MEAT RESEARCH NEWS LETTER

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MEAT RESEARCH LABORATORY

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MICROBIOLOGICAL CRITERIA FOR MEATS

There have been a number of statements in recent months referring to proposals to introduce in the United States microbiological standards for certain foods including some meat products. As the U.S.A. is an important market for Australian export meats there is obvious interest in the extent to which any standards introduced in the United States would affect products exported from Australia. The following notes may help to inform management in the Australian industry of the present position regarding standards and other microbiological criteria for foods.

A number of international and national committees have been investigating the problem of microbiological criteria for foods for some years. Further impetus has been given by the recognition that food poisoning outbreaks can occur on a large scale with modern conditions of manufacture and distribution of huge quantities of food.

The aim of microbiological criteria for foods is to protect the public by using objective methods of evaluating the bacterial status of the food. We are all familiar with microbiological standards for water and milk which have helped protect the consumer from disease from these sources.

Microbiological criteria may be based on tests for bacteria, fungi, yeasts or viruses. With meat, the usual organisms tested are the food poisoning and the food spoilage bacteria. Some bacteria are a distinct health hazard, e.g. Salmonella; others indicate a potential hazard, e.g. coliforms or Escherichia coli. Tests to indicate the total number of bacteria may reflect the conditions of production and storage.

There are three types of microbiological criteria:-

(1) Microbiological specification: The maximum number of a particular type of micro-organism allowed is specified, e.g. a Company's buying or selling specification.

(2) Recommended microbiological limit: A suggestion or a guide line is given within which it is suggested that industry should operate. This microbiological limit must be attainable under good commercial practice and can give warning of unsatisfactory conditions. There are already microbiological limits on 59 food products coming under the jurisdiction of the U.S. Food and Drug Administration.

(3) Microbiological standard: This is part of a law, or administrative regulation, and designates the maximum acceptable number of micro-organisms, or of specific types of micro-organisms, that may be present in a food. Those products which meet the standard are judged to be satisfactory for human consumption, while those products which do not meet the standard may be subject to seizure, condemnation or destruction.

For all three criteria there is need for clear statements on the following:-

(a) The method of taking samples and the number of samples to be examined.

(b) Detailed methods of analysis. Sometimes this is done by referring to published standard or official methods for the examination of the product. Such things as size of sample, method of preparation of dilutions in sterile fluid, the medium for growing the micro-organisms and the temperature and duration of incubation need to be specified.

(c) A clear method of interpretation. For example, the conditions under which a consignment will be accepted or rejected must be clearly stated.

Microbiological criteria for a particular product may refer to more than one type of organism. For example - a specification for a particular ready to eat meat product may include:-

Total plate count	-	not greater than 100,000/gram
Coliform bacteria	-	not greater than 100/gram
Salmonella	-	not present in 50 g

Acceptance of the product may depend on meeting all three specifications.

The choice of numerical limits is a matter of great difficulty, and must have regard to feasibility under commercial conditions. There is no point in setting numerical standards at low levels which industry is unable to meet, or at high levels attained only under unsanitary conditions.

Statements by officials of the United States Department of Agriculture have made it clear that standards must be related to good sanitary practice. The U.S.D.A. has, therefore, commenced detailed studies of the bacteriological status of some meat products at various stages of manufacture. Products now being studied include fresh sausage and some cooked cured meats, and it is in respect of such items that standards may first be introduced. Action on these products may result within the next year or two. U.S.D.A. officials have also indicated that when standards are introduced for domestic meat products, the same standards will apply to imported products of the same type.

For primal cuts and boneless meats in large pieces, sampling problems would be considerable, and five to ten years may elapse before standards for these products were considered. On the other hand, importers of meat from Australia could at any time introduce bacteriological specifications for imported products, including those being used in manufactured meats. It is not possible to state how likely this is, but manufacturers are certainly going to take an interest in the bacteriological status of the ingredients they are using. They may well seek to transfer the problems by writing bacteriological specifications for items being purchased.

CONCLUSION:

There is little doubt that microbiological specifications for some meat products will be introduced while most of our present Works' Managers are still in office.

At present there is considerable study of the microbiology of meat products by both Government and industry bodies in the U.S.A., and this is likely to stimulate further activity elsewhere.

Some official U.S.D.A. standards are likely to be introduced within the next three years for a limited range of manufactured meat products.

For ingredients of manufactured meats the introduction of official standards may be delayed, but importers may begin to write microbiological specifications at a comparatively early date.

Production of frozen meats with a consistently acceptable bacteriological status should not be difficult for Australian meatworks exercising proper control over the conditions of preparation and holding prior to freezing. The degree of control required may, however, be greater than has previously been attained in some plants.

Enquiries are invited from any Australian Works requiring further information, or advice regarding products for which a microbiological limit or specification has been requested.

JOTTINGS:

During June, we were visited by Mr. M. Honda, Secretary General of the Japan Meat Conference, and Mr. L. Mukai of the Foreign Trade Department. Mr. Honda showed considerable interest in chilled and aged meat.

Results of a recent experiment at the Meat Research Laboratory on ageing of cuts in controlled atmospheres showed significant increases in tenderness during the third week of ageing at 35°F. Based on taste panel results, the average increase in tenderness in the first two weeks varied between 19% and 71% depending on the meat cut. In the third week, the increase in tenderness was less and varied between 8% and 19% depending on the cut.

During investigations into Salmonella infection of sheep at slaughter, a new type of Salmonella was isolated at the Meat Research Laboratory, Cannon Hill. This has been confirmed by the International Salmonella Center, Paris, and has been named Salmonella cannon hill

Research into Drying Sheepskins:

The CSIRO Division of Protein Chemistry has been investigating the controlled drying of sheepskins. Dr. J.R. Yates of the Division is the scientist concerned.

In a paper published in 1968, Dr. Yates concludes:-

"The practical possibility of a controlled system for the drying of sheepskins has been demonstrated. The system gives predictable drying in 48 hours without any deleterious effect on the skins. Processing trials have shown that the skins dried in this system are perfectly satisfactory, and superior in some respects to the normal skins of commerce.

The conditions used in the drying system are a temperature of 27° to 29°C. (80°-85°F.) and an air velocity over the skin surface of 50-100 f.p.m. over the whole drying cycle. For the first 24 hours of the cycle, the humidity is kept as low as possible by using a 100 percent supply of fresh air. For the second 24 hours, the relative humidity is controlled at the 50-55 percent level in order that the final regain of the skins will be acceptable. This may be achieved either by regulating the supply of outside air and return air, or by steam injection if necessary. It has been shown that high temperatures *per se* do not have any deleterious effects on the skin quality, but damaging secondary effects preclude their use on a commercial scale. The presence of fat on the skins greatly increases the difficulties associated with the drying process.

The use of thin U-shaped wire clips to straighten out the folds in the skin has been found to solve the problem of incomplete drying in the folds, which is potentially very dangerous."

Dr. Yates would be pleased to assist anyone interested further.

NEXT ISSUE of the News Letter will be Tenderising Meat using Enzymes.