

A Review of the Beef Food Chain

Summary Document



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Background, Purpose and Scope

During 2006, **safefood** undertook a farm to fork review of the beef food chain. The review describes how beef is produced, processed, sold and consumed on the island of Ireland.

The aim of this review is to address issues of consumer concern and to provide consumers with relevant information to help them make informed choices about the food they eat. This review is one of a series of food chain reviews that **safefood** is carrying out over a three-year period. Previous reviews have looked at chicken, finfish and fruit and vegetables.

The review outlines the beef industry on the island, the basic processes by which both domestic and imported beef enters the consumer food chain, and the controls in place to protect consumers from potential risks. It covers the food hygiene practices that consumers should follow when storing, preparing and cooking beef, and examines the nutritional and health benefits of eating beef.

As part of the review process, **safefood** conducted research into consumer awareness and perceptions of the nutrition and food safety issues regarding beef. The findings highlighted key issues of consumer concern such as the cooking of beef and the presence of *Escherichia coli* (*E.coli*)*. Despite these concerns, consumers considered beef to be a safe and nutritious food. Since the Bovine Spongiform Encephalopathy (BSE) crisis and high profile *E. coli* outbreaks, new regulations and farm practices have been introduced. As a result, confidence in beef has largely been restored.

This summary gives a brief overview of the findings of the review and a full report is available on **safefood**'s website at www.safefood.eu

* Also known as Verocytotoxigenic *Escherichia coli* (VTEC)

Consumers and Beef

safe food research shows that three out of four people on the island of Ireland eat beef regularly. The main reason given is that it tastes good and is enjoyed.

Minced beef, burgers and steak are the most popular types of beef consumed, with minced beef being a popular choice for weekdays. The Sunday roast dinner remains a favourite as are casseroles and stew-type dishes.

Consumer concerns about beef included how it was cooked, its country of origin and the presence of contaminants such as hormones and antibiotic residues. To address any concerns they may have, consumers relied on quality assurance marks, place of purchase and country of origin to reassure them.

To further explore some of the issues raised by the research, a number of focus groups were carried out. These groups considered beef to be a relatively healthy food and a good source of protein, iron and other nutrients. Consumers did

consider it to be high in fat, but reported being discerning in the cuts they chose, removing excess fat and using low fat cooking methods.

Beef was regarded as both convenient and versatile and also a low-risk food in terms of food safety. BSE and *E. coli* were mentioned by consumers but were no longer considered to be major issues. Consumers expressed enhanced confidence in beef through the establishment of agencies such as the Food Safety Authority of Ireland (FSAI) and the Food Standards Agency in Northern Ireland (FSANI). When it came to minced beef, however, consumers claimed to be more cautious and acknowledged inherent risks within the product, for example, that it required more thorough cooking.

When asked during research how they liked their burgers cooked, three out of four respondents indicated “well done” though some expressed a preference for “medium” or “rare”. However, minced meat, burgers, rolled meats and kebabs should always be cooked until piping hot all the way through, with no pink meat remaining and the juices running clear.

When thinking of country of origin, consumers generally categorised beef as being “Irish”, “British” or “foreign”, rather than specific cattle breeds or farms. Beef on the island of Ireland was seen to be “world class”. “Local” beef in particular had popular appeal among consumers, as it was perceived to be healthy and fresh. In general, consumers did not have any concerns about beef from outside the EU.

Country of Origin Labeling

In 2006 new legislation was enacted in the Republic of Ireland which requires restaurants and catering establishments to provide information to consumers on the country of origin of the beef served on their premises. This legislation was introduced on the basis of consumer choice.

This country of origin information is not a requirement in Northern Ireland.



The Supply Chain

In economic terms, the beef sector is a very valuable commodity, with a total gross annual turnover of €2.4bn/£1.6bn on the island of Ireland.

In Northern Ireland, the beef and sheep sectors account for the largest share of gross turnover in the food processing sector at 23 percent (£580/€879 million). In the Republic of Ireland cattle and beef account for the largest share of Gross Agriculture Output at 29 percent (€1.5/£1.0 billion).

Production

Cattle on the island of Ireland are reared mainly on grass, which is grazed in the spring, summer and autumn. During winter months cattle are housed indoors and fed grass silage.

Cattle are reared for slaughter or for export as live animals. In 2006 2 million and 460,000 cattle were slaughtered for the food chain in the Republic of Ireland and Northern Ireland, respectively. The majority of cattle slaughtered were aged between 18 and 30 months.

Imports

The Republic of Ireland produced 569,000 tonnes of beef in 2006; 90 percent of this was exported. However, 33,000 tonnes were imported which represented 5.5 percent of total beef available in that year.

Most of the beef imported into the Republic of Ireland is from the UK (56.5 percent) with Brazil, at 18.6 percent, the largest supplier outside the European

Union (EU). Imports from other EU Member State countries in 2006 were approximately 24.9 percent.

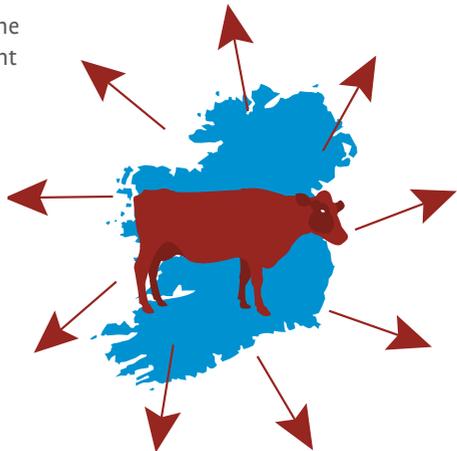
Import data for Northern Ireland are not available separately from total UK data.

Exports

In 2006, 73 percent (104,000 tonnes) of all the beef produced in Northern Ireland was sold in Great Britain, 18 percent was sold on the home market, while 9 percent was sold to other EU countries.

In 2006, the Republic of Ireland exported approximately 90 percent of the beef produced (516,000 tonnes) and 250,000 live cattle. The UK market represented the largest export market receiving 48 percent of all exports (250,000 tonnes).

Other significant markets within the EU were France (52,000 tonnes), Italy (51,000 tonnes) and the Netherlands (45,000 tonnes). For live animal exports, the largest markets were Spain, Italy and the Netherlands with 72,000, 67,000 and 52,000 head exported, respectively. Outside the EU the main market for beef is Russia (30,000 tonnes in 2006).



Food Safety and the Food Chain – from farm to fork

The safety of both domestically produced and imported beef is regulated by legislation primarily enforced by the FSAI and the FSA.

Quality assurance schemes also operate in both jurisdictions to promote standards for the production of beef produced on the island and to safeguard markets for beef and beef products.

Regulation of the food chain

Hygiene laws for EU Member States, commonly referred to as ‘The Hygiene Package’, cover all aspects of the food chain from a food hygiene perspective, including extensive measures to ensure the safety of beef from farm to fork. The Hygiene Package also deals with imported beef. The regulation of suppliers and produce onto the EU market is the responsibility of the European Commission’s Food and Veterinary Office.

In the Republic of Ireland, the FSAI has service level contracts with the Health Service Executive (HSE) and the

Department of Agriculture, Fisheries and Food to oversee the enforcement of the Hygiene Package and other national and EU legislative and safety programmes. The Department of Agriculture, Fisheries and Food is also responsible for the control of all beef and beef products from primary production through to the point of retail and its veterinary inspectors enforce EU standards through inspections at primary level and also at slaughter in abattoirs. Local authority veterinarians are responsible for small establishments. The HSE, through its Environmental Health Officers (EHOs), has responsibility at the point where food enters a distribution network and retains control until final sale to the consumer.

In Northern Ireland, official veterinarians and district councils through EHOs enforce the Hygiene Package and other food safety legislation.

If a health risk is discovered during the testing and monitoring of beef, an investigation will lead to the issuing of a food alert. If necessary, a food recall will be undertaken by the respective food safety agencies on the island.

Foodborne illnesses associated with beef

The incidence of foodborne illnesses associated with beef is relatively low when compared to other foods. The most common cause is *Salmonella*. However, a significant food poisoning organism *E. coli* O157 is associated with beef and beef products, usually minced beef products. The result of an infection can be serious leading to long term health implications and in certain cases, death, particularly in vulnerable groups such as the elderly, the very young, and the immunocompromised.

As a result of a number of outbreaks of food poisoning associated with beef contaminated with *E. coli* O157, most notably an outbreak in Scotland in 1996 resulting in 18 deaths, a radical overhaul of how the beef food chain operates was undertaken. New legislation and regulations concerning the handling

of animals at the time of processing, through to the separation of raw and cooked meats in butchers' outlets were introduced and, in recent years, the incidence of *E. coli* outbreaks from beef and other foods has decreased.

In 1986 a previously unknown condition emerged in cattle in the UK. This condition was identified as BSE or as it is commonly known, "Mad Cow Disease". While measures were being put in place to control the disease in cattle, a new form of an already existing human condition, Creutzfeldt - Jakob disease (CJD), was identified and linked to the consumption of beef contaminated with BSE. The emergence of BSE, and its link to variant CJD, has been singularly responsible for the most significant changes to how beef is produced and regulated in the modern farming era.

While the exact origins of BSE are still uncertain, the general scientific consensus is that the disease was facilitated by the practice of including meat-and-bone meal (MBM) in cattle feed. MBM is a by-product of the beef processing industry and was primarily used in the formulation of cattle feed to improve the protein quality of the feed.

To control BSE and reduce the risk of exposure to humans, a series of new regulations was put in place. These included the ban on the use of MBM in animal feed; the removal of specified risk material (SRM) from carcasses before entering the food chain (these are organs and tissues most likely to harbour the infectious BSE agent); the testing of all cattle over thirty months for BSE (in the UK this measure was extended to the 'Over Thirty Month' rule whereby from 1996 only animals younger than 30 months were permitted to enter the food chain); and a ban on the use of mechanically recovered meat from cattle. Furthermore, the establishment of national food safety regulatory bodies such as the FSAI and FSA coupled with enhanced monitoring and traceability systems have greatly restored confidence in the wake of the BSE crisis.

The combined effect of these controls and regulations has resulted in the numbers of BSE cattle dropping from its peak of 500 cases in the mid 1990s on the island of Ireland to 37 in 2007. Consequently, a number of restrictions have been lifted including the 'Over Thirty Month' rule in the UK. However, all cattle over 30 months

must still be tested for the absence of BSE before they enter the food chain.

Contaminants and Residues

The incidences of chemical residues in beef are largely due to the use of veterinary medicinal products at primary production level, while chemical contaminants can occur due to environmental exposure to substances such as pesticides and pollutants.

Monitoring regimes are in place for potential chemical contaminants entering the beef chain by the respective competent authorities on the island of Ireland.

With regard to veterinary medicinal products, the levels of authorised medicines found in beef tested on the island of Ireland were below those levels considered to be of human health concern in the period from 2003 to 2006. During the same period, authorities in the Republic of Ireland and Northern Ireland reported no evidence of the use of banned hormones in beef in their monitoring programmes. The integrated approach by all regulators and stakeholders in the industry

highlights the safety and integrity of beef production systems on the island of Ireland.

Quality Assurance

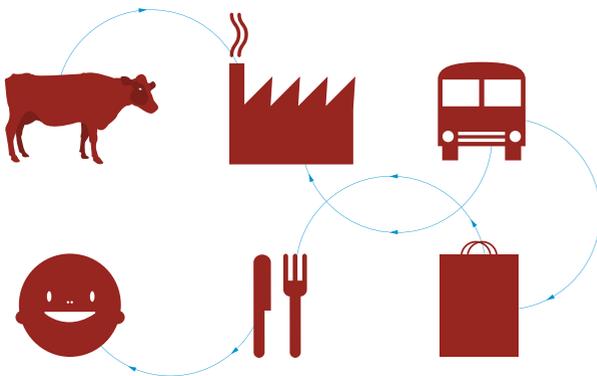
A number of quality assurance schemes exist on the island of Ireland. In Northern Ireland, the Farm Quality Assurance Scheme is owned by the Livestock and Meat Commission and supported by the Department of Agriculture and Rural Development. In the Republic of Ireland there are two schemes, the National Beef Assurance Scheme run under the auspices of the Department of Agriculture, Fisheries and Food, and the Bord Bia Quality Assurance Scheme. All schemes are concerned with providing assurances

to retailers and consumers of the production standards of farms on which beef is produced.

Traceability

Traceability is now the foremost tool in ensuring the integrity of the beef food chain and underpins consumer confidence in it.

While there are slight differences in the approaches taken, all cattle on the island of Ireland must now be traced from birth through to processing, and identification data is recorded and maintained on central databases.



Other innovations in the area of traceability include commercial systems such as DNA Traceback™ which allows traceability of beef back to individual animals and is used by some of the large retail multiple outlets.

Food Hygiene

Beef carries little risk of food borne disease when handled properly and appropriately chilled. Consumers should buy meat at the end of a shopping trip and refrigerate or freeze it as soon as possible to help slow the growth of the micro-organisms that can cause illness. If meat has been frozen, it should be defrosted fully before cooking.

Raw beef, just like any raw meat, should be stored away from other foods on the bottom shelf of the fridge in a sealed container to prevent drips leaking onto other foods. Consumers should ensure hands and surfaces are clean to prevent cross-contamination.

Whole cuts of beef such as steak or beef joints can be cooked to preference because harmful bacteria live on the outside only. But as a precaution, the elderly, the very young, pregnant women and those feeling unwell should avoid eating whole cuts of beef that are “rare” or pink in the middle.

Minced meat, burgers, rolled meats and kebabs should always be thoroughly cooked until piping hot all the way through, with no pink meat remaining and the juices running clear.

Leftover cooked beef should be refrigerated within two hours of cooking, eaten within three days and reheated only once.

Nutrition and Health Benefits

Beef is a highly nutritious food and has traditionally been the mainstay of the main family meal.

As well as being a recognised source of protein and iron, beef is also rich in minerals such as selenium, zinc and copper. Beef is also a good source of B vitamins, particularly vitamin B12.

Although there are many nutritional benefits from eating beef as part of a healthy balanced diet, it has often received negative attention as a source of fat and saturated fat. The total fat content of beef depends on the cut of beef used. In many cases, much of the visible fat can be removed at the butchering stage or in the kitchen. Consumer demands for leaner cuts of meat have resulted in a significant drop in the fat content of certain cuts over the past 30 years. In addition to saturated fat, beef also contains conjugated linoleic acid (CLA) and mono and polyunsaturated fatty acids which are considered nutritionally beneficial.

Different cooking techniques can alter the nutritional value of beef. Cooking methods such as grilling, dry frying and stir frying are healthier options and when roasting, cuts should be placed on a rack to allow the juices to drip onto a tray below. The addition of ingredients such as creams and sauces can alter the nutritional profile of a dish in terms of increased fat, salt and calories.

Adults

According to the North South Ireland Food Consumption Survey, 99 percent of adults in the Republic of Ireland consume beef; steak, burgers, roast beef and composite foods such as beef stews and casseroles are the most popular forms. There is added benefit to composite dishes in that the addition of vegetables can boost the overall nutritional content of the meal.

Data shows that consumers with high consumption levels of beef are less likely to meet carbohydrate intake recommendations and have less fibre dense diets. Beef tends to be consumed in larger portion sizes than other meats; the recommended single portion size for beef is approximately 57g (2oz).

In general, there are no nutrition concerns from eating too little beef, although young women tend to consume less contributing to lower levels of iron in their diets.

A report published by the World Cancer Research Fund/American Institute of Cancer Research in 2007 found a strong link between processed meats and colorectal cancer. It was also suggested that they may also increase the risk of certain other cancers, although the

current evidence is weak. People who eat red meat were advised to consume less than 500g a week (approximately 17.5 oz; cooked), very little, if any, to be processed.

Children

Preliminary results from the National Children's Survey in ROI indicate that children consume most of their meat as processed meat. Since processed meats are higher in salt and fat and lower in nutrients compared to lean red meat, this may lead to increased health risks such as increased blood pressure, cardiovascular disease and obesity in later life. Furthermore, and inadequate intake of fresh, unprocessed, lean red meat negatively impacts on the iron status of young children.



Key Facts

- In economic terms, the beef sector is a very valuable commodity. In Northern Ireland, the beef and sheep sectors account for the largest share of gross turnover in the food processing sector at 23 percent (£580/€879 million). In the Republic of Ireland cattle and beef account for the largest share of Gross Agriculture Output at 29 percent (€1.5/£1.0 billion).
- The Republic of Ireland exported approximately 90 percent of the beef produced (516,000 tonnes) and 250,000 live cattle in 2006. Of all the beef produced in Northern Ireland in that that year, 73 percent (104,000 tonnes) was sold in Great Britain.
- The safety of both domestically produced and imported beef is regulated by regional and European legislation primarily enforced by the FSA and the FSAI. A number of quality assurance schemes also operate in both jurisdictions to promote standards for the production of beef produced on the island and to safeguard markets for beef and beef products.
- The establishment of national food safety regulatory bodies together with enhanced monitoring, traceability systems and controls on animals entering the food chain, has greatly restored confidence in the wake of the BSE crisis. The number of BSE-infected cattle on the island of Ireland has reduced from a peak of 500 cases in the mid 1990s to 37 in 2007.
- Consumer research indicated concerns about *E. coli* O157 with beef and beef products, usually minced beef products. New legislation and regulations concerning the handling of animals at the time of processing, together with separation of raw and cooked meats in butchers' outlets are in place and incidence of *E.coli* outbreaks from beef and other foods has decreased in recent years.
- When choosing cuts of beef, choose fresh unprocessed cuts and where possible lean cuts or trim the fat following purchase. Beef tends to be consumed in larger portion sizes than other meats. The recommended individual portion size for beef is approximately 57g (2oz). It is advised that people who eat red meat should

consume less than 500g (approximately 17.5 oz; cooked) a week, very little if any to be processed.

- The balance of other food groups such as fruit and vegetables and wholegrains in association with lean red meat intake is important in the prevention of conditions such as cardiovascular disease and certain cancers.
- Whole cuts of beef, such as roast beef and steaks can be cooked to preference, i.e. rare, as long as they are cooked on the outside. But as a precaution, vulnerable people including older people, babies and toddlers, pregnant women and individuals who are unwell, should avoid eating beef that is rare or pink.
- Minced meat, burgers, rolled meats and kebabs should always be cooked until piping hot all the way through, with no pink meat remaining and the juices running clear.