final report

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CSIRO

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Meat industry services

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Contents

1 Introduction

This project combined and replaced the services provided by two previous projects A.MIS.0007 (Meat Industry Services IV) and A.MIS.0008 (Meat Industry Knowledge Development), which concluded on 30 June 2010. The service was continued because Australian Meat Processor Corporation (AMPC) and Meat and Livestock Australia (MLA) recognised that the Australian meat industry must remain globally competitive.

The purpose of the Meat Industry Services (MIS) project was to provide industry, government authorities and MLA with information to assist in the maintenance, defence and enhancement of market access, thus providing public benefit to all Australians. The two previous projects included providing responses to enquiries from the meat industry, advice to government and industry organisations, development of publications, providing a point of contact for processor personnel and the provision of high-level technical advice. This project extended the provision of that suite of services.

2 Project Objectives

The objectives of project A.MIS.0010 (Meat Industry Services) were:

1. Communication and knowledge sharing

Knowledge development

- Maintain currency in relevant scientific knowledge through researching developments in literature, industry publications and news.

Knowledge dissemination

- Provide an information and advisory service which communicates feedback of knowledge to industry and MLA.
- Update information on the meatupdate website, on topics agreed by MLA.
- Communicate information about the service and its users back to MLA. This includes but is not limited to providing information to MLA regarding the number and nature of enquiries received and who they are from.
- Publications – six issues of the Meat Technology Update and six issues of Meat Technology – 'What's New' newsletter.

2. High level technical expertise

Provision of high-level technical expertise, advice and input into industry meetings. This includes: Preparation for, attendance at and provision of input into meetings (e.g. EMIAC, E. coli panel, MINTRAC, ARA) as required.

- Attendance and input at MINTRAC conference to be held in September 2010.

- High level scientific and technical advice provided to industry, MLA, AMPC, government.

3. Direct support to industry

Rapid response to enquiries. This includes:

- Provision of advice to industry and other interested parties through an advisory service.
- MIS user access to CSIRO and international networks and the undertaking of literature searches through CSIRO library network and databases.
- Provision of information informally through contact with processor personnel at conferences and networking events.

3 Staffing

The following staff and sub-contractors worked regularly but not exclusively on the project:

Alison Small

Neil McPhail

Robyn Warner

Bill Spooncer (Kurrajong Meat Technology)

Chris Sentance (Food Safety Services)

Other CSIRO staff were consulted or utilised on the project when specialist skills were required.

4 Services Provided

This project provided the Australian red meat processing industry with a range of services including:

- Information and advisory service;
- Rapid response to enquiries;
- Supply chain analysis response to emerging issues;
- Advice to industry and government organisations and input into industry meetings;
- Publications;

- Maintenance of contact with processor personnel.

4.1 Information and advisory service

Up to date information of relevance to the Australian meat processing industry was obtained by regular perusal of scientific journals and by subscribing to food and meat industry electronic bulletins. Project staff regularly kept in touch with MLA project managers to keep up with MLA-funded research and attended industry conferences, committees and seminars. Conferences and workshops that were attended included:

- MINTRAC Conferences
- AMPC Conference
- International Congress of Meat Science and Technology
- MINTRAC QA Network Meetings
- MINTRAC Environmental Network Meetings

The information gained via these means was assessed by the project team and utilised to prepare publications of relevance to industry.

Quarterly analysis of all enquiries received and website activity allowed the team to develop a feel for the issues that were currently affecting the industry. This knowledge was fed back to AMPC, MLA and CSIRO through quarterly reports and direct contact to support strategic decision-making processes.

4.2 Rapid response to enquiries

The Meat Industry Services team received 705 technical enquiries mainly via telephone, email and personal contact, during the term of the project. Approximately 81% of enquiries were from people directly associated with the meat industry and the remaining 19% from researchers, consultants or suppliers who were providers of services and equipment to the Australian meat industry.

A record of all enquiries received was kept and a breakdown of the topics of the enquiries is presented in Figure 1.

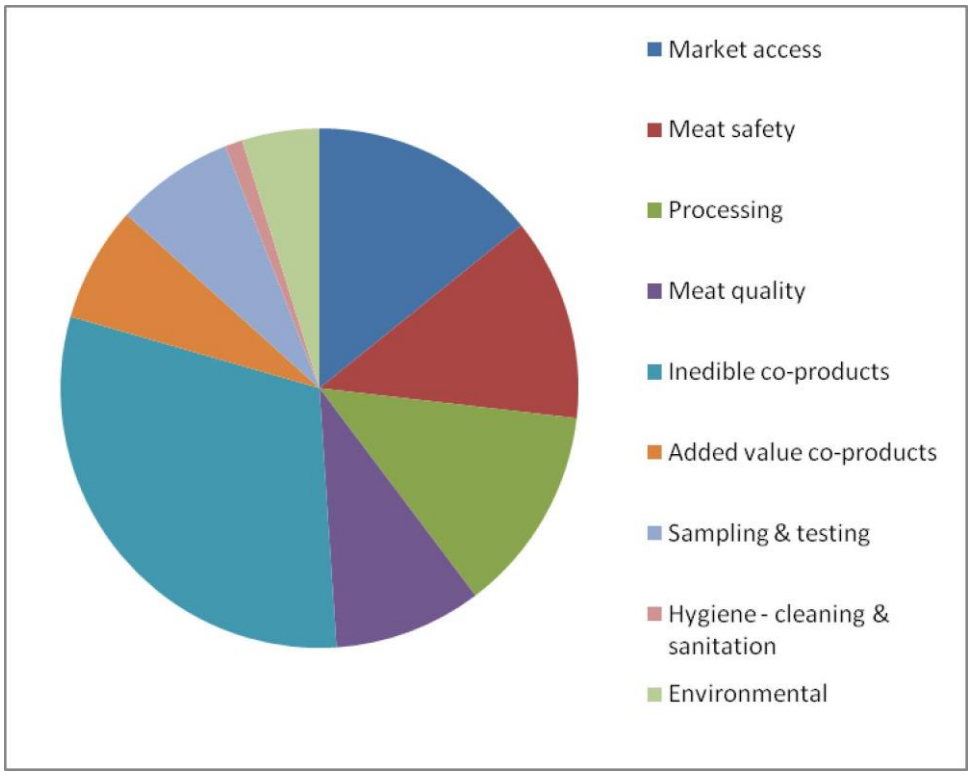

Figure 1: Topics of technical enquiries

Many enquiries could be answered during the telephone conversation or by email response. When available, scientific or technical literature was cited to support the advice provided. In some other cases searches of literature were required. The resources of the CSIRO library network and electronic journals proved invaluable in these cases, as did the database maintained by Meat Industry Services.

4.3 Supply chain analysis response to emerging issues

In some instances, issues with processing required more detailed investigation, which at times included a visit to the processing plant and some analyses. In some cases, this led to a short-term investigative project funded by the processor. Some examples where significant benefit has arisen from Meat Industry Services advice are:

Beef affected by power outage during a cyclone: When cyclone Yasi crossed the north Queensland coast power was lost and beef carcases held in an abattoir chiller were subjected to increased temperatures resulting in higher than acceptable microbial growth on the surface of the carcases. Extensive advice was provided during the incident when predictions were made of the potential growth of E. coli and afterwards when the abattoir was in dispute with AQIS regarding the disposition of the product. A sample of the meat was assessed for wholesomeness at the CFNS laboratory and a report prepared which, along with independent assessment of microbiological quality resulted in the disposition of a considerable quantity of meat being upgraded from pet food to heat treated for limited human consumption.

Discolouration of beef INSCO: A processor experienced a brown discolouration of vacuum-packed beef INSCOs (insides – cap off) exported to Japan. A visit was made to the site to

observe the operations and a returned cut inspected. Measurements of oxygen transmission rate were arranged for the packaging film which indicated that it was within specification. The exact cause of the issue was not confirmed, but the plant changed supplier of the packaging film and have not reported further issues.

Humane slaughter issues: A media exposé of welfare abuses of cattle exported for processing in Indonesian slaughterhouses prompted a number of calls from journalists, producers, processors and regulators. CSIRO policy was not to comment on non-science issues, however the MTU 1/11 'Effect of slaughter method on animal welfare and meat quality' was supplied, and copies of scientific papers discussing humane slaughter research were provided to AQIS.
Market access for rendered products: Meat Industry Services continues to be a source of information on the requirements to access markets such as Indonesia, the EU and North America.

Hygienic rendering: A large number of enquiries continue to be received regarding production of Salmonella-free meat meal. The Australian Standard for Hygienic Rendering has been amended to require that a review of hygiene procedures and corrective action be taken in response to any detection of Salmonella in meat meal. This has led to more requests for advice on actions to be taken.

Poor shelf life of vacuum skin packaged lamb cuts: A processor experienced problems with achieving the required shelf life of vacuum skin packed lamb prepared for retail sale. A visit was made to the site and suggestions were made on processing and storage temperatures and methods of reducing the initial bacterial count.

Rejection of vacuum-packed lamb cuts in export markets: An exporter of vacuum-packed lamb cuts experienced some rejections of their products in a European market for off-condition after 6 weeks. A visit was made to the boning room to discuss possible causes of the poor shelf life with management. Frozen returned product was subjected to microbiological analysis and a report prepared for the company. A proposal was prepared for a comprehensive audit of their operations.

Dark cutting: Dark cutting continues to be a problem for some plants at certain times, particularly in southern Australia where up to 30% of carcases can be affected. A visit was made to the site where the cattle handling facilities were inspected and a report prepared.

4.4 Advice to industry and government organisations and input into industry meetings

Project team members provided advice to industry through attendance and presentations at industry advisory committees, contact groups and other appropriate industry meetings. They included:

- Export Meat Industry Advisory Committee (EMIAC)
- Australian Renderers' Association (ARA)
- MINTRAC QA Managers' Network Meeting
- MINTRAC Environmental Network Meeting
- FAO/WHO expert meeting on Animal Feed Impact on Food Safety
- TSE FAP National Advisory Committee
- Entry and exit meetings with auditors from the Philippines reviewing market access for meat and bone meal
- Lectures to university students

- Assistance in development of the Australian submission to the US on *E. coli* O157:H7 testing of beef for manufacturing
- NSW Food Authority and DPI working group on *Salmonella* in poultry feed
- Development of Diploma Course in Agribusiness with MINTRAC

4.5 Publications

During the course of the project, 6 Meat Technology Updates were prepared and distributed to industry. They were:

4/10 Covered anaerobic ponds

5/10 Sources of contamination on beef carcases during dressing 1/11

Effect of slaughter method on animal welfare and meat quality

2/11 Heat toughening – Part 1: Effects of heat toughening on quality of beef and the incidence in Australia

3/11 Heat toughening – Part 2: Strategies for reducing the incidence of heat toughening in beef carcases

4/11 Very fast chilling

In addition 6 issues of 'Meat Technology – What's New' were prepared and distributed with the Meat Technology Update. These summarised papers published in scientific journals and elsewhere that were considered to be relevant to the industry. A list of topics covered is presented in Appendix 2.

These publications were printed and posted out to plant managers, quality assurance managers, engineers and others on a mailing list maintained by Meat Industry Services and senior managers on a list maintained by AMPC. Currently over 800 copies are posted out but many more people have access to the publications at the plants.

They were also posted on the website (www.meatupdate.csiro.au). In addition an email list is maintained of those who wish to download an electronic copy of these publications. This list is increasing rapidly and when the MTUs are posted on the website, currently in excess of 120 people are advised by email that a new one is available for downloading.

5 Summary

The Meat Industry Services team has, over the period 10th September 2010 to 15th August 2011, responded to a wide variety of issues and queries, relating to numerous scientific and commercial disciplines. Examples of areas of expertise utilised include: Meat Safety; Co-products processing; Market Access; Meat Quality; Processing Technology; Environment and Sustainability; Sampling and Testing. Significant impact was achieved for a number of processors through MIS assistance.

Following an MLA review of the service in 2009, in which it was found that awareness of the service could be better, efforts have been made to engage with processors through attendance at MINTRAC network meetings and through site visits in order to more fully assist processors in addressing issues. The electronic subscriptions to the newsletters have increased over the year from just over 70 at the end of June 2010 to over 120 at the time of this report, while website usage has remained stable at approximately 500 visitors to the site each quarter, at least half of whom are directly associated with meat processing.

Appendix 1

Meat Technology – What's New? – Topics

Issue	Topics
2010.4	Effect of muscle type and cooking temperature on off-flavour of beef chuck muscles High oxygen MAP induces lipid and myoglobin oxidation Effect of post-transport electrolyte-glucose solution on meat quality of young bulls Effect of enzyme treatment on high-and low-connective-tissue muscles Grain and grass production systems in the USA Odour-control technology commercialised EU to extend COOL to all meat and poultry
2010.5	Eating quality of frozen Australian lamb Influence of finishing system on fatty acid composition and display life of lamb Protein denaturation of deep semimembranosus muscle negatively affects tenderness Rapid determination of ammonia in meat exposed to ammonia leaks Foreshank manipulation to improve beef chuck tenderness Rapid detection of E. coli O157:H7 The effect of SmartstretchTM on tenderness of beef topsides and cube rolls
2011.1	Low occurrence of enterohaemorrhagic E. coli in Australian cattle Influence of storage method of beef trim on shelf life of mince Algal biofuel from wastewater Radio frequency tempering of beef No red meat link to prostate cancer Robyn Warner joins CSIRO Food and Nutritional Sciences
2011.2	Targeted interventions to control *E. coli* Alternative cooling procedures for large meat products Little difference in contamination between grass-fed and grain-fed beef The Simplate method of enumeration of *E. coli* *Lactobacillus* to preserve vacuum-packed lamb Influence of high-oxygen MAP on beef quality
2011.3	Heat-resistant *E. coli* from a beef processing facility Effects of dry and spray chilling on *E. coli* and *Salmonella* Dead stock disposal methods The effect of roofing material on the quality of harvested rainwater
2011.4	Retail colour stability of lamb Effect of cattle temperament on meat quality Bacterial community analysis of cattle feedlots Consumer response to new beef packaging technologies Bacterial survival during composting and burial of dead cattle Electrolysis-enhanced anaerobic digestion of wastewater