Meat fabrication and cooking: its relevance to the modern consumer

In the last few decades there has been a dynamic change in food consumption behaviour throughout the world, reflected in a 75% increase in global average per capita meat consumption and the fact that production has almost quadrupled (FAO, 2016).

by Faslu Rahman CK, Tameem, Geshali, Pratibha, S. Chand and S. Talukder, Division of Livestock Products Technology, ICAR-IVRI, Izatnagar, Bareilly, India.

Changing consumer preference to non-vegetarian food also indicates consumer awareness of muscle nutrients over the vegetarian equivalent.

However, they are less aware of the different nutritional values of different muscles of different body parts, which also need to be cooked differently.

To date, most shops are selling meat without much classification or as a whole without grading, which influences the modern consumer's knowledge about the importance of meat fabrication and the various cooking methods for different cuts.

From a nutritional point of view, meat is considered a rich source of essential amino acids, essential fatty acids and vitamins.

Organ meat, like liver, is quite an enriched source of vitamins and consequently plays an important role in fulfilling consumers' nutritional requirements.

However, the current practice of modern meat fabrication techniques are not well known among major meat eating populations.

It is therefore important to spread knowledge regarding various meat cuts and cooking methods among people involved in the meat industry, as well as consumers, in order to make the meat business more transparent and trustworthy.

Meat fabrication

The fabrication of a carcase may be defined as the art or skill of separating a carcase or wholesale primal cuts into different portions to suit various needs in the meat trade to facilitate easy handling. The main purpose of meat cutting is to facilitate handling and marketing of a large carcase into smaller convenient cuts for consumers.

The fabrication procedure varies according to geographical area, country and species of animal. Accordingly, various fabrication procedures include British cutting, Australian cutting, USDA cutting, and BIS cutting. Fabrication helps in separating tender meat from the tough portion, the thick portion from the thin portion, and the cheap part from expensive parts. During fabrication the muscle must be cut across the meat fibre.

In the Indian meat industry there is currently no grading system as in the US and other developed countries. But in India we follow the worldwide accepted system of meat fabrication for export purposes.

Fabrication of cattle and buffalo carcases is somewhat similar. Likewise sheep, goat and deer carcase fabrication is similar, whereas the pig carcase has a different fabrication process compared to other species (APEDA).

Cattle and buffalo carcase cuts

Beef carcases are split into two sides, right side or closed side and left or open side through the centre of the back bone. After chilling, each side is divided into quarters, the fore-quarter and hindquarter, between the twelfth and thirteenth rib. The major wholesale cuts fabricated from the forequarter are the chuck, brisket, foreshank, rib, and short-plate.

The hindquarter produces the short loin, sirloin, rump, round, and flank. The hindquarter is more tender than the forequarter and hence has more value than the forequarter.

● Forequarter cuts

The first cut is made between the fifth and sixth rib counting from the neck to the back. The cut is made parallel with the ribs and produces a cross cut chunk consisting of a square cut chuck, foreshank and brisket.

The foreshank and brisket are separated from the chuck by cutting through the first cartilage and making the cut almost parallel with the backbone of the carcase.

The foreshank is separated from the brisket by following the natural connective tissue seam between the muscle with a knife. Square cut chuck contains the first five ribs of the forequarter and may be sawn into steaks or roasts. The neck is severed at a point where it enlarges to meet the shoulder.

For separating short plate the cut is made from the rib 18-25cm from the inside edge and parallel with the brisket bone. The rib cut is made up of rarer seven ribs (sixth-twelfth) in the forequarter.

● Hindquarter cuts

The first step is to remove the kidney knob along the fat surrounding the inside of the loin. Removal of the flank by cutting into the scrotum or udder, closely following the round muscle.

The round and loin are divided at about the fourth sacral joint in the spinal column to almost parallel with the back end of the round or to about 5cm in front of the stifle joint, cutting tip of ball and socket joint.

The round includes rump, round cushion, outside round muscle and hindshank. Rump is separated by cutting just below the exposed pelvic or aitch bone.

The remaining part is hindshank. Loin, otherwise called short loin or sirloin, is the most tender and valuable cut obtained from beef.

Lamb carcase cuts

Lamb carcases are divided into two halves, the foresaddle and hind-

saddle. The foresaddle produces the major wholesale cuts of the neck, shoulder, rib, breast, and foreshank.

The hindsaddle produces the major wholesale cuts of the loin, sirloin, leg, and hind-shank.

The lamb carcase is divided into the foresaddle and hindsaddle by cutting between the last two ribs. The thin meat is taken off from the natural seam between flank and leg and forwarded to the last rib at a point midway to the level of the last rib. The cutting is continued to a point half an inch above the elbow joint that separates the shank and the rough breast.

The neck is removed at a point where it is blended with the shoulder. The cut is made between the fifth and sixth rib and the shoulder is removed. The portion left between the sixth and twelfth ribs is called rack and rib.

The loin is cut from the hindquarter by sawing just in front of the hip bone in between the last two lumbar vertebrae. The remaining portion, the leg, is the largest cut in the lamb carcase constituting about 32% of the carcase weight.

Pig carcase cut

Pork carcases are usually divided into two sides before chilling and each side is divided into four lean cuts plus other wholesale cuts. The four lean cuts are the ham, loin, Boston butt (Boston shoulder), and picnic shoulder. Other cuts include spare ribs, jowl and foot.

The anterior part of the pig carcase is called the rough shoulder and is separated from the posterior by cutting between the second and third rib. It is divided into jowl, Boston butt and picnic shoulder.

To separate the picnic shoulder and foreshank from the Boston butt, the cutting is done by passing the knife parallel to the cervical vertebrae.

The jowl is separated by cutting close to the neck. In the posterior part, to separate the loin from bacon or belly, the knife is passed through parallel to the dorsal vertebrae starting from the third rib.

Carcase cuts	Characteristics	Used to make	Recommended cooking methods
	Cattle/buffalo		
Chuck	Much muscle activity. Has a lot of tendons and a moderate amount of fat. Firm, tough and elastic.	Minced beef	Stewing Braising Broiling
Ribs	Some muscle activity. Fats are evenly spread. Tender.	Prime ribs Rib eye rolls	Roasting, shallow-frying Can also use: Stewing, broiling
	Pig		
Bacon	Tough. Contains a lot of fat.		Braising Stewing Roasting Deep frying Stir-frying Shallow-frying Steaming Roasting Broiling
Loin	Little muscle activity. Contains a moderate amount of fat. Tender. Easy to digest.	Pork chop fillet	

Table 1. Characteristics of major cattle/buffalo and pig carcase cuts and their recommended cooking methods (Pearson and Gillett, 2012).

Cooking methods

Meat fabrication has a great relevance to the eating quality of meat because different cuts should follow various cooking methods according to their character.

Animal muscles have different cooking behaviour according to their place of origin on the carcase.

Different major characteristics for carcase cuts of beef, carabeef and pork and their recommended cooking methods are presented in Table 1 above.

The basic cooking methods of meat include:

● **Moist cooking**
Relatively low temperatures are used which may prolong the cooking time of meat. Heat is applied through a liquid medium. The liquid medium may be water or steam. Moist methods include broiling/simmering, poaching, steaming, pressure cooker, slow cookers, stewing, and braising.

• **Broiling:**
Meat is cooked in broiling water to tenderise. The water reaches 100°C which causes rapid movement of the water molecules due to heat transfer by convection currents.

• **Steaming:**
Steamed food is cooked over broiling water, either on a hob or in an electric steamer. It is a gentler method of cooking in which the steam rises and cooks the food without it being actually in the water, through convection. The food keeps more of its water soluble vitamins.

● **Dry cooking**
Higher temperatures are used in dry cooking. Heat is applied directly to the meat chunk.

• **Roasting:**
This involves cooking foods in a hot oven with a little fat and turning occasionally to give a crispy surface. Heat is transferred by conduction which causes the water to evaporate from the food. This concentrates the flavours in the food.

• **Grilling:**
This is the cooking of food by radiation. The surface of the meat is quickly sealed and the flavour is well developed. Dry heat is applied to the surface of meat, commonly from above, below or from the side. Before cooking the meat must be moistened with fat to prevent drying out and turned frequently to ensure even cooking.

• **Barbecuing:**
Barbecuing is a method of cooking where meats are cooked on a metal grill over hot, glowing charcoal, or on a modern gas barbecue. The meat is cooked by radiation from the hot coals and if charcoal is used it gives the meat a smoky flavour.

● **Frying**
This is a quick and convenient method of cooking, which involves high temperatures. Heat is applied through a medium of fat or oil. Different frying processes are deep frying, shallow frying, dry frying etc.

● **Microwaving**
Microwaves are radio waves that are absorbed by fat, sugar and water but pass through glass, ceramics and plastic.

They move at the speed of light and have a very high frequency. Inside an oven, microwaves bounce off the metal walls, hit the food and are absorbed by it, causing heating of the food.

Conclusion

Meat occupies the most important part of a non-vegetarian diet all over the world. Meat fabrication is the art or skill of separating various carcases into easily handleable primal and sub primal cuts for various reasons.

Different muscles originating from various parts of the animal's body have a different composition so specific cooking methods are recommended.

Fabrication of the carcase and various recommended cooking methods should be followed to ensure a quality end product for modern day meat consumers. ■

References are available from the authors on request