

T-4.1 THE “STABLE TO TABLE” APPROACH TO ANIMAL HEALTH, ANIMAL WELFARE AND PUBLIC HEALTH

INTRODUCTION

1. The main aims of the paper are to:-
 - (a) explain an effective, integrated system which takes account of animal health, animal welfare and public health in food production from “stable to table”; and
 - (b) focus on the role of the veterinarian within the system;
 - (c) demonstrate the benefit of a “stable to table” system to consumer confidence in food of animal origin.

THE NEED FOR AN INTEGRATED APPROACH

1. During the last 30 years a number of factors have contributed to the need for an integrated approach to the production of safe food:-
 - (a) patterns of production, processing, sale and consumption of agricultural products have changed;
 - (b) the breeds, even the species, of farm animals are different;
 - (c) the conditions of housing, husbandry and feeding are generally more intensive;
 - (d) a new spectrum of animal diseases has emerged with zoonotic diseases assuming greater importance;
 - (e) harvesting and processing, particularly the slaughtering and meat product industries, have become more concentrated and specialised;
 - (f) economies of scale have given consumers cheap and varied food, but the handling of large numbers of animals and carcasses together increases the risk of cross contamination and the widespread dissemination of potentially dangerous products;
 - (g) patterns of sale and consumption and life styles have changed;
 - (h) careless storage and handling of food can result in contamination of other foods and equipment to a degree which did not occur in days before convenience foods, refrigeration, home freezing and microwave ovens.

2. Despite the advances, there is an increasing concern that the incidence of foodborne disease is rising and that consumers are to a certain extent losing confidence in the safety of their food. The BSE crisis has brought the issue into sharp focus but the salmonella scare and more recently VTEC 0157 are examples of other contributors to this loss of confidence.
3. It is clear that food hygiene can no longer be a matter of simple inspection. A multitude of factors contribute to the quality of the end product and these all need to be taken into account. Three main areas have been identified which can present a hazard to food safety. These are:
 - a) environmental contaminants such as pesticides, heavy metals, veterinary medicines, etc;
 - b) on the farm - animal health, public health and animal welfare;
 - c) the slaughterhouse, dairy, etc. and beyond through food processing to the consumer.
5. Risk analysis in one form or another is well developed with respect to establishing standards and specifications for chemical hazards. In theory, methods for risk analysis of post mortem meat inspection programmes are also beginning to emerge. However, much work is yet to be done on the risk analysis of microbiological hazards in meat and all kinds of food products of animal origin.
6. In terms of the simplification of the food hygiene legislation it is recommended that the Hazard Analysis Critical Control Points (HACCP) procedures should be applied to all stages of production and for all products of animal origin intended for human consumption. Risk assessment should be the basis of all food legislation but evidence for this is limited.
7. HACCP principles are applied to individual circumstances and there is a need for a certain uniformity of approach in implementation. This could be provided either by the Codex Alimentarius or by the ISO 9000 series. A set of basic HACCP principles has been suggested and these include the identification and establishment of:-
 - (a) hazards and the analysis and determination of measures necessary to control them;
 - (b) critical points in the system;
 - (c) critical limits for each critical point;
 - (d) monitoring and checking procedures;
 - (e) corrective action to be taken when necessary;

- (f) verification and review procedures;
 - (g) documentation concerning all procedures and records.
8. If HACCP principles can be applied to the entire food chain - from “stable to table” - this will have implications for inspection and audit by the competent authority. A change in approach will also mean a change in the audit requirements.
9. Whilst individual systems for controlling hazards to food safety exist, the information gathered is not generally used to the best effect; neither is one set of data necessarily linked to another. At present all areas suffer from a lack of co-ordination. There is also a lack of international agreement on risk assessment and risk management methodology.

CURRENT LEGISLATION

10. Currently, national and international legislation regulate public health and animal health in the production and marketing of fresh meat, poultry meat, meat products, minced meat and meat preparations, rabbit and farmed game meat, wild game meat, fishery products, live molluscs, egg products, milk and milk products and other products such as frogs' legs, snails and honey.
11. National and international legislation can also apply to:-
- (a) animal welfare, covering farming methods, the transport of animals and their treatment at the time of slaughter;
 - (b) the use of substances administered to farm animals for growth promotion or increasing productivity, as well as the use of medicated feedingstuffs;
 - (c) the control of zoonotic diseases and surveillance of contagious diseases;
 - (d) inspection, control and safeguard measures.
12. The different elements of this legislation complement each other and contribute, as a whole, to the production of safe and wholesome food. Such legislation should aim at at least the following two objectives :
- (a) a high level of protection for consumers, animals and the environment;

- (b) recognition by consumers that their interests and concerns are being respected and protected, not merely from a health point of view but also taking into account animal welfare and environmental considerations.
13. These objectives recognise that it is no longer acceptable to view in isolation the separate links in the food chain. Consumer needs in terms of public health are important but the consumer also demands high standards of animal health and welfare. These demands will not satisfactorily be met until there is an integrated approach to the concept of 'safe food from "stable to table"'.

THE "STABLE TO TABLE" APPROACH

14. Detailed justification for this approach appears below. Briefly and in practical terms it means:-
- (a) the establishment of systems of data collection and document flow;
 - (b) the extension of examination on the farm of origin, including the ante mortem of animals for slaughter. Here the veterinarian who is responsible for systematic herd health surveillance will also be responsible for animal welfare and the surveillance and monitoring for zoonoses and residues of chemicals;
 - (c) the transfer of this information to the point of slaughter or processing before the animals or products arrive;
 - (d) the monitoring and enforcement of health and welfare during transport;
 - (e) the appropriate level of veterinary supervision and food inspection based upon the known health status of the animals and on an assessment of risk at the critical points in the food processing chain where contamination can arise;
 - (f) post mortem and product information transferred back up the chain to the farm of origin so that the veterinarian is made aware of and can solve any farm originated problems which are identified.
15. The links in the food chain are grouped under the following headings which are explained in detail:
- (a) primary production (including breeding, rearing and fattening)
 - (b) transport/movement of animals (for slaughter and/or further fattening)

- (c) processing (ante mortem, slaughter, post mortem, residue testing, and food hygiene inspection in general, etc.)
- (d) marketing (including further processing, wholesaling, retailing).

16. Essential elements of a “stable to table” system are described under the following sub-headings:-

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|-----|--|-------------|
| (a) | A central database and data registration | paragraph 2 |
| (b) | Data access | |
| (c) | Identification | paragraph 2 |
| (d) | Traceability | paragraph 2 |
| (e) | Animal health visits | paragraph 3 |
| (f) | Animal welfare assessments | paragraph 4 |
| (g) | Official control | para |
| (h) | Movement of animals | para |
| (i) | Meat inspection | paragraph 6 |
| (j) | Milk inspection | para |
| (k) | Egg inspection | para |
| (l) | Fish inspection | para |
| (m) | Marketing | paragraph 8 |

17. The lynch pin to all this is the presence of the veterinarian on the farm ensuring that animals and animal products entering the slaughterhouse, dairy, etc. are free from disease and in the processing plant controlling hygiene and preventing the risk of contamination. Good examples are provided by the control measures introduced as a means of eradicating BSE and preventing potential infected tissue from entering the food chain. Key factors in the return of public trust will be confidence in:-

- (a) a foolproof system of identification and traceability;

- (b) consumer protection in processing plants, and
 - (c) a transparent and enforceable system of checks and certification.
18. Such measures enforced at every link in the food chain will meet any other problem which the food industry might face in the future. Herd health surveillance programmes (HHSPs) or quality assurance schemes are likely to provide the framework for the implementation of such control measures and to play a major part in the restoration of consumer confidence in food.

PRIMARY PRODUCTION

Herd Health Surveillance Programme (HHSP) -

A system for control of the primary production in a “stable to table” approach.

19. The first link of the “stable to table” chain is primary production on the farm. The HHSP system described here is a Quality Assurance System. Quality objectives and specific programmes are established for individual animal species and type of production. These complement other systems, eg for arable crops so that each holding is viewed as one complete unit. All programmes take account of:-
- (a) animal health
 - (b) public health
 - (c) animal welfare
 - (d) environmental protection

A central database and data registration

20. Good documentation is a basic requirement of all Quality Assurance Systems. Information about each farm, together with the relevant quality objectives need to be registered and a central database is essential. Contributors to the database include:-
- (a) farmers;
 - (b) veterinarians;
 - (c) agronomists and other technicians;
 - (d) suppliers (feeding stuffs, medicines, pesticides, etc.);
 - (e) food producing plants - dairies, abattoirs, powder milk plants, egg product plants
 - (f) laboratories (producing laboratory results on feeding stuffs nutritional elements, diagnostic results from tests of material of animal origin, etc.).

21. All the contributors will provide appropriate data either directly or through the farmer to the database to be stored in an identifiable farm file with a brief description of the farm (size, husbandry system in use, plans for crops, etc.). All data related to the production of animals is related to an identifiable animal or an identifiable group of animals on the farm.
22. The type of farm data to be collected and stored in the central database includes:-
 - (a) number and types of animals with identification;
 - (b) feed and feeding;
 - (c) reproduction cycles;
 - (d) diseases including death rates and treatments (use of veterinary medicinal products);
 - (e) animal welfare parameters;
 - (f) fertilizer use, pesticides etc. in production of crops;
 - (g) production results - quantity and quality;
 - (h) laboratory results - milk quality, meat quality, disease control including surveillance of epizootic and zoonotic diseases;
 - (i) pathological findings at abattoirs;
 - (j) buying and selling of animals with identification;
 - (k) frequency of collection and storage temperatures (milk, eggs);

Data access

23. Farmers and their contracted advisers (the herd veterinarian, and the farm agronomist) together with the official veterinarian and other official inspectors are the only individuals to have access to the data registered in the farm file. The central database does, however, provide anonymous information for scientific research and statistical purposes.
24. The processed data will form the documentation on which certification of health status, animal welfare, quality of products, etc. is based. It is also used on the farm by the farmer, the contracted veterinarian, the agronomist or by official veterinarians in:-
 - (a) the identification of problems and in finding solutions;
 - (b) developing schemes to improve animal health, animal welfare and public health;
 - (c) to meet or keep the quality objectives set up for the farm and the products produced.

Identification

25. Absolutely fundamental to the efficiency and success of any HHSP is reliable and foolproof identification of individual animals. This has to be secure, easy to apply and yet tamper proof, clearly visible and with each number unique. A widely accepted system for collecting data on the individual animals has still to be developed and should include:-
- (a) date of birth, importation and death;
 - (b) sex, breed
 - (c) records of movement;
 - (d) disease status;
 - (e) slaughter information;
 - (f) herd and holding details;
 - (g) re-tagging details
 - (h) dam/sire
26. There is also a facility to 'flag' those animals which, eg:-
- (a) come from a herd which has had a case of BSE in the previous 6 years;
 - (b) are members of quality assurance schemes;
 - (c) are over thirty months of age;
 - (d) are imported.

Traceability

27. Traceability is also fundamental. The increased movement of animals within and across borders make this absolutely essential if herd health is to be maintained.
28. Animal Health Officers must check animals in and out of markets and farmers record movements in a check book. Movements are reported to an "Animal health office".
29. Such quality assurance systems are seen as essential to underwrite export markets in small countries but even in those countries which do not rely on export trade, there is an increasing demand on the part of the general public for assurance of animal health, food safety and common standards.
30. In many states herd health assurance schemes are now largely in the hands of the private sector. Many of these schemes will be similar to those described here. What is regrettable is the lack of a national scheme with national and international credibility. If confidence in beef products is to be regained after the BSE crisis and lost markets won back, then there is little doubt that audited quality assurance schemes will provide the key. If the schemes are different, they should have a common framework, for example the ISO 9000 series criteria, and they should be

audited by the competent authority.

Animal health visits

31. So far this paper has addressed the documentation required for implementing sound herd health surveillance programmes. HHSP animal health assessments are based on monthly visits to the farm by a veterinarian contracted to the herd. The veterinarian is contracted by the farmer and approved by the competent authority. When the contract is signed the objectives for the herd are agreed between the farmer, the herd veterinarian and the agronomist advising the farmer.
32. The objectives are set in the light of risk assessment and a cost benefit analysis of what can realistically be achieved. Objectives will be different for each farm/herd, probably also different in different countries and will be dependent upon a range of factors relating to, for example:-
 - (a) animal husbandry systems;
 - (b) housing;
 - (c) stocking density;
 - (d) herd health status.
33. Before each monthly visit the contract veterinarian accesses the database for up-to-date information about the herd in question. This will be information gathered both in the previous four weeks and also over a period of time indicating trends. All this allows the veterinarian to plan the visit and the agenda for discussion with the farmer and appropriate stock persons.
34. The visit will involve a clinical examination of the animals and a herd management meeting. Items discussed might include, for example:-
 - (a) decline of immunological response due to herd management procedures, feeding, climate and other stocking conditions, movement of animals inside the herd or the introduction of new animals, excessive production performance;
 - (b) increased infection caused by, for example, parasites, viruses and pathogenic or potentially pathogenic micro-organisms;
 - (c) prophylactic procedures to protect animals;
 - (d) procedures required to determine causes of disease or poor health conditions in the herd, for example post mortems, sampling for laboratory analysis, drug resistance analysis, special registrations, etc.
 - (e) special procedures for monitoring clinical or sub-clinical zoonotic disease in

the herd including the official epizootic and zoonotic surveillance programmes;

- (f) further work to be done to achieve objectives agreed for the herd in terms of increased health status, increased production performance, etc.
35. During the examination of animals a survey of contagious diseases is carried out to identify outbreaks at the earliest possible stage. Procedures in ongoing eradication programmes will be carried out during the visit. Also during the visit, a comprehensive number of samples (blood, urine, faeces etc.) is taken for laboratory analysis to show the health status of the herd in relation to epizootic and zoonotic diseases of importance for animal and public health.
36. Following the visit:-
- (a) the veterinarian submits a written report describing the problems and the conclusions of any investigation, together with proposed action to solve the problems and to improve or maintain the herd health status.
 - (b) the veterinarian prescribes any necessary veterinary medicinal products.
 - (c) certificates of the herd health status (standardized) are prepared as the health status will have an impact on the later processing procedures of the products from the farm.
37. The key data, the written report including results of special registrations, post mortems, laboratory diagnosis, etc., prescribed and used medicines; diseases diagnosed and treatments carried out will be kept in records at the farm and by the herd veterinarian. The data outlined in paragraph 25 above will be downloaded onto the central database.
38. The priority for recommended improvements to the herd health programme is based upon the cost-benefit analysis and the risk assessment carried out for the herd. See paragraph 34 above.

Animal welfare assessments

39. Consumers are demanding more and more information about the conditions in which animals raised for food are kept.
40. As part of HHSP an animal welfare classification system for food production animals could be developed. Such a system should have the potential for being recorded on the labelling of products of animal origin. The herd veterinarian is able to monitor welfare and to register welfare parameters during the monthly visits to each individual herd.

41. A classification system must take into account such parameters as:-
- (a) health status;
 - (b) use of Veterinary Medicinal Products;
 - (c) husbandry system including the density of animals per m² and m³;
 - (d) handling and management of the animals;
 - (e) feed and feed quality.
42. Such a system could provide the farmer with the opportunity to set objectives for achieving a higher animal welfare classification as an integral part of the HHSP. This would be in the farmer's best interest since a premium would be given for the products sold from high status farms. Those farms with a persistently low/unacceptable animal welfare classification would be compromised economically.

Official control

43. The HACCP system encourages the principle of self-checks and responsibility. Herd veterinarians should carry out regular checks, for example, urine sampling to test for the presence of illegal growth promoters or other illegal products.. The HACCP system should incorporate checks on feed, e.g. for beta agonists, heavy metals and salmonella.
44. Herd veterinarians should be responsible for certifying the results of on farm checks but there still needs to be a national audit system under the auspices of the competent authority. For primary production, the State Veterinary Service (SVS) ought to have the resources to visit farms regularly, unannounced, to check compliance with the objectives of the HHSP.

MOVEMENT OF ANIMALS

45. Animals for food will invariably have to be transported at some stage in their lives. They can be transported satisfactorily if the job is done properly and with care. The movement of animals has implications not just for animal health and animal welfare but also for public health.

Movement of Animals - Animal Health

46. The movement of animals is an integral part of primary production. Animals, embryos, eggs and semen all move between farms and further afield. Where there is movement there is also a potential health hazard.
47. The HHSP provides key information as to the health status of the purchased animals including embryos, eggs and semen. The central database provides all the registered

information for the herd and individual animal and this must be available to the farmer and contracted veterinarian at the receiving farm or the official veterinarian at the abattoir.

48. The programme allows for checks before the arrival of purchased stock and for a period of quarantine after arrival. This should be for as long as possible and ideally for 21 days so that the veterinary surgeon involved can take blood and other samples as appropriate. Imported stock should be kept in separate air space from resident animals.
49. Legislation concerning the movement of animals is a cause for concern. . The legislation relating to pre-purchase/movement checks should be rationalised to avoid confusion.
50. Authentication by official veterinarians is essential. Standardised certification must be carried out.

Movement of Animals - Animal Welfare

51. The legislation relating to the transport of animals has yet to be prepared in some countries and to be improved in other countries. Furthermore, the welfare of animals during transport is a matter of enormous concern to the general public - many believing that animals should not be transported at all.
52. There is no doubt that long and stressful journeys will be harmful both to the health and welfare status of the animals being transported. Veterinarians are central to effective enforcement of animal welfare standards during transport, as the protectors and inspectors of animals. High common standards should be uniformly enforced.
53. Veterinarians condemn the *unnecessary* transport of animals and advocate that animals should be slaughtered as close as possible to the point of production. Trade in carcasses rather than in live animals should be encouraged and no animal should be transported unless fit to complete the whole of the intended journey without pain or discomfort.
54. Veterinary experience has shown that there are many factors affecting the welfare of animals during transport, dependent upon species, age and physiological status and include: journey length, resting, feeding and watering intervals, rest periods, stocking densities, vehicle design, loading- and unloading facilities and stockmanship.
55. Veterinary supervision and improvement of conditions and facilities at journey staging posts are essential so that animals are able to rest. Time spent in markets where animals cannot rest should be considered as part of the overall journey time.
56. Animal health and welfare should not be compromised by loading and unloading

when on-lorry facilities are available in the right conditions.

57. The veterinary profession welcomes a recommended 24 hour rest time at the end of each journey stage but would like to be satisfied that this will be enforced at approved lairages where the animals should be inspected by a veterinary surgeon, rested, fed and watered.
58. Vehicles should be plated to show the floor area and unladen vehicle weight, the latter to allow enforcement of stocking densities.
59. Road vehicle design should be based on the requirements for the accommodation and welfare of the individual species and the classes of stock to be carried. It should be feasible to license livestock transporters using a graded class system for design standards and also that these should be stated on the vehicle.
60. Mandatory training schemes must test the practical and theoretical abilities of stockmen responsible for the handling and transport of different animal species. Well experienced stockman significantly improve the welfare of animals during transport. All professional hauliers must possess an individual licence and action should be taken by enforcement officers for any breach of the animal welfare legislation.
61. Future legislation should take into consideration scientific research specific to particular species. The veterinary profession supports further research into conditions of animals during transport. This should apply to commercial situations and the number of variable factors which affect different animals during transport.

Movement of Animals - Public Health

62. Movement of animals for slaughter causes stress. Stressed animals are more likely to cause contamination of the meat with e.g. zoonotic micro-organisms as well as to develop stress symptoms leading to PSE or DFD conditions in the meat. To prevent health hazards due to contamination risk, it is important that journeys are as short as possible and that they cause as little stress to the animals as possible.
63. For those animals going direct to slaughter, the ante mortem inspection is essentially carried out on the farm and the inspection report sent to the official veterinarian at the abattoir prior to the arrival of the animals. At the arrival at slaughterhouse AM inspection is performed by a veterinarian on the spot of delivery - also to check compliance with transport legislation. Based upon the knowledge of the herd, the individual animal and the conditions of transportation, the veterinarian must make appropriate decisions as to the time of slaughter (a resting period may be necessary) and control procedures necessary to ensure that the meat will not be contaminated on the slaughter line.

PROCESSING

Meat Inspection - Animal health, public health and animal welfare

64. The official veterinarian at the abattoir is given access to the database. This information will be used for carrying out a risk-assessment leading to a control procedure based upon the HACCP concept. If a HHSP is in operation, the pre-entry inspection will include consideration of relevant data. The following should be examined:
- (a) animal identification
 - (b) livestock numbers
 - (c) sources of livestock
 - (d) feeding and housing arrangements
 - (e) arrangements for storage and disposal of waste
 - (f) environmental factors
 - (g) farm ratings in terms of herd health status and animal welfare
 - (h) fitness to travel
65. In accordance with the health status of the animals and whether, for example there are any zoonotic agents present, a selection procedure can be established to slaughter healthy animals first and less healthy animals last.
66. In theory it is also possible to introduce special procedures on the line according to the health status of the animals to be slaughtered. Heads can be cut off where the throat, tongue, lymph nodes and tonsils are the main risks and/or the rectum can be closed with ice or wrapped in plastic where contamination with faeces is the main risk factor. The carcasses can be selected according to health status for fresh meat or processed meat products. In practice, however, if this additional action is necessary, there must be serious doubts about the procedures and the product as a whole. Neither are likely to inspire consumer confidence.
67. The post mortem inspection will take into account the health status of the animals delivered. When herd health status and the level of monitoring are satisfactory, then consideration may be given to a less intensive inspection. Using information from the central database on herd health status, feeding, use of veterinary medicinal products, pesticides, fertilisers, etc. samples must be taken as part of the controls for zoonoses and residues surveillance. Animals from herds with potential public health risks are targeted. Spot check sampling must also be carried out.
68. Given the appropriate resources at the post mortem inspection it should also be possible to do more accurate pathological analysis with serological, microbiological and other tests, eg. for antibiotic resistance. All relevant data from ante and post

mortem control must be registered and sent to the central database giving the farmer and his veterinary adviser the opportunity to tackle any health problems in the herd but also to bring about improvements in the herd. Thus the document flow works in both directions - from the farm to the point of slaughter and back to the farm.

69. The application of HACCP, including information on the living animal, should determine the levels of inspection on the line effectively to monitor the slaughter, cutting and processing of meat to prevent cross contamination and failure in heating or cooling procedures.
70. Once the meat has been processed, the individual animal is no longer recognised as a single unit and the product is identified by the lot or batch number. The lot or batch number must be combined with a documented system preventing unintended mixing of meat from different primary production systems. Test results and the results of spot checks of fresh or processed meat must be registered on the database. This applies at retail sales level as well as in the meat plant.
71. Knowing the problems beforehand allows use of the appropriate staff to supervise the various tasks. Routine checks and procedures can be delegated to technicians. This will give the veterinarian the opportunity to develop the team leader role and to specialize in various fields related to meat hygiene. In addition to hygiene supervision and animal welfare, there are opportunities in pathology, microbiology and plant construction including hygiene procedures.

Milk Inspection - Animal health and public health

72. This paper has concentrated on the “stable to table” approach to meat but can easily be extended to other kinds of food of animal origin .
73. In the case of milk, the HACCP approach can be applied to a quality assurance programme in accordance with ISO 9000 series specifications in much the same way as described above. A two way communication system of data is used covering both the registered herd and the milk produced. The herd health information is supplemented with information about cell count, microbes, residues, fat, protein, water and other quality parameters. This information is used by the farmer and the herd veterinarian to find ways of improving the animal health and milk quality in the herd.
74. The participating plant must have lot or batch number labelling based upon a documented system to prevent the unintended mixing of products from different primary production systems.

Egg Inspection - Animal Health and Public Health

75. The same principles can be applied to egg products plants. Data such as collection frequency, percentage of fertilised eggs, storage temperature and breed, will be essential supplements to the health and welfare data. Spot checks on the microbiology including zoonotic micro-organisms must be carried out by the egg products plant and at the retail sales control point. Again the results must be registered and available for the farmer and his advisers. The document flow stretches from the stable to the table and back again.

Fish Inspection - Animal Health and Public Health

76. Farmed fish must be under surveillance in the same way as any other group of animals and the Herd Health Surveillance Programme applies. The health status assessment can be used to determine whether the fish can be sold fresh or has to be processed to minimize health risks.
77. A HHSP cannot of course be applied to 'Wild' caught fish but it is important to gather information about the environment in which the fish have lived. Outlets of pollution to fresh water and sea water areas can cause public health hazards for those consuming the fish. Spot checks on heavy metals, pesticides, pathogenic micro-organisms, parasites etc. must be carried out.
78. The HACCP approach can be applied to the processing of fish in the same manner as for other food products pinpointing the specific hazards arising from the ecology of fish and the processing procedures such as smoking (cold or hot), chemical maturing and conservation, heating and/or cooling etc.
79. The same procedures are applicable to other species originating from water such as molluscs, prawns etc.

MARKETING

80. This paper has examined three different stages in food production - primary food production (on the farm), transport of animals and processing (in the abattoir). It concludes with a note on marketing which encompasses further processing, wholesaling and retailing.
81. The consumer expects food marketed for the end user to be:-
- (a) wholesome and free of public health risks, and
 - (b) suitably labelled to provide sufficient information on the product from “stable to

table”.

82. It has already been said that patterns of sale and consumption have changed. It is important that throughout the rest of the food chain, spot checks must be established in all places where food is processed, stored or sold. The spot checks must be carried out in accordance with the HACCP principles in a quality assurance system based upon the principles of the ISO 9000 series.
83. It is essential that:-
- (a) cross contamination during processing or contamination during storage is prevented;
 - (b) the chain of cooling or heating is not broken and that correct temperatures and times are used;
 - (c) cooling takes place as fast as possible;
 - (d) packaging material, additives etc. are used in accordance with their licence and the regulations;
 - (e) labelling is correct and not misleading. Appraisals must be correct and controlled.

CONCLUSIONS

84. Emerging zoonoses and the BSE crisis has reinforced the need for public protection in the slaughterhouse and in other food processing plants. Veterinary involvement in meat hygiene and food safety has developed as a result.
85. There is a strong argument for the application of HACCP and risk assessment within a framework provided by the ISO 9000 series. There is a need for international agreement on risk assessment and risk management.
86. It is clear, however, that the processing of food of animal origin from the slaughterhouse, meat processing plant and beyond to the consumer, is only part of the story. For all the reasons outlined in paragraphs 5 - 12 above, there is a need for an integrated approach to food safety from “stable to table” with a system of data flow which travels in both directions up and down the food chain.

87. Herd Health Surveillance Programmes or quality assurance schemes are likely to provide the framework for the implementation of control measures which will play a large part in the return in consumer confidence in food of animal origin. Many of the requirements of the Florence agreement on the phased lifting of the beef export ban are central to any well designed HHSP, namely foolproof identification and traceability; both internal and external audit checks at every link in the chain; absolute enforcement in the slaughterhouse and all food processing plants.
88. Veterinarians are present at every link in the chain and have the knowledge and expertise to audit the standards of animal health, animal welfare and public health from “stable to table”. Safe food can only be produced if healthy, clean, residue and stress free animals are delivered to the slaughterhouse where a dedicated inspectorate, headed by a veterinarian, can ensure that high standards of animal welfare and food safety are maintained. This assurance should apply to all products of animal origin throughout the processing and marketing stages.