Centre for Agricultural Strategy

Food safety in the human food chain

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A summary of the discussion

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Questions after each paper and general discussion at the end of the programme occupied a total time of almost two hours. Rather than present this *verbatim* the main points discussed have been summarised under general headings.

HAZARDS IN THE FOOD CHAIN AND THEIR IDENTIFICATION

The importance of microbiological hazards in comparison eg with pesticides and additives, was re-emphasised in discussion. Changes in methods of preparing poultry-meat over the years were given as an example. Whereas poultry was almost entirely sold whole, with the skin on and not cut, modern methods of automatic preparation and processing for convenience of consumption had removed many of the barriers to microbial contamination, eg through removal of the skin and cutting the carcass into portions. Whereas freezing had then inhibited microbial development, modern methods of chilling had increased the chances of bacterial proliferation.

Sources of infection had also increased, with more holiday travel and the importation of bacterial infections by returning holiday-makers suffering from diarrhoea and vomiting. Differences between countries were noted, from WHO studies, in the distribution of cases of food poisoning between different sites of food consumption such as the home or in catering premises. Whereas institutional establishments had previously been the major source of reported cases of food poisoning, family outbreaks were now an increased proportion eg in Austria, Germany and Scotland.

The widespread distribution of bacteria such as *Salmonella*, as well as of

Listeria, was stressed. This meant that even if there were no infection at the farm it was so widespread that the bacteria would soon be picked up in any food product. Measures to prevent infection therefore needed to operate with the utmost efficiency at all stages, including the farmer, transporter, food manufacturer, retailer, and the point of food preparation, whether through catering or in the home.

A more general plea was made that 'food safety' should encompass feed (for livestock) and water as well as food. The whole range of micro-organisms should be considered, including viruses, fungi, and the less well-defined classes of infectious agent responsible for scrapie and bovine spongiform encephalopathy (BSE). Water-borne infections of cryptosporidiosis and *Giardia* should also be considered. Bottled water used for babies should be carbonated.

There were also degrees of severity of infection to be taken into account such as invasive types of *Salmonella* which can cause serious septicaemia and are therefore of particular concern in the medical profession. Other infectious diseases are of slow onset, such as reactive oesteo-arthritis or *Campylobacter* causing gastric ulcers.

In considering these varied hazards the welfare of the workers in the agricultural industry should be taken into account – eg farmers and their staff, veterinarians and abattoir staff. Hazard analysis techniques such as those described (HACCP) were suggested as a means of identifying these points of weakness in the food chain. The adoption of predictive modelling would provide usable data early in 1990 and could be employed in food spoilage control in the later stages.

Among the more general effects discussed were those of the general affluence of the consumer. Whereas eggs are widely purchased at all levels of income, there is an association of affluence with a concern with pesticides and additives.

Temperature control

More specific parts of the food chain requiring particular attention were discussed. There was seen to be a danger to customers in delaying the journey home after purchasing chilled and frozen foods. Restaurants in supermarkets enhanced this danger unless the public delayed their purchases until after their restaurant meal.

A seasonal variation in food poisoning might be expected, but temperature effects might also be confounded with seasonal differences in types of food purchased.

A study to monitor temperatures in home refrigerators; conducted by the AFRC Institute of Food Research at its Langford Station, had included questions on transport times. The information suggested that quite dangerous increases in the temperature of chilled and frozen food could occur after purchase. Irradiation could reduce the level of

microbial contamination which might develop in variable temperature regimes.

Cooking methods
In the home, care to ensure adequate cooking with certain methods such as microwave ovens was mentioned. This was seen as a matter for education and advice through cooking instructions on the pack, discussed under other headings.

Catering
In round terms, some 80% of reported cases of food poisoning arise from mistakes at the food preparation stage. Of these, about 80% are from professional catering and 20% in the home. It was pointed out that this partly reflects the much higher number of food premises categorised as 'catering' than as 'food manufacturing'. Furthermore, the larger numbers affected from one source tended to enter the statistics more frequently than sporadic cases in the home.

CONTROL METHODS AND REGULATORY MECHANISMS

The proposed Food Bill
Parts of the Food Bill mentioned by the Minister, and changes in Food Hygiene regulations, were subject to some scrutiny during discussion. A major improvement was claimed as a result of the focus on microbial food poisoning over the last eighteen months which was bringing the required methods of control into being.

The proposed amendments to the Food Hygiene regulations were commended as a step in the right direction. To help remedy mistakes during catering an input of expertise was needed in the design and setting up of restaurants. This required regulation and licensing. There was also a need for more Environmental Health Officers.

The Food Hygiene regulations were discussed in relation to the control of *Listeria*. Sources of infection could be found eg in unopened packs of pâté as well as being introduced through cross-contamination in the store. Temperature levels imposed to deal with these infections posed no problems to the large retail store provided the equipment could be supplied in time.

The reference in Mr Cumming's paper to BS5750 was explained as being a total quality management system based on HACCP (described in Professor Gould's paper). Such systems are widely used in engineering and were now being introduced in food manufacturing. Ultimately BS5750 could be applied in food retail stores.

With reference to catering, favourable comment was made on the regulations for the compulsory training of staff and registration of premises.

The large increase in food consumption away from the home had led to more sources of preparation of sandwiches etc which were subsequently sold without refrigerated storage. Not only should all food preparation premises be registered, it was suggested, but management methods needed scrutiny. Unless sick pay was available for catering staff suffering from diarrhoea or vomiting they were more likely to stay at work and were then a potential source of infection for large numbers of people.

The opposite view was also expressed, that regulation could become excessive and bureaucratic. Education and advice should be increased as a way of avoiding this, together with instructions on food packs providing guidance on microwave ovens and other equipment.

Even cooking instructions, however, could be problematic. The provision of these did not necessarily ensure that they were read. Furthermore it was impossible to cover all possible methods of cooking.

Other countries

The Federal Drugs Agency (FDA) in the USA had been studied by the National Consumer Council but could not be regarded as a blue-print for the UK. The FDA itself would prefer separate regulatory bodies for drugs (potentially dangerous) and food (potentially safe). It had desirable features such as the equivalent of UK Treasury funding and a consumer committee with wide representation able to suggest legislation. The NCC position was in support of a UK Food Agency attached to a MAFF or Health Department or standing alone, but it should be independent.

Concern was expressed that the considerable quantity of imported food, valued at £9 b, would not be subject to the same regulatory procedures as food produced in the UK. Most of this was from crops which could not be grown in this country. Several reassuring examples were quoted. In the labelling and surveillance procedures of the UK Register of Organic Food Standards, imported food would need to be examined in the same way as in the UK if it were to be registered to meet the UK standards. The large food retailers themselves apply the same requirements of good manufacturing practice to overseas food products as in the UK. Similarly, MAFF surveillance procedures are applied equally to imported foods as to UK-produced foods.

Bovine spongiform encephalopathy

The particular position of BSE in relation to legislation was raised. The source had been animal feeds containing material from scrapie-infected sheep, causing cross-contamination to cattle. Offal from slaughtered cattle had never been used in baby foods and its use in other foods would not, in future, be permitted. There were no regulations, however, to ensure freedom from infected material in exported animal compound feeds. The incubation period was a subject of uncertainty but was known to be a very

long time, extending to many years, and could differ among strains of the infective organism. Even the nature of the organism itself was unknown, and the degree of infection present in other countries was a matter of speculation.

PUBLIC PERCEPTIONS, EDUCATION AND RESEARCH

The question was raised as to why the '*Salmonella* crisis' had not been handled as well as the examples of food safety problems described in Dr. Crossett's paper. It seemed that the scientific evidence available on the incidence of *S. enteritidis* phage Type 4 was less complete than, eg in the case of aflatoxins or of nitrosamines. Nevertheless the source had been identified unambiguously. Although the situation with *Salmonella* was more diffuse, an independent scrutiny had shown that 95% of the required action had been taken correctly. Reassurance to the consumer could only come through understanding and an objective presentation of the story. It was not helpful to remove large amounts of food from the menu without adequate evidence. The costs and trade-offs had to be considered in the light of the microbial ecology of the situation.

Food Safety Advisory Centre

The role of the Food Safety Advisory Centre was described as an independent one based on a scientific assessment of the problems. The consortium of retailers associated with it, however, responded also to public opinion and might make different decisions (eg to remove food from the shelves) from those based solely on the scientific evidence.

The question was raised whether the customer was prepared to pay for better quality produce in the form of infection-free raw poultry and eggs. It seemed that while a premium might be paid eg for tamper-proof closures on containers it was not forthcoming for good manufacturing practice and safe food. In the USA, however it appeared that the customer was prepared to pay for safety.

Public perceptions were discussed in relation to the example of the use of pesticides. It was necessary to dispel misconceptions about the 'perceived misuse' of pesticides since it was not possible, nor everyone's wish, to eat a diet of organic produce.

Similarly, sweeping generalisations are sometimes made about 'intensive' versus 'extensive' systems. Some people are against intensive systems in any form but it is a mistake to believe that 'extensive' is a meaningful statement about a system. There is a wide variety of extensive systems which vary enormously in their methods, including whether they are better for the animal or not. It should not be assumed that because a system is extensive it is either good or bad – it comes in many forms.

The role of the housewife had changed enormously since the days when she shopped daily for fresh food and cooked it thoroughly the same day. Many foods purchased now are offered as 'ready to eat' and errors through inadequate refrigeration or reheating can creep in. Furthermore it may be thought by the public that food either contains bacteria or is free from them whereas, as had been pointed out, they have a very widespread distribution the whole time.

Education was discussed in terms of the provision of information, which is plentiful, but is not the same as knowledge. However, information is the raw material from which knowledge is derived. Although it is necessary to give people the facts, consumers need help in creating usable knowledge from that stream of information.

A basic understanding of food hygiene was needed in the school curriculum and in fact some considered that consumer subjects in general should be part of the school curriculum from the age of five.

Research funding and the cuts made in near-market research were a subject for great concern. Although examples were given of support from the industry for specific projects this was not seen to be a satisfactory answer to the funding problem. It might not be satisfactory that all the research in a particular area is sponsored by the immediate beneficiary. This might appear to be a way of determining that only certain kinds of research are carried out. Some sorts of research would be left undone if industry were simply asked to fund pieces of research from which 'near-market' funds were withdrawn.

On aspects of research it was pointed out that in seeking to reduce the use of pesticides by genetic engineering to produce plants with their own fungal resistance, the residues of the equivalent substance in plants that have developed their own immunity is about 700 ppm whereas the residues from properly used pesticides are as low as 1 and 2 ppm.

Another research suggestion was that the human gut is not sterile and a cocktail of dead *Salmonella* vaccine might be used to immunise us against these infections.