

NML at LGC-developed method for DNA meat species quantitation to support food authenticity and food fraud prevention testing published as a CEN standard

A method that was pioneered, developed and validated by the UK National Measurement Laboratory (NML) at LGC as part of a programme of work funded by the Food Standard Agency (FSA) and Department for Environment, Food & Rural Affairs (Defra) funding has now been officially published as a European standard ([EN 18033:2024](#)) by the European Committee for Standardisation (CEN). Released in January 2025, this is the first harmonised standard for the relative quantitation of horse DNA in a food sample, providing business operators, regulators and compliance authorities with a robust and repeatable approach for determining the level of meat adulteration in raw beef products.

The application of standardised approaches for food authenticity is a prerequisite for ensuring accuracy of test results and supporting public safety and was highlighted as one of the recommendations of the HM Government Elliott Review into the Integrity and Assurance of Food Supply Networks¹. Progressing the initial method to a technically sound documentary standard is a significant achievement and a testament both to the pro-active response of the NML at LGC and the UK government agencies (Defra and FSA) in addressing the recommendations of the Elliot Review and to the measurement expertise and leading scientific role of the NML at LGC.

The real-time PCR method for the relative quantitation of horse DNA described in the standard is based on an approach developed in the aftermath of the UK/EU horse meat incident of 2013, where the Food Safety Authority of Ireland reported on a significant amount of horse DNA found in a beef burger product on sale at a local supermarket. In response to the multiple registered cases of illegal substitution of beef with horse meat, Defra commissioned the NML at LGC to develop and validate a method for the relative quantitation of horse DNA. This method subsequently underwent in-house validation to demonstrate its fitness for purpose at the agreed levels required as a trigger for future enforcement action (1% w/w) and its applicability to processed food materials, such as mince, burgers, pies, ready meals etc. It was further validated through an international collaborative trial, funded by the FSA and led by the NML at LGC. A total of seventeen laboratories participated in the trial, representing nine official control laboratories and private labs in the UK, six laboratories from EU member states, and laboratories from Switzerland and the United States of America, and confirmed that the method was fit for purpose.

“The initial intention was for this method to be used by the UK Official (Control) Laboratories, but the work delivered was of such high quality that, through discussions with the competent authorities (FSA and Defra), it was agreed to progress this work into a standard through its active participation in CEN (TC 460 Food Authenticity, WG2 Species analysis using DNA-based methods).”

*Dr. Malcolm Burns,
Senior Advisor & Head, GMO Analytical Unit
National Laboratories and Science*

¹ [HM Government Elliott Review into the Integrity and Assurance of Food Supply Networks](#)

The rapid response in commissioning and delivering a fit for purpose measurement tool demonstrated the preparedness of the UK national measurement infrastructure to counteract an incident of such scale. Yet this was a reactive response to an emergency issue that had revealed the vulnerability of the food supply chain and challenged consumer confidence in the quality and authenticity of the food they were buying.

Over a decade later, meat remains consistently within the top ten commodities subject to food fraud, according to the latest FAN Global Food Fraud report (2024)². And while preventing fraudulent behaviour requires far more complex intervention, the availability of accurate methods for determining meat species in a food product helps increase public confidence in the safety and quality of the food they consume.

“This new harmonised standard provides government authorities with the assurance that there are tools to support regulatory and compliance measures for protecting public health and ensuring a resilient and secure food supply chain.”

Sophie Rollinson

*Food Authenticity Programme Manager, Agri-Food Chain Directorate
Department for Environment Food and Rural Affairs*

Working alongside the FSA and Defra, NML at LGC experts have taken the lead in addressing this persistent challenge for the global food industry, and their dedicated efforts have led to the successful co-creation and release of the 1st harmonised European CEN standard for the relative quantitation of horse DNA in a food sample. The [EN 18033:2024](#) standard is a pivotal document for laboratories, food manufacturers, and regulatory bodies involved in the food industry, offering detailed guidance for the accurate determination of the presence and quantity of equine (horse) DNA in raw beef products.

This CEN standard, based on an NML at LGC developed method, has set a benchmark for standardising the quantitation of meat DNA. Through effective collaboration with Defra and FSA, it has paved the way for similar advancements in detecting other meat species³, thus solidifying the UK's leadership in food safety and authenticity.

“The more we can standardise measurements used across the food industry, the easier it becomes to track and ensure the food and feed supply chain is resilient and reliable for the consumer. Working with experts from the NML at LGC on this pioneering work has been key to achieving this milestone and ensuring the integrity of the food supply. “

Bhavna Parmar

*Senior Scientific Methods Advisor,
Food Standards Agency*

² [FAN 2024 Global Food Fraud Report](#)

³ [Food authenticity - Quantitation of roe deer DNA relative to mammalian DNA in meat and meat products by real-time PCR](#)