Introduction

As an island state in the turmoil of the mid-twentieth Century, the United Kingdom (UK) drove for self-sufficiency in food production. Increasingly intensive methods became the norm in certain sectors, such as poultry and pigs. Subsequently, in the 1960s, a backlash occurred against ‘factory farming’ and all that this system appeared to entail – poor attention to the welfare of the individual animal, excessive use of chemicals and damage to the environment. However, the consumer has become used to the idea of cheap food, and has not generally expected to pay a premium for animal produce reared in a more traditional manner.

This increasing public concern for animal welfare has meant that, in recent years, the UK has taken action on farm animal welfare in advance of European Union (EU) regulations. For example, the use of sow-stalls and veal crates has been phased out. As imported food animals may now be raised in conditions banned in the UK, this has left farmers in the UK at a commercial disadvantage.

Since the late 1980s, consumers have seen a major crisis in food production and a series of food scares. Such problems have affected many of the member states of the EU and countries further afield, but bovine spongiform encephalopathy (BSE) was first identified in cattle in the UK and remains predominantly a problem in that country. Although the evidence suggesting that BSE is a zoonosis did not appear until 1996, the unproven fears that this would be the case had caused serious damage to consumer confidence in beef long before this time. Many consumers were shocked to hear of the ‘unnatural’ livestock feeding practices which turned ruminants into carnivores, enabling the epizootic of BSE to occur (26).

As was the experience elsewhere, Salmonella enteritidis was considered to be widespread in the poultry industry of the UK in the late 1980s, causing great concern for poultry farmers, especially egg-producers. Listeria monocytogenes was found in certain unpasteurised dairy products and chilled prepared meals. Sheep were contaminated by radioactive caesium from the Chernobyl incident. Lead contamination was found in...
batches of cattle feed. More recently, incidents of *Escherichia coli* (VTEC O157) food poisoning (some of which have been fatal) gave even greater cause for concern (24).

In addition, criminal tampering with foodstuffs has occurred during this period, carried out by persons with a grudge against a food company or simply for monetary gain through blackmail. Such an incident can be devastating for a manufacturer or retailer, but an effective mechanism for product recall and removal from sale can moderate the commercial damage and the risk to the customer.

### The need for traceability

The White Paper on Food Safety (12) by the European Commission emphasised that such problems are an international issue and addressed many of the concerns noted above. In particular this paper summarised, as follows:

'A successful food policy demands the traceability of feed and food and their ingredients. Adequate procedures to facilitate such traceability must be introduced. These include the obligation for feed and food businesses to ensure that adequate procedures are in place to withdraw feed and food from the market where a risk to the health of the consumer is posed. Operators should also keep adequate records of suppliers of raw materials and ingredients so that the source of a problem can be identified.'

Traceability of livestock and food serves a number of purposes, namely to protect the following:

- animal health: control of epizootic and enzootic livestock diseases, e.g. classical swine fever (hog cholera), foot and mouth disease, Aujeszky’s disease, Johne’s disease, scrapie
- public health: recall of food products from sale, enforcement of drug withdrawal periods
- both animal and public health: control of zoonotic diseases (tuberculosis, salmonellosis, BSE) and control of emergencies (contaminated land, contaminated animal feed)
- animal welfare: enforcement of standards
- the investment by the taxpayer: audit of livestock support schemes.

Tracing the source of livestock has become more complicated in recent years. The marketing of livestock and animal products has developed with improvements in transport, especially road transport. Many livestock, notably cattle and sheep, are now traded many times before being ready for slaughter. Animals may be slaughtered hundreds of kilometres from the original place of rearing, and in Europe, international trade of live food animals is particularly common.

Systems of food animal traceability have not always kept pace with commercial developments, but have evolved as needs were identified. As traceability entails increased costs, the perceived need for improvement has often followed a costly crisis in the agriculture or food industry.

### Identification systems for livestock

Traceability of livestock requires the unique identification of individual animals or groups of animals. For centuries, livestock have been identified in order to prove ownership or to maintain breeding programmes. Systems of ear punch marks, horn brands and tattoos are still in use, although not often recognised for official purposes. The ear tag is a more modern solution, allowing official bodies to regulate the issue of numbers, although the ear tag suffers from the possibility of loss.

Member states of the EU have now standardised official cattle identification in the form of uniquely-numbered pairs of tags (one in each ear) to guard against loss of identity. In addition to the official numbering, farmers often use cross-referenced management identification systems such as freeze brands, collars, colour marks or even the pet names of cows for day-to-day use.

### Recording movements of livestock

A simple paper farm register of animal movements on and off the farm has proved invaluable for the control of epizootic disease. Assuming that every record book covering a chain of movements is complete, accurate and retained for reference, animals can be traced back to the possible source of a disease. Stock can be forward-traced to identify premises at risk of the spread of disease. However, tracing through farm-based paper records is laborious and time-consuming.

Where livestock subsidy is paid from EU funds, the farm register must be effectively maintained to justify claims. This provides a valuable incentive for the register to be kept up-to-date, over and above the legal requirement.

Modern developments in disease control and subsidy audit are leading to centralised regional or national movement registers held as computer databases. In Europe, this is most developed for cattle tracing, the main driving-force being the need for source-verification of beef following the BSE crisis of 1996. For example, in the UK, two systems are in use, in Great Britain (England, Scotland and Wales) and Northern Ireland, respectively. Great Britain has a centralised database of cattle, each individual being recorded on the system and issued with...
an identity document (a ‘passport’ in younger cattle) which accompanies the animal throughout life. This document is surrendered at slaughter, providing the meat inspection service with the necessary information to label meat according to source. A separate tracing system is in operation in Northern Ireland, as described in the paper by McGrann and Wiseman in this issue (21).

The cattle tracing system in Great Britain

When a new-born calf is ear-tagged, the birth is registered on the central database and entered in the farm register. The database issues a paper passport which accompanies the calf throughout life. At each movement to a new farm, the off- and on-movements are recorded in the farm register, on the database and on the passport. At the slaughterhouse, the movement history on the passport can be used in the preparation of labels for the meat. The meat hygiene service (MHS) returns the passport to the central database to record the death of the animal (Fig. 1).

The integrity of the tracing system is controlled by the physical inspection of a proportion of animals and documents. Sanctions such as movement restriction, loss of value or loss of premium may be applied where non-compliance is detected (Fig. 2).

The triplicate movement records on the passport, database and farm register are a necessary safeguard while the databases are being trialled, although the extra work is unpopular with farmers. Future development of live access to the computerised cattle database systems should allow the industry to dispense with paper documents, the necessary information being extracted directly from the database when needed.

For national trade, the current EU system of marking for sheep and goats identifies the premises of birth, but does not necessarily allot each animal an individual number. Consultation of the farm register and the documents which accompany batches of sheep or goats still satisfies most of the requirements for tracing. However, accurate identification of intermediate holdings (where a particular sheep or goat has been kept between the holding of birth and the slaughterhouse) can prove difficult with such a system. For example, tracing through paper records might reveal a number of possible holdings which would each need to be investigated in the course of tracing the source of disease.

Pigs in the EU are also required to be identified to the holding of birth. However, because much of the pig (and poultry) industry in the UK is vertically integrated, intermediate holdings are limited in number.

Recent developments in identification and traceability of livestock

Increasingly, new technology is entering the field of animal identification. For example, many countries incorporate a bar code on the ear tag for ease of use and to avoid transcription error.

Radio-frequency identification devices (RFIDs) may be attached to ear tags, implanted subcutaneously or be incorporated in a bolus placed in the reticulum of ruminants.
One major constraint on the uptake of this technology in Europe is the absence of widely accepted international standards for the use of these devices. An approved European standard will hopefully follow publication of the results of the current trial (Identificaton électronique des animaux [IDEA]) being conducted by the European Commission (27).

Scottish Borders Traceability and Assurance Group

The Scottish Borders Traceability and Assurance Group (TAG) is an industry initiative comprising a full traceability system for cattle based on electronic identification (EID) using RFID ear tags and readers to comply with the standards of the International Organization for Standardization (ISO) 11784 and 11785. Electronic data transfer (EDT) is used to transmit data to farm databases, a scheme database and the national cattle tracing system (Fig. 3) (8).

If the look-up table is made available to third parties, such as a market or slaughterhouse, the RFID device may be read automatically into the business management system. This integration of RFID tags with slaughterhouse management is well developed in some other countries, such as Australia (18).

For greater security of identification, more sophisticated security technology, such as DNA profiling or retinal imaging, may be applied to food animals in the future, although the cost is currently prohibitive. The collection of samples stored for later DNA profiling (if required) has seen limited use in the meat industry as a method to limit the cost of product recall.

Trade benefits of traceability – government initiatives

Legislative controls requiring the traceability of livestock have enabled producers to benefit from schemes that allow wider trade. Following the implementation of further BSE-related controls in 1996, the Ministry of Agriculture, Fisheries and Food (MAFF) subsequently introduced two schemes in the UK in which traceability is an essential feature.
The Beef Assurance Scheme

Following scientific advice to restrict the consumption of additional parts of older cattle, a decision was taken in 1996 to allow the sale for human consumption of beef from Great Britain only if the meat was produced from cattle under the age of thirty months at slaughter. As an exception to this rule, the Beef Assurance Scheme (BAS) was designed to allow the sale of beef from grass-fed, slow-maturing traditional breeds of beef cattle which may not be finished at thirty months. Membership of BAS allows the deadline to be relaxed, slaughter for human consumption being acceptable up to forty-two months of age. The rules of membership are onerous, as follows:

- the producer is required to double-tag all cattle (this was introduced in advance of the general legal requirement in 1998)
- documentary proof must be provided that meat-and-bone meal has not been fed during the last seven years
- the farm must not have experienced BSE
- the herd must be an all-beef herd and must have contained no dairy cattle in the previous seven years
- purchased cattle must be sourced from farms of similar status.

The MAFF BSE database is consulted to check the history of each animal, to establish that no BSE has been confirmed on the farm of origin. Any death on the farm must be reported and investigated by histopathology for lesions of spongiform encephalopathy at a MAFF laboratory. If BSE were to be suspected (which has not happened to date), membership would be suspended immediately until a negative histopathology result was received.

When each animal over thirty months of age is sent for slaughter, the animal must be accompanied by an official certificate which confirms the BAS status of the animal. The scheme has attracted only a limited membership.

The date-based export scheme

The date-based export scheme (DBES) is the second MAFF scheme designed to implement the terms agreed in the EU (Commission Decision 98/692/EC) (11) and the Office International des Epizooties (OIE) recommendations for the resumption of international trade in beef from the UK. The scheme allows the export from the UK of deboned beef and
beef products from eligible cattle born after 1 August 1996. To be eligible, cattle must also fulfil the following basic criteria:

- be aged between six and thirty months at the time of slaughter
- have a complete movement history on the cattle passport and, where appropriate, on the cattle tracing system
- the mother must have survived at least six months after the birth and must not be a suspected or confirmed case of BSE.

In addition, cattle must be slaughtered in DBES-approved slaughterhouses and the carcasses cut and processed in export-approved establishments (23).

In advance of farmers sending the animals for slaughter, the slaughterhouse checks the eligibility of each prospective animal using the MAFF DBES administration unit. The various checks include searching the following databases for the necessary official evidence that the mother of the calf survived for six months:

- cattle tracing system (record of a later calving on the database; date of slaughter at a licensed slaughterhouse)
- subsidy schemes (date of claim)
- slaughter schemes (over thirty-month scheme, BSE selective cull)
- notifiable diseases database (records of sundry disease outbreaks, e.g. anthrax, tuberculosis).

If evidence is insufficient to pass these checks, the animals will not be sent to a DBES-approved slaughterhouse. For those animals that pass, the database is checked again on the day of slaughter to ensure that the animal is still eligible for export under the scheme.

Management of the food supply chain

The Food Safety Act of 1990 was part of the response to the food crises by the Government of the UK. This legislation was drafted to implement the response of the EU Directive 89/397 (10). At all points in the food supply chain, ‘due diligence’ must now be demonstrated. For the retail end of the supply chain, this has been translated into an increased emphasis on traceability of all ingredients, in order to assure the consumer and the government inspector that due diligence is in place (6, 16, 32).

The House of Commons Select Committee on Agriculture resumed the situation, as follows:

‘From a food safety point of view, the traceability of produce throughout the food chain is of substantial benefit. Multiple retailers have recognised this, and effectively audit their produce from the level of the farm until it arrives on their shelves. As well as allowing multiple retailers to influence production methods in response to changing consumer preferences, assurance schemes and traceability assist greatly in pinpointing food safety problems when they arise’ (19).

In addition, the food-processing sector is increasingly using process control approaches based on hazard analysis, critical control point (HACCP) principles advocated by the Codex Alimentarius Commission. This is an international initiative employed to identify, evaluate and control hazards which are significant for food safety (2).

Once converted from an animal to an item of food, traceability depends on similar prerequisites as noted above for animals, namely:

- identification of the item or batch
- records of the source and distribution of product.

Although parallels exist with the traceability of livestock, the audit trail for food items becomes increasingly complex as the items are mixed, processed or stored for long periods. The first prerequisite for the continuity of identification through the food chain is maintenance of a link between the animal and the primary product. The official animal identification number may be transferred to the product, but more generally, a cross-reference is maintained between the animal identification number and the identification of the product batch.

Product coding systems

Once packaged for sale, most food products (and many other items such as pharmaceuticals) are labelled with a product code, generally in the form of a bar code.

Most items are given a batch code or lot number to allow any necessary tracing in the case of product recall; this is a legal requirement in the EU. The amended Council Directive 89/396/EEC established a framework for a common lot or batch identification system to facilitate product recall along the entire food chain (10). This was implemented by the Food (Lot Marking) Regulations 1996 in the UK (Fig. 4) (20).

![Figure 4: Symbol for the EAN 13 product code](image-url)
numbers, but may additionally be encoded within a bar code, such as the EAN128 code (35).

Product codes and lot numbers or batch codes, are generally printed on the outer case packaging and pallet label (the ‘trade item’) in addition to being printed on the individual retail items. The value of having this ‘secondary’ product information in the bar code is that traceability data can be scanned into the computer network of the retailer to automate the maintenance of an audit trail. Batch or lot numbers in this format may be formed using alphabetic characters, numeric characters, or both, and may have any length up to a maximum of twenty characters (Fig. 5).

The ‘sell-by’ or ‘use-by’ date is closely associated with the lot number or batch code as a pointer to the date of production. The product code and the ‘sell-by’ date may therefore be all that is needed to identify a product for withdrawal from sale, for example, where the production over a single day is found to be below specification. However, this is relatively crude, and therefore expensive to implement. Full reference to the batch code allows product recall to be more discriminating.

**Example of product coding by a supermarket chain**

Standardised bar-coding for the outer packaging of products in a controlled food chain is presented in Figures 6 and 7 (29). The major retailers use the entire range of modern information technology systems to maintain the source and distribution data for each batch. Investments in ‘business-to-business’ computer systems and associated scanning technology are not made for traceability alone, but are driven by the need to reduce margins in an intensely competitive industry.

Although bar codes are most commonly used for data entry, the use of newer technology is becoming more popular. A development of the bar code is the ‘two-dimensional’ bar code, known as a portable data file (PDF). An example is the PDF417 standard which can encode more than a kilobyte of data in
machine-readable code the size of a postage stamp. This can be laser-printed on documents used to accompany shipments of produce, enabling rapid entry of source data to the retailer network of the receiving depot (Fig. 8). To further automate the process of data collection, RFID tags may be attached to containers (such as pallets) and vehicles. Depots and retail premises may be connected by a wireless local area network (WLAN) to facilitate data capture and exchange. At each stage of production or manufacture, data are loaded onto the FoodTrak computer via a modem link or by telephone. An electronic ‘key’ is passed to the next business in the supply chain to enable access to the data for that batch. This ‘key’ may be encoded into the bar code of the batch (17). When the finished product reaches a retailer, the full history of all ingredients and products is stored on the system, to be accessed as necessary by the retailer.

Example of electronic data interchange in a supermarket chain

The supermarket chain Tesco has over 500 outlets in the UK. The ordering system is sales-based, collecting information on product sales from the checkout scanners. These data are sent electronically to the store control-centre computers. These computers calculate what items need to be replenished and send the data to the depot serving that store. Where stock is not held at the depot, orders are generated automatically and forwarded to suppliers using EDI. By employing such a system, a replacement can be on the shelves within 24 hours of a sale (15).

Online trading exchange

The latest incarnation of EDI is the concept of the online trading exchange. Trading exchanges are similar in design to the ‘hub and spoke’ system of private EDI networks. The company that runs the exchange is the ‘hub’, and all of the buyers and suppliers who belong to the exchange are the ‘spokes’. However, instead of expensive private network installations, the trading exchange is configured as an ‘Extranet’. This uses the technology of the Internet to provide secure global data exchange to business subscribers.

Business-to-business exchange of electronic data

According to ECR Europe, a joint trade and industry body, the efficient consumer response (ECR) movement began in the mid-1990s and was characterised by the emergence of new principles of collaborative management along the supply chain. Companies realised that consumers could be served better, faster and at less cost by working together with trading partners (14).

Two main strands of ECR are relevant to traceability in retailing, namely: electronic data interchange (EDI) and supply chain management (SCM). Electronic data interchange refers to electronic communications or transactions between businesses via software applications (1).

A simple form of EDI is the use of electronic mail to replace paper documents in business transactions. A more advanced implementation of EDI is the use of private wide area network (WAN) installations.

Food Trak: an example of Internet-based electronic data interchange

A computer-based traceability service for the food supply chain has been developed in the UK by a private company. The FoodTrak service enables information, principally related to food safety, to be input at the farmer or grower level, checked against relevant approved practices, linked with identifiable batches of food and passed on through a secure Internet connection to nominated parties further along the supply chain (22).
of information technology in the commercial world expands, the retailer is able to shorten the supply chain. The shorter the chain and the more data shared between vendor and purchaser by electronic means, the better the quality of the audit trail for any particular batch of product.

The major food retailers use complex computer systems that maintain stock levels at a commercially-desirable minimum. Online ‘electronic point-of-sale’ (EPOS) data are now commonly used as a source of information for the system that replenishes stocks of produce. The complexity of modern systems is illustrated by the example presented in Table I.

**Farm assurance and whole-chain assurance schemes**

Supermarket companies in the UK are engaged in a highly competitive struggle for market share and have found that certain guarantees relating to the source, breed, feeding regime and welfare-friendly management of animals can encourage consumers to buy their product instead of the product offered by a competitor. The supermarkets are also keen to differentiate additional requirements for different end-customers. Own-label branding is an important factor in the UK. These products are seen as providing additional assurance through the supermarket branding, despite carrying a discount against the price of the traditional brand (13).

The five largest supermarket retailers control approximately 60% of the market for food in the UK. These companies have therefore become extremely powerful operators in deciding the future direction of food production. In the recent past, farmers would have expected to be paid a premium for the production of food to certain additional standards. Now that margins are reduced, the market works in a different way; much of the market is closed to a farmer who does not embrace one or more of the assurance schemes designed to give added value. To the consumer, a confusing array of assurance labels now exists (Fig. 9).

![Examples of assurance labels currently used in Great Britain](image)

**Fig. 9**

**Table I**

<table>
<thead>
<tr>
<th>Name</th>
<th>Acronym</th>
<th>Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>Complaints analysis reporting system</td>
<td>CARES</td>
<td>Used by stores to report details on customer complaints and by the company to communicate those complaints to the relevant supplier</td>
</tr>
<tr>
<td>CARES for depots</td>
<td></td>
<td>Reporting system used by the distribution network to communicate all product refusals at the point of receipt and whole load failures</td>
</tr>
<tr>
<td>Corporate file management</td>
<td>CFM</td>
<td>Central database of supplier and item details; maintained by buyers</td>
</tr>
<tr>
<td>Crates tracking</td>
<td></td>
<td>Monitors all collections of empty plastic crates from RDC sites</td>
</tr>
<tr>
<td>Distribution inventory and stock control</td>
<td>DISCO</td>
<td>Records the movement of stock into and out of RDC sites</td>
</tr>
<tr>
<td>Gate house register</td>
<td>GHR</td>
<td>Records the movement of all vehicles and equipment on and off the RDC site</td>
</tr>
<tr>
<td>Office automation system in Sainsbury’s</td>
<td>OASIS</td>
<td>Sainsbury’s internal electronic mailing system, which can have external links to suppliers</td>
</tr>
<tr>
<td>Sales-based replenishment</td>
<td>SABRE</td>
<td>Store ordering system; orders goods to replenish actual sales and forecasts of sales</td>
</tr>
<tr>
<td>Supply chain integrated ordering network</td>
<td>SCION</td>
<td>Central ordering system; generates purchase orders for suppliers to deliver goods into RDCs</td>
</tr>
<tr>
<td>Sainsbury’s information direct</td>
<td>SID</td>
<td>Online trading exchange</td>
</tr>
</tbody>
</table>

RDC: regional distribution centre
locations, etc. These schemes are usually promoted and operated by producer trade organisations and either self-regulated or controlled by an independent party (4, 9). To satisfy trading partners, assurance schemes are obtaining accreditation to the EN45011 standard for product certification schemes.

**Farm Assured British Beef and Lamb**

In 1992, Farm Assured British Beef and Lamb (FABBL) was created as a limited company by the National Farmers’ Union (NFU), the National Cattle Association, the National Sheep Association and the Federation of Fresh Meat Wholesalers. This is an example of a horizontal partnership, i.e. one that exists within one part of a supply chain (2).

In common with similar schemes, FABBL is concerned with animal welfare, origin of stock and feed, feed composition and storage, housing and handling facilities and the responsible use of veterinary medicines.

**Assured British Meat**

Half of the beef and lamb in supermarkets in the UK is now estimated to be from FABBL or the equivalent schemes in Scotland and Wales. Overall management and independent verification of compliance with the rules of the (meat) schemes was instituted by a new producer-driven initiative known as Assured British Meat (ABM). The agreement between ABM and FABBL was announced in 1998. Other schemes have subsequently joined ABM to realise the aim of enhanced consumer confidence in beef, lamb and pork by establishing a safety assurance framework for the entire supply chain.

The ABM standards cover the manufacture of feedstuffs, on-farm production, transport, livestock markets, abattoirs, caterers, butchers, manufacturers and retailers. All members are subject to rigorous, independent inspection to ensure that these standards are adhered to. For example, the rules of the ABM scheme for multiple retailers include the following with regard to product traceability:

a) an appropriate system must be in place to enable products to be withdrawn and enable subsequent recall of products which have been sold

b) all finished products must be identified in such a manner as to allow the product withdrawal system to operate effectively

c) part-finished or finished products awaiting packing must be clearly labelled with the appropriate description and coding information

d) to maintain full traceability, all meat production records should be kept with a record of the supplier (3).

Although the individual parts of the ABM scheme are horizontal partnerships, the scheme itself is an example of a vertical partnership, forged through collaboration between parts of a supply chain (2).

**National Farmers’ Union British Farm Standard label**

The process of reorganisation and clarification shown by ABM is continuing: ‘Increasingly, the different parts of the food chain are coming together to produce coherent schemes that can cover a product throughout the food chain’ (22).

The British Farm Standard scheme was launched by the NFU in June 2000, supported by a red tractor logo. This scheme combines six different quality standards (Assured Chicken Production, Assured Combinable Crops, Assured Produce, Assured British Meat, National Dairy Farm Assurance Scheme and Assured British Pigs) into one trademark to identify food which meets specific standards of food safety, animal welfare and environmental issues. The scheme was developed, in part, to address concerns about the proliferation of food labels, which were confusing consumers and creating unnecessary burdens for producers. It is managed by Assured Food Standards (AFS) which will seek mutual recognition of schemes in the EU and beyond. Most major retailers in the UK are supporting the initiative (7).

The role of AFS is both to develop an integrated and common framework, within which existing assurance schemes can work, and to license the use of the British Farm Standard logo (25).

**Other assurance schemes**

Assurance schemes do not relate only to health risks and animal welfare. Organic food is gaining a market share despite the premium paid by the consumer. Since early 1999, the drive to certify own-label food items as free of genetically modified (GM) products has been gaining momentum (30).

All such schemes need to be credible to the sophisticated consumer. A confusing plethora of industry-funded labelling initiatives is gradually being replaced by independently audited assurance programmes. In some cases, labelling claims need to be supported by scientific evidence, for instance the claim that an item is free of GM products. Retailers may use their own laboratories or contract this work to specialists in the field.

The value of assurance schemes is that many products, especially animal products, are not amenable to being tested in a laboratory to prove the claims on the label. For instance, eggs produced intensively may be indistinguishable from a ‘welfare-friendly’ variety, so an effective tracing system is the only means to ensure that the labelling reflects the true contents of the package. Traceability is very important in improving long-term competitiveness and is made most effective by the development of partnerships (8).

Farm assurance schemes may have particular characteristics designed by the retailer for marketing advantage. In this case, the retailer will usually employ an inspection force to ensure
compliance with the rules, non-compliance leading to loss of the contract. Some retailers go as far as requiring their own audit visits at all the premises of the suppliers, in addition to the inspections necessary for retaining membership of the assurance scheme. This is a true vertical partnership arrangement, where assurance at all stages of the supply chain is managed to the benefit of all parties concerned.

The Partnership in Livestock programme

The Partnership in Livestock programme, introduced in 1990 by Sainsbury, was the first of its kind in the UK. Links have been developed between the supermarket, processors and the supplying farms. The farm assurance programme has been operated through established national or regional schemes or through schemes run by suppliers, which are verified independently. Trained personnel employed by Sainsbury visit all the abattoirs and randomly selected farms, to monitor standards (31).

The programme has 12,000 farmer suppliers, all of whom are visited and accredited individually. This illustrates the proactive role played by the UK supermarkets in the food supply chain – linking back to individual agricultural producers and using food technology skills in developing new products and quality assurance (2).

Freedom Foods Ltd

An example of additional animal welfare requirements is the Tesco/Royal Society for the Prevention of Cruelty to Animals (RSPCA) Freedom Food label. This sets out to assure, through independent inspection, that suppliers meet more stringent animal welfare conditions. Tesco promotes the Freedom Foods products to the consumer as having no extra cost. However, the producer has to meet both the direct cost of inspection fees and the indirect cost of less intensive production (2).

Traceability from farm to the retailer shelves is an important facet of the scheme. Accreditation does not stop with the producer, but continues through inspection and assessment of hauliers, abattoirs, processors, manufacturers and packers who are expected to demonstrate product segregation throughout the supply chain (33).

The assessors check that throughout the chain, traceability and segregation procedures are in place to ensure that Freedom Food products are not mixed with non-Freedom Food products (28).

Discussion

The test of a traceability system is the ability to effectively remove produce from sale and consumption if any doubt arises as to the status of the produce. Some multiple retailers, in addition to providing internal audits, employ third parties to spot-check traceability. A company will be contracted to purchase products at random in the stores and verify the source through the batch codes on the label. Additionally, the premises of the producer may be inspected for compliance with the production standards of the retailer or any additional declared farm assurance standards which relate to the product.

Despite the best endeavours of the retailers, recall of a perishable product will not always be total. Food is generally purchased for immediate consumption, so will often be eaten before the recall is enacted. However, to protect the good name of the retailer, widespread publicity is usually embarked upon to maximise the response. Honesty is seen to be the best policy for retaining customer trust and loyalty. Indeed, following the high profile food scares of the 1980s and 1990s, trust in supermarkets by consumers is well in excess of the trust for the official government bodies which profess to have the welfare of the consumers at heart.

Multiple retailers have become dominant in the UK food supply chain, with over 70% of all food purchases being made from them and 45% being bought as ‘own label’ products. Multiple retailers have thus become the ‘gate-keepers’ of the industry (5) and are happy to exploit this position as the champion of the consumer.
Traçabilité dans les filières de production animale et la grande distribution

R.G. Pettitt

Résumé

Mots-clés

Rastreabilidad en el sector agropecuario y en las cadenas de supermercados

R.G. Pettitt

Resumen
Desde los años cincuenta, los consumidores del Reino Unido se han acostumbrado a disponer de alimentos baratos pero con condiciones de higiene garantizadas. En los años ochenta y noventa, una serie de episodios provocaron no sólo la alarma sino también la pérdida de confianza del público en el cometido de los productores y el Gobierno dentro de la cadena de aprovisionamiento alimentario. En este artículo, el autor examina las consecuencias de las recientes crisis alimentarias en el Reino Unido, donde el sector ha sufrido un proceso público que ha desembocado en la aplicación de nuevos controles en todas las fases de la producción. Las fábricas de piensos animales, la producción ganadera, los mataderos y el uso o descarte de subproductos animales sufren ahora controles de una rigidez inconcebible antes de que se identificara la encefalopatía espongiforme bovina (EEB) a finales de los ochenta. La
La rastreabilidad se ha convertido en una cuestión de gran importancia para los consumidores y, por delegación, para los numerosos minoristas que abastecen el mercado. Los minoristas han organizado la cadena alimentaria de forma que sea posible garantizar y controlar por auditoría el máximo nivel de calidad. También han descubierto que pueden obtener ventajas comerciales de algunos factores ligados a la obligación de comprobar el origen de los alimentos. Por otra parte, con el fin de conseguir la mayor cifra de ventas posible en un mercado deprimido, los propios colectivos de productores han desarrollado múltiples dispositivos de garantía de calidad.

**Palabras clave**

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**References**


