



Backgrounder: Defining the Public Health Threat of Food Fraud

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What is Food Fraud?

Food fraud is a collective term used to encompass the deliberate and intentional substitution, addition, tampering, or misrepresentation of food, food ingredients, or food packaging; or false or misleading statements made about a product, for economic gain. Food fraud is a broader term than either the economically motivated adulteration (EMA) defined by the Food and Drug Administration (FDA) or the more specific general concept of food counterfeiting. Food fraud may not include “adulteration” or “misbranding,” as defined in the Food, Drug, and Cosmetic Act (FD&C Act), when it involves acts such as tax-avoidance and smuggling. The economic motivation behind food fraud is distinctly different from those for food safety, food defense, and food quality. The *cause* of an event might be food fraud, but if a public health threat becomes involved, the *effect* is an adulterated product and a food safety incident. All of this is under the umbrella of food protection, which encompasses food fraud, food quality, food safety, and food defense.

What is Economically Motivated Adulteration?

The May 2009 FDA Open Meeting on Economically Motivated Adulteration defined EMA as: “... the fraudulent, intentional substitution or addition of a substance in a product for the purpose of increasing the apparent value of the product or reducing the cost of its production. EMA includes dilution of products with increased quantities of an already-present substance to the extent that such dilution poses a known or possible health risk to consumers, as well as the addition or substitution of substances in order to mask dilution.” The corollary concept of economically motivated misbranding is when an act specifically meets the FD&C Act definition of “misbranding” and not “adulteration.”

Food Regulatory Definitions of Adulteration and Misbranding

It is valuable to review these terms without the economic motivation component. Merriam-Webster’s Dictionary defines the term *adulteration* as: to corrupt, debase, or make impure by the addition of a foreign or inferior substance or element; *especially*: to prepare for sale by replacing more valuable with less valuable or inert ingredients. Merriam-Webster’s Dictionary also defines the term *misbrand* as: to brand falsely or in a

misleading way; *specifically*: to label in violation of statutory requirements. The FDA defines these two terms more precisely in the FD&C act, in Section 401[342] and Section 403[343]. Other USDA Acts also define specific types of terms applicable to the foods these laws regulate. According to the regulations (in selected portions of these definitions, as they apply to food), a product is considered **adulterated** if:

- “it bears or contains any poisonous or deleterious substance which may render it injurious to health”
- “it bears or contains any added poisonous or deleterious substance”
- “any filthy, putrid, or decomposed, or otherwise unfit food” [including if it achieved this during handling]
- “the product of a diseased animal or of an animal which has died other than by slaughter”
- “its container [package] is composed, in whole or in part, of any poisonous or deleterious substance”
- “any valuable constituent has been in whole or in part omitted or abstracted therefrom”
- “damage or inferiority has been concealed in any manner”
- “any substance has been added thereto or mixed or packed therewith so as to increase its bulk or weight, or reduce its quality or strength, or make it appear better or of greater value than it is”
- “it bears or contains a color additive which is unsafe within the meaning of this section.”

In selected definitions, as they apply to food, a product is considered **misbranded** if:

- “it is offered for sale under the name of another food”
- “it is an imitation of another food” (unless it bears the word “imitation” on the label)
- “its container [package] is so made, formed, or filled as to be misleading”
- “it purports to be, or is represented as, a food for which a definition and standard identity have been prescribed by regulations”
- “it falls below such standards”
- “a food for which a standard or standards of fill of a container have been prescribed by regulations as provided by section 401, and it falls below the standard.”

What Is The Food Risk Matrix?

The Food Risk Matrix covers the food protection concepts described above; it was created to illustrate the differences among food fraud, food safety, food defense, and food quality. Differences can be categorized according to action (intentional or unintentional) and motivation (economic gain or harm via public health, economic, or terror threat). This table identifies the *cause* of an incident, in contrast to its *effect*. For example, the *cause* or motivation of the act may be food fraud, but if there is a public health threat involved, the *effect* is an adulterated food product.

The Food Risk Matrix

		Motivation
Food Quality	Food Fraud ⁽¹⁾	Gain: Economic
Food Safety	Food Defense	Harm: Public Health, Economic, or Terror
Unintentional	Intentional	
Action		

(1) Includes Subset components of Economically Motivated Adulteration and Food Counterfeiting

How Does Food Fraud Differ From Food Safety?

The *cause* of the incident needs to be taken into consideration. Food safety focuses on the unintentional contamination of food by known ingredients, organisms, mishandling, or processing. Food fraud differs since it is an intentional act perpetrated for economic gain. Food fraud also differs from food safety since the types of adulterants are unconventional and may only become known once encountered. Food fraud and food safety are very similar in that both can lead to public health risks.

How Does Food Fraud Differ From Food Defense?

Considering the *cause* of the incident, food defense is a collective term that encompasses preventing and recovering from an intentional and deliberate contamination or tampering of food, motivated by either economic gain or public health harm. Food fraud differs in that the motivation is *only* for the perpetrator's economic gain.

How Does Food Fraud Differ From Food Quality?

Considering the *cause* of the incident, food quality focuses on the unintentional spoilage or deterioration of food that only results in economic loss, such as an unsalable or down-graded product. This could be due to specific product characteristics deviating from industry reference standards, including expected physical or chemical attributes. Similarly, food fraud can result in economic losses in the form of unsalable product, lower margins, lost tax revenues, or brand equity damages from recalls or consumer concerns. If a food quality incident leads to a product that is harmful, then, although the *cause* is unintentional, the *effect* makes it a food safety incident.

How does Food Fraud Differ From Food Protection?

Food protection is an overall concept that includes prevention, intervention, and response for incidents in food quality, food safety, food fraud, and food defense. In 2007, the FDA

created a Food Protection Plan which stated: “The plan focuses FDA’s efforts to prevent problems before they start. It employs risk-based interventions to ensure preventive approaches are effective. And it provides for a rapid response when contaminated food or feed are detected, or when there is harm to humans or animals.”

What is the Extent of the Food Fraud Problem?

Food fraud is not a new problem, but quantifying the economic or public health impact of food fraud remains difficult; the challenges are similar to other measures of crime. While seizure data is anecdotal and may only reflect crime prevention tactics, an overwhelming set of incidents and case studies indicates that food fraud is a growing trend.

Globalization, consolidation of manufacturing, urbanization, and other large-scale trends may provide insights to why food fraud is growing. Globalization requires more diverse and longer food supply chains to meet the demands of growing urban populations. Global economics enable criminal activity, since remoteness and anonymity are often characteristics of such supply chains.

All these features of the fraud opportunity contribute to why this emerging risk evolves so quickly. The very nature of this rapid and varied evolution creates further challenges to determining the extent of the food fraud risk. Researchers usually rely on historical incidents and on quantitative analysis to identify emerging risks, which are then used to create early warning systems. But there is frequent evidence of very creative fraudsters who seem to constantly evolve, to evade the most recent detection hurdles. While the exact probability or risk may not be readily identifiable, the vulnerability or fraud opportunities are more static. Many traditional food risk assessment tools are not holistically applicable for trying to quantify or predict food fraud incidents.

The Awareness of Food Fraud

In 2009, several events—such as the wide-spread media coverage of the melamine adulteration and the General Office of Accountability (GAO) report on Seafood Fraud—signaled an increasing awareness of food fraud in the United States. Specifically, the GAO report not only identified various types of adulterated seafood, it also noted gaps and overlaps in the enforcement authority of the various government agencies involved.

Later that year, the FDA held its first Open Meeting on Economically Motivated Adulteration. The FDA addressed the economically motivated adulteration of “food (including dietary supplements and animal food), drugs, medical devices and cosmetics.” This was the first time the FDA officially recognized this emerging risk as an autonomous concept. The meeting became a catalyst for trade and non-governmental organizations to formalize their work in this area. Examples include the Grocery Manufacturers Association’s (GMA) Consumer Product Fraud Report (January 2010); the US Pharmacopeia (USP) Food Protein Workshop: Developing a Toolbox of Analytical Solutions to Address Adulteration (June 2009); and the USP creating the Expert Panel on Food Ingredient Intentional Adulteration (August 2010).

What Are The Types Of Food Fraud?

Existing research on product fraud and counterfeiting have defined seven distinct types of food fraud. These fraudulent incidents include: adulteration, tampering, over-run, theft, diversion, simulation, and counterfeiting. Below is a table that contains the definitions and examples of each food fraud type.

Food Fraud Incident Types

Term	Definition	Example
Adulteration	A component of the finished product is fraudulent	Melamine added to milk
Tampering	Legitimate product and packaging are used in a fraudulent way	Changed expiry information, product up-labeling, etc.
Over-run	Legitimate product is made in excess of production agreements	Under-reporting of production
Theft	Legitimate product is stolen and passed off as legitimately procured	Stolen products are co-mingled with legitimate products.
Diversion	The sale or distribution of legitimate products outside of intended markets	Relief food redirected to markets where aid is not required
Simulation	Illegitimated product is designed to look like but not exactly copy the legitimate product	“Knock-offs” of popular foods not produced with same food safety assurances
Counterfeiting	Intellectual Property Rights infringement, which could include all aspects of the fraudulent product and packaging being fully replicated	Copies of popular foods not produced with same food safety assurances

Source: Spink J, and Moyer DC, (2011) Defining the Public Health Threat of Food Fraud, [working paper]

What Are The Public Health Risks Associated With Food Fraud?

Three types of public health risks can result from food fraud: Direct, Indirect, and Technical. **Direct food fraud** risk occurs when there is an immediate or imminent risk to the consumer, such as the inclusion of an acutely toxic or lethal contaminant. **Indirect food fraud** risk occurs when the consumer is put at risk through long-term exposure, such as the build up in the body of a chronically toxic contaminant through the ingestion of low doses. Indirect risk also includes the omission of beneficial ingredients, such as preservatives or vitamins. **Technical food fraud** risk is non-material in nature. For example, food documentation fraud occurs when product content or country-of-origin information is deliberately misrepresented.

Efficient Food Fraud Countermeasures

First, recognizing the differences and similarities between food fraud and the other food disciplines is important. Food fraud is an economically motivated crime that can have public health risks. Next, it is important to understand that mitigating the risks of food fraud requires a multi-disciplinary approach. Some of the useful disciplines, beyond Food Science, include Criminology, Supply Chain Management, and Packaging. Each of these disciplines provides insights for understanding the nature of food fraud and contributes proactive solutions to reduce food fraud.

Why Is Criminology Important To Food Fraud?

Food fraud is an illicit activity that human actors perpetrate for economic gain. The field of criminology, which tries to better understand both criminals (i.e., why people offend) and crime events (i.e., the process to “create” crime), is, therefore, a useful platform for examining food fraud events and the food fraudsters themselves. For example, environmental criminology—which encompasses routine activity theory, the crime analysis triangle, and situational crime prevention—focuses on understanding and responding to the opportunity structures that make crime possible. In practice, numerous opportunity-reducing techniques have been shown to be effective in reducing various types of crime and disorder across many different communities. And the concepts that underlie these techniques (e.g., increasing the risk or effort of crime), as well as others rooted in criminology, may have the same potential for reducing food fraud.

Why Is Supply Chain Management and Procurement Important To Food Fraud?

Knowing the source and history of foods is important. Fraudsters are able to perpetuate their crimes through vulnerabilities in food supply chains. End-to-end visibility and supply chain transparency are critical management tools for food brand owners. Track-and-trace and product pedigrees, combined with market monitoring and testing, are key tactics for proactively mitigating food fraud risks.

Why Is Packaging Important To Food Fraud?

Proper packaging protects food, conveys product information, and adds functionality for consumers. Packaging and Packaging Science balance the needs of manufacturers, transporters, and consumers. Packaging can also provide anti-counterfeiting security features, enable product track-and-trace and pedigrees, and facilitate product authentication by consumers and law enforcement officials.

What Are The Immediate Strategies For Food Fraud?

The classic Food Protection Plan, as outlined by the FDA, is Prevention, Intervention, and Response. Food fraud is an evolving and emerging threat, so a more natural starting point for the plan is to gather information on the previously unidentified or unexpected risks in the intervention step. Once the mechanisms and risks are better understood, the next step is improved response. Improved response can be facilitated by focusing on understanding and reducing the vulnerability—analysis of historical incidents and changes in the underlying fraud opportunity factors are important but will not provide a complete picture of future risks. Finally, once information has been gathered and systems are in place, there is a natural shift to prevention. Proper risk analysis, vulnerability assessments, applying criminology and behavioral sciences theory, prioritization, and risk mitigation planning will facilitate a strategy that is proactive and can prevent food fraud before it occurs. Planning for food fraud incidents, reactions, and contingencies are also prudent strategic actions. Strategically planning for food fraud will permit the selection of proper tactics that are customized to particular threats.

References

1. [Working Paper - Journal, Defining the Public Health Threat of Food Fraud](#)
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3. [GAO seafood fraud report](#)
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5. [USP/ FCC food ingredients intentional adulteration expert panel](#)
6. [FDA Food Protection Plan](#)

About the Authors

This research was conducted by the Anti-Counterfeiting and Product Protection Program (A-CAPPP) within the School of Criminal Justice at Michigan State University (MSU), through a grant from the National Center for Food Protection (NCFPD). The deliverables for the grant are the submission of a scholarly peer-review paper, this backgrounder, and a series of videos on the topic. [DR. JOHN SPINK, PHD](#) is Associate Director and Assistant Professor of the A-CAPPP at MSU. He leads the US Technical Advisory Group to the International Standards Organization Technical Committee 247 Fraud Countermeasures and Controls, and he developed and teaches the first university course on anti-counterfeit strategy. [DOUGLAS C. MOYER, MS, CPP](#) is a research manager for the A-CAPPP and, in the MSU Programs in Public Health (College of Human Medicine) where he is the lead instructor for Counterfeit Medicines. He has twenty-five years' experience in industry, in which he has led Fortune 100 corporate programs in quality, packaging, and brand protection strategies.

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