# Frequently Asked Questions :

1. **Explain the concept of freezing as a method of preservation.**

Freezing proves to be an excellent way to preserve animal products such as meat, poultry, fish and shellfish. In some cases, eggs as well as dairy foods can also be frozen for use at a later date. Freezing does not sterilize food. Instead, the extreme cold tends to retard the growth of spoilage microorganisms and also slows down the changes which affect the quality and texture of the meat. Food should not be frozen too much at one time because the food will freeze slowly, resulting in a mushy final product. Only the amount of unfrozen food that will freeze within 24 hours should be added.

2. **What is canning ?**

Canning is a method of food preservation in which a cooked or uncooked food is sealed in a tin plated and lacquered steel can sterilized by heat treatment, sometimes under high pressure. The temperature required for effective sterilization varies with the pH of the item, and is generally higher than boiling point of water (100°C or 212°F) for low-pH foods such as fish (and other seafood), meats, poultry, mushrooms, and vegetables. Practice of canning predates the discovery of disease causing bacteria such as *Clostridium botulinum.*The quality and safety of the final product depends to a large extent on the way the product was handled before, during and after freezing. Freezing affects the texture, colour, juiciness and flavor of foods. Care should be taken that the process should be started with high quality food. Freezing does not improve the quality of food.To obtain the highest quality of frozen and canned food, it should first be tightly sealed in moisture vapor resistant materials and then frozen quickly at $0^0$ F or below.

3. **Write a note on the type of packing materials used for meat packaging.**

Before preparing animal products for freezing, assemble the packing materials you will need. The type of packaging material depends on the type of food which is to be frozen, on the personal preferences and also on the type of material which is readily available. It is very important for the packaging material to be moisture and vapor resistant, durable and easy to seal and it should not become brittle at low temperatures. Special freezer paper is the best material for packing meats, poultry and fish. Heavy-duty aluminum foil or freezer wrap can also be used, but they tend to tear more easily. If enough air can be excluded, then freezer bags or containers can also be used. When packaging meat, poultry or fish for freezing either the “drugstore wrap” or the “butcher wrap” can be used. The drugstore wrap is preferable but for the irregular cuts of meat. These are best when wrapped with the butcher wrap.

**4. Write a note on chilling of meat.**

Freshly slaughtered meat carcasses or primal cuts need to be cooled to below $40^0$ F within 24 hours to prevent souring or spoiling. The meat should be chilled at $32^0$ to $36^0$F. Variety meats (liver, heart or sweetbreads) are ready to be wrapped and frozen after they are cold. After 24 hours, pork, veal and lamb are ready to be cut, wrapped and frozen. Beef many be left at a temperature range of $32^0$ to $36^0$F temperature for a total of 5 to 7 days to age the meat. Meat which is purchased from grocery stores is ready to be frozen as is, or cut into serving-size portions and then frozen.

**5. What are the different types of wraps used in meat packaging ?**

Meat can be packed using freezer paper or wrap, using either the drugstore or butcher wrap. Freezer bags or containers can be used for ground beef, stew beef or other meats frozen in small portions. Meat which has been brought from stores need to be over-wrapped. This is because their clear packaging is not moisture or vapor resistant. If film-wrapped meats are purchased from a meat packer, then the wrap should be checked to see if it is a new heavy-duty film. If so, then it needs no over wrapping.

Meat should be packed in small meal-size portions, removing as many bones as possible (because bones take up freezer space). Two layers of freezer paper or wrap should be placed between meat slices or patties of meat so that they are easier to separate when frozen. This will help speed thawing.

**6. What is the difference between large game and small game?**

Large animals such as deer, moose, antelope and other large game can be handled for freezing just like any other meat or carcass. The meat should be trimmed and bloodshot discarded before freezing. Then it is ready to be packed. After this it is sealed and frozen. Smaller animals or small game such as rabbit, squirrel and other game should be skinned, dressed and then chilled. It should be refrigerated for 24 to 36 hours until the meat is no longer rigid. It should then be cut into serving-size pieces or left as a whole. It is then packed, sealed and frozen.

**7. How are poultry birds frozen and canned ?**

Only high quality, fresh poultry should be selected for freezing. The tender young bird is best for roasting, frying and broiling. More flavorful older birds should be chosen for braising or stewing. Poultry should be packed in freezer paper or wrap using the drugstore or butcher wrap, or it should be placed in freezer bags.

Poultry purchased from store needs to be over-wrapped before freezing as its clear wrap is not moisture-vapor resistant. When packaging pieces, it should be arranged to form a

compact, square, flat package so that they will stack better in the freezer. Once packed, it should be sealed and frozen immediately. Quail, dove, duck, pheasant and other game birds should be dressed and gutted as soon as possible after shooting. Care should be taken to cool and clean them properly. Excess of fat should be removed from wild ducks and geese since it can become rancid very quickly. Poultry or game birds should not be stuffed before freezing. During freezing or thawing times, bacteria that cause food borne diseases can easily grow in the stuffing. Commercially stuffed frozen poultry is prepared under special safety conditions that cannot be duplicated at home.

**8. How should meat and poultry be thawed?**

Meat, fish and poultry can be cooked from the frozen or thawed stage. Frozen meats and poultry are best when thawed in the refrigerator at $40^0$F or lower in their original wrappings. For faster thawing, the meat or poultry should be placed in water proof wrapping in cool running water which is usually maintained at $70^0$ F. Running water should be kept moving over the surface the whole time when it is being thawed.

Frozen meat or poultry can also be thawed in a microwave oven. Once microwave thawing is carried out, the thawed meat, poultry or fish should be cooked to completion immediately.

Frozen meat or poultry should not be thawed at room temperature unless the cool running water method is used. If meat or poultry is cooked without thawing, additional cooking time must be allowed, depending on the size and shape of the product. Large frozen roasts can take up to one and a half times as long.

**9. How is temperature control achieved in storage of meat?**

Maximum storage life is achieved when meat is stored at the lowest possible temperature, without the product freezing completely. In practice, the optimum storage temperature is $-1^0$c ($30^0$ F) for unwrapped product and $-1.5^0$c ($29^0$ F) for cartooned product in preservative packaging. 100% of the storage life attainable is obtained at this temperature. Reduction in storage life is profound with only small increases in storage temperature. Consequently, stringent temperature control proves to be the most critical factor, irrespective of all other factors. Product temperature, rather than ambient temperature must be monitored to be adequately managed. For every degree reduction in storage temperature towards the optimum, product storage life is increased by at least 10%. In this regard, exposing carcasses to blast chilling ($-20^0$c or $-4^0$ F) for a period of 40 to 60 minutes prior to conventional freezing substantially improves the hygienic efficiency of the carcass chilling process.

**10. How critical is maintenance of hygiene is meat processing?**

High levels of microbial contamination on meat reduce the time prior to the onset of spoilage, irrespective of all other factors. Consequently, prevention of contamination of the

product during slaughter, chilling, processing and packaging is essential to extend the storage life of meat or pork.

The dehairing process, during pork slaughter, usually contaminates the entire carcass with a relatively heavy load of both spoilage and pathogenic organisms, including lactic. In addition to this, early off-flavor development constitutes the limiting factor of chilled pork storage life extension. This early off-flavor development coincides with lactic acid bacteria approaching maximum numbers. Consequently, carcass decontamination i.e pasteurization following the dehairing process is essential. By subjecting the pig carcass to an on-line pasteurization at a temperature of $85^0$c water for 20 seconds, the spoilage bacteria were reduced by more than 50%. However, carcass pasteurization will be ineffective and a waste of resource unless stringent hygienic control is applied to all subsequent processes to prevent product recontamination.

**11. How does oxygen regulate the preservation of meat?**

The presence of oxygen within the packed meat promotes the growth and proliferation of spoilage organisms, the autolytic deterioration of meat properties and oxidative changes resulting in rancidity. The presence of oxygen within the meat package, particularly at low partial pressures, accelerates the discoloration of meat surface. However, pork with normal muscle characteristics appears to be more stable in the presence of oxygen than either beef or lamb.

Package selection for a particular purpose must be based upon considerations of product characteristics affecting storage stability, the environmental conditions etc. The packaged product must withstand during storage, distribution and merchandising. Maximization of storage life requires removal of all oxygen from the package (less than 300 ppm). This level can only be consistently reached by using a dual chamber or snorkel vacuum packaging machine.

**12. How does carbon di oxide help in preservation of meat?**

Carbon dioxide is bacteriostatic and retards the growth of most spoilage organisms. Since meat absorbs relatively large quantities of carbon dioxide, excess carbon dioxide must be put into the package to prevent package collapse and provide the desired bacteriostatic effect after the meat has been saturated. It has been experimentally proven that 2 liters of carbon dioxide per kilogram of product is the optimum level to use in chilled pork packaging. Although a mixture of carbon dioxide and nitrogen is often used to prevent package collapse, sufficient carbon dioxide must remain after product saturation to provide the desired bacteriostatic effect.

**13. Elaborate on the steps for life extension of frozen meat products.**

Below are the steps for life extension of frozen meat products:

- The meat product should be brought down to temperatures under control and stringent temperature control should be maintained at $1^0$c, as soon as possible after slaughter.
- Once the temperature has been controlled, the carcass needs to be pasteurized after the dehairing process. Stringent hygiene should be maintained to prevent recontamination of carcasses and subsequent cuts.
- Only if the above 2 steps are followed correctly will the beneficial effects of appropriate preservative packaging be realized.
- Essentially all of the oxygen from the package should be removed to levels of 300 ppm or below which can be achieved by using a dual snorkel or chamber vacuum packaging machine.
- Re-entry of oxygen into the package over time can only be prevented through the use of oxygen impermeable, foil laminate or double metalized packaging materials with oxygen impermeable heat seals on all perimeters or minimized through the use of plastic barrier films with very low oxygen permeabilities.
- Introduction of 2 liters of 100% carbon dioxide per kilogram of product provides a bacteriostatic environment within the package and avoids package collapse.

**14. Highlight the major achievements of the freezing industry.**

A combination of 100% carbon dioxide package and storge at $0^0$c provides a storage life of 3 months to uncured cuts and more than 5 months to cured cuts. It has also been studied that carbon dioxide in the package environment gave high pH meat a storage life of up to 42 days. Closely trimmed, bone-less meat with substantially reduced microbial contamination had a storage life of 18 weeks in vacuum over 24 weeks in 100% carbon dioxide at $-1.5^0$c.

Retail case life progressively deteriorated from 5 days to one and a half days during storage in 100% carbon dioxide for 24 weeks at $-1.5^0$c. Off-flavor development was not detected during 24 weeks of storage in 100% carbon dioxide when microbial contamination was reduced. Although cited laboratory studies provide a clear indication adequate storage life should be attainable to facilitate all export and domestic marketing activities. The processing system and packaging system described must be tested under commercial conditions. Despite these findings, available evidence clearly indicates that sufficient storage life is attainable to facilitate continental distribution of centrally processed meat, if product temperature is adequately controlled at $-1^0$c ($30^0$ F), and the contamination on the commercial product is reduced sufficiently to prevent spoilage organisms, including lactic, from rapidly growing numbers and producing early off-flavor development.

**15. Write a note on chilling, ageing and cutting of meat.**

Freshly slaughtered meat carcasses or primal cuts need to be cooled to below $40^0$ F within 24 hours to prevent souring or spoiling. The meat should be chilled at $32^0$ to $36^0$F. Variety meats (liver, heart or sweetbreads) are ready to be wrapped and frozen after they are cold.

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Cutting the meat is done depending upon the individual preferences for the number of servings and the type of cooking method to be followed, the meat can be cut into roasts, rolled roasts, steaks, chops, stew meat, ground meat etc., before freezing it.