

COMMON STORAGE FOODS II

B. DAIRY PRODUCTS

Got milk? Butter? Cheese? In the refrigerator, right? Dairy products are a great source of essential amino acids, vitamin D, and calcium, but in their usual forms found in the refrigerator case of your local supermarkets are perishable commodities. Fortunately, there are a number of dairy products that lend themselves to food storage.

B.1 DRY MILKS

Dry, powdered milk is available in nearly as many varieties as the fresh fluid product. Most can be found on the shelves of your local supermarket while a few may have to come from rather more specialized suppliers. Skillfully and knowledgeably used they can vastly improve the quality of your food storage program.

NONFAT (skim): This is pasteurized skim milk reduced to a powdered concentrate and is found in two forms - regular and instant. They are both made from the same type of milk, but the instant variety has been given further processing to make it more easily soluble in water than regular dry milk. Both types have essentially the same nutrient composition. The regular variety is more compact, requires less storage space than the instantized variety, usually costs somewhat less, but is a little more difficult to reconstitute. Instant dry milk is commonly available in nearly any grocery store. The regular type generally has to be sought out from baking and restaurant suppliers or storage food dealers. There is a retail brand by the name of "Milkman" that has a bit of fat content that makes it similar to 1% milk. The fat content means it should be stored like whole milk, described below.

It takes 3.2 oz or about 3 tablespoons of instant nonfat dry milk added to 32 oz of water to make 1 quart of milk you can drink or cook with like fresh milk. Combining the dry milk with water at least several hours before you plan to use it gives it time to dissolve fully and to develop a fresher flavor. Shaking the fluid milk vigorously will incorporate air and will also help to improve flavor. Add the powder to baked goods, gravies, smoothies, hot cereals, casseroles and meat loaf as a nutrition booster. It can also be used to make yogurt, cheese and most any cultured dairy product that does not require a high fat content. Several of the ways that we use dry milk powder is in making grits, oatmeal, and our favorite whole wheat bread. A few tablespoons of dry milk greatly improves the amino acid composition of any grain product.

FLAVORED NONFAT: This may be found packaged in a variety of forms from a low calorie diet drink (artificially sweetened) to the other end of the scale, as cocoa mix or malted milk. The key ingredient is the dry milk so buy and store these products accordingly.

WHOLE MILK: This is whole dry milk with all of its fat content (roughly 28% milkfat) and therefore has a shorter shelf life than nonfat. Other than that, it may be reconstituted and used in exactly the same way as nonfat dry milk. Dry whole milk can sometimes be found in the Hispanic foods area of grocery stores (Nido and Klim by Nestlé are the two brands I know), natural or health food stores, and some storage food suppliers carry it as well as institutional and restaurant foods businesses. It can also sometimes be found where camping and outback supplies are sold. Because of the high fat content this form of dry milk really needs to be either vacuum sealed or packaged with oxygen absorbers in gas impermeable containers such as canning jars, Mylar bags, etc. Rotate and use dry whole milk within two years, less if not packaged for long-term storage.

BUTTERMILK: Dry buttermilk is for use in recipes calling for buttermilk. It can be reconstituted into liquid buttermilk, but it's not much like the fresh liquid product and is best used in baked goods. Since it has a slightly higher fat content than nonfat dry milk, it generally does not keep as long. If properly packaged it should keep for several years.

SOUR CREAM: Made from cultured sweet cream like the fresh product then dried and processed into a powder. Like the real thing it has a high milk-fat content (25-28%) and should be stored like whole milk using vacuum sealing and/or oxygen absorbers and kept in a cool place. Mixed with the proper amount of cold water it can be reconstituted into a rich, thick product much like fresh sour cream and can be used in a similar manner or just used as a powder to add a tangy richness to many foods. Properly stored in oxygen free packaging and kept in a cool environment it is possible to achieve about a three year shelf life.

MILK SUBSTITUTES: There are a number of products on the market that purport to take the place of cow or goats milk. They range from soy "milk", rice or other grain "milks", and beverages based on milk components such as whey. If there is not a substantial fat content they may all be stored as you would nonfat dry milk. Those products with a significant fat content (above 1% by weight) should be stored as you would whole dry milk. Do keep in mind that nearly all of these products DO NOT have the same nutritional composition as either nonfat or whole milk. In storage food programs dairy products serve as important sources of high quality complete proteins, calcium, vitamin D and possibly vitamin A. If the milk substitute you're considering does not you'll need to find another adequate source of these important nutrients.

B.1.1 BUYING DRY MILK PRODUCTS

(a) - Be sure the dry milk you are buying has been fortified with vitamins A and D. All of the whole and nonfat dry milks I've seen come fortified with these two vitamins. The dry buttermilk does not come this way, at least the SACO brand does not. The flavored dry milks vary by manufacturer.

(b) - There should be no artificial colors or flavors. I believe it is illegal to add preservatives to any dry milk sold in the U.S. so a claim of "no preservatives" on the label is of no consequence. Other nations may be different, however.

(c) - "Extra Grade" on the label indicates the manufacturer has held to higher processing and quality standards and the milk is somewhat lower in fat, moisture and bacterial content, is more soluble, and has fewer scorched particles.

There are still some manufacturers of dry milk that sell ordinary Grade A product, but they are becoming fewer. Every brand of instant powdered milk in my local grocery store is the Extra Grade, even the generic store brand. This, too, may vary outside of the States.

(d) - If you'll be buying your milk in bulk from businesses such as restaurant and institutional foods suppliers be sure to specify "low-temperature spray process" dry milk. The high-temperature process dry milks will not give you a very desirable product unless you intend to use it solely for baking.

(e) - Try to buy your dried milk in containers of a size that makes sense for the level of consumption in the household. Once it is opened, powdered milk has a short shelf life before undesirable changes in flavor and nutrient content occurs. If you buy large packages and do not use much at one time, consider breaking it down and repackaging into smaller containers at the time of purchase. I vacuum seal mine in glass canning jars.

(f) - As with any storage food you buy, try to deal only with reputable dealers. It is particularly important to do this with dry milk because of its short shelf life and sensitivity to storage conditions. Check expiration dates, then date and rotate packages.

B.1.2 STORING DRY MILKS

Dry milk products are highly sensitive to environmental conditions, particularly temperature and moisture. Their vitamins A and D are also photosensitive and break down rapidly if exposed to light.

The area where your dry milk is stored should be kept as cool as possible. Air-conditioning or even refrigeration can greatly extend the nutrient shelf life.

If the storage container is transparent or translucent then it should be put into a second container opaque to light or stored in a dark room.

Dry milk will absorb moisture and odors from the air so storage containers should be impervious to both air and moisture. The drier it can be kept, the better it will keep which makes the use of desiccants is an excellent idea. Oxygen also speeds decomposition so vacuum sealing or oxygen absorbers will decrease the available oxygen. Because of its fine powdery texture gas flushing with nitrogen or carbon dioxide generally yields poor results.

If the dry milk you purchased was not packaged for long term storage then it should be repackaged right away.

I purchase the instant variety of dry skim, whole milk, and sometimes buttermilk powder at my local grocery and repack it at home. The method I now use is to pour the powder into clean, dry canning jars then vacuum seal them with my Tilia Foodsaver using the jar adapter then storing in the ubiquitous cool, dark place. They must be guarded against breakage, but they offer the advantage of not holding odors, thus allowing for reuse after cleaning. Since the glass is transparent they must be protected against light.

Clean, sound plastic one and two liter soda bottles can also be used, but probably should be used just once since the plastic is somewhat permeable and will hold odors.

If you have access to a can sealer, #10 cans make wonderful storage containers for dry milk, particularly if used in conjunction with O₂ absorbers.

Please see Section III Specific Equipment Questions for information concerning the proper use of containers, desiccants, compressed gasses, dry ice and oxygen absorbers.

B.1.3 SHELF LIFE OF DRY MILKS

From: SacoFoods@aol.com (Amy Thompson)
To: Dunross@dkeep.com (Alan Hagan)

Subj: SACO Mix'nDrink Instant Pure Skim Milk
Date: May 9, 1996

Dear Mr. Hagan:

Thank you for your e-mail today and for your interest in SACO Mix'nDrink Pure Skim Milk.

Our Mix'n Drink will keep its nutrition value for up to about two years if kept cool and dry, and the only vitamins that actually decrease over time are the vitamins A and D. These are not shelf-stable vitamins and are sensitive to heat and light. A good rule of thumb to follow is that the vitamins A and D will dissipate at a rate of about 20% every year if stored properly. The less heat and moisture the milk is exposed to, the better the vitamins will keep. A freezer could extend the shelf life, as long as the powder does not get moisture in it. If you had to put a time limit on the Mix'nDrink, for rotation purposes, I would date it at two years after the date of purchase.

After opening a package of dry milk, transfer the powder to a tightly covered glass or metal container (dry milk can pick up odors from plastic containers) and keep it in the refrigerator. Unsealed nonfat dry milk keeps for a few months; dry whole milk for a few weeks.

From: SacoFoods@aol.com (Amy Thompson)
To: Dunross@dkeep.com (Alan Hagan)
Subj: SACO Mix'nDrink Instant Pure Skim Milk
Date: May 21, 1996

Dear Mr. Hagan:

Since vitamins A and D are heat and light sensitive, I would say that your 1 1/2 year shelf life is very reasonable. If you are trying to determine when the nutritional value has been affected more than 40%, as you previously indicated, you should be pretty safe with that time element, as long as it is not exposed to extreme heat.

[Eds note: We were discussing the higher average temperatures found in Florida and other hot climates and the effect that it would have on their dry milk's nutrient content]

B.2 CANNED FLUID MILKS AND CREAMS

Preserved liquid milk comes in a number of forms, none of which are very similar to each other. The most common are as follows:

CANNED MILKS: These are commonly called UHT milks (Ultra High Temperature) for the packaging technique used to preserve them. They come in the same varieties as fresh liquid milks: Whole, 2%, 1% and skim. I've even found whipping cream in UHT packaging (Grand Chef - Parmalat), though this may be offered only in the commercial and restaurant trade. In the U.S. they all have vitamin D added. The lesser fat content milks do not keep as long as whole milk and their use by dates are correspondingly shorter term. This milk is packaged in aseptic laminated paper cartons. It has the same composition as fresh milk of the same type, and can be stored at room temperature because of the special pasteurizing process used. The milk has a boiled flavor, but less so than evaporated milk. The dates are usually for approximately six months. The milk is still usable past its date, but the flavor soon begins to go stale and the cream separates.

With a six-month shelf life this type of canned milk naturally requires a much faster rotation cycle than other types. Several companies sell flavored milks (chocolate, etc.) in this packaging, usually in the smaller single-serving sizes. UHT milk makes excellent yogurt, losing the boiled flavor.

EVAPORATED MILK: Made from fresh, unpasteurized milk using a vacuum-heating process that removes 60% of the water, the concentrate is heated, homogenized, and in the States, vitamin D is added. It is then sealed in cans and heated again to sterilize the contents. Some brands may have other nutrients and/or chemical stabilizers added so read can labels closely. A mixture of one part water and one part evaporated milk will have about the same nutritional value as an equal amount of fresh milk. It does not taste like fresh milk but many do not find the flavor to be disagreeable. Both whole and skim milk varieties are available with the higher fat content type having the best storage life. The typical recommended storage time is six months. There is generally no date or use by code on evaporated milk.

Some grocers along with health food stores carry canned, evaporated goat's milk, in a similar concentration.

SWEETENED CONDENSED MILK: A less processed product than evaporated milk. It starts with pasteurized milk combined with a sugar solution. The water is then extracted until the mixture is less than half its original weight. It is not heated because the high sugar content prevents spoilage. It's very rich as well: 8 oz contains 980 calories. Obviously with a greatly reduced water content and a high sugar level it won't taste like fresh milk but it does have many uses in cooking. Some use condensed milk to cream their coffee. This type too is available in whole and skim varieties.

A fairly new entry into the sweetened condensed milk field is Dulce de Leche a popular dessert item in Latin America. It's basically sweetened condensed milk that has been heated to the point that the sugar begins to brown which produces a rich tasting caramel dessert. In the past you had to make it yourself, but now it can be purchased ready made in the can. I have seen it in the canned/dry milk areas or the Hispanic/ethnic foods areas of many grocery stores here in Florida.

Although it is often hard to find, the condensed milk can label should have a stamped date code which indicates the date by which it should be consumed. Condensed milk may thicken and darken as it ages, but it is still edible.

CANNED CREAM: So far as I have found here in the U.S. only the Nestlé company produces canned creams, both being imports. One is "Media Crema" produced in Mexico with a pull-top can and the other is "Table Cream" produced in Australia in a standard (as in use an opener) can. There is a slight difference in preservatives and thickeners, but basically both are a shelf stable light cream which can be used in any way that you would use fresh light cream. I haven't yet determined a shelf-life for these products, but it seems to be in excess of two years in any decent storage environment. Like the Dulce de Leche above I found them either in the dry/canned milk areas or the Hispanic/ethnic areas of my local grocery stores. Would be worth looking or asking for in your local markets.

B.3 BUTTER

Butter can be found in several forms each with their particular strengths and weaknesses.

BUTTER POWDER: Probably the easiest to find of the shelf-stable butters the powder is a moisture free product consisting of butter fat condensed on milk solids generally with added antioxidants. It can be reconstituted by mixing with water to make a spread similar to whipped butter, but it cannot be used for frying or other applications requiring high heat that would burn the milk solids. Most butter powders have something of a milky taste due to the additional milk solids necessary to create the powder, but many do not find this objectionable. Because it is a powder (lots of surface area) with a high fat content it needs good packaging to keep it at its best. Vacuum sealing and/or oxygen absorbers will work well if you are doing your own packaging.

CLARIFIED BUTTER (GHEE): Another form of butter suitable for storage programs is clarified butter or ghee as it is known in India. This is fresh, unsalted butter gently heated to drive off the moisture with the remaining fat poured off of the butter solids. It can be purchased commercially but most choose to make it themselves. As it's essentially pure butter-fat with no water there is little to spoil so will keep for years in a glass jar protected from oxygen, heat, and light. A

good source of fat calories and useful in cooking, but maybe not something you'd want to spread on a biscuit.

CANNED BUTTER: For those whom only the real thing will do it's now possible to find shelf stable real butter. It seems mostly to be sold in those nations where home refrigeration is not as common as it is here in the U.S. As a rule I do not single out suppliers for any given product but at the time of this writing (11/2003) the only U.S. importer of shelf stable canned butter I've been able to find is Bruce Hopkin's Internet Grocer (<http://www.internet-grocer.com>). His product is Red Feather brand canned butter from New Zealand. It is salted though not as heavily as most salted butter in the U.S. The manufacturer claims an eighteen month shelf-stable storage life though they do advise keeping it in a cool, dry place. Like all butter it will liquefy if allowed to warm too much. Each can contains twelve ounces (equivalent to about three sticks of butter) and once opened should be handled like any other butter.

B.4 CHEESE

There are a number of shelf-stable cheese products that are suited for storage programs. Each of them have particular strengths or weaknesses for given uses. The basic forms storage cheeses can take are:

CANNED CHEESE: Actually, it's "Pasteurized Processed Cheddar Cheese Product" but it's the closest thing to a shelf-stable real cheese that I've yet found. It's another one of those products produced for use in countries where home refrigeration is scarcer than it is here in the U.S. The only brand available in the States that I know of at this time is made by Kraft's Australian division whose product most resembles a mild white cheddar or perhaps an American cheese. The only U.S. source for this cheese that I have found thus far is again Bruce Hopkin's Internet Grocer (<http://www.internet-grocer.com>). It comes in an eight ounce can and the manufacturer claims it will keep "indefinitely" at any reasonable storage temperature.

DRIED GRATED CHEESES: These are the familiar grated dry Parmesan and Romano cheeses, possibly others as well. They're generally a coarse dry powder, low or non-fat, and often with a fair amount of salt. Kept dry, cool, and dark they'll keep as they come from the store for several years though to get the maximum possible shelf life you should vacuum seal them in glass. Usually fairly expensive for the amount you get but as they're also strongly flavored a little will go a long way.

CHEESE SAUCES AND SOUPS: These are products such as Cheez Whiz, Campbell's Cheddar Cheese Soup, chip dips and related. They're not really cheese, but a mixture of cheese, milk, flour, and other ingredients. Depending on

what your end uses may be they can provide a cheese flavor, calories, and a degree of protein, fat, and calcium. In any decent storage conditions they'll keep for several years at least. Aerosol cheese is an abomination that will not be discussed here.

POWDERED CHEESE: Used in products such as boxed macaroni and cheese, au gratin potatoes, snacks, and the like, this is basically cheese that has had its moisture removed leaving behind mostly protein, fat, a fair amount of calcium and various flavoring and coloring compounds (naturally occurring or added) along with a fair amount of salt. It can't really be melted, but it can add a nice cheese flavor where a real cheese texture is not needed.

There are also cheese powder blends, typically a mixture of cheese powder, food starch, whey, milk solids and other non-cheese ingredients. It has less fat than true cheese powder, about the same protein, but less calcium. You can make it yourself with dry milk and cornstarch so there's little point in not getting real cheese powder.

Cheese powder will keep for many years in sealed metal cans kept at cool temperatures. You'll probably have to get it from restaurant foods suppliers or order it from storage foods dealers. It's high fat content means that it needs low-oxygen packaging.

C. EGGS

The noble fruit of the hen, eggs play an important role in the kitchen arts. Unfortunately, outside of regular runs to the store to buy fresh eggs or keeping your own hens (which is what I do) they're problematical to store. There are two basic ways to keep eggs for those times when fresh eggs may be hard to come by. One is to preserve them in the shell, a process which must be done at home as there are no commercial sources of preserved shell eggs that I know of. The second is to buy dry, or powdered, eggs. I may address home shell egg preservation in a future FAQ update but for now I will concentrate on dry eggs which anyone can buy.

C.1 DRY EGGS

Dry eggs are generally available in four different forms – whole eggs, egg whites, egg yolks, and as a mix for making scrambled eggs and omelets. Which you should buy depends on how you expect to use them. As a general rule I find dry eggs reconstitute more easily when mixed with warm (not hot) water. Mixing the

dry powder with other dry ingredients before adding liquids also increases the ease by which they can be reconstituted. Allowing the eggs to sit a few minutes before using improves water adsorption.

WHOLE EGGS: This is everything but the shell and the water. Usually found in the form of a somewhat clumpy, eggy smelling yellow powder. Typically one tablespoon of whole egg powder mixed with two tablespoons of water will equal one large fresh egg. Can be used to make most anything you'd make with fresh eggs though personally I prefer to use them in baking rather than as scrambled eggs or omelets. Whole egg powder is commonly used in baking mixes of all kinds, but I've never seen plain powdered eggs for sale in any grocery. Fortunately, they're easy to come by from mail order suppliers. A #10 can of powdered eggs is quite a lot so give some thought as to how fast you might use them and either order smaller cans, repackage an opened can into smaller containers, or plan on eating eggs often.

EGG WHITES: Nearly pure protein, egg white powder can add a high-protein boost to anything you put it in. The powder itself is whitish in color and not as clumpy as whole egg powder. When properly reconstituted it will whip into meringue like fresh egg whites and can be used in producing angel food and sponge cakes. Dry egg whites are often found in the baking section of many supermarkets. The brand name I have seen is "Just Whites" by Deb El. Powdered egg whites are also available from many mail order suppliers.

EGG YOLKS: High protein, high fat, and a source of lecithin (a natural emulsifier). Egg yolk powder can add richness and flavor to any number of foods, used to make custards, sauces, noodles, even mayonnaise. Not generally as easy to find as whole eggs and whites, but can be mail ordered. Being pure yolks this powder has a high fat content and must be appropriately packaged to achieve a good shelf life.

EGG MIX OR SCRAMBLING MIX: Typically a mix of whole egg powder, non-fat milk powder, oil, and salt. Used for making scrambled eggs, omelets, or general egg cookery. This mix does offer a degree of convenience but you can easily make it yourself and save the trouble of having to store it as a separate product.

C.1.2 STORING DRY EGGS

All dry egg products are exceedingly sensitive to moisture and will go off quickly if allowed to become the least bit damp. Whole eggs, egg yolks, and egg mix have high fat contents which make them very sensitive to oxygen. I highly recommend vacuum sealing in glass jars or using oxygen absorbers in conjunction with some other form of high barrier property packaging to keep these products at

their best. If you bought quality products, packaged them well in oxygen free packaging, and put them away in a good storage environment then whole eggs, egg yolks, and egg mix should be able to achieve at least a three year shelf life, possibly more. Egg whites will easily achieve five years. Naturally, if you're packaging your eggs in any sort of transparent or translucent packaging then they should be stored in a dark place.

D. SUGAR, HONEY AND OTHER SWEETENERS

There are a wide number of sugars to be found for purposes of sweetening foods. Fructose is the primary sugar in fruit and honey; maltose is one of the sugars in malted grains; pimentose is found in olives, and sucrose is what we know as granulated or table sugar. Sucrose is a highly refined product made primarily from sugar cane though sugar beets still contribute a fair amount of the world supply. Modern table sugar is now so highly refined as to be virtually 100% pure and nearly indestructible if protected from moisture. Powdered sugar and brown sugar are simple variations on granulated sugar and share its long life.

Liquid sweeteners do not have quite the longevity of dry sugars. Honey, cane syrup, molasses, corn syrup and maple syrup may crystallize or mold during long storage. These syrups are chemically not as simple as table sugar and therefore lose flavor and otherwise break down over time.

D.1 GRANULATED SUGARS:

Buying refined sugar is a simple matter. Select a brand you know you can trust, be certain the package is clean, dry and has no insect infestation. There's little that can go wrong with it.

GRANULATED: Granulated sugar does not spoil, but if it gets damp it will grow lumpy or turn into a sugar rock. If it does, it can be pulverized into smaller pieces and used. Granulated sugar can be found in varying textures, coarser or finer. "Castor/caster sugar" is a finer granulation than what is commonly sold as table sugar in the U.S. and is more closely equivalent to our super fine or berry sugar.

POWDERED, CONFECTIONERS, ICING: All names refer to the same kind of sugar, that is white granulated sugar very finely ground. For commercial use there is a range of textures from coarse to ultra-fine. For home consumption, what is generally found is either Very Fine (6X) or Ultra-Fine (10X), but this can

vary from nation to nation. Not all manufacturers will indicate the grind on the package. Sugar refiners usually add a small amount of corn-starch to prevent caking which will make it undesirable for use in sugar syrups or solutions where clarity is needed.

Powdered sugar is as inert as granulated sugar, but it is even more hygroscopic and will adsorb any moisture present. If it soaks up more than a little it will cake and become hard. It's difficult to reclaim hardened powdered sugar, but it can still be used like granulated sugar where clarity in solution (syrups) is not important.

BROWN, LIGHT & DARK: In the United States brown sugar is generally refined white sugar that has had a bit of molasses or sugar syrup and caramel coloring added to it. Dark brown sugar has more molasses which gives it a stronger flavor, a darker color and makes it damp. Light brown sugar has less molasses which gives it a milder flavor, a blonder color and is slightly dryer than the dark variety. Light brown sugar can be made by combining one fourth to one third white sugar to the remainder dark brown sugar and blend thoroughly.

Both varieties need to be protected from drying out, or they will become hard and difficult to deal with. Nor do you want to allow them to become damper than what they already are.

There are dry granulated and liquid brown sugars available, but they don't have the same cooking qualities as ordinary brown sugars. They also don't dry out and harden quite so readily either.

RAW, NATURAL, TURBINADO & OTHERS: In recent years, refiners have realized there is a market for less processed forms of cane sugar in the U.S. so have begun to sell these under various names and packaging. None of them are actually raw sugar as it is illegal to sell in the States due to the high impurities level in the truly raw product. All will have been processed to some degree, perhaps to remove the sticky surface molasses or to lighten the color, but will not have been subjected to the full refining and whitening processes of ordinary white table sugar. This leaves some of the natural hue and a strength of flavor that deepens with the color. All of these less refined sugars may be stored and handled like brown sugar.

Outside of the United States it is possible to buy cane sugars from the truly raw product with all of the detritus remaining from the cane juice extraction process up through various stages of refinement much like we have here in the United States. Many can be found with names such as "muscavado", "jaggery" (usually a raw palm or date sugar), "demerara", "sugarcane", and others. Colors will range from quite dark to blonde and may or may not be sticky with molasses. Generally the darker the color the stronger the flavor will be. In spite of any impurities they can be stored like brown sugar since their sugar content is high enough to inhibit

most microbial growth. Recently I have found demerara sugar for sale here in the U.S.

D.1.1 STORING GRANULATED SUGARS

All granulated sugars have basically the same storage requirements. They need to be kept in air tight, insect and moisture proof containers. For powdered, and granulated sugar you might want to consider using some desiccant in the storage container if your local climate is damp. Since brown sugars and raw sugars are supposed to be moist, they do not need desiccants. Shelf life is indefinite if kept dry, but anything you intend to eat really should be rotated occasionally. Time has a way of affecting even the most durable of foods.

I've used brown sugar that was six years old at the time it was removed from storage and, other than the molasses settling somewhat toward the bottom, it was fine. A friend to whom I gave a bucket of the brown sugar finished it off three years later which was nine years after it was packaged and it, too, was fine.

D.2 HONEY

Honey may be the oldest sweetener known to man - its use predates recorded history. Remains of honey have been found in the Egyptian pyramids. This product of honeybees is typically sweeter than granulated sugar by a factor of 25%-40% depending upon the specific flowers from which the bees gathered their nectar. This means a smaller amount of honey can give the same amount of sweetening as sugar. The source flowers also dictate the flavor and the color as well. Honey color can range from very dark (nearly black) to almost colorless. As a general rule, the lighter the color and the more delicate the flavor, the greater the price the honey will bring. As you might expect, since honey is sweeter than table sugar, it also has more calories as well -- an average of twenty two per teaspoon compared to granulated sugar's sixteen. There are also trivial amounts of minerals and vitamins in the bee product while white sugar has none. Honey is not a direct substitute for table sugar however, its use in recipes may call for a bit of alteration to make them to turn out right.

Although the chance is remote, raw honey may also contain minute quantities of *Clostridium botulinum* spores so should not be fed to children under one year of age. PLEASE READ THE POST FROM GERI GUIDETTI CONCERNING THIS BELOW. Raw honey is OK for older children and adults.

Honey comes in a number of forms in the retail market and all with somewhat different storage characteristics:

WHOLE-COMB: This is the bee product straight from the hive. It is the most unprocessed form of honey, being large pieces of waxy comb floating in raw honey. The comb itself will contain many unopened honey cells.

RAW: This is unheated honey that has been removed from the comb. It may contain bits of wax and other small particles.

FILTERED: This is raw honey that has been warmed slightly to make it easier to filter out small particles and impurities. Other than being somewhat cleaner than raw honey it is essentially the same. Most of the trace amounts of nutrients remain intact.

LIQUID/PURE: This is honey that has been heated to higher temperatures to allow for easier filtering and to kill any microorganisms. Usually lighter in color, this form is milder in flavor, resists crystallization and generally clearer. It stores the best of the various forms of honey. Much of the trace amounts of vitamins, however, are lost.

SPUN, CRYSTALLIZED or CREAMED: This honey has had some of its moisture content removed to make a creamy spread. It is the most processed form of honey. It keeps quite well. Also available in various flavors.

D.2.1 BUYING HONEY

Much of the honey sold in supermarkets has been blended from a variety of different honeys and some may have even had other sweeteners added as well. Like anything involving humans, buying honey can be a tricky business. It pays to deal with individuals and brands you know you can trust. In the United States you should buy products labeled U.S. GRADE A or U.S. FANCY if buying in retail outlets. However, be aware there are no federal labeling laws governing the sale of honey, so only honey labeled pure is entirely honey and not blended with other sweeteners. Honey grading is a matter of voluntary compliance which means some producers may be lax in their practices. Some may also use words like "organic", "raw", "uncooked" and "unfiltered" on their labels, possibly to mislead. Fortunately, most honey producers are quite honest in their product labeling so if you're not certain of who to deal with, it is worthwhile to ask around to find out who produces a good product.

Honey may also contain trace amounts of drugs used in treating various bee ailments, including antibiotics. If this is a concern to you, then it would be wise to investigate with your local honey producer what they may have used.

D.2.2 STORING HONEY

Honey is much easier to store than to select and buy. Pure honey won't mold, but may crystallize over time. Exposure to air and moisture may cause color to darken, flavor to intensify and may speed crystallization as well. Comb honey doesn't store as well liquid honey so you should not expect it to last as long.

Storage temperature is not as important for honey, but it should not be allowed to freeze or exposed to high temperatures if possible. Either can cause crystallization and heat may cause flavor to strengthen undesirably.

Filtered liquid honey will last the longest in storage. Storage containers should be opaque, airtight, moisture and odor-proof. Like any other stored food, honey should be rotated through the storage cycle and replaced with fresh product.

If crystallization does occur, honey can be reliquified by placing the container in a larger container of hot water until it has melted. Avoid adding water to honey you intend to keep in storage or it may ferment.

Avoid storing honey near heat sources or petroleum products (including gasoline/diesel engines), chemicals or any other odor-producing products which may infuse through plastic packaging.

D.2.3 RAW HONEY AND BOTULISM

From: Geri Guidetti arkinst@concentric.net

Duane Miles wrote:

- > If I recall correctly, honey contains very, very small amounts of the bacteria that cause botulism.
- > For adults, this seldom causes problems. Our immune system is capable of dealing with small
- > numbers of even nasty bacteria, they do it all the time. The problem is when we get large numbers
- > of bacteria, or when our immune system is damaged or not yet developed.

- > That is where the problem with honey comes in. Some people used to use honey to sweeten milk
- > or other foods for infants. Infants immune systems sometimes cannot handle the bacteria that
- > cause botulism, and, of course, those infants became seriously ill. So pediatricians now advise
- > strongly against using honey for children under a certain age.

Yes, raw honey can contain the temperature resistant spores of *Clostridium botulinum*, the bacterium that causes botulism. The organism is a strict anaerobe, meaning that it only grows in the absence of molecular oxygen. The problem with infants and honey is that the small, intestinal tract of an infant apparently is sufficiently anaerobic to allow the spores to germinate into actively growing *C. botulinum* organisms. Essentially, the infant serves the same role as a sealed, airtight, contaminated can of beans as far as the organisms are concerned. There in the infant's body the bacteria secrete the dangerous toxin that causes the symptoms of botulism. There have been quite a few documented infant deaths due to honey. As I recall, the studies identifying honey as the source were done in the '80s. Most pediatricians recommend no honey for the first year. It is probably best to check with your own for even later updates...Geri Guidetti, The Ark Institute

EDITOR'S NOTE: The advice not to give raw honey or foods containing raw honey to infants under one year of age still stands. Do please understand, though, that honey is not the *only* means by which infants can suffer from botulism, in many of which cases no certain source of contagion could ever be determined. The actual chances of any infant being stricken is very, very small and keeping the child's colon open, active and healthy can reduce it still more. Breastfed children seem to be more resistant as well.

D.2.4 HONEY OUTGASSING

Q: My can of honey is bulging. Is it safe to use?

A: Honey can react with the can lining to release a gas especially when stored over a long period of time. Honey's high sugar content prevents bacteria growth. If there is no sign of mold growth, it is safe to eat. FREQUENTLY ASKED FOOD QUESTIONS, FN250

D.3 CANE SYRUPS

CANE SYRUP: Seldom found in supermarkets pure cane syrup is a sweet symbol of the U.S. Deep South. Produced by boiling down the extracted juice of the sugarcane in much the same fashion as sorghum and maple syrups are produced. The best syrup is clear with a dark amber color and a smooth intense flavor. Cane syrup usually has to be purchased from roadside stands, living history recreations, farm festivals, or state and county fairs. Some syrup makers will add small quantities of lemon juice or corn syrup to deter crystallization. Flavored cane syrups can sometimes be found, but are usually a sign of inferior syrup.

MOLASSES: A by-product of sugar refining, molasses is generally composed of sugars such as glucose that are resistant to crystallization, browning reaction products resulting from the syrup reduction process, and small amounts of minerals. Flavor can vary between brands, but is usually strong and the color dark and opaque. Sulfured molasses can sometimes be found but its intense flavor is unappealing to most. Brands labeled as ‘blackstrap molasses’ are intensely flavored.

SORGHUM SYRUP: This is produced in the same manner as cane syrup, but sweet sorghum cane, rather than sugar cane, is used. Sorghum tends to have a thinner, slightly sourer taste than cane syrup. Good syrup should be a clear dark amber with a smooth flavor. It can sometimes be found in the supermarket, but more often is found in the same types of places as genuine sugar cane syrup.

TREACLE: This sweetener comes in varying colors from a rather dark version, similar to, but not quite the same as blackstrap molasses, to paler versions more similar to golden syrup. If you cannot find it in your store’s syrup area check in their imported foods section.

All of the above syrups are generally dark with a rich, heavy flavor.

GOLDEN SYRUP: This syrup is both lighter and paler in color than any of the above four, more similar to what we would call a table syrup here in the U.S. Can usually be found in the same areas as treacle above.

TABLE SYRUP: There are many table syrups sold in supermarkets, some with flavorings of one sort or another such as maple, various fruits, butter, etc. A close examination of the ingredients list will reveal mixtures usually of cane syrup, cane sugar syrup or corn syrup along with preservatives, colorings and other additives. Table syrup usually has a much less pronounced flavor than molasses, cane or sorghum syrup or the darker treacles. Any syrup containing corn syrup should be stored as corn syrup.

D.3.1 STORING CANE SYRUPS

All of the above syrups, except for those having corn syrup in their makeup, have the same storage characteristics. They can be stored on the shelf for about two years and up to a year after opening. Once they are opened, they are best kept in the refrigerator to retard mold growth. If mold growth does occur, the syrup should be discarded. The outside of the bottle should be cleaned of drips after each use. Some pure cane and sorghum syrups may crystallize in storage, but this causes no harm and they can be reliquified using the same method as for honey. Molasses or other sugar refining by-products won't usually crystallize, but will dry into an unmanageable tar unless kept sealed.

D.4 CORN SYRUP

Corn syrup is a liquid sweetener made by breaking down cornstarch into its constituent sugars through an enzyme reaction. Available in both a light and a dark form, the darker variety has a flavor similar to molasses and contains refiners syrup (a byproduct of sugar refining). Both types often contain flavorings and preservatives. It is commonly used in baking and candy making because it does not crystallize when heated. Corn syrup is common in the U.S., but less so elsewhere.

Corn syrup stores poorly compared to other sweeteners and because of this it often has a best if used by date on the bottle. It should be stored in its original bottle, tightly capped, in a cool, dry place. New unopened bottles can be expected to keep about six months past the date on the label and sometimes longer.

After opening, keep the corn syrup four to six months. These syrups are prone to mold and to fermentation so be on the lookout for bubbling or a mold haze. If these present themselves, throw the syrup out. You should wipe off any drips from the bottle after every use.

D.5 MAPLE SYRUP

Maple syrup is produced by boiling down the sap of the maple tree (and a lot of it too) collected at certain times in the early Spring until it reaches a syrup consistency. This native American sweetener is slightly sweeter than table sugar and is judged by much the same criteria as honey: Lightness of color, clarity and taste. Making the syrup is energy and labor intensive so pure maple is generally expensive. Maple flavored pancake syrups are usually mixtures of corn and cane sugar syrups with either natural or artificial flavorings and should be kept and stored as corn syrups.

New unopened bottles of maple syrup may be kept on a cool, dark, shelf for up to two years. The sweetener may darken and the flavor get stronger, but it is still usable.

After the bottle has been opened, it should be refrigerated. It will last about a year. Be careful to look out for mold growth. If mold occurs, discard the syrup.

E. FATS AND OILS

All oils are fats, but not all fats are oils. They are similar to each other in their chemical makeup, but what makes one an oil and another a fat is the percentage of hydrogen saturation in the fatty acids of which they are composed. The fats which are available to us for culinary purposes are actually mixtures of differing fatty acids so for practical purposes we'll say saturated fats are solid at room temperature (70°F, 21° C) and the unsaturated fats we call oils are liquid at room temperature. For dietary and nutrition purposes fats are generally classified as saturated, monounsaturated and polyunsaturated, which is a further refinement of the amount of saturation of the particular compositions of fatty acids in the fats.

E.1 BUYING AND STORING OILS AND FATS

There is a problem with storing oils and fats for the long term and that is they want to go rancid. Rancid fats have been implicated in increased rates of heart disease, arteriosclerosis and are carcinogenic (cancer causing) so are best avoided whenever possible.

Oxygen is eight times more soluble in fat than in water and it is the oxidation resulting from this exposure that is the primary cause of rancidity. The less saturated a fat is, the faster it will go off. This may not, at first, be readily apparent because vegetable oils have to become several times more rancid than animal fats before our noses can easily detect it. An extreme example of rancidity is the linseed oil (flaxseed) that we use as a wood finish and a base for oil paints. In a matter of hours the oil oxidizes into a solid polymer. This is very desirable for wood and paint, very undesirable for food.

Because of this difficulty in storing fats and oils for any long period of time many books and articles on the subject of food storage make only passing mention of them, if they say anything at all. This is unfortunate because fat contains *nine* calories to the gram compared to the *four* calories contained by either carbohydrates or protein. This makes fat a valuable source of concentrated calories that could be of real importance if faced with a diet consisting largely of unrefined grains and legumes. For small children, infants, nursing mothers, and the elderly, they may not be able to consume the volume of food that would be necessary in the course of a day to get all of the calories they would need to avoid weight loss and possible malnutrition. Additionally, fats play an important role in our perception of taste and texture and their absence would make many foods more difficult to prepare and consume. Furthermore, a small amount of dietary fat is necessary for our bodies to properly absorb fat soluble vitamins like A,D,E and K.

Long term storage of fats may be problematical, but it is not impossible. There are some general rules you can follow to get the most life out of your stored cooking oils and fats.

#1 - Exposure to oxygen, light and heat are the greatest factors to rancidity. If you can, refrigerate your stored oil, particularly after it's been opened. If possible, buy your oils in opaque, airtight containers. If you purchase it in plastic, particularly clear plastic, then transfer it to a gas impermeable glass or metal container that can be sealed airtight. If you have a means of doing so, vacuum sealing the storage container is an excellent idea as it removes most of the air remaining inside, taking much of the oxygen with it. Transparent glass and plastic containers should be stored in the dark, such as in a box or cabinet. Regardless of the storage container, it should be stored at as cool a temperature as possible and rotated as fast as is practical. All other considerations being equal, oils and fats with preservatives will have a greater shelf life than those without, provided they are fresh when purchased.

#2 - Unless they have been specially treated, most unopened cooking oils have a shelf life of about a year to a year and a half, depending upon the above conditions. Some specialty oils such as sesame and flax seed have shorter usable lives. If you don't use a lot, try to not buy your fats in big containers. This way you won't be exposing a large quantity to the air after opening, to grow old and possibly rancid, before you can use it all up. Once opened, it is an excellent idea to refrigerate cooking fats. If it turns cloudy or solid, the fat is still perfectly usable and will return to its normal liquid, clear state after it has warmed to room temperature. Left at room temperatures, opened bottles of cooking oils can begin to rancid in anywhere from a week to a couple of months, though it may take several more months to reach such a point of rancidity that it can be noticeably smelled.

#3 - Although darker colored oils have more flavor than paler colored, the agents that contribute to that flavor and color also contribute to faster rancidity. For maximum shelf life buy paler colored oils.

E.2 EXTENDING SHELF LIFE BY ADDING ANTI-OXIDANTS

I take no position on doing this, but if obtaining the maximum possible shelf life in your cooking fats is important to you, it is possible to add anti-oxidant preservatives to the fat you have purchased. Used in conjunction with a gas impermeable container, either opaque in color or stored in a dark place, and cool storage temperatures (70° F 21°C or less) then shelf life can be extended to about five years, possibly longer.

The anti-oxidant in question is Butylated HydroxyToluene (BHT). It is often used in the food industry to slow the development of off-flavors, odors and color changes caused by oxidation, mostly in foods with significant fat contents. BHT

is on the U.S. Food and Drug Administration's Generally Recognized As Safe (GRAS) list as a common preservative. The FDA limits the use of BHT to 0.02% or 200 parts per million (ppm) of the oil or fat content of a food product. The directions that I give below will be for the FDA limit.

BHT is available over the counter in the retail trade, typically found in health or natural foods stores or vitamin and nutritional supplement suppliers. It may also be found from various suppliers on the Internet.

To get the best results you will need the freshest oil you can find. Purchasing from a large, busy supermarket will usually suffice. You'll also need containers that are gas impermeable such as glass jars, or metal cans. There may be plastic containers with high gas barrier properties that will also serve, but I cannot knowledgeably say about this. It is important that your containers be food grade, clean, dry and dust-free.

In keeping with the FDA's GRAS guidelines you want to add 5.3mg of BHT crystals per fluid ounce of oil or fat. If you're using a scale calibrated in grains, such as a reloading powder scale, you may use the following table.

HT in grains	OIL	BHT in milligrams
0.1 grain	1 fl oz	5.3 mg
0.7 grain	8 fl oz (1 cup)	42.4 mg
1.3 grain	16 fl oz (1 pint)	84.8 mg
2.6 grain	32 fl oz (1 quart)	169.6 mg
5.2 grain	64 fl oz (1/2 gal)	339.2 mg
10.3 grain	128 fl oz (1 gallon)	678.4 mg

NOTE: The grain weight measurements have been rounded up to the nearest tenth grain since most powder scales will not accurately measure less than one-tenth of a grain.

IMPORTANT NOTE: If you are using a reloading powder scale, be sure the balance pan is clean and the balance has been calibrated recently with a reliable set of check weights.

Remove the BHT crystals from their gelatin capsules and weigh them, if you're going to. Once you have the appropriate amount, add the crystals to a pint or so of the oil, shaking vigorously. It may take several hours for the preservative to dissolve completely. Bringing the oil up to a warm, NOT HOT, temperature will speed the process. Once completely dissolved, pour the anti-oxidant laden oil into the rest of the oil and mix thoroughly. Once mixed, the oil can then be poured into its storage containers leaving approximately 1/2 inch of headspace. If you have a vacuum sealer the jars or cans may be vacuum sealed to remove most of the oxygen laden air from the container, otherwise just seal the lid. Store in a cool place and if using transparent jars, be certain to put them in a larger container such as a box to keep the contents in the dark. Don't forget to label and date the jars.

Before I close out this section on fats and oils, please allow me to reemphasize that no amount of preservatives that can be added to your stored fats will substitute for proper storage and rotation. Don't sit on your oil supply for years without rotating it. A little bit rancid is a little bit poisonous. `Nuff said.

F. COOKING ADJUNCTS

F.1 BAKING POWDER

Baking powder is a combination of an acid and an alkali with starch added to keep the other two ingredients stable and dry. The powder reacts with liquid by foaming and the resulting bubbles of carbon dioxide can aerate and raise dough. Almost all baking powder now on the market is double acting, meaning it has one acid that bubbles at room temperature and another acid which only reacts at oven temperatures. Unless a recipe specifies otherwise, this is the type to use.

Don't expose baking powder to steam, humid air, wet spoons, or other moisture. Store in a tightly lidded container for no more than a year. Even when kept bone dry it will eventually loses its potency. To test its strength, measure 1 tsp powder into 1/3 cup hot water. The mixture should fizz and bubble furiously. If it doesn't, throw it out.

For those folks concerned with aluminum in the diet, the Rumford brand has none and there may be others.

F.2 BAKING SODA

This gritty powder is sodium bicarbonate also known as sodium acid bicarbonate (NaHCO_3), a mild alkali. When combined with an acid ingredient such as buttermilk it is used in baking to leaven quick breads and other baked foods working in the same manner as baking powder. It can also be used to make hominy. When combined with an acid ingredient, the bicarbonate reacts to give off carbon dioxide bubbles which causes the baked good to rise. If kept well sealed in an air- and moisture-proof container its storage life is indefinite. If kept in the cardboard box it usually comes in, it will keep for about eighteen months. Do keep in mind that baking soda is a wonderful odor adsorber. If you don't want your baked goods tasting of whatever smells it adsorbed then keeping it in an airtight container is a good idea.

F.3 HERBS AND SPICES

It is difficult to give exact instructions on how best to store culinary herbs and spices because there are dozens of different seeds, leaves, roots, barks, etc., we call an herb or a spice. There are, however, some general rules that may be followed to best preserve their flavors. All spices, particularly dried, are especially sensitive to heat, air, moisture, and light. Room temperature is satisfactory for storage but refrigeration or freezing is even better. What ever you do they should be kept away from heat sources. It is common for the household spice cabinet or shelf to be located over the stove, but this is really about the worst possible place to keep herbs and spices even if it is convenient. Dark opaque glass is best for storage, but failing that, keeping a tightly sealed glass container in a dark place is next best. The cellophane packets some products come in won't do. Tightly sealed metal containers will work as well. Even dense plastic will do, but glass is best.

Where possible, buy spices whole. Whole nutmegs will keep their flavor far longer than ground nutmeg, the same for other seeds and roots. You'll have to use a grater, grinder or whatever, but the difference in flavor is worth it.

If you buy spices in bulk containers (which is certainly cheaper) consider transferring some into smaller containers and keeping the larger one tightly sealed in a cool, dark place. This will prevent unwanted light and air from continually getting in and playing havoc. My large jars of reserve spices are kept in vacuum sealed jars with smaller jars of ready spices kept in the kitchen.

There are many mail order or online suppliers of bulk herbs and spices. My personal favorite is Penzey's (<http://www.penzeys.com>). Their products have been consistently excellent with good prices. It's worth investigating some of these companies as they can really take the sting out of purchasing large quantities.

F.4 SALT

Storage life for salt is indefinite. So long as you do not let it become contaminated with dirt or whatever, it will never go bad. Over time, iodized salt may turn yellow, but this is harmless and can still be used. Salt is rather hygroscopic and will adsorb moisture from the air if not sealed in an air-tight container. If it does cake up, it can be dried in the oven and then pulverized again with no harm done.

All salt, however, is not the same. Salt comes in a number of different varieties, and very little of what is produced in the U.S. is intended for use in food. The rest of it, about 98%, has other uses. Therefore, it is important to be certain the salt you have is intended for human consumption. Once you are satisfied it is, you should then determine its appropriateness for the tasks to which you might want to set it to. Below is a list of some of the available salts

TABLE SALT: This is by far the most widely known type of salt. It comes in two varieties; iodized and non-iodized. There is an ingredient added to adsorb moisture so the salt will stay free flowing in damp weather. This non-caking agent does not dissolve in water and can cause cloudiness in solutions if sufficiently large quantities are used. In canning this won't cause a problem since little per jar is used. For pickling, though, it would be noticeable. If you are storing salt for this purpose, you should be sure to choose plain pickling salt, or other food grade pure salt such as kosher salt. In the iodized varieties, the iodine can cause discoloration or darkening of pickled foods. For folks in areas that are historically iodine deficient a store of iodized salt for table consumption should be kept.

CANNING SALT: This is pure salt and nothing but salt. It can usually be found in the canning supplies section of most grocery stores. This is the preferred salt for most food preservation or storage uses. It is generally about the same grain size as table salt.

KOSHER SALT: This salt is not really, in itself, kosher, but is used in "kashering" meat to make the flesh kosher for eating. This involves first soaking the meat then rubbing it with the salt to draw out the blood which is not-kosher and is subsequently washed off along with the salt. The cleansed meat is then kosher. What makes it of interest for food storage and preservation is that it is generally pure salt suitable for canning, pickling and meat curing. It is of a larger grain size than table or canning salt, and usually rolled to flake the grains for easier dissolving. Frequently it is slightly cheaper than canning salt and usually easier to find in urban/suburban areas.

NOTE: Not all brands of kosher salt are exactly alike. Diamond Crystal Kosher Salt is the only brand that I'm aware of that is not flaked, but still in its unaltered crystal form. The Morton brand of Coarse Kosher Salt has "yellow prussiate of soda" added as an anti-caking agent but unlike other anti-caking agents it does not cause cloudiness in solution. Morton even gives a kosher dill pickle recipe on the box.

Whether flaked or in its unaltered crystal form, kosher salt takes up more volume for an equivalent amount of mass than does canning salt. If it is important to get a precise amount of salt in your pickling or curing recipe you may want to weigh the salt to get the correct amount.

SEA SALT: This type of salt comes in about as many different varieties as coffee and from many different places around the world. The "gourmet" versions can be rather expensive. In general, the types sold in grocery stores, natural food markets and gourmet shops have been purified enough to use in food. It's not suitable for food preservation, though, because the mineral content it contains (other than the sodium chloride) may cause discoloration of the food.

ROCK or ICE CREAM SALT: This salt comes in large chunky crystals and is intended primarily for use in home ice cream churns to lower the temperature of the ice filled water in which the churn sits. It's also sometimes used in icing down beer kegs or watermelons. It is used in food preservation by some, but none of the brands I have been able to find label it as food grade nor do they specifically mention its use in foods so I would not use it for this purpose.

SOLAR SALT: This is also sometimes confusingly called "sea salt". It is not, however, the same thing as the sea salt found in food stores. Most importantly, it is not food grade. It's main purpose is for use in water softeners. The reason it is called "solar" and sometimes "sea salt" is that it is produced by evaporation of sea water in large ponds in various arid areas of the world. This salt type is not purified and still contains the desiccated remains of whatever aquatic life might have been trapped in it. Those organic remains might react with the proteins in the foods you are attempting to preserve and cause it to spoil.

HALITE: For those of us fortunate enough to live where it is warm, halite is the salt that is used on roads to melt snow and ice. It, too, is not food grade and should not be used in food preservation. This form of salt is also frequently called rock salt, like the rock salt above, but neither are suitable for food use.

SALT SUBSTITUTES: These are other kinds of metal salts such as potassium chloride used to substitute for the ordinary sodium chloride (NaCl) salt we are familiar with. They have their uses, but should not be used in foods undergoing a heated preservation processing, as they can cause the product to taste bad. Even the heat from normal cooking is sometimes sufficient to cause this.

F.5 VINEGAR

There is vinegar and then there is vinegar and it is not all alike. The active ingredient in all vinegars is *acetic acid*, but how the sour stuff was made can vary widely. The most common vinegar is *white distilled* which is actually diluted distilled acetic acid and not true vinegar at all. It keeps pretty much indefinitely if tightly sealed in a plastic or glass bottle with a plastic cap. The enamel coated metal caps always seem to get eaten by the acid over time. It is usually about 5-6% acetic acid and for pickling it is the type most often called for.

The next most common is *apple cider vinegar* which is available in two varieties. A *cider flavored* distilled acetic acid type and a *true cider vinegar* fermented from hard cider. Either will store indefinitely at room temperature until a sediment begins to appear on the bottom. Non-distilled vinegar will sometimes develop a cloudy substance. This is called a *mother of vinegar* and it is harmless. As long as the liquid does not begin to smell foul it can be filtered out through cheesecloth or a coffee filter and rebottled in a clean container. The mother can even be used to make more vinegar. If it begins to smell bad, however, it's gone over and should be tossed out.

The more exotic *wine, balsamic, malt, rice* and other vinegars can be stored like cider vinegar. Age and exposure to light and air, however, eventually begin to take their toll on their delicate flavors. Tightly capped in a cool, dark cabinet or refrigerator is best for their storage.

F.6 YEAST

Yeast is just not a product you can stow away and forget about until you need it in a few years. After all, this single celled microscopic fungus is a living organism so if it's not alive at the time you need it, you'll get no action. When we incorporate yeast into our bread dough, beer wort or fruit juice it begins to ferment madly (we hope) and produce several by-products. If you're baking, the by-product you want is carbon dioxide which is trapped by the dough and subsequently causes it to rise. In brewing or vintning what is wanted is the ethyl alcohol and, if the drink is to be carbonated, the carbon dioxide as well.

Almost all yeasts used for these purposes are in the same genus (*Saccharomyces* or sugar fungi), but several different species or strains within species have evolved and some are more suitable for a particular task than others. It's entirely possible to use grocery store bread yeast to brew beer or ferment wine, but the flavor may leave a great deal to be desired. It's also possible to use yeast from ale

brewing to make bread. From my limited experience with trying it myself the results were pretty much indistinguishable from bread yeast.

Types of Baking Yeasts

Leaving aside the brewing and vintning yeasts that are outside the scope of this FAQ I am going to concentrate on bread yeast. It comes in two generally available forms; *compressed* or *fresh yeast* and *dried yeast* which is further broken down into *active dry yeast* and *rapid acting* also known as *rapid rise* or *bread machine yeasts*. Although both of the dry yeasts are in the same species they come from different genetic strains with different performance characteristics and are processed somewhat differently from each other.

COMPRESSED (FRESH) YEAST: Compressed yeast is only partly dried (about 70% moisture), requires refrigeration and keeps even better in a deep freezer. If kept in an air- and moisture-tight container to prevent desiccation this type of yeast will keep for a year in the freezer (0°F, -17°C or less), but only about two weeks in the refrigerator. Unless your kitchen is quite chilly it will not keep on the shelf. It should not have a mottled color or a sour odor. Compressed Yeast is generally available in 0.6-ounce and 2-ounce foil-wrapped cakes. For traditional baking, dissolve compressed yeast in warm (90°-95°F, 32°-35°C) liquids. A 0.6-ounce cake will leaven up to 4 cups of flour (about a pound). A 2-ounce cake will leaven about 12 cups or roughly three pounds of flour.

ACTIVE DRY YEAST: A granular powder with about an 8% moisture content, active dry yeast can be found in either single use foil packets or vacuum packed foil covered one pound 'bricks'. In general bread making active dry yeast is typically dissolved in water (105°-115°F, 40°-46°C) along with an equal amount of sugar to give it time to resuscitate and actively begin growing before being mixed into the dry ingredients. Bread machines, however, are often different in this regard and you should follow the directions your particular machine's manufacturer gives. Mine calls for putting the dry yeast atop the other dry ingredients completely out of contact with the liquid ingredients until the machine mixes them together. One envelope (roughly 2 ¼ teaspoons) is sufficient to leaven about four cups or roughly one pound of flour.

RAPID ACTING & BREAD MACHINE YEAST: A more finely granulated powder with a lower moisture content than standard active dry yeast the rapid acting version is designed to raise bread as much as fifty percent faster. This lends it to the 'quick' or 'rapid' cycles of many bread machines that eliminate one rise cycle of the bread dough to facilitate faster production. This form of yeast is also generally mixed with a small amount of ascorbic acid which acts as a dough conditioner to give improved rise performance. Rapid Acting yeasts often perform poorly in recipes calling for long fermentation periods. Because of its finer granulation it does not need to be dissolved in liquid first and should be added to the dry ingredients instead. In the case of bread machines follow the

manufacturer's directions. One envelope (roughly 2 ¼ teaspoons) is sufficient to leaven about four cups or roughly one pound of flour.

Interchanging Yeast Types

Can fresh, active dry, and rapid acting yeasts be used interchangeably?

Yes, to a certain extent.

To substitute Rapid Acting yeasts for Active Dry yeasts reduce the amount of Rapid Acting used by 25% from the amount of Active Dry the recipe calls for then add the dry yeast to the dry ingredients before mixing.

To substitute Active Dry for Rapid Acting increase the amount of Active Dry by 25% over what the recipe calls for of Rapid Acting yeast and dissolve in warm water (105°-115°F, 40°-46°C) with an equal amount of sugar before mixing in with the dry ingredients.

Once 0.6 ounce cake of fresh, compressed yeast is roughly equivalent to one pack of active dry yeast (2 ¼ teaspoons) or to about 1 ¾ teaspoons of Rapid Acting yeast.

NOTE: Substituting one yeast type for another can be done, but will oft times require a bit of tweaking. If at all possible use the yeast type specified in the recipe. If you can't be prepared to make adjustments where necessary.

PROOFING YEAST: Although it's generally not necessary anymore if you are concerned that your yeast may be dead due to age or poor storage conditions any type of yeast can be tested for viability by *proofing*. This is nothing more than mixing a small amount of the yeast with an equal amount of sugar in warm water 105°-115°F, 40°-46°C for dried; 90°-95°F, 32°-35°C for fresh). Within about five to ten minutes active yeast will become bubbly and begin to expand (at normal room temperature). Yeast which only slowly becomes active can still be used, but you will have to use more. If there is no activity at all, the yeast is dead and should be tossed. If you've stored your yeast in half-way decent conditions, or better yet in the freezer, proofing will usually not be necessary.

NOTE: Rapid Acting yeast loses its fast rising capabilities if dissolved in liquid for proofing, and will require two complete rises like standard active dry yeast.

STORING YEAST: All of the dry yeasts will last for months on the shelf, until the expiration date which should be clearly stamped on the package. If packaged in an air/moisture tight container and kept in the freezer it may last for several years though one year is the general recommendation most often found among various authorities. I'm presently (12/2003) using yeast stored in my refrigerator freezer in a tightly sealed canning jar with a "Best Used By" date of June, 1998

that is still going strong. The larger packs of yeast should be transferred to an air and moisture tight container after opening. A canning jar with a decent lid will suffice.

There is another means of providing leavening for breads besides buying yeast from a grocery store and that is by using a sourdough starter. I'm not going to address it here, but I will point out that it has a Usenet newsgroup all its own (*rec.food.sourdough*) which has several FAQ's devoted to it. You can find addresses for these FAQs in the Resources section. Drop in and read for awhile and you'll learn more than you thought you could ever want to know.