

# An efficient and low-cost approach to detecting food fraud

October 11 2021

---



Credit: CC0 Public Domain

Fraudulent practices in food production, especially false claims of geographical origin, cause billions of dollars in economic damage every year. Botanists at the University of Basel have now developed a model

that can be used to determine the origin of food in an efficient and low-cost manner.

Strawberries from Switzerland or [olive oil](#) from Italy can be sold at much higher prices than the same products from other countries. Both the authorities and the [food industry](#) spend a great deal of time fighting false declarations of geographical origin that are assumed to cause an estimated USD 30 million to 40 billion a year in economic damage.

One method for detecting food fraud is to determine the  $\delta^{18}\text{O}$  (delta-O-18) value of a product sample, which characterizes the oxygen isotope ratio. Until now, this procedure has been highly time consuming and costly. A case of suspected fraud involved not only collecting reference data from the claimed country of origin, but also comparative data from other regions to validate or disprove the product's origin.

## **Cutting costs through model calculation**

Basel botanist Dr. Florian Cueni has now developed a model in collaboration with Agroisolab GmbH, a company specializing in isotope analysis. This model is intended for use in simulating the oxygen isotope ratio in plants from individual regions, thereby eliminating the need for the time-consuming collection of reference data. The model is based on temperature, precipitation and humidity data and information about the growing season of a plant, all of which are available from publicly accessible databases.

Cueni tested and validated the model on a unique  $\delta^{18}\text{O}$  reference dataset for strawberries collected across Europe over 11 years. The [case study](#) has shown that the model can simulate the origin of the strawberries with a high degree of accuracy.

## Wide range of uses

"With minor adjustments to the parameters, our model can be used to determine all plant products," says Professor Ansgar Kahmen, who led the research project. This makes it possible to simplify and speed up conventional isotope analysis by accurately simulating the regions of origin of agricultural foodstuffs.

The [model](#) developed by the Basel [botanists](#) is of interest to food forensics officials or the investigating authorities when it comes to the origin of confiscated drugs, for example, as well as to private forensic institutes that inspect food or serve as expert witnesses in court. NGOs such as WWF or Greenpeace are also interested—especially with regard to determining the [origin](#) of illegally logged timber—as is the [food](#) industry, which suffers reputational damage due to the sale of products that may have been falsely declared.

The research was published in *Scientific Reports*.

**More information:** Florian Cueni et al, Using plant physiological stable oxygen isotope models to counter food fraud, *Scientific Reports* (2021). [DOI: 10.1038/s41598-021-96722-9](https://doi.org/10.1038/s41598-021-96722-9)

Provided by University of Basel

Citation: An efficient and low-cost approach to detecting food fraud (2021, October 11) retrieved 20 March 2024 from <https://phys.org/news/2021-10-efficient-low-cost-approach-food-fraud.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is

provided for information purposes only.