



Halting horsemeat contamination: providing standards

LGC played a crucial role in helping the UK government robustly address the 2013 horsemeat issue. The rapid development of reference materials for meat species alongside the provision of the first proficiency testing scheme for horsemeat in beef provided essential support for routine laboratories which contributed to resolving the incident and restoring consumer confidence.



The requirement

Food fraud is the deliberate and intentional substitution, addition, tampering or misrepresentation of a food or its ingredients for economic gain. Ever more complex supply chains make it increasingly difficult to ensure confidence in the origin and quality of the food chain. Processed foods in particular are more susceptible to fraud, where cheaper species or ingredients can be substituted more easily.

In early 2013, horse DNA was found to be present in beef burgers sold in a UK supermarket chain. This was the start of a meat substitution incident that was found to be widespread across Europe as well as affecting other countries worldwide.

This horsemeat incident presented a significant challenge to the UK's food analysis infrastructure, with Public Analyst methods being challenged and a loss in consumer confidence in meat-based products as evidenced by a rapid drop in sales of these foods.

It highlighted the need for sound measurement science to provide support for rapid and reliable appraisal of the meat supply chain. Standardised approaches for the detection and quantitation of different meat products to ensure the safety and authenticity of the food chain were required urgently to support comparable measurements across the UK, Europe and the rest of the world.

The solution

Recognising LGC's long established multidisciplinary expertise, Defra and the FSA asked for LGC's immediate support in addressing this incident. LGC was part of the government's Horsemeat Survey Steering Group from its inception.

Within a month of the publication of the results showing the presence of horse DNA in beef burgers, LGC provided the first Proficiency Testing scheme for horsemeat in beef to support meat testing laboratories in carrying out mandatory tests on all processed beef products.

To support comparability among local authority Public Analyst laboratories participating in the government 'horsemeat surveys', LGC rapidly sourced and prepared authentic reference samples of horse, pig and beef. In addition, LGC prepared and delivered meats and mixtures down to 0.1 % adulteration for horse and pig meat in beef. These were used as reference materials by Public Analyst laboratories analysing samples for the government horsemeat surveys.

The impact

The action taken by industry, government and LGC minimised the disruption to the ~£3 billion/year UK beef market and ultimately helped to restore flagging consumer confidence in processed meat products as quickly as was practically possible. Within a year, beef consumption increased to pre-horsemeat issue levels despite a £95 million drop in consumer spending during 2013.

The rapid provision of a proficiency testing scheme to allow meat testing laboratories to establish and improve the quality of measurements ensured retailers, consumers and regulators could trust the test results on beef products in the wake of the horsemeat issue. Since the introduction of the first PT scheme, the rate of satisfactory performance identifying meat contamination has increased. Failures resulting from the use of inappropriate test methods were identified and have not occurred in recent rounds. In addition, the levels of contamination which laboratories can successfully identify has reduced from <10 % in the early rounds to <3 % currently.

Early availability of reference materials supported the government horsemeat surveys of beef products on sale across the UK. The results of these surveys were crucial to understanding the initial extent of the contamination and offending meat products from the shelves. Over 100 product lines were withdrawn in 2013, estimated to have cost UK industry around £360 million. Subsequent UK government surveys and data from industry were fed into the European Commission at their request to survey products across the EU and help eliminate the presence of horsemeat.

The Government Chemist also undertook referee analysis of multiple samples which had been shown to be non-compliant from the government horsemeat surveys, identifying food fraud issues such, as the substitution of lamb with cheaper meats (e.g. chicken and beef) in takeaway dishes. In addition to the horsemeat in beef meat reference materials, LGC has produced further single meat species reference materials (turkey, chicken, goat and sheep; ISO Guide 34 accredited) and meat mixtures of beef, turkey and chicken in sheep meat at 5 % and 1 % w/w to address this issue.

Dr Lucy Foster, Science Lead, Food and Farming Directorate, Defra, said of LGC's contribution:

"The Government Chemist function delivered by LGC provides a valued source of expert scientific advice which we drew on to shape the Government's response to the horsemeat incident. Their expertise and advice helped ensure we had confidence in the analytical approaches we used to underpin policy development."

Publications

^a *Horse Meat in Beef Products - Species Substitution 2013*. M Walker, Malcolm Burns and D Thorburn Burns. *Open access Journal of the Association of Public Analysts* (2013), 41, 67 – 106:

http://www.apajournal.org.uk/html/japa_vol_41_pg_67-106.html

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