

Fighting Food Fraud



What is food fraud?

According to the European Commission, food fraud is defined as any intentional adulteration or misrepresentation of foods or food ingredients for economic gain.¹

How widespread is food fraud?

The scale of the problem is significant. Research indicates that fraud accounts for up to 25% of all globally reported food safety incidents.² High-profile incidents such as horsemeat being discovered in beef products in the UK and Europe in 2013 have driven consumer awareness around food authenticity and fake foods.

Food fraud facts:



Food fraud is estimated to cost the global food industry between **\$30 - \$40 billion** per year.³



Foods that are commonly reported to be adulterated include herbs and spices, coffee, seafood, honey and olive oil.⁴



In 2019, over £80 million of fraudulent food and drink was seized across 78 countries – and this was likely to only represent a fraction of global occurrences.⁵



Food fraud can be harmful if consumers are exposed to contaminants such as chemicals, biological agents or unlabeled allergens.⁶

Types of food fraud⁷



Roll over the icons above to reveal the 'Types of food fraud'

Identifying food fraud



Analytical testing is an important tool for assessing food authenticity, which is essential to protect the health of consumers and the incomes and brand integrity of food producers. Testing techniques and reference databases used for food authenticity testing are rapidly evolving but much more needs to be done.

Current testing and regulation facts:



A consistent global framework for testing food authenticity would address the issue of food fraud on the scale needed.



The global food authenticity testing market was valued at USD 5.81 billion in 2019 and is expected to reach USD 8.3 billion by the year 2026.⁸



The rising issue of food fraud has led governments in the USA, UK, China, and Europe to set up laws and departments, which include the US Food Safety Modernization Act, UK National Food Crime Unit, Chinese Food Safety Law and European Commission Food Integrity Project.⁹

Current methods and technologies



Roll over the icons above to reveal the 'Current methods and technologies'

Two-tier test regime

A novel two-tier testing system offers speed and convenience, with inexpensive and easy to use screening that delivers a speedy 'yes/no' analysis of a sample.

Tier 1



Rapid screening approach

A molecular spectroscopy solution which provides the ability to do 'in field' analysis, enabling rapid screening of a large number of samples with minimal training requirement. The samples are matched against a library of results with a 'fingerprint' spectrum. In cases where materials test as 'non-compliant', the second tier test is required.

Tier 2



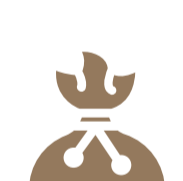
Laboratory-based approach

A laboratory-based approach which establishes exactly what is – and what is not - in a sample with a very high degree of certainty. The test also indicates quantities of ingredients which is ideal for complex fraud cases.

High confidence, confirmatory analysis using laboratory-based methods using techniques such as:

- LC/MS including LC/TQ and LC-Q/TOF
- GC/MS including GC/SQ, GC/TQ and GC-Q/TOF
- ICP-MS

The two-tier method in action: monitoring and managing rice fraud



Fraud in the rice supply chain is a well-known issue and typically involves the replacement of low-quality rice for premium Basmati or Jasmine rice, prized for their aroma and flavour. Recently rice producers have been accused of treating rice with bleach, spraying it with fragrance to mimic premium rice, and bagging it into premium branded bags. This adulterated rice has been sold into global markets, especially into Africa.¹⁰



The Agilent Foundation funded a project to reduce the impact of fraudulent rice with Professor Chris Elliott from the Institute for Global Food Security, Queen's University Belfast, alongside regional expertise from universities in China, Vietnam, and Ghana. The overall aim of this two-year project was to develop a two-tiered testing system to provide rapid screening of rice samples. The first tier can be used in the field while the second tier combines results with a sophisticated laboratory-based method for confirmation.

Project results



3,500 individual rice samples collected over two years, establishing a global database.



Commencement of a program to develop biomarkers into the new standard test methods, at the ISO standards level.



Partnering with Western African government officials and the U.S. Food and Drug Administration (FDA) to increase food fraud awareness.

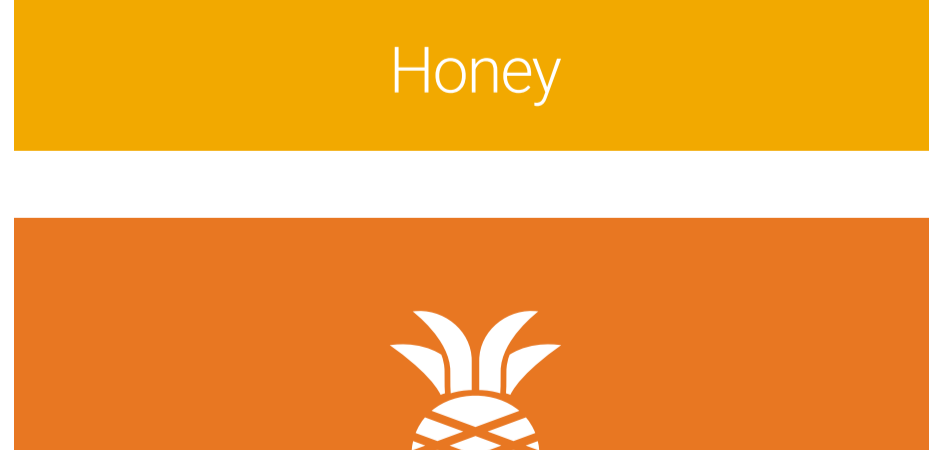
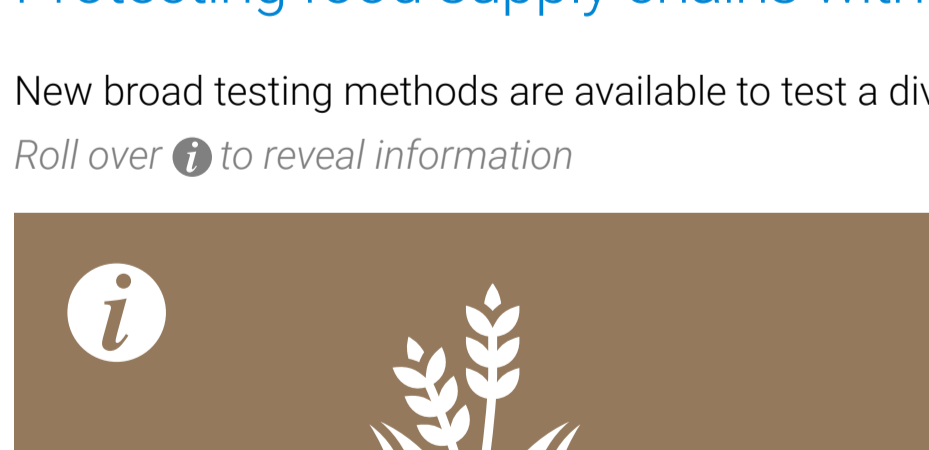


Increasing awareness and education in academia and commerce, including working with undergraduates and regulators in China, Vietnam, and Ghana.

Protecting food supply chains with greater traceability and labeling

New broad testing methods are available to test a diverse range of foods.

Roll over **i** to reveal information



The future of food fraud detection

The global food supply chain is increasingly complicated, raising the opportunity for food fraud. However, experts predict that food authenticity tests will become cheaper, increasingly automated, and easier to perform. Fingerprinting methods – in which the entire molecular profile of a food can be obtained – will be a major feature of future food fraud identification systems.

Food and agriculture industries need fast and accurate analytical tools today. Agilent is working with agricultural scientists and researchers to ensure food is safe by providing cutting-edge tools to monitor food quality efficiently and reliably.

To learn more about how Agilent supports food authenticity testing visit:

<https://www.agilent.com/about/newsroom/media-room/food-authenticity.html>



Trusted Answers

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1. https://ec.europa.eu/food/food/agn/food-fraud/food-fraud-what-does-it-mean_en
2. <https://www.ifst.org/resources/information-statements/food-authenticity-testing-part-1-role-analysis>
3. <https://www.pwec.com/sg/en/industries/assets/food-fraud-vulnerability-assessment.pdf>
4. <https://online.library.wiley.com/doi/full/10.1111/j.1750-3841.2012.02657.x>
5. <https://researchbriefings.files.parliament.uk/documents/POST-PN-0624/POST-PN-0624.pdf>
6. <https://globalfoodsafetyresource.com/dangerous-side-food-fraud/>
7. https://knowledgepolicy.ec.europa.eu/food-fraud-quality/topic/food-fraud_en
8. <https://www.reportsanddata.com/report-detail/food-authenticity-testing-market>
9. <https://www.nature.com/articles/s41538-019-0044-x>
10. <https://phys.org/news/2016-06-affairance-vigilance-poor-quality-imported.html>
11. <http://ropeia.org/news/food/the-global-staple-rice-consumers/#:~:text=rice's%20is%20the%20staple%20food,per%20capita%20protein%20in%202009>
12. <https://www.fortunebusinessinsights.com/industry-reports/honey-market-100551>
13. <https://www.statista.com/statistics/1095541/indonesia-palm-oil-export-volume/>
14. https://www.cfs.gov/hk/english/programme/programme_rafs/programme_rafs_ft_02_01.html