one and a half to two gallons of food in each batch. That is the equivalent of two #10 cans. Using the Home Freeze Dryer just three to four times a week allows a family to produce 300 to 400 gallons of food in a year.





## PRESERVING THE FOOD YOU WANT, WHEN YOU WANT

One major reason that many families decide to freeze dry their own food is that they can guarantee that the food is free of additives. If they have grown their own fruits or vegetables, or processed their own meat or fish, or have purchased high quality fresh foods, they know that what they preserve is as natural and healthy as possible.



Canned or packaged food from the grocery store, or commercially produced freeze dried foods, put consumers at the mercy of the ingredients the producer used in the preservation process. Most, if not all, of the major companies distributing and selling processed food (dehydrated, canned, and freeze dried) add ingredients that could be harmful to your health.

These additives include preservatives such as sodium nitrite, used to preserve the color, and flavor of meat products. Methylcyclopropene, a gas pumped into crates of apples and other fruits, is used to stop them from producing ethylene, the natural ripening hormone. BHA and BHT are used in common household foods to keep them from oxidizing. Benzoic acid and sodium benzoate are often used in drinks, low-sugar products, cereals, and meats. Propyl gallate is used to keep fats and oils from spoiling.



And then there are the many sweeteners and flavor enhancers. Not only heavy doses of refined sugar and high fructose corn syrup, but also artificial sweeteners such as maltodextrin and aspartame. Two of the worst offenders are salt, which is often used far too heavily in processed foods and monosodium glutamate (MSG).

Other troubling additives include trans fats, which, as additives, have been reduced in many foods (but not yet eliminated), food colorings, and even cornstarch, which adds calories but no real nutritional value.

The advantage of preserving your own food through freeze drying is that you can avoid all of these additives and know that the food you choose to preserve is exactly what you will want to eat months or even years into the future.

## FOOD WASTE

Studies have shown that the average family of four throws away 40 percent of the food they purchase each month, either by not taking advantage of leftovers or by not using the food before it spoils. A family that makes a concerted effort to freeze dry food could preserve as much as four months of normally wasted food each year.

For example, ripening fruit could be saved for later use as snacks, in children's lunches, and in treats such as homemade smoothies. Leftovers from meals (steak, roast beef, chicken, spaghetti sauce, and soup, to name just a few) could become the tastiest parts of a family's long-term food supply.





## WHAT FOODS WORK BEST FOR HOME FREEZE DRYING?

Nearly every food can be freeze dried, including meat, cheese, fruits, vegetables, and dairy. In addition, entire meals can be freeze dried for short or long-term storage.



Fruit is perfect for freeze drying. It is delicious and easy to prepare. From apples to watermelons, all you need to do is cut it into good-sized pieces that fit onto the trays. This picture shows apples that have already been freeze dried. It is beautiful and still looks fresh doesn't it?

Vegetables also freeze dry extremely well. From avocados to tomatoes, they are best preserved raw, and freeze dried in slices about half an inch thick.

Poultry, seafood, and red meats are perfect for freeze drying. They may freeze dried raw or cooked. Both freeze dry perfectly.

Eggs may also be raw or cooked before drying. Cheese, meat, and vegetables can be mixed in with the eggs prior to drying. Raw, freeze dried eggs are great for baking.

Freeze dried yogurt is delicious. All flavors and types dry well. Even ice cream and ice cream sandwiches can be freeze dried.



## COST ADVANTAGE OF HOME FREEZE DRYING

When comparing the expense of freeze drying your own food to the cost of commercially prepared freeze-dried foods, in-home freeze drying will cost as little as one-fifth as much. That means you could save \$20 to \$50 on each #10 (gallon) can equivalent that you freeze dry yourself. The accompanying table illustrates how a family can establish a good stock of freeze dried food at a fraction of the commercial price by buying the equivalent amount of food as in a commercial #10 can and then freeze drying it themselves.



## COMPARISON TABLE: RETAIL FREEZE-DRIED FOOD VERSUS HOME FREEZE-DRIED FOOD

COST OF RETAIL FREEZE-DRIED FOOD		COST TO HOME FREEZE DRY FOOD				SAVINGS	
FOOD PRODUCT IN A #10 CAN OR ONE GALLON EQUIVALENT	FREEZE DRIED PRICE (LEADING BRANDS)	FRESH FOOD PURCHASED AT STORE	FREEZE DRYER ELECTRICITY COST PER #10 CAN	MYLAR BAG (7.0 MIL) AND OXYGEN ABSORBER	HOME FREEZE DRIED COST EQUIVALENT	SAVINGS	% SAVED
Asparagus	\$55.00	\$8.95	\$1.20	\$0.75	\$10.80	\$44.20	81%
Beef	\$76.99	\$8.41	\$1.20	\$0.75	\$10.36	\$66.63	86%
Chicken	\$52.99	\$6.74	\$1.20	\$0.75	\$8.69	\$44.30	83%
Peaches	\$42.00	\$3.90	\$1.20	\$0.75	\$5.85	\$36.15	86%
Pineapple	\$44.00	\$10.57	\$1.20	\$0.75	\$12.43	\$31.57	72%
Raspberries	\$46.99	\$14.20	\$1.20	\$0.75	\$16.05	\$30.94	66%
Corn	\$29.00	\$4.29	\$1.20	\$0.75	\$6.14	\$22.86	79%
Green Beans	\$34.00	\$3.09	\$1.20	\$0.75	\$4.94	\$29.06	85%
Pork Chops	\$76.87	\$15.60	\$1.20	\$0.75	\$17.55	\$59.32	78%
Cheddar Cheese	\$49.95	\$7.05	\$1.20	\$0.75	\$9.00	\$40.95	82%
Mozzarella Cheese	\$49.95	\$7.05	\$1.20	\$0.75	\$9.00	\$40.95	82%
Blueberries	\$42.99	\$10.92	\$1.20	\$0.75	\$12.77	\$30.22	70%
Bananas	\$29.00	\$2.24	\$1.20	\$0.75	\$4.09	\$24.91	86%

### WHY FREEZE DRYING PAYS OFF

The average American family, studies show, wastes 40 percent of its food purchases through spoilage or unused leftovers. With the home freeze dryer, families can preserve two to four months' worth of otherwise abandoned food.

Sadly, much of what people grow in their gardens is similarly wasted, simply because they can't eat it or even give it away fast enough. In the past, canning and dehydrating had been the best ways to preserve this food. Now, bringing freeze drying capabilities into the home has displaced those methods.

Many families and individuals have prepared for potential emergencies by buying commercially prepared freeze dried food, but that food can be quite expensive and often has unhealthy additives. With a home freeze dryer from Harvest Right, they can preserve gluten-free foods, vegetarian and vegan meals, as well as make sure whatever food they preserve is entirely GMO-free. When a family does its own freeze drying, it controls the quality, taste, and natural goodness of the food that they're saving and that they will eat next month ... or in the years or even decades to come.



For more information visit  
[www.HarvestRight.com](http://www.HarvestRight.com) or call 1-800-700-5508