

REVIEW OF METHODS FOR VERIFYING COMMODITY ORIGINS

Supporting EUDR Compliance



Introduction

Testing methods can support businesses to verify the geographical origin of foods. With funding from the Food Standards Agency (FSA) and Defra, Fera conducted a comprehensive critical review of current methods available to determine the geographical origin of food and feed. This initiative was undertaken in response to increasing concerns around food authenticity, sustainable sourcing, and compliance with regulations such as the new European Union Regulation on Deforestation-Free Products (also known as EUDR). The review evaluates the capability of existing analytical techniques to determine geographical provenance of food and feed and provides recommendations for improving traceability and verification systems to further support consumers as well as the UK and global economies going forward.



As businesses grapple with evolving regulatory requirements, such as ensuring supply chains are deforestation-free, the insights from this report will serve as a critical resource. By identifying effective tools, gaps in knowledge and areas for further development, the findings support businesses in making informed decisions regarding compliance and supply chain integrity.

Report Overview

The report focuses on critically assessing methods used to verify the geographical origin of commodities, with the goal of supporting industry compliance with food authenticity and traceability. Recognising the complexities of modern supply chains and the diverse risks of origin misrepresentation, the study reviews a wide range of analytical techniques and their applicability to different food and feed commodities.

Key areas of focus include:

Stable Isotope Ratio Analysis (SIRA): Widely used for verifying food origins due to its ability to reflect the difference in environmental growing/rearing conditions such as differences in water and soil in different regions. Can be applied to numerous commodities including coffee, cocoa, soya bean, oil palm, honey, edible oils and meats.

Trace Element Analysis: In combination with SIRA, this is useful for identifying unique regional profiles in commodities such as meat, cereals, and coffee, again linked to differences in, for example, soil, geology and water.

Emerging Techniques: Including metabolomics, genomics, proteomics and blockchain technologies for traceability.

Stakeholder engagement was also a central focus of the project. Industry experts highlighted challenges such as the high costs of testing, outdated databases which need to account for seasonal variation, and the need for harmonised standards. These insights informed recommendations aimed at building more robust and reliable verification systems.

The report concludes by outlining future directions for investment and development, including the need for creation of centralised, up-to-date databases and the integration of advanced technologies to address existing gaps in data and methodologies.

Core Findings

Key Results

The report identified several techniques as critical for origin verification. It is rare that a single method or technology can provide unequivocal results across all commodities. Instead, combining methods from the following technologies often yields the most reliable outcomes.

- **Stable Isotope Ratio Analysis (SIRA):** Effective for many commodities, often when combined with trace element analysis. For example, it has been successfully used for verifying the origins of wine, meat, and coffee. However, it requires comprehensive reference databases, which are often incomplete or require updating.
- **Trace Element Analysis:** Particularly valuable for commodities influenced by local environmental factors, such as cereals and cocoa. Challenges include variability caused by fertilisers and soil chemistry.
- **Metabolomics and Profiling:** Emerging methods that offer detailed chemical fingerprints of products. Untargeted methods provide the capability to interrogate hundreds of potential biomarkers of origin.
- **Blockchain Technology:** Can support rapid searching of the paper trail but are currently limited by implementation costs and the challenge of verifying data accuracy.

Challenges Identified

1. **Database Quality:** Many reference databases require updating to account for seasonal variation and often lack global coverage, reducing their effectiveness for origin verification at short notice. Updating databases with new, authenticity-assured reference sample data which reflects recent seasonal variation would be required before many of the developed methods could be applied.
2. **Standardisation and Accreditation:** Few methods are harmonised or accredited, and there is a lack of engagement with proficiency testing schemes to ensure reliability.
3. **Data Sharing:** Concerns over intellectual property often hinder collaboration, slowing progress in building robust verification systems.

Recommendations of the report

The report outlines several areas for future investment to enhance origin verification capabilities:

1. **Comprehensive Databases:** Develop a hub to act as a single, central point to store and curate comprehensive databases. Databases should be underpinned by authentic data, representing a global geography and data must be frequently updated to account for natural annual and seasonal variation.
2. **Method Standardisation:** Harmonise protocols and encourage engagement with proficiency testing to ensure consistent results across laboratories and support method accreditation. Only harmonised data should be fed into the underlying databases.
3. **Integration of Emerging Technologies:** Explore the potential of AI and spectroscopy to complement existing techniques.
4. **Improved Data Sharing:** Foster collaboration between governments, industries, and research institutions to build shared resources and reduce duplication of efforts, especially in database creation.
5. **Cost Reduction Strategies:** Invest in developing lower-cost technologies to make origin verification accessible to a broader range of stakeholders.

Implications for Business and Supply Chain

The ability to verify geographical origin with testing has significant implications for businesses striving to comply with EUDR. The EUDR's emphasis on traceability and compliance necessitates robust systems for origin verification, and testing schemes offer a roadmap for achieving these goals, laying the foundation for enhanced supply chain transparency.

As regulatory frameworks such as the EUDR evolve, the ability to verify commodity origins will become increasingly important. Fera's work in this area underscores the importance of proactive investment in testing systems, ensuring businesses can meet compliance requirements while contributing to global sustainability goals and protection of brand.

[Find out how Fera's testing services can interrogate the geographical origin of your products.](#)



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