

Selection of Food Containers: Glass Jars

Food Processing for Entrepreneurs Series

Durward A. Smith, Extension Food Processing Specialist and
Jill Gifford, Manager, Food Entrepreneur

This publication provides information that could be useful to entrepreneurs in selecting and purchasing food containers. Basic information is given about containers, closures and some considerations that may help in positioning and marketing products.

The function of food packaging is to protect the product from the time and point of manufacture to the time and point of consumption. The package must be sturdy enough to ensure that the food contained in the package is not damaged or spoiled during the distribution and the shelf life of the product. The package prevents contamination of the food with microorganisms, oxygen, filth or environmental contaminants that would reduce the quality of the food or render it unsafe for human consumption. The package must have sufficient strength to withstand abuse in processing and distribution, and have adequate barrier properties to prevent physical or chemical degradation of the food and to prevent the migration of flavors and odors either into or out of the package.

Choice of Container

A number of factors should be considered in choosing a container type. Will glass, metal or plastic be best suited to your product, production and distribution? Will the container tolerate the processing conditions for your product? Will the container be suitable for the conditions encountered in distribution and usage by the consumer? Can the container and its closure withstand contact with acid foods for extended periods of time? If the product requires any kind of pasteurization or thermal processing can the container and its closure withstand the high temperature for the specified period of time? One also must consider if the container will be compatible with the processing equipment that must be used in the manufacture, closing and distribution of the food product. Other important considerations are: is the container suitable for the product image you wish to present and is the cost per container acceptable.

Choice of Supplier

The same container often is sold by different companies that may have different prices. There are several factors that may affect price quotes. These include delivery location, quantity, season or time of year, and the payment schedule. It is best to understand how each factor affects the price when comparing quotes from different companies. If a supplier offers volume discounts, consider your available storage space and the frequency of your production runs. The choice of a supplier of containers also may be affected by the lead time a supplier needs to deliver the necessary quantity or by the availability of customer service.

Glass Containers

Glass usually is the container of choice for entrepreneurs processing high moisture foods. It generally is easier to attain relatively small quantities of glass containers than other types of packaging. Glass withstands exposure to acid foods such as jams, jellies and condiments for extended periods of time. If the product needs to be pasteurized either by hot fill and hold or by immersion in a hot water bath, glass withstands the temperature and provides good protection to the food product. The integrity of the seal ensures the stability and safety of the product. This seal is provided by a vacuum in the *headspace*, which is the area in the jar between the product and the cap or closure. The simplest procedure to produce a vacuum in the finished package using a hermetic seal is simply to fill and close the product at a high temperature. As the product cools and shrinks, a vacuum is formed by the steam and water vapor in the headspace condensing. The vacuum also can be generated by a steam-vacuum closing machine that sprays a small jet of steam into the headspace of the jar to replace the air in the headspace. As the steam condenses, the vacuum is formed in the package. The closure normally is a coated metal cap lined with a special sealant called *plastisol*. The plastisol provides a seal that holds the vacuum in the container.

A glass container has three basic parts the *finish*, the *body* and the *bottom*. These are formed in three parts of the glass container molds in which they are blown.

Finish

The finish is the part of the jar that holds the closure or cap. It is the portion of the container surrounding the opening, that has the lugs or threads to secure the cap, and the sealing surface (a smooth surface against which the cap seats). The finish is manufactured in the finish ring of the glass mold. When glass was hand manufactured the finish was the last part of the container to be made, and was thus called the *finish*. Some containers have a transfer bead incorporated into the finish. The transfer bead is a continuous horizontal ridge of glass around the circumference of the finish near the point where the finish joins the body. The transfer bead aids in transferring the container from one part of the manufacturing operation to another.

There are many different finishes for closures (caps or lids) of glass containers. Every type of closure for sealing glass containers has a specific finish with which it was designed to function. **The closures must be matched with appropriate containers. They are not interchangeable.**

Closure Types for Specific Finishes

1. Lug or Twist Cap – Several different types of lug closures have been designed, each of which work best with a specific lug-style finish. The lug or twist cap consists of a steel shell and may have from three to six lugs (inward protrusions from the curl of the cap side or skirt). Lug caps are secured to the finish by twisting the cap onto the finish which seats the lugs of the cap with the threads of the glass. Vacuum maintains the seal.
2. Platisol-Lined Continuous Thread Cap – This cap consists of a metal shell with a threaded skirt that is knurled. The cap contains a flowed-in platisol gasket and is applied by screwing the closure onto the glass finish. This is the most common type of container used by small-scale food processors. The cap can be applied with minimal mechanization, and cooling of the hot food will provide the necessary vacuum for a good seal.
3. Press-on Twist-off Cap – The press-on twist-off cap is the most common cap used for baby foods. It combines the simple application requirements of a press-on closure with twist off convenience. The cap consists of a steel shell with no lugs. The gasket is molded platisol that covers the sealing area that extends from the top down the side or skirt of the cap, and forms the primary top seal and secondary side seal. The cap is applied simply by pressing the cap down on the glass finish after flowing steam over the headspace. The glass threads form impressions in the gasket on the skirt of the cap. The cap is held in place primarily by the vacuum formed in the headspace by the condensing steam. Closing equipment is required for the press-on twist-off closure.

Body

The body of the container is the largest portion of the container and lies between the finish and the bottom. The body of the container is made in the body mold. Shapes and sizes can vary.

Bottom

The bottom of the container is made in the bottom plate part of the glass container mold. The bottom has the bearing surface or the portion of the container upon which it rests. The bearing surface may have a special configuration known as a stacking feature designed to provide a degree of interlocking of the bottom of the jar with the closure of another jar upon which it might be stacked for display purposes.

Glass Treatments or Lubricants

Glass is not slick! Surface treatments or lubricants usually are applied to glass containers for the purpose of facilitating the smooth flow of containers through conveying systems. These treatments also protect the outside of the container from abrasion during manufacture and distribution. Several different types of treatments are used. The surface treatment can affect both the application of closures (caps) and labels. Surface treatments and compatibility with closing and labeling operations should be discussed with suppliers.

Plastic Containers

Entrepreneurs often ask about using plastic containers. Their concern usually is reducing shipping weights or eliminating the danger of glass breakage. There are FDA approved food grade plastic containers that can be used for hot filling, but if an oxygen barrier or a UV light barrier is included in the container the cost usually exceeds that of glass. The user of plastic containers needs to specify the specific characteristics needed pertaining to the temperatures the container must stand during filling, and the desired shelf life characteristics (oxygen and other barrier layers needed in the plastic). Hot filled plastic containers often present problems because the containers tend to panel. Paneling is the collapsing of the sides of the container inwards as a result of the headspace vacuum. Paneling is a difficult problem because it requires either capping with a minimum vacuum or reducing the headspace volume to a minimum (filling beyond the stated net contents).

Purchasing Containers

When you prepare to purchase containers it is wise to consider several factors in addition to the type of container and closure you need. One needs to know the quantity of each style and size needed per production run. You also should know the number of product batches you will produce within a given timeframe. The quantity of packaging inventory you can warehouse also is important. Consider the different sizes and styles you may need for each container delivery and the lead time required by the supplier to provide the quantity you need for each production run. Ask questions! Does the container supplier have a good reputation with other processors similar in size to you? Is the container food grade? Will the container maintain a hermetic seal? Does the container need to be washed prior to use? Will there be any returned containers in the shipment to me? What is the required lead time for orders to be shipped? What are the shipping terms and methods? Who is responsible for damage during shipping? What is the physical size of the order of containers? Does it

need to be broken down before it can be handled or brought into my facility? How many units per case or how many cases per pallet will I receive?

Marketing and Branding Considerations

Consumers are inundated with marketing messages every day. For most products the package is what sells the product the first time and the quality of the product attracts repeat customers. It is important to consider the “message” your package sends to the potential consumer.

Most entrepreneurs are encouraged to select a standard or in-stock container. This allows you to purchase containers at a lower price and in smaller quantities. Many food items are packaged in the same type of container. The individual look of the package is achieved through well-thought out professional label designs.

Container Size and Shape

When selecting the size of the container you should ask yourself several questions. Can the product be consumed in the appropriate length of time? What size is the competition using? How will the consumer access the product? Will they need to insert a spoon, pour the contents or reseal the container? How tall is your container? If it is too tall it may only fit on the top shelf of a store which can limit your ability to have your product displayed and viewed by potential consumers.

Product Visibility

Is it important for the consumer to see the product before purchasing the product? Perhaps visual appeal will encourage a purchase. If this is important you should consider a clear container. However, be aware that store lighting can discolor some products such as certain spices.

Lid/Cap Color

Choosing an appropriate color for the lid/cap is an important step in the overall look or design of the package. The color should complement and not detract from the label appeal.

Environmentally Friendly Containers

Consumers are becoming more aware of how important recycling is to the environment. Therefore, they are seeking out containers that can not only be recycled but are also made from recycled materials.

UNL Extension publications are available online at <http://extension.unl.edu/publications>.

Index: Foods & Nutrition Storage

Issued January 2007

Extension is a Division of the Institute of Agriculture and Natural Resources at the University of Nebraska–Lincoln cooperating with the Counties and the United States Department of Agriculture.

University of Nebraska–Lincoln Extension educational programs abide with the nondiscrimination policies of the University of Nebraska–Lincoln and the United States Department of Agriculture.

© 2007, The Board of Regents of the University of Nebraska on behalf of the University of Nebraska–Lincoln Extension. All rights reserved.