

PROCESS CONTROL MONITORING – IS THERE A BETTER WAY?

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Project Description

Meat testing is an onerous and expensive task for all establishments, and one which currently provides little or no information on process control or food safety. This project examined process control and food safety as they currently apply to the Australian meat industry, starting with a clean slate, though with the benefit of solid scientific background information on the industry. As a result of this work, changes to the way establishments are required to monitor production and test meat products are proposed.

Project Content

Data from numerous sources were considered, including:

- The SARDI database of ESAM data (2007 to present), providing results from over one million ESAM/Shiga-toxin producing *E. coli* (STEC) tests
- Recent Product Hygiene Index (PHI) data from a representative sample of beef, sheep and pig establishments
- Company data including more than forty investigations
- Department of Agriculture and Water Resources (DAWR) reviews

Project Outcome

Based on the scientific analysis of the data, a number of findings have been made, one of which is that the beef, sheep and pig sectors are producing meat products that consistently outperform those of other major exporting countries.

- Analysis of ESAM data over the decade 2007-2016 indicates that beef, sheep and pig carcasses are manufactured with extremely low contamination rates.
- Global comparisons indicate that Australian carcasses have Aerobic Plate Counts approximately 10-fold lower (1 log) than those of other countries, plus a lower prevalence of generic *E. coli*.
- Risk studies indicate that if all Australian beef trim exported to the USA were manufactured into “Aussie” hamburgers (no comingling), they would cause less than 1 illness/annum if served in quick serve restaurants.

Findings on the existing PHI system

An analysis of the PHI indicates that:

1. The PHI does not meet the Department's own criteria as outlined in Meat Notice 2009/11.
2. The PHI does not indicate unsatisfactory performance or non-compliance. As DAWR staff have stated: "... a plant may be operating satisfactorily and still obtain a red traffic light for any particular KPI" (Deo, 2016).
3. Consignment to yellow and red traffic light categories is punitive and leads to confusion both domestically and by importing countries (Langbridge, 2016).
4. Criteria used for identifying trends result in a high rate of false positives.
5. Microbiological testing of food contact surfaces during pre-operational inspection and of personal equipment bear no relevance to carcase or end-product microbiological results.
6. Slaughter floor MHA and Boning room MHA bear no relevance to carcase/end-product microbiological results.
7. KPIs for carton meat assessments are no longer considered useful because they rarely are defective, a finding also of a DAWR review committee (Pearse, 2012).
8. Standard deviation has been incorporated as a KPI for seven aspects of the PHI, without any scientific underpinning.
9. The 1-2 month lag in reporting PHI summaries by DAWR is not sufficiently timely to be of practical use.

A proposed improved PHI

A revised, improved PHI system is proposed which:

1. Is straightforward
2. Is focused on "testing what you sell"
3. Is focused on compliance with Australian requirements
4. Has 11 KPIs, each of which is linked with an Alert based on a moving window
5. Has a red/green traffic light dashboard updated in almost real time based on the Alerts

Proposed reduced monthly microbiological KPI assessment

KPI*	Acceptable	Alert
Chilled carcase	No alerts for APC and <i>E. coli</i>	≥1 Alerts for APC or <i>E. coli</i>
Primals	No alerts for APC and <i>E. coli</i> **	≥1 Alerts for APC or <i>E. coli</i> **
Bulk meat	No alerts for APC and <i>E. coli</i> **	≥1 Alerts for APC or <i>E. coli</i> **
Offals	No alerts for APC**	≥1 Alerts for APC**

* Applicable only for end product produced

** Requires validation as there are no/limited available data

Proposed reduced monthly visual KPI assessment

KPI*	Acceptable	Alert
Largest daily SF/BR MHA Mean	≤ 1.5	> 1.5
Largest daily Bulk Pack MHA Mean**	≤ 0.5**	> 0.5**
Largest daily Primals MHA Mean**	≤ 0.5**	> 0.5**
Largest daily Offal MHA Mean	≤ 0.5	> 0.5

* Applicable only for end product produced

** Requires validation as there are no available data

It is proposed that to test the utility of the proposed PHI system, and also to generate data to validate aspects of the Alert criteria listed above, that a comprehensive trial be undertaken, involving establishments from the beef, sheep/lamb and pig sectors.

Deo, A. (2016). "Product Hygiene Index Manual – Operational Investigation Guidelines and Beef KPI Data Trends", Canberra.
Langbridge, J. (2016). EMIAC Food Safety and Animal Health Sub-committee, Meeting of 25 March 2016, Agenda Topic: Microbiological Process Control).

Pearse, B., Vanderlinde, P., Zorah, K., Edmunds, G., & Curby, B. (2012). Data Collection and Analysis Project: Executive Summary. DAWR, Canberra.

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