FAQs

1. What is processed meat?

Post mortem muscle that has gone through major physical and / or chemical alterations is considered as processed meat. Meat processing includes chemical and enzymatic treatments, massaging and tumbling, curing, smoking, stuffing, cooking, canning, irradiation, dehydration, size reduction, mixing of meat with various additives etc. Meat and poultry products are primarily of two types, viz., (i) whole muscle and (ii) comminuted products. Whole muscle products can be cured or uncured products. There are several traditional as well as newly developed convenience meat and poultry products from whole muscle as well as from comminuted / minced meats.

2. What are the strategies for development of meat and meat products?

Animal production and meat processing strategies help develop healthier meat and meat products. Animal production strategies include production of lean meat by dietary manipulation, alteration of fat by increasing healthy fatty acids such as conjugated linolenic acid in feeds. I t also includes enriching meat by incorporating essential vitamins such as vitamin E and mineral such as selenium in feed formulations. Meat processing strategies include enriching meat with fiber and healthy fatty acids such as unsaturated fatty acids (Omega – 3 fatty acid), fortification of meat products with essential vitamins, minerals, antioxidants.

3. What are the non - meat ingredients used in meat products and what are their roles?

Addition of 10 – 15 % water helps in solubilization of proteins, temperature control and machinability. Common salt (1.5 – 5 %) enhances flavor, solubilises proteins, retards microbial growth and extends shelf life. Nitrite / nitrate (< 200 ppm) helps attractive color development, flavor protection and has bacteriostatic effect. Phosphates (< 0.5 %) improve water holding capacity. Sweeteners (sugar 1 – 2 %) reduce harsh hardening effect of salt and help develop attractive color due to browning. Inclusion of spices improves flavor of meat products.

4. What are the extenders used in meat product preparation and what are their roles?

Soybean products, cereal (wheat, barley, corn, rice) flours and potatoes (starch) are the generally used extenders / fillers used in meat products. They improve emulsion stability, water binding capacity and slicing characteristics, enhance flavor, reduce shrinkage and formulation costs.

5. What are the methods of cooking of meats?

Cooking is transfer of heat which affect quality and properties of meat and meat products. Transfer of heat in meat is low due to low thermal conductivity. The main objectives of cooking are to destroy food poisoning and spoilage organisms and to provide a firm texture by denaturing proteins. Conventional cooking used for fresh meat or processed meat may be

broadly classified in to dry heat and wet heat cooking. Baking, steaming, grilling and roasting are the main methods of dry cooking, while boiling, stewing, barbequing and frying are the wet cooking methods.

6. Describe briefly dry cooking methods of meat products.

The main features of dry cooking are: (i) No use of water to cook the food and (ii) Food is left dry and heat is applied directly to the food by way of convection. The action or movement of hot air around the food cooks it. Different dry cooking methods are:

- *Baking:* Food is put into an enclosed area where heat is applied and the movement of heat within the confined space acts on the food that makes it get cooked.

- *Steaming:* Water is added to a pot and a stand is placed inside the pot. The water level should be under the stand and not above it. There is no contact between the food and the water that is added to the pot. Food is then placed on the stand and heat is applied. The hot steam rising from the boiling water acts on the food and the food gets cooked. This method of cooking is very good as the food does not lose its flavor and much of the nutrients are not lost during the cooking.

- *Roasting:* Direct heat is applied to the food. The heat seals the outside part of the food and the juice inside the food cooks the food. Roasting is mainly used when cooking fleshy foods like fish, meat or chicken. There is very little nutrient loss and the flavor is not spoiled. Food is frequently rotated so that there is even heating applied to all parts of the food.

- *Grilling:* In this type of cooking, food is cooked over hot charcoal on an open fire. The food is placed on top of the burning charcoal. Sometimes food is placed over wire mesh over the open fire to grill fish or meat.

7. Describe briefly wet cooking methods of meat products.

The important methods of wet cooking are:

- *Boiling:* It is the most common method of cooking and is also the simplest. Enough water is added to food and it is then cooked over the fire. The action of the heated water makes the food to get cooked. During the heating process, the nutrients can get in to the water and the flavor may be reduced with this method of cooking.

- *Stewing:* Food is cooked using a lot of liquid. The pieces of meat, fish or chicken are chopped and added to the stew. The liquid is slightly thickened and stewed food is served in that manner. With this cooking method, every food is cooked together at the same time in one pot. In this way much of the nutrient contents of the food do not get lost.

- *Barbequing:* It is most suitable to cook meat cutlets, fish or chicken pieces. The food is usually marinated with spices and tenderizers (for meat cuts) for sometime before it is

cooked. With this method of cooking, a sheet of metal with stands is heated up and oil is used to cook the food. A sufficient amount of oil is heated up and food is added. The food is then turned over a couple of times before it is dished out.

- *Frying:* The two types of frying are:

Shallow fat frying: Food is cooked in a frying pan with a little amount of oil or fat and food is turned over a few minutes or is stirred around a couple of times before it is cooked and dished out.

Deep fat frying: Large amount of oil or fat is used in cooking the food and oil or fat is usually put into a deep pan and is heated to boiling point. Food is then put into the hot boiling oil and is cooked in that way.

8. What is curing of meat and what are curing methods?

Preservation of meat by using salt and salt mixtures is referred to as meat curing. Dry salt curing, pickle curing, artery pumping or injection curing (stitch pumping) and combination of any two of these methods are the different methods of curing. In the production of ham and bacon, pickle injection to the level of 10 % of its weight followed by 5 % dry cover cure is generally practiced to obtain best results. The concentration of pickle solution is maintained between 60 - 65° salinometer readings. About 36 h per pound of meat at temperature between 2 - 6 °C and at relative humidity of 80 - 85 % is suitable for ham and bacon curing.

9. How curing helps preserve meat?

Curing ingredients such as common salt, nitrate / nitrite inhibit bacterial growth by bringing down water activity. Nitrite / nitrate stabilize meat pigments and color, retard lipid oxidation and growth of pathogenic bacteria (*Clostridium botulinum*). Inclusion of phosphates in curing mixture improves meat texture by increasing water holding capacity of meat proteins.

10. What are drawbacks of nitrite / nitrate in the curing mixture and what are alternatives for nitrite / nitrate?

Nitric oxide from nitrite reacts with secondary amines in meat and produces nitrosamine, which is carcinogenic (cancer causing). Food regulations in many countries restrict the use of nitrite to 200 ppm in the final products. The potential alternatives suggested are: (i) Sorbic acid and sorbates, (ii) Sodium hydrophosphate and (iii) Fumarate esters. These compounds may be used with reduced nitrite levels. Irradiation also has been suggested with lower nitrite levels.

Acidulation by lactic acid producing bacteria is another alternative approach. Ascorbate and erythorbate also may be used as "blocking agents", which can trap surplus NO radicals.

11. How smoking of meat helps preservation of meat?

Cured meats are generally smoked. The cured meats are desalted for about 1 hour in running water to remove excess of salt and then subjected to smoking. The purpose of smoking meats are: (i) To develop of flavor and color, (ii) To give preservatives action to meats by controlling bacterial population and (iv) To retard fat oxidation. The phenolic constituents in smoke have bactericidal action. Smoke is generated by the slow combustion of wood. Modern smokehouses are provided with filters to remove dust and tarry particles and also with heaters to heat the smoke to the desired temperature. Hams and bacon are generally smoked up to 6 hours at smoke temperature of 60 °C. After curing and smoking, ham and bacon are covered with polythene sheets and stored in cool and dark place to avoid fading of color.

12. What are Indian traditional meat and poultry products? Mention steps involved in making tandoori chicken.

There are many traditional meat and poultry products in India. Biriyani, tandoori chicken, shami kabab, meat curries, chilli chicken, mutton fry and chicken fry are some of them. Tandoori chicken is a delicacy prepared from chicken of selected age group and cooked in a specially built oven called "Tandoor". The essential steps are: (i) Dressing and deskinning chicken (from 3 - 4 weeks old birds), (ii) Marination, *i.e.* application of a spice mix for a specified duration and (iii) Cooking in tandoor. The tandoor is heated with charcoal and is so constructed that the refractory surface of the interior creates radiant heat to 300 - 350 °C. The cooking done in a very short time at such high temperature imparts the desired texture and flavor characteristics typical of tandoori chicken. The critical factors which govern the quality of finished product are choice of bird, composition of marinating mix, duration of marination and manner of cooking. Important quality parameters are penetration of spices and texture, apart from the delicate flavor developed.

13. What are sausages and how they are made?

Sausages (Latin word *Salsus* means salt) are comminuted meat products containing salt, spices, fat and other ingredients. Ground meat sausages are prepared by chopping or grinding meat along with water / ice, salt and other ingredients. Emulsion type sausages are prepared by solubilising meat proteins and suspending fat particles in the protein solution. Various stages of sausage preparation are mixing of minced fat, curing mix (common salt, sodium nitrite, sodium tripolyphosphate, sugar), chopped onion, ginger, garlic etc, binders (milk powder, soyabean flour, soji, wheat flour), fillers (cereal flours, starch), extenders (carrot, cabbage) and dry spices with minced meat in a bowl chopper to obtain a dough. The dough is then stuffed in casings, linked, cooked / smoked and packed for storage and marketing.

14. What are shelf stable meat products?

The products which can be stored under ambient conditions without spoilage are referred to as shelf stable products. The basic approach to produce product with shelf stability is application of techniques like reduced water activity and controlled pH. Additives like salt and other humectants are used to retain high moisture in order to achieve better texture and other qualities.

15. Write a note on chicken pickle.

The product is developed using chicken meat, vinegar, salt, spices and other condiments. Optimization of ingredients with regard to pH, acidity, saltiness, taste and flavor is carried out and the final product has a pH of 4.2 and moisture level of 30 %. The product can be stored up to a period of 6 months at ambient temperature.