SETTING A THRESHOLD FOR CONTAMINATION OF PROCESSED MEAT PRODUCTS WITH UNDECLARED MEAT SPECIES

Report by Steve Wearne, Director of Policy

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1. SUMMARY

1.1. A clear threshold for acceptable levels of undeclared meat species in processed meat products would help consumers choose food with confidence, would set a good practice standard for industry, and would support decisions by enforcement officers on whether products were of the nature and quality intended.\(^1\)

1.2. We set a threshold of 1% horsemeat in beef early in the horsemeat incident as a pragmatic and interim means of distinguishing adventitious contamination from gross adulteration. We have since been gathering evidence to support a more robust consideration of the extent to which adventitious contamination might be minimised by good manufacturing practice (GMP) to a level acceptable to consumers.

1.3. Based on a Laboratory of the Government Chemist (LGC) study which looked at the processing of beef mince after processing pork mince in UK meat processing plants, our conclusion is that, where GMP is followed in the preparation of comminuted meat products (i.e. chemical deep clean or high pressure water wash of mincing equipment batches of meats from different species), we can be confident that there will be no detectable carryover of undeclared species even using the most exacting current tests and this is likely to be acceptable to the majority of consumers.

1.4. Where there is no chemical deep clean or high pressure washing carried out between processing batches of meat from different species (e.g. beef meat is minced directly after pork meat with no cleaning), carryover does occur and is detectable. To the extent that this practice continues, we would expect food producers to advise their customers where relevant so that consumers are not misled.

\(^1\) Caveats: deliberate addition of an ingredient without declaring on the ingredients list would remain an offence as this relates solely to adventitious contamination; “acceptability” in the general consumer context may not equate to “acceptability” for faith groups, although clarity over the level of assurance that industry good practice can consistently provide should help faith group certification bodies determine whether this would be sufficient for their purposes.
1.5. The Board is asked to agree that our advice to the food industry and local authority enforcement officers should now be based on the following principles, which are based on the evidence we have collected:

- testing to determine the absence of carryover where good practice has been followed, whether such tests are part of industry own checks or part of official controls, should use a threshold of 0.1% undeclared meat species in comminuted meat on a weight for weight basis (w/w);

- where official control samples show a content of undeclared meat species in comminuted meat that is equivalent to between 0.1% and 1% w/w, enforcement officers should investigate the causes of this carryover and should ensure that corrective action is taken by the food producer; and

- where any test, whether conducted as part of industry own checks or as part of official controls, shows a content of undeclared meat species in comminuted meat that is equivalent to 1% or above w/w (once measurement uncertainty has been taken into account), the established procedure for reporting those findings to the Food Standards Agency, publishing details of the findings, and instigating a product recall should continue to be followed.

2. STRATEGIC AIMS

2.1. This work relates to the FSA’s responsibility across the UK to provide a framework for enforcement relating to food authenticity. It contributes to our strategic aims of ensuring that food producers give priority to consumer interests.

2.2. The approach we have taken to this issue, which includes collection of relevant evidence, engagement with external experts, and open discussion by the Board, provides a paradigm for open policymaking.

3. EVIDENCE AND CONSULTATION

3.1. The key evidence for this paper is the results from three strands of research on: analytical science capability (what is measurable?); carryover compatible with industry good practice (what is achievable?); and consumer views (what is acceptable?).

3.2. The research on methods and carryover has been subject to peer review by the Analytical Methods Working Group (AMWG). The membership of the group has been augmented with representatives from the British Retail Consortium, Food and Drink Federation, British Meat Processors Association and other industry representatives to help oversee the carryover studies.

3.3. The citizens’ forum research was also subject to peer review, which concluded that:

- the research instruments and stimulus materials had been thoughtfully designed and were clear and balanced;
• the plan and content of the deliberative event were well conceived as the third and final stage of the research;

• a specially commissioned film provided a graphic example of the complexity, cost implications and food safety considerations of meat processing and understanding practice will have helped participants to build on and anchor their earlier discussions; and

• the presence of external experts, including a representative from the LGC and a large food processor, enabled complex scientific and other considerations to be introduced in logical steps, allowing for clarification at a number of points.

4. DISCUSSION

Consumer research

4.1. Online panel research in February 2013\(^2\) and July 2013\(^3\) suggests that, for many consumers, reported purchasing behaviour has not greatly changed as a result of the horsemeat incident, but that a lack of trust is prevalent with consumers concerned about mislabelling and finding the mislabelling issue of greater concern than eating horsemeat itself. Generally consumers are feeling less confident about food safety. However this is an area which will be further explored as part of wider research looking at the dynamics of the food supply chain in response to supply and incidents.

4.2. Participants in citizens’ forums commissioned by the FSA\(^4\) did not reach a consensus on acceptable levels of trace contamination of meat product with DNA from undeclared species. Three distinct viewpoints emerged:

• pragmatists who would only become concerned where contamination exceeded 1% of an undeclared species;

• those taking a knowing acceptability position, where unavoidable contamination was accepted if good manufacturing practices had been followed; and

• those who found the presence of DNA from undeclared species unacceptable, even at very low levels of 0.1%.

4.3. Regardless of their attitude towards acceptability, consumers wanted reassurance that trace carryover would be minimised now the issue was recognised. Consumers wanted greater transparency of the issue, either through labelling or

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\(^2\) Horse Meat Wave 1: Consumer attitudes to towards the horse meat contamination issue (Annexe A)

\(^3\) Horse Meat Wave 2: Changing consumer attitudes following the horse meat contamination issue (Annexe B)

\(^4\) Trace DNA in processed meat: Consumer views about acceptability (Annexe C)
public awareness, as this would help to drive standards in the industry. There was an expectation that oversight, testing regimes and intelligence gathering should improve, both to prevent food scares like horsemeat and to develop and enforce practices that minimise carryover, such as conducting interim washes between red meats. Ensuring the food industry was effectively minimising avoidable contamination was considered an important part of the regulatory approach by all participants.

4.4. The FSA’s Consumer Advisory Panel discussed the issues at its meeting in June 2013. Members of the Panel noted that labelling trace DNA would set a precedent that could have unintended consequences on future labelling requirements and that labelling should only be considered if it is likely to make a material difference to consumers.

Analytical methodology

4.5. The aim of this work was to develop and validate robust analytical methods for detection and quantification of horsemeat in meat products. The final report of this work is published on the Defra website. The work showed that it is possible to measure horse DNA in minced beef reliably down to levels equivalent to 0.1% w/w, and to establish a clearer and more consistent relation between DNA results and meat content, at least for minced raw horse in beef. The carry-over study showed this is also possible for raw pork in beef. Therefore, methods need not be major bar to looking at a lower level, down to 0.1% w/w, to define and control trace carryover in these materials.

4.6. Further work is now needed to support the use of this (and potentially of other methods) across a range of laboratories, as part of the work to support application of the proposed thresholds in practice. This would include validation of the method across a range of laboratories in a collaborative ring trial and confirming the appropriate quality controls necessary to ensure testing is robust and reliable.

Carryover studies using industrial mincing equipment

4.7. Mincing was considered by the AMWG to be the industrial process that carries the highest risk of meat species carryover. The LGC study shows that either a chemical deep clean, or a high pressure water wash of complex industrial mincing equipment between the mincing of batches of pork meat and batches of beef meat is effective in preventing the carryover of pork meat from the first batch into the subsequent batch of beef to a limit of detection of <0.1% w/w.

4.8. Where one batch follows another through an industrial mincing process with no high pressure water wash or chemical deep clean, carryover does occur and detectable levels of pork meat from the first batch could be found in finished minced beef product from the subsequent batch of beef. The mean pork content of 100 kg beef, minced directly after 100 kg pork, was found to be 0.65 kg – with levels of pork generally higher in portions of the batch that were processed first.

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5 Hyperlink to Defra Website: Method development for the quantitation of equine DNA and feasibility of establishing objective comparisons between measurement expression units (DNA/DNA compared to w/w tissue) - FA0135

6 This LGC study focused on carryover of undeclared species DNA between batches. It did not consider issues relating to potential carryover of pathogens and the microbiological safety of minced meat products, although during group discussions the concept of carryover was associated with cross contamination and did raise questions about whether carryover may indicate poor hygiene practices in meat processing plants.
4.9. These conclusions have been drawn from controlled studies conducted in a commercial pilot plant. Work mirroring the pilot plant studies has been carried out where LGC has worked with commercial plants to verify the results in situations as practiced by industry. The results have not yet been formally considered by AMWG but LGC has confirmed that no carry over (above 0.1% w/w) could be detected after mincing pork and beef meat sequentially when either a chemical deep clean or a high pressure water wash was carried out between processing the two meat species.

5. IMPACT

5.1. The proposed outcome from consideration of this issue is the promulgation of advice to the food industry and local authority enforcement officers on a consistent approach to determining whether processed meat products are contaminated with undeclared meat species. This would replace the pragmatic, interim threshold introduce at an early stage of the horsemeat incident with a robustly evidence-based threshold.

5.2. As the proposals take into account both consumer expectations and industry good practice, we anticipate that they would contribute to increasing consumer confidence whilst not placing additional burdens on compliant food businesses.

6. LEGAL, RESOURCE, RISK, SUSTAINABILITY IMPLICATIONS

6.1. There could be greater use of chemical and high pressure washing to reduce the risk of carry over contamination in meat processors given the results from this study and the role and efficacy of chemical or high pressure water washing in reducing carry over. This study will help inform supplier specifications and will provide more clarity on enforcement in relation to undeclared ingredients and carry over.

7. DEVOLUTION IMPLICATIONS

7.1. We anticipate that the advice to the food industry and local authority enforcement officers proposed in this paper would be issued in all four countries of the UK.

8. CONSUMER ENGAGEMENT

8.1. Consumer engagement provided a key strand of the evidence used in developing the proposal, as described in the discussion section above.

9. CONCLUSION AND RECOMMENDATIONS

9.1. The evidence we have collected, described in the discussion section above, suggests that where GMP is followed in the preparation of comminuted meat products, we can be confident that there should be no detectable carryover of undeclared species even using the most exacting current tests and this is likely to be acceptable to the majority of consumers.
9.2. The Board is asked to **agree** that our advice to the food industry and local authority enforcement officers should now be based on the following principles, which are based on the evidence we have collected:

- testing to determine the absence of carryover where GMP has been followed, whether such tests are part of industry own checks or part of official controls, should use a threshold of 0.1% undeclared meat species in comminuted meat on a weight for weight basis (w/w);

- where official control samples show a content of undeclared meat species in comminuted meat that is equivalent to between 0.1% and 1% w/w, enforcement officers should investigate the causes of this carryover and should ensure that corrective action is taken by the food producer; and

- where any test, whether conducted as part of industry own checks or as part of official controls, shows a content of undeclared meat species in comminuted meat that is equivalent to 1% or above w/w (once measurement uncertainty has been taken into account), the established procedure for reporting those findings to the Food Standards Agency, publishing details of the findings, and instigating a product recall should continue to be followed.