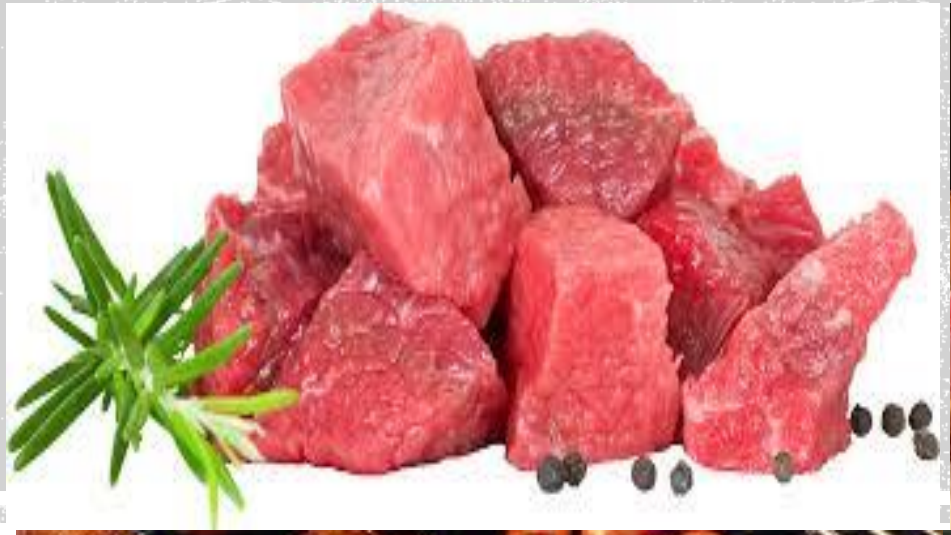
Meat Processing (By-Products)



MEAT BY-PRODUCTS

- The majority of the waste, in the meat industry is produced during slaughtering.
- Such waste includes bones, tendons, skin, the contents of the gastro-intestinal tract, blood and internal organs.
- Efficient utilization of meat by-products is important for the profitability of the meat industry.
- It has been estimated that 11.4% of the gross income from beef and 7.5% of the income from pork, come from the by-products.

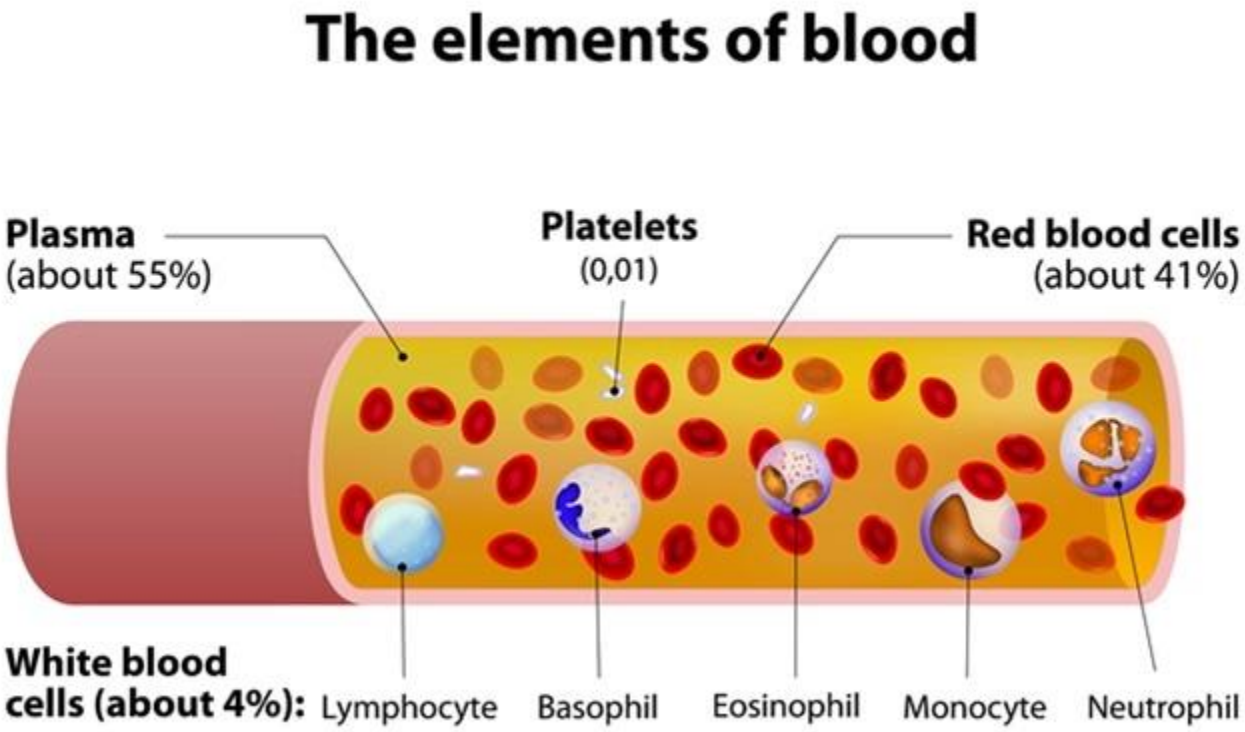
WHAT IS MEAT BY-PRODUCTS?

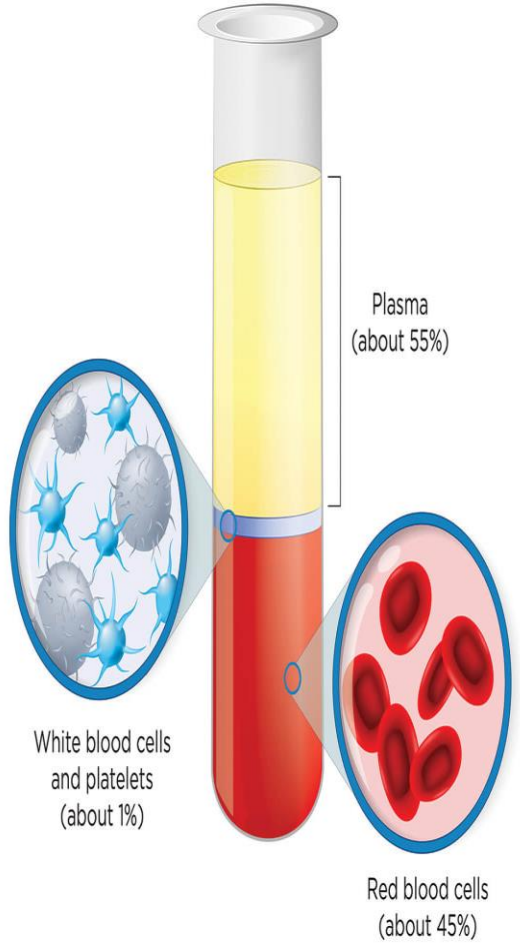
- **THE MEAT BY-PRODUCTS** are including organs, fat or lard, skin, feet, abdominal and intestinal contents, bone and blood of cattle, pigs and lambs represents 66, 52 and 68% of the live weight respectively.
- More than half of the animal by-products are not suitable for normal consumption, because of their unusual physical and chemical characteristics.
- As a result, a valuable source of potential revenue is lost, and the cost of disposing of these products is increasing.
- In addition to economic losses, unused meat products cause serious environmental pollution.
- However with improved utilization, meat by-products can give a good profit to meat processors.

UTILIZATION OF BLOOD

- Animal blood has a high level of protein (17%) with a reasonably good balance of amino acids and heme-iron.
- In Europe, animal blood has long been used to make blood sausages, blood pudding, biscuits and bread.
- In Asia, it is used in blood curd, blood cake and blood pudding.
- It is also used for non-food items such as fertilizer, feedstuffs and binders.
- According to the Meat Inspection Act of the United States, blood is approved for food use when it has been removed by bleeding an animal that has been inspected and passed for use in meat products.
- Blood is usually sterile in a healthy animal.
- However, the use of blood in meat processing may mean that the final product is dark in colour, and not very palatable.

BLOOD TO PLASMA (AFTER CENTRIFUGE)





UTILIZATION OF BLOOD PLASMA

- Plasma is the portion of blood that is of greatest interest, because of its functional properties and lack of colour.
- It is used in food as an emulsifier, a stabilizer, a clarifier, a colour additive, and as a nutritional component.
- Most blood is used in livestock feed in the form of blood meal.
- It is used as a protein supplement, a milk substitute, a lysine supplement or a vitamin stabilizer, and is an excellent source of most of the trace minerals.
- Blood plasma has ability to form a gel, because it contains 60% albumin.
- Plasma is the best water and fat binder of the blood fraction.
- Plasma gels appear very similar to cooked egg whites.
- Plasma forms a gel at a protein concentration of 4–5% and the strength of the gel increases with increasing concentration.
- Blood plasma also has an excellent foaming capacity, and can be used to replace egg whites in the baking industry.

UTILIZATION OF HIDES AND SKINS

- Hides and skins are generally one of the most valuable by-products from animals.
- Animal hides have been used for shelters, clothing and as containers by human beings since prehistoric times.
- The hides represent a remarkable portion of the weight of the live animal, from 4% to as much as 11% (e.g. cattle: 5.1–8.5%, sheep: 11.0–11.7%.
- Examples of products from hides of cattle are leather shoes and bags, rawhide, athletic equipment, reformed sausage casing and cosmetic products, sausage skins, edible gelatine and glue.
- Pork skin is similar to human skin, and can be converted into a dressing for burns or skin-ulcers.

UTILIZATION OF GELATIN

- Gelatin extracted from animal skins and hides can be used for food.
- Collagen from hides and skins also has a role as an emulsifier in meat products because it can bind large quantities of fat.
- Gelatin is added to a wide range of foods major ingredient in jellies.
- Also widely used as a stabilizer for ice cream and other frozen desserts.
- High-bloom gelatine is added as a protective colloid to ice cream, yoghurt and cream pies.
- Inhibit the formation of ice crystals and the recrystallization of lactose during storage.
- Gelatin can also be used as a binding agent in medicated tablets.
- It is used as an important ingredient in protective ointment, such as zinc gelatin.

UTILIZATION OF BONE

- 11% percent of pork carcasses, 15% of beef carcasses and 16% of lamb carcasses are bone.
- The marrow inside some of the bones can also be used as food.
- The marrow may be 4–6% of the carcass weight.
- For centuries, bones have been used to make soup and gelatine.
- Meat and bone meal (MBM) is widely recommended and used in animal nutrition as a protein source in place of proteinaceous feeds because of its content of available essential amino acids, minerals and vitamin B_{12}.
- MBM and related rendered protein commodities have potential for use in applications other than animal feed or a phosphorus fertilizer.

UTILIZATION OF GLANDS AND ORGANS

- **Glands and Organs are** including the brain, heart, kidneys, liver, stomach, lungs.
- Animal organs and glands offer a wide variety of flavours and textures, and often have a high nutritional value.
- They are highly prized as food in many parts of the world, particularly Southeast Asia.

UTILIZATION OF GLANDS AND ORGANS

Heart

- Heart is used as a table meat.
- Whole hearts can be roasted or braised (cook through lightly heat). Sliced heart meat is grilled or braised.
- Heart meat is often also used as an ingredient in processed meats.
- Liver is the most widely used edible organ. It is used in many processed meats, such as liver sausage and liver paste.
- Animal intestines are used as food after being boiled in some countries.
- Animal intestines are also used in pet food or for meat meal, tallow or fertilizer.

UTILIZATION OF GLANDS AND ORGANS

Intestines

- The most important use of the intestines is as sausage casings.
- Brains, nervous systems and spinal cords are a source of cholesterol which is the raw material for the synthesis of vitamin D3.
- Cholesterol is also used as an emulsifier in cosmetics.
- Bile consists of acids, pigments, proteins, cholesterol etc., and can be obtained from the gall bladder. It is used for the treatment of indigestion, constipation and bile tract disorders.

BEEF LIVER

UTILIZATION OF GLANDS AND ORGANS

Liver

- Liver extract can be obtained from pigs and cattle, and has been used for a long time as a source of vitamin B12, and as a nutritional supplement used to treat various types of anaemia.
- Heparin is used as an anticoagulant to prolong the clotting time of blood. It is also used to thin the blood, to prevent blood clotting during surgery and in organ transplants.
- Progesterone and oestrogen can be extracted from pig ovaries. It may be used to treat reproductive problems in women.

UTILIZATION OF EDIBLE TALLOW AND LARD

- Animal fats are an important by-product of the meat packing industry.
- The major edible animal fats are lard and tallow.
- Lard is the fat rendered from the clean tissues of healthy pigs.
- Tallow is hard fat rendered from the fatty tissues of cattle or sheep.
- However, because of consumer demand, lard and tallow are now often bleached and given a deodorizing treatment before being used in food.
- Traditionally, tallow and lard were used for deep frying.
- However, this use is declining in the fast-food industry, due to consumer health concerns.
- Tallow and lard are also used for margarine and shortening.
- Some edible lards are used in sausages or emulsified products.

MEAT INDUSTRY IN BANGLADESH

- **Livestock Sector:** Bangladesh has a sizable livestock sector, including cattle, goats, sheep, poultry, and fish. Cattle are predominantly raised for meat, milk, and draft purposes. The country also has a significant number of backyard poultry farms.
- **Traditional Slaughterhouses:** The majority of meat processing in Bangladesh occurs in traditional slaughterhouses, often lacking modern equipment and facilities. These slaughterhouses primarily cater to local demand and may not adhere to strict hygiene standards.
- **Modern Meat Processing Facilities:** In recent years, there has been a gradual emergence of modern meat processing facilities in Bangladesh, equipped with advanced machinery and adhering to international quality and hygiene standards. These facilities focus on producing processed meat products like sausages, burgers, and nuggets.

COMPANIES INVOLVED IN MEAT PROCESSING, AND DISTRIBUTION

- Bengal Meat
- Deshi meat
- Kazi Farms Group
- Aftab Bahumukhi Farms Ltd.
- Paragon Group
- AG Foods, etc.

RECENT TRENDS IN MEAT PROCESSING

Recent trends in meat products cater to consumer needs for nutrition, health, and natural products. The meat sector employs novel strategies to enhance quality, safety, and nutritional value. Lipid oxidation is a key concern, prompting the use of antioxidants, including natural plant extracts, to maintain product freshness and safety. This can be described by below segment.

- **Diversification of Meat Offerings**: Consumer preferences are shifting towards meats from diverse cultural backgrounds, such as Middle Eastern lamb and Asian pork. Retailers and brands are responding by expanding their meat offerings, with products like chorizo seeing significant sales growth, particularly in online channels.

RECENT TRENDS IN MEAT PROCESSING

- **Projected Increase in Global Meat Consumption**: The United Nations forecasts a 14% increase in global meat consumption by 2030, driven by rising income levels and population growth. This trend underscores the importance of meeting growing demand through innovative preservation technologies and sustainable production practices.
- **Rise of Plant-Based and Frozen Meat Products**: Plant-based meats, like burgers and nuggets, are gaining popularity alongside a growing demand for healthier, quality frozen meat products. This trend reflects changing lifestyles, with millennials seeking convenient yet nutritious options to balance family and career responsibilities.

RECENT TRENDS IN MEAT PROCESSING

The fundamental factors that influence the shifts in meat processing trends:

- **Recent Technological Advances**
- **Health and Wellness Trends**
- **Sustainability Initiatives**

RECENT TECHNOLOGICAL ADVANCES

- **Automation and Robotics:** Increasing use of automation and robotics in meat processing facilities for tasks such as portioning, packaging, and quality control, leading to improved efficiency and consistency.
- **High-pressure processing (HPP):** HPP technology is gaining popularity for its ability to extend the shelf life of meat products by applying high pressure to eliminate pathogens while preserving freshness and nutritional value.
- **Advanced Packaging Materials:** Adoption of innovative packaging materials with properties like antimicrobial coatings, oxygen scavengers, and vacuum sealing to enhance shelf life and maintain product quality.

HEALTH AND WELLNESS TRENDS

- **Clean Label Products:** Growing consumer demand for "clean label" meat products made with minimal additives, preservatives, and artificial ingredients, reflecting a preference for natural and wholesome foods.
- **Functional and Fortified Meats:** Development of meat products fortified with vitamins, minerals, omega-3 fatty acids, and other functional ingredients to offer health benefits such as improved heart health, immune support, and muscle recovery.

SUSTAINABILITY INITIATIVES

- **Plant-based Meat Alternatives:** Rising popularity of plant-based meat substitutes made from ingredients like pea protein, soy, and mushrooms, catering to vegetarian, vegan, and flexitarian consumers concerned about environmental sustainability and animal welfare.
- **Sustainable Sourcing Practices:** Increased emphasis on sustainable sourcing of meat from ethical and environmentally responsible farming practices, including pasture-raised, organic, and grass-fed livestock.

Recent trends in meat processing reflect evolving consumer preferences, technological advancements, and sustainability concerns shaping the future of the industry.