



FOOD SAFETY SYSTEM CERTIFICATION 22000

GUIDANCE DOCUMENT: FOOD FRAUD MITIGATION

1. BACKGROUND

The relevance of Food Fraud has grown over the last years, not in the least following a number of food scandals that have led to reduced consumer confidence in the Food Industry.

Although the driver of Food Fraud act (cause) may be economic gain it may nevertheless result in a food safety risk. Such a risk is very often caused by negligence or lack of knowledge by fraudsters. For the consumer food fraud related risks can be¹:

- a) *Direct Food Safety risks*: the consumer is put at immediate risk (e.g., addition of melamine to milk powder that results in an acutely toxic exposure; hiding of substances resulting in undeclared allergens);
- b) *Indirect Food Safety risks*: consumer is put at risk through long-term exposure (e.g., high levels of heavy metals in food supplements causing harm – or lack of benefit – over a longer period of time)
- c) *Technical food fraud risk*: there is no direct or indirect food safety risk (e.g., misrepresentation of country-of-origin information). However, this indicates that material traceability may have been compromised and the company no longer able to guarantee the safety of their food products.

For Food Manufacturers, the economic impact can be high (e.g., recall, loss of sales, cost of rebuilding reputation etc.), but also the consumer trust is important, not only for companies but for food industry (sectors) as a whole.

The FSSC 22000 additional requirements contain a paragraph on Food Fraud prevention including a Food Fraud Vulnerability Assessment applicable to all products, in line with GFSI requirements.

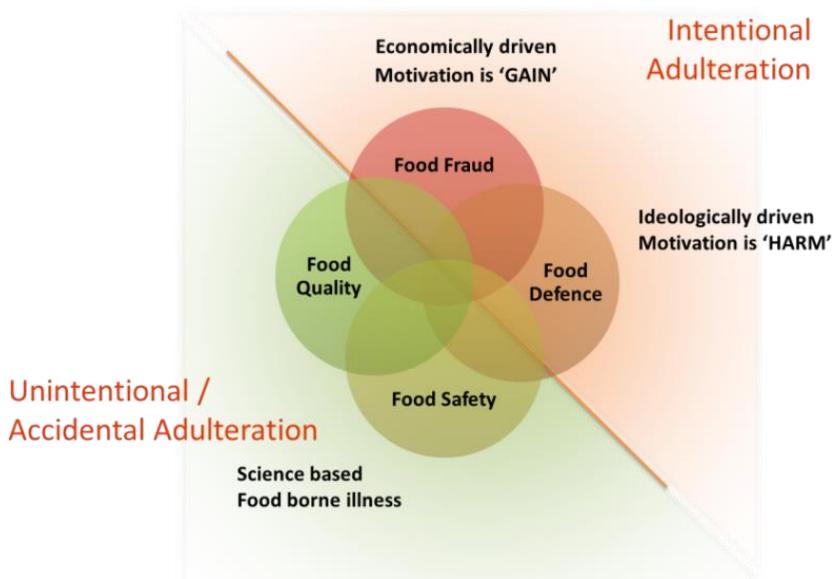
2. DEFINITION

The definition that FSSC uses is based on the GFSI Position paper issued in 2014²:

Food Fraud is the collective term encompassing the intentional substitution, addition, tampering or misrepresentation of food/feed, food/feed ingredients or food/feed packaging, labelling, product information or false or misleading statements made about a product for economic gain that could impact consumer health (GFSI BRv7:2017).

Food Defense is different from Food Fraud in that the motivation is not economic gain, but an intent to cause harm to consumers or companies from an ideologically or behaviorally motivated background. The harm could be economic, public health or terror. Since there are different motivations Food Defense and Food Fraud prevention require a different approach.

Food Fraud is as at least as old as ancient Rome and will never be eliminated fully, the actions taken shall be aimed at minimizing the vulnerability for Food Fraud by reducing opportunities for fraudsters.

Figure 1. Intentional vs unintentional adulteration²

3. FSSC 22000 SCHEME REQUIREMENTS

Part 2 – requirements for certification V5

2.5.4 FOOD FRAUD MITIGATION

2.5.4.1 Vulnerability assessment

The organization shall have a documented procedure in place to:

- a) Conduct a food fraud vulnerability assessment to identify and assess potential vulnerabilities;
- b) Develop and implement mitigation measures for significant vulnerabilities.

2.5.4.2 Plan

- a) The organization shall have a documented food fraud mitigation plan specifying the mitigation measures covering the processes and products within the FSMS scope of the organization.
- b) The food fraud mitigation plan shall be supported by the organization's FSMS.
- c) The plan shall comply with the applicable legislation and be reviewed regularly.

4. IMPLEMENTATION

To help implementing the FSSC 22000 Food Fraud prevention requirements, the following way of working is recommended:

- 1) Establish a Food Fraud Mitigation Team,
- 2) Conduct a Food Fraud Vulnerability Assessment (FFVA) identifying potential vulnerabilities,
- 3) Define the significant vulnerabilities,
- 4) Identify and select proportionate control measures for the significant vulnerabilities,
- 5) Document the vulnerability assessment, control measures, verification and incident management procedures in a Food Fraud Prevention Plan supported by the Food Safety Management System,
- 6) Develop an effective training and communication strategy and implement the Food Fraud Prevention Plan.

Note: address all types of Food Fraud defined by GFSI (substitution, unapproved enhancements, misbranding, counterfeiting, stolen goods, or others); address all products from incoming goods (e.g., raw materials, packaging materials) to outgoing goods (e.g. (semi) finished product). See Appendix 1 for more information.

It is important to note that every vulnerability identified will NOT automatically be determined to be significant and will NOT automatically be required to be addressed by a control measure. It is important to identify as many vulnerabilities as possible so they can be assessed. For example, horsemeat in beef was not originally considered to be a vulnerability that required a control measure. After severe incidents, the vulnerability assessment may determine this to be significant in such a way that a control measure is required.

Ad 1/2. When conducting an FFVA a number of factors shall be taken into account such as:

- Economic vulnerability (how economically attractive is fraud),
- Historical data (has it happened),
- Detectability (e.g., how easy to detect, routine screening present),
- Access to raw materials, packaging materials and finished products in the supply chain,
- Relationship with supplier (e.g., long relationship or spot-buying),
- Certification through an independent sector specific control system for fraud and authenticity,
- Complexity of the supply chain (e.g., length, origins and where the product is substantially changed/processed).

Many more aspects may be taken into account as deemed appropriate. A number of tools have been developed to assist companies in setting up a FFVA, one of them is SSAFE³, this tool is freely available. The GFSI Board endorses this SSAFE vulnerability assessment tool.

Supplier certification (forward and backward) by sector specific control systems which are specialized to prevent or mitigate food fraud can substitute own analytical routine screening. An example is supplier certification via a voluntary control scheme in the sector of fruit and vegetable juices and purees⁴.

Supply chain mapping including factors as socioeconomics, behavioral, geo-political and historical data may be a useful tool to use. Very often, Food Fraud Prevention (or elements thereof) needs to be addressed at the business organization level rather than at the site level only.

The key to assessing the vulnerabilities is: "think like a criminal".

When conducting the FFVA, it is allowed to group materials to start with (e.g., similar raw materials or similar finished products). When significant risks are identified within a group, a more in-depth analysis may be required.

Ad 3/4. When defining a Prevention strategy, the potential vulnerabilities identified under 1 shall be assessed for their significance. A risk matrix similar to HACCP can be used (e.g., Likelihood of occurrence x Consequences). Profitability is an important factor of likelihood of occurrence. A prevention strategy for the *significant* risks shall be developed and documented.

Ad 5. The plan shall be supported by the organization's Food Safety Management System (FSMS) for all its products meaning that it shall contain system elements such as training, internal audits, management review, etcetera as well as operational control measures, verification activities, corrections and corrective actions, responsibilities, record keeping, verification activities, continuous improvement. Examples of verification activities can be origin/label verification, testing, supplier audits, specification management. In addition, also the FSMS needs inclusion of the Food Fraud prevention element into e.g., policies, internal audits, management review, etc.



Figure 2. Differences between HACCP, TACCP and VACCP

5. FOOD FRAUD PREVENTION TEAM AND TRAINING

The Food Fraud Vulnerability Assessment is performed by a multidisciplinary team with wide range of expertise (e.g., Security, Legal, Purchasing, Production, Research & Development, Regulatory affairs, Quality). The composition of the Food Fraud Prevention team is likely to be different than that for your HACCP/Food Defense Threat Assessment. The composition of the team may evolve over time as the understanding of the food fraud opportunity evolves. External expertise may be required.

Training of the team is required. Many training options are available, an example being Michigan State University which provides free web-based courses (MOOC Food Fraud audit guide – MOOC = massive open online course)⁵.

6. AUDITING

Food Fraud poses a significant risk, and it is important that around the globe the food industry takes actions. Auditors however must realize that they are not crime investigators; they are not supposed to detect fraud or confirm that the anti-food fraud program is adequate to prevent fraudulent issues. Auditors should audit only how well the company has protected itself and check if all elements required by FSSC 22000 are in place.

The introduction of Food Fraud prevention within the organization's FSMS is expected to become more granular over time. At first stage it is more realistic to focus on the system/strategy being fit for purpose, rather than focusing on the effectiveness of control measures.

As an auditor, the following questions need to be asked as a minimum:

- Is there a team with the correct competencies/knowledge?
- Has a vulnerability assessment been performed and documented?
- Are all types of vulnerabilities covered (substitution, unapproved enhancements, misbranding, counterfeiting, stolen goods, or others)?
- Depth of the vulnerability assessment (historical data, economic motivations, detectability etc.)?
- Breadth of the vulnerability assessment (all materials covered)?
- Is there a methodology to determine the significance of vulnerabilities?
- When significant vulnerabilities are identified, is there a written prevention plan?
- Is the performance of the Food Fraud Prevention Process evaluated in line with ISO 22000:2018 Chapter 9 (Performance Evaluation)?
- Is the analysis regularly reviewed and is the frequency adequate?
- Is the Emergency Response Team prepared (ISO 22000:2018 paragraph 8.4)?
- Is all of the above effectively included and implemented through the organization's FSMS (e.g., records, awareness of people, site security, internal audits, management reviews)?

7. REFERENCES

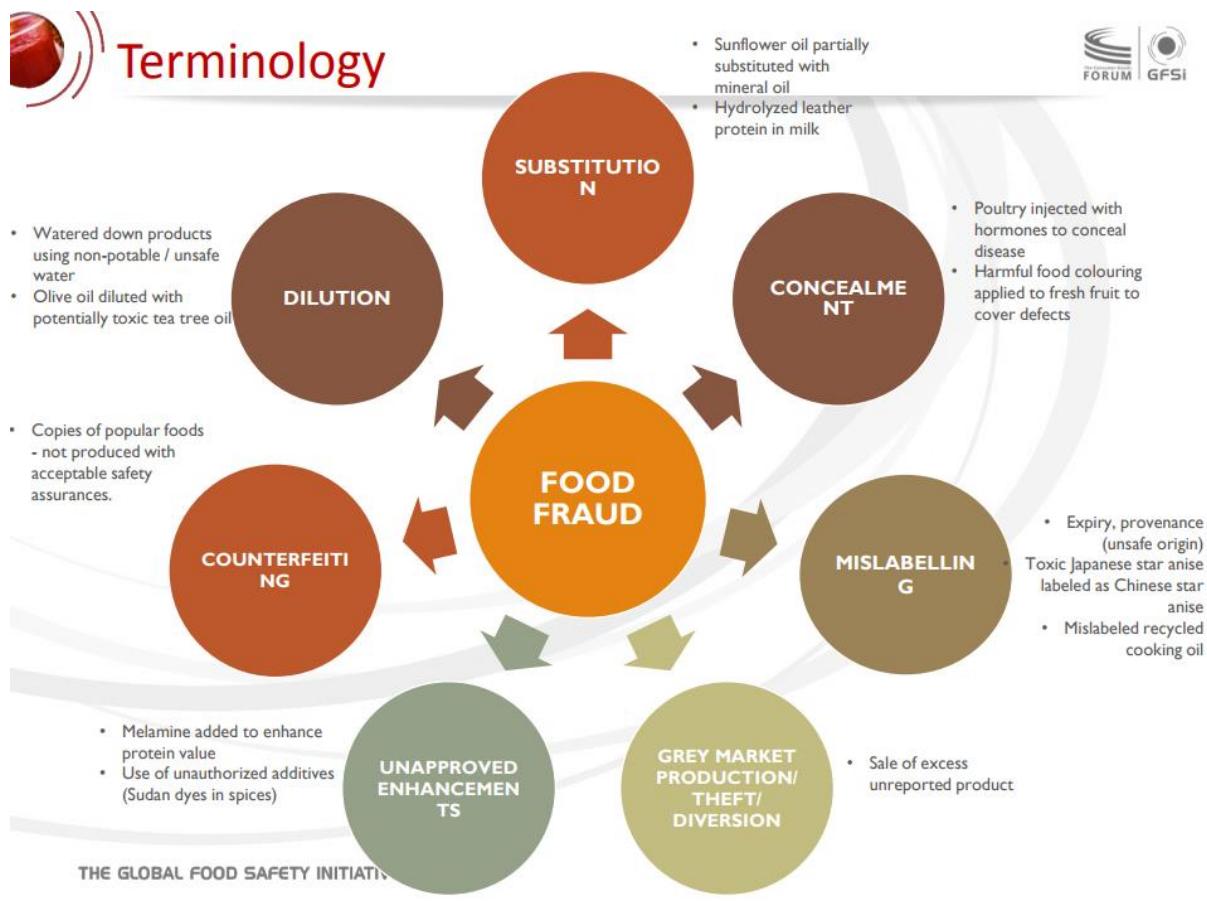
- 1) John Spink and Douglas C. Moyer. Defining the public health threat of food fraud. Journal of Food Science Vol 76, Nr 9, 2011 p R157-R163
- 2) GFSI position on mitigating the public health risk of food fraud
https://www.mygfsi.com/files/Technical_Documents/Food_Fraud_Position_Paper.pdf
- 3) SSAFE
- 4) The Voluntary Control System of SGF International e.v.: <https://www.sgf.org/en/home/fks/>
- 5) Michigan State University courses: <http://foodfraud.msu.edu/mooc/>
- 6) PWC: <https://www.pwc.com/gx/en/services/food-supply-integrity-services/assets/pwc-food-fraud-vulnerability-assessment-and-mitigation-november.pdf>
- 7) Spink, Fortin et al. Chimia International Journal for Chemistry, vol 70, Nr 5, 2016 p 320-328:
<http://www.ingentaconnect.com/content/scs/chimia/2016/00000070/00000005/art00002#>

APPENDIX 1 TYPES OF FOOD FRAUD - DEFINITION AND EXAMPLES

(PWC⁶; Spink, Fortin et al⁷)

GFSI (1) Type of Food Fraud	Definition from SSAFE (2)	Examples from GFSI FFTT (3)	General Type of Food Fraud
Dilution	The process of mixing a liquid ingredient with high value with a liquid of lower value.	<ul style="list-style-type: none"> • Watered down products using non-potable / unsafe water. • Olive oil diluted with potentially toxic tea tree oil. 	Adulterant-substance (Adulterant)
Substitution	The process of replacing an ingredient or part of the product of high value with another ingredient or part of the product of lower value.	<ul style="list-style-type: none"> • Sunflower oil partially substituted with mineral oil. • Hydrolyzed leather protein in milk. 	Adulterant-substance or Tampering
Concealment	The process of hiding the low quality of a food ingredients or product.	<ul style="list-style-type: none"> • Poultry injected with hormones to conceal disease. • Harmful food coloring applied to fresh fruit to cover defects. 	Adulterant-substance or Tampering
Unapproved enhancements	The process of adding unknown and undeclared materials to food products in order to enhance their quality attributes.	<ul style="list-style-type: none"> • Melamine added to enhance protein value. • Use of unauthorized additives (Sudan dyes in spices). 	Adulterant-substance or Tampering
Mislabeling	The process of placing false claims on packaging for economic gain.	<ul style="list-style-type: none"> • Expiry, provenance (unsafe origin). • Toxic Japanese star anise labelled as Chinese star anise. • Mislabeled recycled cooking oil. 	Tampering
Grey market production/ theft/diversion	Outside scope of SSAFE tool.	<ul style="list-style-type: none"> • Sale of excess unreported product, • Product allocated for the US market appearing in Korea. 	Over-run, Theft, or Diversion (4)
Counterfeiting	The process of copying the brand name, packaging concept, recipe, processing method etc. of food products for economic gain.	<ul style="list-style-type: none"> • Copies of popular foods not produced with acceptable safety assurances. • Counterfeit chocolate bars. 	Counterfeiting
Notes:			

- (1) GFSI – Global Food Safety Initiative
- (2) SSAFE – Safe Secure and Affordable Food For Everyone
- (3) GFSI FFTT – Global Food Safety Initiative: Food Fraud Think Tank
- (4) Grey Market -- a market employing irregular but not illegal methods; Theft -- something stolen; Diversion/ Parallel Trade -- the act or an instance of diverting straying from a course, activity, or use

Figure 3. GFSI types of food fraud⁸