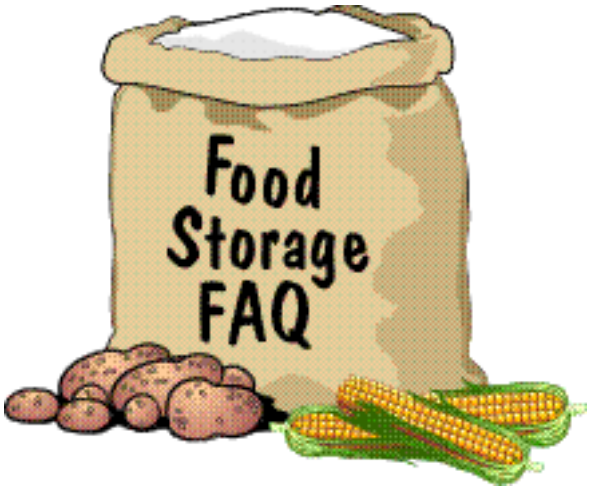


Types of Availability of Grains and Legumes

Grains and legumes of all types may be purchased in a number of different fashions depending largely on where you live and the time of year. If you should happen to live in the area where the type of grain or legume that you are interested in purchasing is grown you may be able to purchase direct from the producer or distributor.

If you are interested in doing this, you may be able to find what you want at any processing step along the way. The most basic form is called "field run" which means that it's been harvested and sold shortly thereafter. It will not have been given any cleaning or processing and is likely to be rather dirty depending upon the conditions under which it was grown and harvested.

A second basic form called "field run from storage" is grain that has been harvested and then put into storage for a time. It will have all of the dirt and detritus of field run grain and whatever it may have picked up from the silo as well.

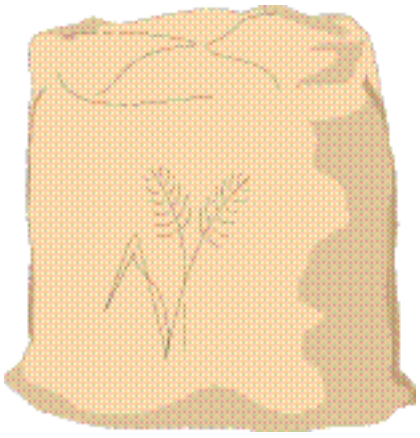
If you want cleaner grain you should look for "pre-cleaned" which means that it has been passed through fans, screens or sieves to remove chaff, smut balls, insect parts, mouse droppings and other debris.

For those of us who don't live in an area that produces the grain and legumes that we're interested in, we have to resort to the last type which is "pre-cleaned and pre-packaged". This is grain that's been harvested, cleaned and put up in bags or other containers-possibly even going so far as to already be packaged for long term storage.

Each of the above types of availability has its good and bad points. As you might expect, the more processing the product receives, the higher its price is likely to be. If you don't mind doing a little cleaning and you need to be frugal with your cash, then field run grain is the way to go.

Important Note: If you have purchased your grains and legumes from a food store or a foods dealer then you needn't worry about hidden mold infections, fungicides or insecticides that are unsafe for human consumption. In the U.S. the products will have been checked at least several times by Federal and State agriculture dept's and probably by the major foods dealers as well, to insure its quality.

This is not *necessarily* the case when you purchase your grains or legumes direct from the farmer or elevator operator as field run or field run from storage grain. Nor is it necessarily the case if you've made the decision to utilize grains marketed as animal feed. Inspection procedures vary from nation to nation, so outside of the U.S. inquire of your supplier.



If you are buying your grains and legumes from some-place other than a food store then you need to know the history of what it is you are buying. Straight field run grain, other than being dirty, is not likely to have had anything added to it that would make it undesirable for human consumption. There is, however, the small possibility it may have been infected with molds that would make it unsafe for eating. Field run from storage and any grade of grain not specifically advertised for human consumption may have had fumigants, fungicides or insecticides not certified as safe for human foods added to it while it was in the bin. It is important to know what it has been treated with before you buy it.

There is a fungal infection of grain called "ergot". It is attracted to rye more so than other grains, particularly if the growing conditions were damp where it was grown. This fungus causes a nervous disorder known as St. Anthony's Fire. When eaten in large quantities the ergot alkaloids can cause constriction of the blood vessels, particularly in the extremities. The effects of ergot poisoning are cumulative and lead to numbness of the limbs and other, frequently serious symptoms.

This fungal disease affects only the flowering parts of some members of the grass family, mostly rye. The fungus bodies are hard, spur like, purple black structures that replace the kernel in the grain head. The ergot bodies can vary in size from the length of the kernel to as much as several times as long. They don't crush as easily as smut bodies of other funguses. When they are cracked open, the inner broken faces are can be off-white, yellow, or tan. The infected grain looks very different from ordinary, healthy rye grains and can be spotted easily. Ergot only rarely affects other grains. If you purchase field run rye, you should closely examine it first for the presence of ergot bodies. If you find more than a very few, pass up that grain and look elsewhere.

Sometimes grain in the form of animal feed or seed grain/legumes is available. Keep in mind animal feeds may have a higher contaminant level than what is permissible for human consumption. Under certain circumstances, the USDA allows the sale of grain or legumes for animal feed that could not be sold for direct human consumption. If that feed is to be fed to non-lactating (non-dairy animals), they will sometimes allow an aflatoxin (a type of fungal mycotoxin) content of five times what is permissible for use in human foodstuffs. It may even be mixed varieties of one grain and not all one type. Seed grains, in particular, must be investigated carefully to find out what they may have been treated with. It is quite common for seed to have had fungicides applied to them, and maybe other chemicals as well.

If you do purchase field run grain of any sort, examine it closely for contamination and moldy grain. Ask the farmer or distributor whether it has been tested for mold or mycotoxin content. This is especially the case if you are buying field-run CORN, RYE, SOYBEANS or RICE. When you purchase direct from the field, you may be getting it before it has been checked. Be certain of what it is that you are getting and ask questions if you choose to go this route. Know who you are dealing with. Unless you just can't find any other source, I don't recommend using animal feed or seed grains for human food.

Please see section III.B.3 " Molds In Grains and Legumes" for further information.

Moisture Content

The moisture content of the grain or legume you want to purchase or grow has a major impact on how long you will be able to store it and have it remain nutritious and edible. Some of the information I have found says that grain with a moisture content as high as 12% can be safely put into long term storage, but there is a risk to storing grain at that moisture level that should be understood.

The outside of each and every kernel of grain or bean you buy or grow may host thousands of fungi spores and bacteria. This is all perfectly natural and is not a reason to panic. The problem lies in that at moisture levels between 13.5% to 15% some fungal species are able to grow and reproduce. Other species require a moisture level in the 16-23% range. Aerobic bacteria (oxygen using) require a moisture level of about 20%. Raw peanuts are particularly susceptible to Aspergillus mold growth that produces afltoxin and should be stored with an 8% moisture content or less.

Thus, if you have grain you want to store with a moisture content as high as 12% you are perilously close to having enough moisture to enable mold growth which could lead to the ruin of your grain. For this reason, I suggest keeping all grains and legumes to a moisture content of no more than 10%.

If you do not have a clue as to what the moisture level of your grain is here is a rough method to determine it.

Take 20 ounces of the grain or legumes in question from the middle of its bag or container (this needs to be an actual weighed twenty ounces and not estimated). Spread the grain in a large baking dish making sure it is not more than an inch deep. Heat at 180 F for about two hours, stirring occasionally. Allow the grain to cool where it won't readsorb moisture, the oven will do. Once cool, reweigh the grain. A one ounce loss in weight indicates the grain had roughly a five percent moisture content, 2 ounces indicates that it has a 10% moisture content, etc, etc. You might even be able to cut it as fine as a half oz loss, but I wouldn't try to take it further than that.

Obviously, this is only a rough measure, but it works and I don't have a better idea that could be used by an individual in the home. If anyone has a better way of measuring moisture levels which can be done without a lab or special equipment I'd surely like to hear it.

Cleaning it Yourself

If you've chosen to purchase field-run grain or if the pre-cleaned product you've bought isn't clean enough to suit you, you can do it yourself.

The fastest and easiest method is "fanning", a form of winnowing. This is done by pouring the grain slowly through the air stream of a fan or blower into a clean, deep container such as a cardboard box or trash can. The wind blowing through the falling grain will blow out most of the broken kernels, chaff, smut balls, mouse droppings, etc. If you're losing too much good grain, try turning the fan down or moving it further back from the container. The deep container will cut down on the amount of kernels that bounce out. Repeat fanning as necessary until the grain is clean enough to suit or you've blown all of the lighter contaminants out.

If the fanning didn't get the grain clean enough then it can be further cleaned by running it through a screen or sieve. This should be made with holes just big enough to pass an average sized grain of what it is you're cleaning. Obviously, the size of the holes will necessarily vary depending upon the kernel size of the grain.

Should the kernels still not be clean enough to suit then you'll just have to resort to "hand picking" out the offending particles. I'd strongly suggest doing this just prior to grinding where it can be done in small batches rather than trying to do your entire storage all at once. It's much easier to do a few pounds at a time than fifty or a hundred.

If you have it in mind to wash the grain, this should not be done prior to storage, but, rather, just before use. After it's been rinsed, it should be dried immediately in the oven by placing it no deeper than 1/2 inch and heated at 150 F for an hour. It should be stirred occasionally to improve drying.

Storing Grains and Legumes

Having properly prepared your grains and legumes for storage, you're now ready to package it.

For methods and procedures of packaging please see section IV.

- IV. Specific Equipment Questions
  - Storage Containers
  - CO2 and Nitrogen
  - Oxygen Absorbers
  - Desiccants

- Diatomaceous Earth

Next | Previous | Top | Table of Contents | Home