

4 Things That Affect Food Storage

January 23, 2014, by Ken Jorgustin

The shelf life of your food storage is affected by many things, perhaps most important are temperature, moisture, atmosphere, and containment.

Here's more detail...

Temperature

Temperature greatly affects food storage life.

Based on the Q10 temperature coefficient formula 'Rule of 10', For every 10 degrees C, shelf life will halve or double (hotter-cooler).

For every 18 degrees F, shelf life will halve or double (hotter-cooler).

An example of the general relationship of food storage shelf life with temperature:

Generally, stated food shelf life is referenced to room temperature, 22°C (72°F).

90°F (half the stated shelf life)

54°F (double the stated shelf life)

We learn from this how important it is to store your long-term food supplies in the coolest place possible; as in a basement, etc..

[Temperature vs. Food Storage Shelf Life](#)

[Use-by and Sell-by dates](#)



Moisture Content

For long term storage, drier is better. The drier the food and the drier the environment, the longer the shelf life – to a point...

For example, grains should maintain a moisture content of 10% or less. Commercially dried foods easily achieve these levels.

Be aware of the likelihood that typical home dehydrated foods might not result in the same moisture levels as from commercially dried foods, and therefore may not last as long. As a rule of thumb, dried foods with 10% or less moisture will snap easily and are very brittle.

Unless the food is packaged in air-tight containment, then the moisture from the environment will work its way in over time and reduce its shelf life.

Atmosphere

Earth's atmosphere contains about 78% nitrogen and 21% oxygen. Oxygen oxidizes many of the compounds in food and reduces its shelf life over time.

Bacteria, one of several agents which make food go rancid also needs oxygen to grow.

For maximum shelf life, foods should be stored in an oxygen free environment.

Oxygen absorbers dropped into a sealed container or a Mylar bag is common practice for long-term food storage. When the oxygen within the sealed container is absorbed, what remains is 99% pure nitrogen in a partial vacuum – a good atmospheric condition for food storage.

Note that it is important that the container you are using must be able to hold an air-tight seal over time.

Container

To get the best storage life for most food products, the product container must have a hermetic (air tight) seal, and ideally be opaque or stored away from sunlight. Common methods used include vacuum sealed bags, sealed cans or jars, sealed food storage buckets, and sealed Mylar bags. If using 5-gallon plastic buckets, be sure that they are rated 'food grade'. Remember that just because a bucket is HDPE #2 does not necessarily mean that it is food grade.

Temperature Versus Food Storage Shelf Life

March 4, 2014, by Ken Jorgustin

Temperature is the most important factor having to do with general food storage shelf life. Here's how it relates...



There are temperature versus food-storage shelf life statements and charts around the internet, some of which are in error (I have made this same mistake). Having recently read about accelerated shelf life testing by companies who do this, I have discovered the flaw which others have made with regards to the relationship between temperature and food storage shelf life. That is, degrees Celsius versus degrees Fahrenheit.

Many have stated and charted that for every 10 degrees (F) of increased temperature, the shelf life will halve. For every 10 degrees of cooler storage temperature, the shelf life will double.

The problem with that is the actual formula used to calculate this relationship is referenced in degrees Celsius, not Fahrenheit!

Two correct ways to state the general relationship are as follows:

For every 10 degrees C, shelf life will halve or double (hotter-cooler).

For every 18 degrees F, shelf life will halve or double (hotter-cooler).

There are caveats which will affect the exact ratio, but the general statement is accurate based on the Q10 temperature coefficient and the Rule of 10.

Q10 Rule-of-10 Temperature vs. Shelf Life

The temperature coefficient (Q10) represents the factor by which the rate (R) of a reaction increases for every 10-degree rise in temperature (T).

$$Q_{10} = [R_2/R_1]^{10/(T_2-T_1)}$$

T1: Hypothetical Storage Temperature (C)

T2: Room Temperature Constant (22 C)

R1: Rate Reference of the rated shelf life (# days, weeks, months, years, etc.)

R2: Rate to solve for (will be same unit as R1)

Q10: 2 (doubling)

Examples

(rounded to nearest decimal)

degrees-Celsius

A can of food with a rated shelf life of 1 year (at room temperature 22 degrees C) will actually reduce to one-half year if stored at 32 degrees C.

degrees-Fahrenheit

A can of food with a rated shelf life of 1 year (at room temperature 72 degrees F) will actually reduce to one-half year if stored at 90 degrees F.

Formula for the example above:

T1: 32-degree-C storage temperature

T2: 22-degree-C room temperature constant

R1: 1 year rated shelf life

R2: ?

$$2 = [R2/1]^{10/(22-32)}$$

solve for R2

$$R2 = 0.5$$

If we store the same can of food in a cooler environment, the inverse is true...

degrees-Celsius

A can of food with a rated shelf life of 1 year (at room temperature 22 degrees C) will actually increase to 2 years if stored at 12 degrees C.

degrees-Fahrenheit

A can of food with a rated shelf life of 1 year (at room temperature 72 degrees F) will actually increase to 2 years if stored at 54 degrees F.

Formula for the example above:

T1: 32-degree-C storage temperature

T2: 12-degree-C room temperature constant

R1: 1 year rated shelf life

R2: ?

$$2 = [R2/1]^{10/(22-12)}$$

solve for R2

$$R2 = 2$$

More Examples

Let's say some of your #10 cans of long-term survival food is stated to have a shelf life of 10 years. By keeping them downstairs in the basement which may be 65-degrees, in theory you'll get 13 years shelf life.

Another example is when you're storing some food (cans, food bars, etc.) in a 72-hour kit which is inside your vehicle during the hot summer. Something with a given shelf life of 1 year while stored in a 100-degree-F car will be reduced to 17 weeks (slightly more than 3 months).

The basic lesson here is that you can potentially significantly increase your food storage shelf life by storing in a very cool environment while at the same time you can severely harm food storage shelf life in a hot environment.

The lower the temperature, the better.

The higher the temperature, the worse.

Use-by, Best-by, and Sell-by Food Expiration Dates

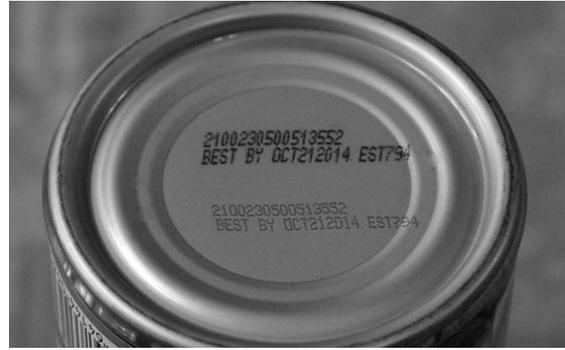
August 28, 2014, by Ken Jorgustin

More than 90% of Americans throw out food prematurely, and 40% of the U.S. food supply is tossed out unused every year because of food dating.

Most people do not understand what ‘Use-by’, ‘Best-by’, and ‘Sell-by’ (so called ‘expiration’) dates really mean on their foods.

The fact that so much food is thrown out is stunning, and unbelievably wasteful...

(Updated)



The following information sourced from TIME.com is important for the prepper, and anyone who is confused about what these ‘Use-by’, ‘Best-by’, and ‘Sell-by’ dates really mean...

Use-by dates are contributing to millions of pounds of wasted food each year.

A report from the Natural Resources Defense Council and Harvard Law School’s Food Law and Policy Clinic says **Americans are prematurely throwing out food, largely because of confusion over what expiration dates actually mean.**

Most consumers mistakenly believe that expiration dates on food indicate how safe the food is to consume, **when these dates actually are NOT related to the risk of food poisoning or food-borne illness.**

The dates solely indicate FRESHNESS, and are used by manufacturers to convey when the product is at its peak. That means the food does not expire in the sense of becoming inedible.

Stackable Can Rack Organizer

For non-refrigerated foods, there may be no difference in taste or quality, and expired foods won’t necessarily make people sick.

But according to the report’s analysis, words like “**Use-by**” and “**Sell-by**” are used so inconsistently that they contribute to widespread misinterpretation — and waste — by consumers.

Eggs, for example, can be consumed three to five weeks after purchase, even though the “**Use-by**” date is much earlier. A box of mac-and-cheese stamped with a “**Use-by**” date of August 2014 can still be enjoyed on August 2015, most likely with no noticeable changes in quality.

Because food dating was never about public health, there is no national regulation over the use of the dates. The only federally required and regulated food dating involves infant formula, since the nutrients in formula lose their potency as time goes on.

What regulation does exist and occurs at the state level — and all but nine states in the United States have food dating rules but these vary widely.

“What’s resulted from [the FDA letting states come up with regulation] is really a patchwork of all sorts of different rules for different products and regulations around them,” “Sometimes a product needs a date, sometimes it doesn’t. Sometimes a product

cannot be sold after a different date. Or there is no requirement at all. Even with different categories there is so much variability.” -Dana Gunders, staff scientist with the NRDC
The result is a confused public — and tons of wasted food.

Use-by and Best-by Dates

The ‘Use-by’ and ‘Best-by’ dates are intended for consumer use.

It is the date the manufacturer deems the product reaches peak freshness.

It’s NOT a date to indicate spoilage, nor does it necessarily signal that the food is no longer safe to eat.

Sell-by

The ‘Sell-by’ date is only intended to help manufacturers and retailers, not consumers.

The ‘Sell-by’ date is a stocking and marketing tool provided by food makers to ensure proper turnover of the products in the store so they still have a long shelf life after consumers buy them. Consumers, however, are misinterpreting it as a date to guide their buying decisions. Some say that “**Sell-by**” dates should be made invisible to the consumer.