

MEAT AND MEAT PRODUCTS CATEGORISATION: A REVIEW

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ABSTRACT

This review deeply explores meat and meat products, emphasising their categorisation based on various criteria including production standards, species, source, country origin, structural shapes, degree of processing, degree of their moisture contents and parts of animal processed from. It emphasises the diverse spectrum of edible animal tissues used globally, from livestock to unconventional animals such as insects and reptiles, highlighting the cultural and culinary importance of meat intake around the world. The classifications mentioned providing insights into industrialised multinational items and traditional local specialties, addressing standardisation, quality, and safety concerns while safeguarding historical practices. These systematic categorisations help to promote inclusive trade, food modernisation, and cultural consciousness.

Keywords: Meat products, Conventional and unconventional sources, Categorisation.

INTRODUCTION

Meat refers to all edible animal tissues that are suitable as human food (Boler and Woerner, 2017; Liu *et al.*, 2017), mostly acquired from livestock animals which include cattle, sheep, swine, horse, camel, rabbit, poultry, and fish species, and even dogs (Liu *et al.*, 2017). Other animals eaten include game animals, insects, rodents, amphibians, reptiles, crustaceans, molluscs, and many aquatic species. International meat is usually sold fresh, frozen, canned, or other-wise processed as patties, sausages, barbeque, pizza, burger, *kilishi*, beef jerky, and are also regarded as meat products (Liu *et al.*, 2017).

Meat products refer to the raw or cooked meats that utilise animal flesh or their edible by-products as the main ingredient, adding or not adding food accessories, to be processed by curing, drying, saucing, spicing, steaming, stewing, smoking, roasting, baking, frying, shaping, or fermenting (Liu *et al.*, 2017). The term meat products encompasses a wide range of animal tissues that are prepared and eaten in various culinary traditions around the world (Boler and Woerner, 2017), and are classified into multiple groups based on certain criteria.

A. Classification of meat products based on standard

i. **Standard meat products:** refer to meats that are formally produced, processed, and consumed across different countries, often imported or exported as part of global trade. These products are typically standardised to meet international quality and safety regulations using a documented recipe and methods. They are produced in large quantities using industrial farming and processing techniques with consistency in quality and packaging to meet global market requirements of agricultural products. Widely available in supermarkets and restaurants around the world marketed under well-known international brands. Examples include patties and sausages (Ferro *et al.*, 2015).

ii. **Local meat products:** refer to meats that are produced, processed, and consumed within a specific region or country. These products often reflect the traditional practices, cultural preferences, and local ecosystems of their place of origin. They are produced using traditional, artisanal methods with emphasis on heritage animal breeds and local ancient recipes in smaller quantities compared to industrial agribusiness. Mostly consumed within the locality, state, region, or country of production, and often featured in local cuisines and traditional dishes. Availability outside the domain is limited due to smaller production scales and preservation methods. Example *kilishi*, *kebab*, *dambun-nama*, *ganda*, *pomo*, *ishewu*, *asun*, *kundi*, and *ragadada* etc. Most of those traditional products have not been industrialised well due to the inadequate standardised processing, which results in difficulties in safety control, low consistency in product quality, and high amounts of salt and nitrite or nitrate (Gagaoua and Boudechicha, 2018). Even the processing technology of some traditional meat products are mainly based on experience with the process being delivered by master to student (Liu *et al.*, 2017).

B. Classification of meat products based on species of animal it is derived from

Meat products are classified based on the species of animals they are obtained from, including mammals, poultry, seafood, and insects. Each species offers a variety of meat products with distinct characteristics in terms of appearance, flavour, texture, nutritional content, and culinary uses. This classification helps in understanding the diversity in meat consumption and culinary applications across different cultures and countries (Table 1).

Table 1: Classification of meat products based on class and species of animal

Species	Products name	Description	Sources
Cattle (beef)	Beef steaks	Grilled or fried thick cut of meat sliced across the muscle fibres of beef	Yeh <i>et al.</i> (2018)
Sheep(Mutton)	Mutton stew	Chunks of mutton in a spicy, warming stew, with the flavour of lemon	David, (2008)
Goat (Chevon)	Goat curry	Flavourful and aromatic dish made with tender pieces of chevon cooked in a rich, spiced gravy	Narayan <i>et al.</i> (2013)
Bison/Buffalo	Bison burgers	Burger made with ground buffalo meat and seasoned with sage, topped with smoky barbecue sauce	Bain (2014)
Rabbit	Rabbit sausages	Ground rabbit meat, mixed with spices, and occasionally other ingredients like pork fat	Honrado <i>et al.</i> (2022)
Chicken	Grill thighs	Chicken thigh cuts that are seasoned with spices, marinades, or herbs and cooked on a grill	Kim <i>et al.</i> (2021)
Turkey	Ground turkey	Ground turkey meat shaped into shapes, seasoned with spices and other ingredients, and cooked by grilling, frying, or baking	Wong <i>et al.</i> (1993)
Duck	Duck confit	Duck legs slowly cooked in their own fat, seasoned with spices and preserved by dipping them in the rendered fat	O'Neill (1992)
Goose	Roasted goose	Whole goose meat spiced with seasoning cooked using dry heat with hot air enveloping it evenly on all sides	Ch'en <i>et al.</i> (2012)
Quail	Grill quail	Whole quail or quail pieces marinated or seasoned with spices then cooked on a grill	Genchev <i>et al.</i> (2008)
Termites	Fried termites	Ample termites spiced with seasonings cooked by frying using their body fat	Van Huis (2017)
Cockroaches	Roach roast	Cockroaches seasoned with spices or marinades, and roasting	Ramos-Elorduy (1998)
Cricket	Cricket crispies	Crickets seasoned with spices, and roasted or fried until crispy	Promkhan <i>et al.</i> (2020)
Locust	Fried locust	Locusts seasoned with spices usually cooked by deep-frying in oil	El Hassan <i>et al.</i> (2008)
Snake	Snake jerky	Snake meat thinly sliced, typically marinated with spices and dehydrated	Chase (2002)
Lizard	Grill lizard	Lizard meat seasoned and marinating cooked over an open flame or on a grill,	Collingham (2006)
Frog	Frog leg	Hind legs of frogs, coated with breadcrumbs and then fried or cooked	Kusrini and Alford (2006)

C. Classification of meat products based on source of the animal it was harvested

i. Domestic meat products: refer to meat products obtained from animals that are raised and bred in controlled environments such as farms, ranches, or agricultural settings. These animals are domesticated and some have been selectively bred over generations for specific qualities such as meat production, growth rate, and temperament. Common domestic meat source animals include cattle, pigs, goat, sheep, chickens, turkeys, rabbit, and ducks (Mukesh *et al.*, 2022).

ii. Game meat products: refer to meat products that come from undomesticated animal species that are hunted or trapped in their natural habitats. These animals are uncultured and live freely in the wild. Common species of animals include deer, wild boar, elk, bison, wild rabbits, pheasants, elephant, and kangaroos (Niewiadomska *et al.*, 2020).

D. Classification of meat products based on country or city of origin

Meat products are categories on the bases of their country or city of origin, which highlights the diversity in global culinary practices and the importance of regional specialties. Each region has its own traditional methods and recipes, contributing to the rich display of global cuisine. This classification helps in appreciating the cultural significance and unique cuisines associated with each meat product. Breakdown of some notable meat products and their places of origin are presented in Table 2.

Table 2: Classification of meat products based on country or city of origin

Country	Products name	Description	Sources
United States	Texas BBQ	Smoked brisket, ribs, pulled pork	Morthland and Harrison (2012)
Canada	Montreal smoked Meat	Cured and smoked beef brisket (Montreal)	Bauer (2017)
Argentina	Matambre	Flank steak, often stuffed and rolled	Brooks (2003)
Brazil	Churrasco	Barbecue style with various cuts of beef, pork, and chicken	Ferreira (2016)
France	Foie Gras	Fatty liver of duck or goose (Aquitaine region)	DeSoucey (2016)
United Kingdom	Haggis	Traditional Scottish dish made from sheep's pluck	Fraser (2011)
China	Char Siu	Cantonese-style barbecued pork (Guangdong)	
India	Tandoori Chicken	Marinated and roasted chicken (Punjab)	Nair <i>et al.</i> , (1995)
South Africa	Biltong	Air-dried cured meat, usually beef or game	Jones <i>et al.</i> , (2017)
Morocco	Tagine	Slow-cooked stew with meat like lamb or chicken	Norman (2015)
Australia	Kangaroo Meat	Popular and widely consumed	Waitt, (2014)
Lebanon	Shawarma	Thinly sliced meat, typically lamb or chicken	Armstrong (2017)

E. Classification of meat products based on structural appearance

Meat products can be classified based on their structural appearance into categories such as whole muscle, restructured, comminuted, cured, smoked and fermented meat products. Each category represents a different level of processing and preparation, affecting the texture, flavour, and culinary uses of the meat. This classification helps in understanding the variety of meat products available and their specific characteristics.

i. Whole muscle meat products: refer to meat products that are made from whole cuts of meat with minimal processing. They retain their natural muscle structure and appearance. Example: Whole poultry: whole chicken, turkey, duck.

ii. Restructured meat products: refer to meat products are made from smaller pieces of meat that are bound together using additives, mechanical methods, or a combination of both. They are processed to form a consistent and uniform product. Example: Meatloaf: ground beef or pork mixed with binders and seasonings, shaped and cooked.

iii. Comminuted meat products: refer to meat products are made from meat that has been finely chopped, ground, or minced. These products often include added ingredients such as seasonings, binders, and fillers. Examples: Sausages: Hot dogs, bratwurst, Italian sausage.

iv. Cured meat products: refer to meat products that have been treated with curing agents such as salt, nitrates, and sometimes sugar, to preserve them and enhance their flavour. Examples: Bacon: cured.

v. Smoked meat products: refer to meat products that have been exposed to smoke from burning wood or other materials to impart flavour and preserve the meat. Examples: Smoked ham, smoked pork leg

vi. Fermented meat products: refer to meat products that undergo a controlled fermentation process where beneficial bacteria convert sugars into acids, resulting in distinctive flavours and extended shelf life. Examples: Pepperoni: fermented and dried sausage, typically used on pizza.

F. Classification of meat products based on degree of processing

i. Primary meat products: simply refers to those meat products we obtain directly from animals which do undergo little or no transformation process. Examples; fresh meat, fresh viscera, frozen meats.

ii. Secondary meat products: simply refers those meat products we obtain indirectly by transforming primary meat products to form a new product. Examples; hamburger, sausage, meat floss (dambu nama), kilishi, beacon, meat loaf.

iii. Tertiary meat products: refers to those meats products produced by further transformation of secondary meat products to create entirely new novel meat product.

G. Classification of meat products based on parts of animal processed from

i. Carcass meat products: refers to those products derived from the skeletal muscles of animals, this is the most commonly consumed part. Examples: Steaks, fillets, balangu, tsire.

ii. Viscera offal products: refers to those products processed from viscera of animals, includes internal organs and glands. Examples: Liver (liver pate), viscera pepper soup.

iii. **Dark offal products:** refers to those products processed, head, skin/ hide, tail, and legs of animals. Examples: Cow legs pepper soup, nganda, cow tail pepper soup, pomo etc.

H. Classification of meat products based on their degree of moisture content

i. High-moisture meat products: refers to those products that possess high level of moisture, often close to their fresh or processed state. Examples: Fresh meat cuts (e.g., steaks, chicken breasts), boiled or steamed meats, BBQ.

ii. Intermediate-moisture meat products: refers to those products that have undergone some processing to reduce moisture content, but they still retain water to remain palatable. Examples: Smoked meats (e.g., smoked ham, bacon), cured meats (e.g., salami, pepperoni), semi-dried sausages, kilishi etc.

iii. **Low-moisture meat products:** refers to those products are extensively dried or dehydrated, with very low water content, resulting in a firm or hard texture and extended shelf life. Examples: Jerky, dried sausages (e.g., chorizo), biltong etc.

CONCLUSION

Categorisation of meat and meat products highlight the diversity and complexity of global meat product. These distinctions not only ease understanding of meat diversity but also aid in standardising quality, enhancing safety, and preserving traditional practices amidst industrial advancements. Such inclusive classifications promote foundation for global trade, food innovation, and cultural appreciation.

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