

# Global Food Fraud: A Primer

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## ABSTRACT

As markets grow from local to global, food supply chains become complex distribution systems and pose the challenge of safeguarding our food supply. Food fraud is an emerging global problem with wide range of economic, social, health, and environmental impacts. It is committed when food is placed on the market with the intention of deceiving the customer, for financial gain. There are essentially two main types of food fraud: the sale of food that is potentially harmful, and the deliberate mislabelling of food. The goal of this paper is to present the general understanding of food fraud concept by the food industry at large, not just within the United States but globally.

**KEYWORDS:** food fraud, global food fraud, fake food, food fraud prevention

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## INTRODUCTION

Food is essential to life, survival, and existence. Food fraud, or deliberate adulteration of food, is not a new phenomenon. Its cases date as far back as the Roman Empire. Food fraud or adulteration is occurring increasingly today. It can be international in scope and no nation is immune from its reach and impacts. Food fraud is a major challenge in today's expanding global food industry. It is a potential threat to many nations with direct effect on public health and international trade. With food products being exported and imported from all over the world, the risk of food fraud is now at an all-time high. As food supply chains become more globalized, food fraud may likely occur on a larger scale. Consumer sensitivity to fraud scandals is further amplified by rapid communication such as by social media.

Besides climate change, food fraud is perhaps one of the most significant challenges facing the modern global food systems. It is an emerging global problem that is drawing attention of food industry, governments, scholar, and consumers [1]. Globally, food fraud is estimated to cost the global food industry between \$10 and \$15 billion per year, according to the U.S. Grocery Manufacturers Association (GMA).

Food fraud often arises due to competition among food businesses. The sale of fraud food is being reported widely on a global basis. Food fraud incidents have been reported in many countries with a direct link to public health problems and even deaths. There has been global incidents such as Sudan Red, melamine, horsemeat, gutter oil, and others. It is

not known for sure how widespread food fraud is around the world. By nature, global food fraud may not have the same effects in all places and at all points in time.

## FOOD FRAUD CONCEPT

Food fraud (FF) is intentionally using deception for economic gain involving food. It is the act of defrauding buyers of food gain whether consumers, food manufacturers, retailers or importers. As depicted in Figure 1, food fraud can also be regarded as one category within the food risk continuum which also includes food quality, food safety, and food defense [2]. The food attributes are explained as follows [3]:

- **Food quality:** This includes all the attributes that influence a product's value to the consumer. Food quality refers to the features and characteristics of a food product that is acceptable to consumers and meet their expectations. FF is a major problem for food quality.
- **Food safety:** The assurance that food will not cause harm to the consumer. Food safety is the discipline that describes handling, preparation, and storage of food in ways that prevent food-borne illness.
- **Food fraud:** This occurs when food is intentionally misrepresented or adulterated. Food fraud can cause significant food safety risks where consumers' health is compromised. It is essentially a food safety risk.
- **Food Defense:** Protect against intentional acts that have intent to harm. Food defense is essentially the effort made to protect food from acts of intentional contamination or adulteration.

Food fraud is also related to food authenticity, food integrity, food law, food protection, food crime, food monitoring, and food control. It originated as a way of extending food's primary ingredients for economic gain. Although food fraud can occur for a variety of reasons, it is often driven by a desire for financial gain.

As shown in Figure 2, food fraud can take a number of different forms: adulteration, tampering (including mislabeling), theft, smuggling, gray market/diversion, and counterfeiting [4]. It could refer to the mislabeling of food and ingredients. From fish to beef, honey to oils, coffee to spices, salt to saffron, soil to society, the range of fraud foods across the world is ever-widening.

### GLOBAL FOOD FRAUD PROBLEM

Since the 17th century, governments started to introduce food laws to address abuses such as watered-down milk and the use of chalk as filler in bread. Many national governments are requiring that food fraud hazards be assessed in order to make their food supply chains less susceptible to fraud.

- **United States:** In the US, the FDA and the USDA are the primary agencies for regulating and preventing food fraud. The US Food and Drug Administration (FDA) regards economically motivated adulteration (EMA) as the fraudulent, intentional substitution or addition of a substance in a food product for economic gain. Over the years, Congress has introduced a number of bills intended to address food fraud issues. The Food and Drug Administration (FDA) has several hundred agents deployed around the world to investigate food fraud. For example, studies in various parts of the United States found up to 55% of fish purchased and DNA tested have been mislabeled by the seller [5].
  - **European Union:** The EU is currently the global leader in importing and exporting of agri-food. EU food is believed to be safer than ever, yet consumer's trust in the food products is low. EU food is widely recognized for its high standards of production, labelling, and safety. The Europe-wide scandal surrounding the substitution of cheaper horse meat for labeled beef products caught the attention from consumers and regulators. In 2013, the European Parliament reached the decision "to make the prevention and combating food fraud an integral part of an EU policy." The EU Food Fraud Network (FFN), created in 2013, links the liaison bodies designated by each Member State. It was established to handle requests for cross-border cooperation. The Network refers to four key operative criteria to distinguish between a suspicion of fraud or as a non-compliance: (1) Violation of EU law, (2) Intention, (3) Economic gain, (4) Deception of Customers [6]. For example, food produced in Germany is subject to specific legal regulations of the EU. FoodIntegrity brings key stakeholders together to discuss food authenticity problems and possible solutions. As shown in Figure 3, honey is one of the most faked foods in Europe [7].
  - **United Kingdom:** The UK Food Standards Agency (FSA) defines food fraud as when "food is deliberately placed on the market, for financial gain, with the intention of deceiving the consumer." FSA estimates that approximately 10% of food on UK supermarket shelves is adulterated. UK Agriculture Department help facilitate
- the advancement of new scientific approaches and techniques through discussion and cooperation to help demonstrate the UK's potential as a world leader in food authenticity. The Food Authenticity Network (FAN) was launched in July 2015 by the UK government to help bring together those involved in food authenticity testing and help improve society by fighting food fraud globally [8].
  - **Canada:** Food fraud is an important economic and safety problem in Canada. In Canada, it is prohibited to sell a food that is harmful, misleading, deceptive, or falsely labelled. Canadian laws do not permit misrepresentation, substitution, dilution, addition of undeclared substances, and adulteration. Penalties for violators are becoming more severe. The Canadian food regulatory system currently focus on meat, fish, agricultural products, consumer packaging, and labelling. Various organizations play a role in combating food fraud in Canada. These include Health Canada, the Canadian Food Inspection Agency (CFIA) and Canadian Food Inspection Agency (CFIA) [9]. Canada is one of only three countries that have signed a food safety system recognition arrangement with the United States.
  - **Australia:** Australian officials discovered horse and kangaroo meat in boxes of beef export to the US from Melbourne. In 1982, Royal Commission investigated 35 meat companies, revealing serious breaches of substitution, false description, false production dating, and a perceived tolerance for malpractice by the meat industry. Also, fish sold in Australia has received attention by consumer and environmental groups. The Australian Competition and Consumer Commission (ACCC) pursued a number of egg, chicken, and duck producers for misleading or deceptive conduct [10].
  - **Brazil:** Brazil is known to be the world's leading food producers and exporter, feeding roughly 1.5 billion people worldwide. It is the largest coffee producer in the world. Besides coffee, some common foods produced in Brazil include sugar cane, soybean, maize, cassava, orange, molasses, barley, rice, and soybean oil. Opportunities for food fraud are great due to the large quantity of food produced, exported, and imported [11].
  - **China:** The Chinese food landscape has witnessed significant changes in the recent decades. China has been improving governance of its food supply chains. Food law and regulation have developed slowly in China. In spite of the considerable reform of the governance of the food system, Chinese consumers perceive some risks associated with the purchase of locally produced foods. They are worried about by the risks posed by food fraud and the pervasive nature of fraudulent activity within the domestic food industry. Chinese domestic food chains have been beset with serious food safety incidents, compromising their integrity and safety. Chinese consumers perceive food fraud as food safety risk [12].

### FOOD FRAUD PREVENTION

The focus on food fraud prevention has led to regulatory and enforcement actions. Preventing food fraud is the joint responsibility of the food industry, consumers, and the government. Everyone has a role in preventing food fraud. Suppliers can deter and detect food adulteration. Retailers

can ensure that their suppliers are providing genuine and safe products. Governments can establish global standards, share information regarding potential fraud incidents, reduce the number of illegal businesses, and prevent potentially unsafe products from entering their countries. This will address threats before they become global. Consumers can demand higher food safety standards [13]. Currently available technologies for detecting food adulteration are available. For example, high-tech, low-cost food scanners are proving to be an effective measure. Technologies such as DNA and isotope testing, QR codes, Barcodes, and near field communication (NFC) tags are allowing consumers to track food. Consumers are increasingly demanding for a device for fraud detection on food markets. According to the World Economic Forum (WEF), technology will help to root out food fraud.

Another possible solution is certification to global food safety standards. The Global Food Safety Initiative (GFSI) is an industry-driven collaborative platform whose aim is setting up new standards for food safety management systems that prevent food fraud at the source. These global standards address food, packaging, storage, and distribution. NSF International offers certification to GFSI-benchmarked standards as part of its comprehensive range of supply chain assurance services. As a global safety organization, NSF International has brought together an expert group of food practitioners, regulators, scientists, and academics to help provide guidelines and best practices to help safeguard against it.

#### CHALLENGES

Food fraud is a socioeconomic problem as well as a public health issue. Food manipulation or adulteration has been found to occur in different forms and different steps of the food supply chain at different places around the world. Many western governments focus on food safety while food fraud has taken a back seat because it is harder and more expensive to tackle. Food fraud incidents are more difficult to detect than food safety incidents.

Globalization and trade liberalization have increased the risk of food safety policies and the distance food must travel from its production site to consumers. The strategies of the international community to confront and solve food fraud today are essentially ineffective. Partnerships between the government, the industry, and academia are needed at the national and international levels to address the global food fraud problems.

The United Nations Food and Agriculture Organization (FAO) and the World Health Organization (WHO) have identified some areas for improvement in global food fraud [14]:

1. Establishing a global food integrity system. affected by external systems.
2. Developing effective strategies, techniques, and tools for combating food fraud.
3. Investigating food fraud in developing countries, where many systems are operated manually.
4. Expanding research into the methods used by criminals to perpetrate food fraud.
5. Thoroughly investigating the national and global economic implications of food fraud.

6. Developing effective policies and legal frameworks to deal with food fraud and addressing consumers' concerns.
7. Identifying the roles of organizations, bodies, and individuals associated to fraud mafias.

#### CONCLUSION

Food fraud is the intentional adulteration, dilution, substitution, mislabeling, theft or counterfeiting of food ingredients for a financial gain. It is committed with the intention of deceiving consumers. It occurs when food is intentionally misrepresented or adulterated. It has become a major growing problem around the globe. The cost of ongoing, proactive food fraud management is a significant challenge for the global food industry. Another major problem with food fraud is that it often goes unreported and undetected.

Both the government and food industry need to put systems in place to protect against fraudulent activities in the food chain. Both the consumers and food companies must be vigilant to combat food fraud in the system. Food fraud to optimize profit is an ongoing global problem. It is here to stay. More information about food fraud can be found in the book in [15] and related journals: *Food Control* and *Food Review*.

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<b>Food Quality</b>	<b>Food Fraud [a]</b>	Motivation: Economic Gain
<b>Food Safety</b>	<b>Food Defense [b]</b>	Harm including health, economic, terror
Unintentional	Intentional	

Figure 1 Food risk matrix [2].



Figure 2 Food fraud can take different forms [4].



**Figure 3 Fake honey is one of the most faked foods in Europe [7].**

