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The current and potential applications of Ambient Mass Spectrometry in detecting food fraud

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Highlights of 'The current and potential applications of Ambient Mass Spectrometry in detecting food fraud'

- Food fraud is an economically motivated concept rife within the food industry.
- All food commodities are susceptible to food fraud.
- Ambient mass spectrometry (AMS) consists of over thirty different techniques.
- Olive oil, spices, dairy products and coffee has been successfully analysed using AMS.
- The detection of meat adulteration has been successfully identified using LESA-MS.
- Not all AMS techniques have shown to be suited to detect the adulteration of food.
- Quantitation still a big issue for AMS, especially solid samples.

Abstract

The adulteration of food has received substantial amounts of media attention in the last few years, with events such as the European horsemeat scandal in 2013 sending shockwaves through society. Almost all cases are motivated by the pursuit of profits and are often aided by long and complex supply chains. In the past few years, the rapid growth of ambient mass spectrometry (AMS) has been remarkable, with over thirty different ambient ionisation techniques available. Due to the increasing concerns of the food industry and regulators worldwide, AMS is now being utilised to investigate whether or not it can generate results which are faster yet comparable to those of conventional techniques. This article reviews some aspects of the adulteration of food and its impact on the economy and the public's health, the background to ambient mass spectrometry and the studies that have been undertaken to detect food adulteration using this technology.

Keywords: Food fraud; Ambient ionisation; Mass spectrometry; Food authenticity; Meat adulteration

1. Introduction

With a growing global human population and longer life expectancies, the increased demand for food has led to corresponding growth of the food industry. In 2013 the agri-food sector contributed £103 billion to the United Kingdom (UK) economy, which accounted for 7.6% national Gross Value Added (GVA). [1] More recently, the Institute of Grocery Distribution (IGD) estimated that the UK food retail industry has a turnover of £177.5 billion in the year for May 2015, with projections for over £200 billion of sales in 2020. [2] Horizon forecasts that the UK foodservice market is worth £46.6 billion in 2014 and that this will rise to £56.3 billion in 2019. [3] On a global scale the IGD expects the value of the world's grocery market to increase by a third between 2015-2020 reaching $11.8 trillion in 2020, with the greatest contribution in growth being driven by lower-middle income countries such as India, Indonesia and Nigeria. [4] Table 1 identifies how this value was established,

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