

## Should I Vacuum Package Food at Home?

There are numerous types of equipment being marketed for vacuum packaging food at home. They vary greatly in technological sophistication and price, and usually are called vacuum packaging machines or vacuum sealers. These machines may extend the storage time of refrigerated foods, dried foods and frozen foods. **However, vacuum packaging is not a substitution for the heat processing of home canned foods.**

Vacuum packaging is also not a substitution for the refrigerator or freezer storage of foods that would otherwise require it. In fact, vacuum packaging can add to the concerns associated with storing of these perishable foods (which are foods not stable at room temperature and requiring cold storage).

There are many precautions that must be taken when vacuum packaging perishable foods for refrigerator or freezer storage. You must assume that the perishable food carries the risk of potential pathogenic contamination. And, when frozen food is ready to be thawed and used, steps to minimize the risks from microorganisms in food must still be followed. Again, perishable foods must still be refrigerated or frozen for storage after packing in a vacuum or partial vacuum environment.

Producing a vacuum means removing air from the contents of a package. Oxygen in environmental air does promote certain reactions in foods which cause deterioration of quality. For example, oxidative rancidity of fats in food and certain color changes are promoted by the presence of oxygen. Therefore, removal of oxygen from the environment will preserve certain quality characteristics and extend the food's shelf life based on quality.

However, removal of oxygen from the surrounding environment does not eliminate the possibility for all bacterial growth; it just changes the nature of what is likely to occur. In fact, what is most likely to be eliminated is growth of spoilage bacteria. The bacteria that normally spoil the quality of food in noticeable ways (odor, color, sliminess, etc.) like to have oxygen in the environment. If able to multiply on foods, these spoilage bacteria can let you know if a food is going bad before it reaches the point it makes someone sick. In an almost oxygen-free environment like vacuum packaging produces, the spoilage bacteria do not multiply very fast so the loss of food quality is slowed down.

Some pathogenic (illness-causing) bacteria, however, like low-oxygen environments and reproduce well in vacuum-packaged foods. In fact, without competition from spoilage bacteria, some pathogens reproduce even more rapidly than in their presence. These bacteria often do not produce noticeable changes in the food, either. In the vacuum-packaged environment, food may become unsafe from pathogenic bacterial growth with no indicators to warn the consumer; the bacteria that would also normally be multiplying and spoil food in ways to make it unappealing (odor, sliminess, etc.) are not able to function without enough oxygen.

For example, *C. botulinum* (a very dangerous pathogen that causes the deadly botulism poisoning under certain conditions) grows at room temperature in low-acid moist foods if the package presents anaerobic (lacking in oxygen) conditions -if the bacteria are present, of course. Without the competition from spoilage bacteria,

reproduction is even easier. Refrigeration at 38-40 degrees F becomes a critical step for storage of low-acid vacuum-packaged foods that aren't otherwise stable (don't keep) at room temperature (e.g., canned properly). The actual temperature of the refrigerator and the temperature at which it keeps the food are essential to maintain safety of this product. If the food were not packaged under vacuum, the oxygen in the environment would offer some protection against *C. botulinum* growth and toxin development in the package.

The removal or reduction of oxygen in the storage environment is indeed helpful for extending the storage quality of non-perishable dry foods such as dried nuts or crackers. Products like this are low enough in moisture that bacterial growth is prevented.

Vacuum packaging can also be safe for food that will be stored frozen. However, proper thawing under conditions that minimize bacterial growth - like refrigeration - would be essential. If the package stays closed during thawing, you still have a vacuum environment where pathogenic bacteria can be active if the temperature is warm enough.

There is no advantage to combining the use of a vacuum packaging machine with boiling water or pressure canning of foods. Jars processed in either canner develop sufficient vacuums for safe, stable storage at room temperature. They also have the added advantage of a heat process that kills pathogenic bacteria able to grow in that food at room temperature.

So is a vacuum packaging machine needed or are there advantages to owning one? One would need to ask if the amount of the investment is worth the uses for the appliance. Traditionally recommended freezing procedures and packaging methods, if carried out carefully, will produce high quality products with reasonably lengthy storage times. Storing crackers, nuts and other dried foods in air-tight storage containers will also keep them of high quality for a reasonable period of time for normal usage.

And, perishable foods still need to be treated carefully to prevent pathogens from making them unsafe. Remember, removing oxygen from a food's environment does not just solve some food storage problems - it could cause others. Consider how carefully safe food handling practices will be followed at all times, since vacuum packaging creates very good conditions for some pathogens to be a problem if any mistakes are made. For example, perishable food being vacuum packaged should not be out of refrigeration very long -no longer than 2 hours total time above 40 degrees F. Food that needs to be refrigerated without vacuum packaging still needs to be refrigerated! While food is being packaged and prepared or used later, extremely clean hands, and clean and sanitized equipment and work surfaces are essential. Food should be dated and still used within reasonable storage times unless frozen. Raw meats, poultry and seafood should be cooked thoroughly to recommended temperatures, measured with a food thermometer, before eating. Any food showing signs of spoilage should be discarded -*when in doubt, throw it out!*

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