

Improve Survival Food Storage - Oxygen Absorbers and Nitrogen Packing By Kevin Taylor

The freeze drying process removes 98% of the water from food, stopping bacterial growth as well as killing insects and their eggs.

Beyond freeze drying further to preserve food and increase shelf life, oxygen is the main enemy. If the food is stored in a way that it is not exposed to oxygen, the shelf life can reach 25 to 30 years. Shelf life here refers to the food maintaining its properties of nutritional value, taste, and appearance. It may still be safe to eat beyond this time but the aforementioned properties are degraded. Oxygen Absorbers

Some freeze dried food producers use oxygen absorbers to extend shelf life.

Oxygen absorbers are materials that chemically react with oxygen in the environment they are in, combining with the oxygen and thus removing it from that environment. The most commonly used material for absorbers is iron in the forms of iron powder or iron carbonate. Both combine with oxygen very effectively.

Once oxygen absorbers are exposed to oxygen they will continue to react with it until the material is fully "oxidized" meaning it can not absorb any more oxygen. For this reason they need to be very carefully sealed and stored so that they are not consumed before their intended use.

The application in which oxygen absorbers are used for freeze dried food storage is to place them in the can of food before it is vacuum sealed.

The idea is that any oxygen that leaks into the sealed container over years of storage will be absorbed by it, rather than the oxygen reacting with the freeze dried food and degrading it.

There are two types of oxygen absorbers commonly used. One type, Multisorb Technologies' FreshPax Type-B requires some moisture from the environment it is in to be present to work and is used for moist foods like bread and processed meats. Type-D absorbers contain their own moisture source and are thus suited to dry foods like freeze dried food.

You may remember the old adage Aristotle proclaimed in 350 BC, "nature abhors a vacuum". So any vacuum packed container will over time be invaded, if ever so slightly, by the surrounding air and with it the 21% of air that is oxygen.

So while the oxygen absorber will extend the shelf life by absorbing the oxygen in the air that is present initially during packing as well as the air that leaks in over time, eventually the absorber will be "maxed out", that is it will be fully oxidized and can not absorb any more oxygen.

I have seen the guarantees for shelf life for this type packed freeze dried food at 10-15 years. This period may be a reflection of the limit of the process and process controls that the producer of the food uses, as well as that of the oxygen absorber. <http://bulk-survival-food.com>

Nitrogen Packing

Nitrogen packing or "nitro-pak" on the other hand takes a different approach to dealing with oxygen "enemy".

Rather than relying on the properties of the container to fight the invading air trying to get in, the container is flushed with nitrogen or packed in a nitrogen environment. As a result the sealed container has the same or slightly higher pressure but with nitrogen and not air. This means that air is not fighting to get in. There is no abhorrence so to speak.

Thus the period that the food remains unexposed to significant concentrations of oxygen is much longer and thus the possible shelf life is longer.

What is the longest shelf life for nitrogen packed freeze dried food?

Mountain House, the commercial brand of Oregon Freeze Dry which has been around for over 40 years, states on their web site regarding their #10 cans of freeze dried food;

"Our foods will have the longest shelf life available...up to 30 years!"

It may be the result of superior process controls, not only the nitrogen packing process, that makes them feel comfortable making this statement.

There is information online on how you can nitro-pak foods yourself with some equipment but I would be leery of assuming your process control would be on the same par and have the same shelf life.

In any case "nitro-pak" freeze dried food has the longest shelf life for any type of commercially available stored food I have seen.

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<http://www.survival-training.info>

LONG-TERM STORAGE METHODS FOR DRY FOODS

(Storage for longer than 5 years)

To prepare dry (10% or less moisture) food for long-term storage, oxygen should be removed from or replaced in containers. There are four kinds of containers that can be used:

1. #10 metal cans
2. Heavy mylar pouches
3. Glass canning jars
4. HDPE plastic buckets

All four kinds of containers should be stored in a cool, dry and dark environment for the longest shelf-life.

Enamel lined **#10 metal cans** are filled with dry food, an oxygen absorbing packet is added and the can is sealed with a can sealer. Cans can be stored in a small amount of space and should be stored where they are not in direct contact with floors and walls. Cans are impermeable to light, moisture, air and insects, but they will eventually rust when stored in humid climates. When a can is opened, a plastic lid should be put on it or the contents transferred to a container with a lid. Each can will hold about 13 cups of food. Used cans cannot be reused for canning without using a reflanger to cut and reshape the edge of the can.

Heavy mylar pouches are filled with dry food, an oxygen absorbing packet is added and the pouch is sealed with an impulse sealer. Pouches that are 7 ml thick are not easily punctured but can still be chewed through by rodents. The pouch is impermeable to light, moisture, air and insects. They can be slid into shorter spaces than #10 cans, stacked in boxes or bins, put in plastic buckets, or placed on a shelf. Pouches should not be stored in containers that have been used to store nonfood items. Once the pouch is open, the contents should be transferred to another container with a lid and stored on a shelf or in a cupboard. The 12" by 13-1/2" pouches comfortably hold 1 gallon (16 cups). Used pouches can be washed, dried and reused but will hold less food each time they are reused.

Glass canning jars are filled with dry food, an oxygen absorbing packet is added, the jar edge is wiped clean and a new, clean canning lid and ring are screwed on tightly. Glass is impermeable to moisture, air and insects. Jars should be stored away from light and in a way that protects them from breakage. They can be stored in a short space such as under beds. Once opened, jars are usually small enough to store in a cupboard or on a pantry shelf where the contents are easily seen. When the jars are reused, a new lid should be used.

Because **food grade HDPE (high density polyethylene) plastic buckets** are oxygen permeable, dry food must be packed in one of two ways for long-term storage.

1. A **thin mylar bag** is placed inside a clean bucket, the bag is filled with food and oxygen absorbers are put in (one 300 cc absorber for each gallon of food). The bag is sealed by placing a wood board on one edge of the bucket, folding the top of the mylar bag over the board and ironing the bag until it is sealed. The top of the bag is then folded into the bucket. The bucket lid is secured by hammering around the outside edge with a hammer or mallet.
2. A 2 to 3-inch layer of food is placed in the bottom of a clean bucket and **dry ice** is added (2 to 4 ounces for 5 gallons). The bucket is filled with food to within 1-inch of the top and the lid loosely attached. The dry ice is allowed to sublimate (change to gas) for about 30 minutes or until the bottom of the bucket is no longer very cold. The lid is secured and the bucket watched for bulging for a short time. If the lid or sides bulge, the lid should be lifted slightly to allow gas to escape and then resealed. When the bucket no longer bulges, it is safe to store.

Buckets should be opaque (especially when using dry ice since they are not lined with mylar) to protect food from light. They should be new or, if used, should have stored only food previously. They are impermeable to moisture and insects when they have a gasketed lid. When packed using one of the above methods, they also protect from the air. To open buckets, cut through the marked slits on the sides of the lid (being careful to avoid cutting the gasket) and pull up sections until the lid comes off. Lid lifting tools are also available. Some lids have a round opening with an attached spout and lid for pouring out the contents without removing

the main lid. Frequently used buckets can have the lid replaced with a gamma seal lid (a 2-piece lid with a removable inner portion) for ease of use.

Buckets should not be stored directly on cement. They should rest on racks or pieces of wood to allow air to circulate underneath and prevent the cement from sweating. Avoid stacking them more than 3 high especially without boards between the layers or the center of the lid may crack and break.

For additional information, visit the home storage pages at www.providentliving.org

NOTE: Sugar should not be packed with oxygen absorbers.