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Methods for Surface Extraction of Food Surfaces

An innovative surface extraction and mass spectrometry system allows for rapid, cost-effective, and automatable on-site lipid analysis in food products without sample pre-processing.

In many food industries, lipid extraction to test for quality assurance and for special labeling is an essential part of the pre-market production process. There are a number of techniques designed to extract and analyze compounds found in food, such as liquid chromatography coupled with mass spectrometry. While effective, these methods are laboratory-based, time-consuming and expensive. Researchers at Purdue University have developed a new method of surface extraction coupled with mass spectrometry compatible with on-site and online mass spectrometry analysis, allowing for quick and cost-effective analysis. This innovative system increases speed and allows for a larger volume of testing while decreasing the need for employee training. The process can be automated using a robotic arm, which could streamline the process and be integrated into the product processing in industrial settings.

Technology Validation:

The sample extraction method was used to conduct lipidomic profiling of pre-freezing and post-freezing beef and chicken breast samples and red and brown beef samples

Advantages:

-Increased speed and efficiency of lipid analysis in food products

-Decreased employee training time

-Possibility of automation through use of a robotic arm

-Accurate and convenient analysis through online or offline mass spectrometry

-No need for sample pre-processing

Technology ID

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Category

Agriculture, Nutrition, & AgTech/Food Safety & Traceability
Robotics & Automation/Automation & Control
Biotechnology & Life Sciences/Analytical & Diagnostic Instrumentation

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Applications:

-Various food industries, particularly beef, in which on-site lipid analysis is used in grading and special labeling/categorization

TRL: 3

Intellectual Property:

Provisional-Patent, 2024-04-24, United States | PCT-Patent, 2025-04-23, WO

Keywords: Lipid extraction, Quality assurance, Food testing, Surface extraction, Mass spectrometry, On-site analysis, Online analysis, Cost-effective lipid analysis, Food industry applications, Robotic automation, Agriculture, Chemistry and Chemical Analysis, Food Products, Lipid panels, Mass Spectrometry, MRM profiling, Surface extraction