Government of Western Australia
Department of Health

Food Act 2008 (WA) Fact Sheet 20

Australian Standard Alternative Equivalent Procedure: Risk-based review of routine visual inspection of pigs

Version 2 – March 2019

Rationale and description of the alternative technique

There has been substantial work to validate the equivalence of routine visual versus traditional inspection under Australian industry conditions (Hamilton *et al*., 2002). While alternatives to incision of head lymph nodes (i.e. observe or excise/discard) were approved and subsequently adopted within AS4696 (Anon 2007) there is likely under-capitalisation of these earlier assessments of eqivalence of visual inspection (i.e. observation) against the standard.

This has been verified by work across the European Union which has regulated routine visual post-mortem inspection of pigs.

The alternative post-mortem inspection procedures approved by the Australian Meat Regultaors Group are as follows.

Approved equivalent alternative post-mortem inspection procedures to AS4696

Based on the quantitative evidence presented for pigs in Australia, it is recommended to implement routine visual inspection for all pigs accompanied by a PigPass NVD (National Vendor Declaration).

That palpation or incisions used in current post-mortem inspection should be omitted in pigs subjected to routine slaughter, because the risk of microbial cross-contamination is higher than the risk associated with potentially reduced detection of conditions targeted by those techniques.

The use of palpation and incision techniques during post-mortem inspection should be limited to suspect pigs identified, inter alia, through post-mortem visual detection of relevant abnormalities or herd health history (i.e. risk-based).

Palpation and incision may be used where appropriate to ensure that equivalent suitability is achieved; this covers gross abnormalities arising from animal health and welfare problems (Schedule 2 Guideline Table 4).

Palpation and incision may be used in determining if there is evidence of active systemic infection to inform carcase disposition judgment.

When palpation and incision are used, these additional procedures must be followed by effective decontamination interventions of hands and associated equipment to minimise cross-contamination.

Specific alternative post-mortem inspection procedures in Schedule 2 are shown in the following table.

Post-mortem inspection procedures according to AS4696 (2007) and equivalent alternative procedures primarily based on visual inspection (V=Visual inspection; P=Palpation: I=Incision). Grey lines indicate changed inspection procedures.

Inspected site	Procedures for Post-Mortem Inspection of Pigs – extracted from Schedule 2 AS 4696	Alternative post-mortem inspection procedure[2]
1. **Procedure for post-mortem inspection of carcases**		
All carcases	Observe internal and external surfaces of carcases (including tail, musculature, exposed bone, joints and serous membranes)	V[1]
Lymph nodes		
Superficial inguinal	Observe or excise/discard without inspection	V or excise/discard without inspection
Internal iliac	Observe	V
Lumbar	Observe	V
2. **Procedure for post-mortem inspection of viscera**		
Lymph nodes		
Bronchial & mediastinal	Palpate	V
Portal	Palpate	V
Mesenteric	Observe	V
Lungs	Palpate. Bronchi opened and internal surfaces observed - for human consumption.	V
Heart	Palpate	V
Liver	Palpate	V
Gastrointestinal tract	Observe	V
Spleen	Observe	V
Kidney (enucleated)	Palpate	V
Other tissues & organs	Observe tissues when for human consumption	V
3. **Procedure for post-mortem inspection of head**		
All carcases	Observe external surfaces	V
Lymph nodes		
Submaxillary Cervical	Incise and observe or) observe only, or b) excise and discard these nodes without inspection.	Visual only, or b) excise and discard these nodes without inspection.
Other tissues	Observe when for human consumption – thymus, non-gravid uterus, bladder, testicles, and penis	V
4. **Additional post-mortem inspection when specific diseases are detected or suspected[2]**		

[1] Visual used as equivalent to Observe in Anon (2007) to highlight hands-off of alternative procedures

[2] Palpation and/or incision may be used when a lesion has been found after routine visual-only inspection or on herd health history (i.e. risk-based) to decide if the meat/carcase is fit for human consumption. This also applies to suspicion of Bovine Tuberculosis, *Cysticercus celluosae* (Pork Measles) and Sparganosis in pigs. Such additional procedures (I, P) must be accompanied by an effective hygiene intervention to minimise cross-contamination.

Background and supporting information

The previous Australian assessments provide evidence that support equivalence of routine visual inspection, including:

- Hygiene being hampered by likely contamination, especially from head inspection;
- Same level of foodborne hazards in normal and abnormal lymph nodes with the former far more prevalent on a carcase throughput basis;
- Sensitivity of visual inspection improved for some abnormalities and decreased for others, however, either way there is a negligible adverse effect on food safety from non-detected abnormalities;
- Sensitivity of detection is often poor by both methods;
- Reactive lymph nodes are infrequently associated with total carcase condemnation;
- Total carcase condemnation rate significantly higher with visual inspection; with reasons for condemnation not being significantly different to traditional inspection ;
- Both inspection systems appeared likely to result in a similar level of consumer protection.

Key Findings

Further quantitative studies overseas similar to those conducted in Australia have focused on sensitivity of detection of gross abnormalities and subsequent non-detection rates.

From the predicted non-detection rates the effect of alternative post-mortem inspection procedures is mostly minor. Overall, the European assessments concluded that:

- omission of incision and palpation may have a variable negative effect on the sensitivity for detection of lesions in organs;
- neither traditional or visual inspection systems are effective in detecting all gross abnormalities;
- omission of incision is likely to affect sensitivity of detection of diseases localised to the inner parts of organs such as taeniasis (Pork Measles) and bovine tuberculosis; the absence of these diseases in Australian pigs eliminates this concern; and
- as expected, where inspection procedures for food safety abnormalities are unchanged the non-detection rates remain the same (e.g. fever, septicaemia, Salmonellosis).

The demonstration of equivalence of an alternative inspection procedure on wholesomeness with the current standard was also demonstrated. The European studies report that differences in sensitivity, and hence non-detection rates, tend to disappear if alternative (visual-only) inspection is supplemented with the use of incision and palpation when indicated by visual inspection or in response to prior knowledge of herd health problems. For pigs that are marketed regularly, the use of partial condemnation data from preceding lots from the same farm is seen as being particularly useful in identifying lines of pigs where additional inspection resources and/or procedures may be required i.e. risk-based.

In determining the extent to which these alternative post-mortem inspection procedures should apply, consideration of any increased risk associated with outdoor reared pigs needs to be addressed. In the UK, only bovine tuberculosis was considered to present a significant public health and animal health risk due to poorer sensitivity of routine visual inspection in outdoor reared pigs. Due to eradication of bovine tuberculosis in Australian livestock this concern does not apply.

Equally, there is a lack of evidence for hazards that may be more likely in outdoor reared pigs such as Cysticercosis (Pork Measles) and Sparganosis. While these have been recorded many decades ago, they are prevented by on-farm animal health programs that are components of the Australian Pork Industry Quality Assurance Program. The control of these hazards elsewhere in the supply chain (i.e. on-farm) addresses a key term of reference of this review.

Reflecting this evidence, it is recommended that 1) visual post-mortem inspection is an equivalent procedure for outdoor reared pigs in Australia and 2) there is no recommendation to change post-mortem inspection procedures for Tuberculosis, Cysticercosis and Sparganosis in pigs when suspected (AS4696:2007, Schedule 2 Table 2).

Further assessments of the net effect of post-mortem inspection was conducted. Net effect is defined as the detection and removal of food safety hazard:abnormality combinations compared with contamination of edible tissue with hazards resulting from the actual inspection procedures.

In short, the net effect of visual only inspection versus traditional inspection of head nodes of pigs is estimated to be 214:1 i.e. for every head LN abscess with a *Salmonella* detected, another 214 carcases are predicted to be cross-contaminated with *Salmonella* by inspection of normal carcases. This example serves to demonstrate the negative effect of incision of lymph nodes, as noted in the EU assessments.

Furthermore, the finding that inspectors' hands may be contaminated with *Salmonella* at an average rate of 14% at two export licenced pig abattoirs in Australian supports the potential for cross-contamination resulting from current inspection procedures.

Assessments of any adverse effects of the alternative technique

Post-mortem inspection and/or disposition

Non-detection rates are an issue for current procedures. Marginal increases are predicted to result from routine Visual inspection, however, allowance for palpation and/or incision based on carcase observation or herd health history is judged to mitigate this effect.

Food safety

Few gross abnormalities of pigs are of foodborne significance and they occur at very low prevalence. Food safety is judged as equivalent, as present procedures may result in negative net effect i.e. more contamination added than foodborne hazard:gross abnormality combinations removed.

Product wholesomeness (including non-detection rates)

Minimal adverse effect on wholesomeness – refer to post-mortem inspection and/or disposition above. Effect on total carcase condemnation rate unaffected.

Animal health (including zoonoses) and animal welfare surveillance

There is minimal adverse effect on surveillance.

Animal welfare

Detection of animal welfare conditions is unaffected.

Product integrity

Not applicable

Useful Resources

Anon (2007) Australian Standard for the Hygienic Production and Transportation of Meat and Meat Products for Human Consumption. FRSC Technical Report 3, AS 4696:2007.

CAC (Codex Alimentarius Commission) (2005) Code of Hygienic Practice for Meat. CAC/RCP 58-2005.

Hamilton, D. R., Gallas, P., Lyall, L., Lester, S., McOrist, S., Hathaway, S. C., & Pointon, A. M. (2002). Risk-based evaluation of post mortem inspection for pigs in Australia. *The Veterinary Record*, 151(4), 110-116.

Pointon, A.M., Hamilton, D.H and Kiermeier, A. (2018) Assessment of the post-mortem inspection of beef, sheep, goats and pigs in Australia: Approach and qualitative risk-based results. *Food Control* 90, Pages 222-232.

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The information contained in this Fact Sheet was provided to the Australian Meat Regulators Group in support of this change to the meat inspection procedures content in the Australian Standard for the Hygienic Production and Transportation of Meat & Meat Products for Human Consumption (AS 4696:2007).

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