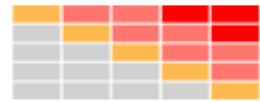


Process description Food Fraud (in Safefood-Online)

(The WORD-document can be requested at:

info@safefood-online.de)

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1. Objective

Food Fraud in this context is the intentional and economically motivated adulteration (EMA) of foods. World-wide Food Fraud is causing a damage of around 10-15 billion Euro per year. If the adulteration is not detected during the incoming goods inspection and the food manufacturer is using these products in production, the final products will result in non-compliance with the European Food law. That means the final goods are injurious to health or unfit for human consumption. The risk for the food manufacturer is not only an economic but also a reputation damage.

Food Fraud is dealing with the protection against fraudulently adulterated foods, i.e. addition of illegal ingredients (peanut semolina added to hazelnut semolina) or the intentional mislabelling (i.e. another than the appropriate origin). In food production Food Fraud represents a high risk. Therefore a process should be in place to prevent this risk by mitigation measures.

The process description "Food Fraud" given in this document is implementing the requirements of the GFSI (Global Food Safety Initiative) regarding Food Fraud as laid down in the Guidance Document „Tackling Food Fraud Through Food Safety Management Systems“ https://www.mygfsi.com/files/Technical_Documents/201805-food-fraud-technical-document-final.pdf .

The GFSI Standard requires a documented vulnerability assessment regarding risks caused by Food Fraud and to take measures to decrease these risks.

The objective of this process description is to implement a documented action plan laying down control measures with defined instructions to minimize or prevent vulnerability to fraud.

2. Scope

This process description shall apply to all raw materials, food contact materials and third-party activities of a food manufacturer.

3. Definitions

For the purpose of this process description raw materials means any substance or product to be used as an ingredient in the production process including food contact materials and animal feed. Due to a great number of different raw materials it can be useful to group the raw materials. Clustering raw materials gives the advantage to query the known risks regarding fraud as a "sum".

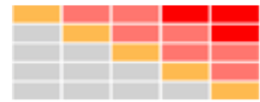
Food Fraud means that adulterated foods are intentionally placed on the market to achieve a financial and/or economical advantage. The intentional adulteration of food is also known as „economically motivated adulteration“ (EMA). Also, fraud caused by food contact materials is in scope of the Food Fraud process.

For the time being there is no legal definition of the term "Food Fraud". The GFSI Standard defines Food Fraud as:

"a collective term encompassing the deliberate and intentional substitution, addition, tampering or misrepresentation of food, food ingredients or food packaging, labelling, product information or false or misleading statements made about a product for economic gain that could impact consumer health."

The following list describes common types of Food Fraud:

- **Mislabelling** (i.e. wrong information regarding date of minimum durability (best before), misleading information about origin of the product or the primary ingredients or the quality of the ingredients.)
- **Adulteration by adding a cheaper product** (i.e. substitution or dilution of an authentic ingredient with a cheaper alternative, sometimes also by adding i.e. colours to mask the adulteration)
- **Adulteration of a primary ingredient** (i.e. counterfeiting a better quality by dilution honey with sugar or (partly) substituting beef with horsemeat)
- **Using substances not fit for human consumption or substances not allowed** (i.e. addition of melamine to dairy products to mimicry a higher nitrogen content and as a consequence a higher milk protein content (when analysing the protein content of the product). Intentional use of not labelled GMO-products or GMO-products not approved from a legal point of view within the EU)



- **Not allowed operation or production** (i.e. irradiation, radioactive treatment or CO-treatment),
- **Illegal purchased products** (i.e. theft or „grey market“)
- **Overproduction or not authorized production** (i.e. illegal import for not registered products, not registered products or from productions with limited quantities)
- **Adulteration of products and/ or brands** (i.e. imitating of well-known brands by products with lower quality)

3.1 Delimitation Food Fraud, Food Defense, HACCP

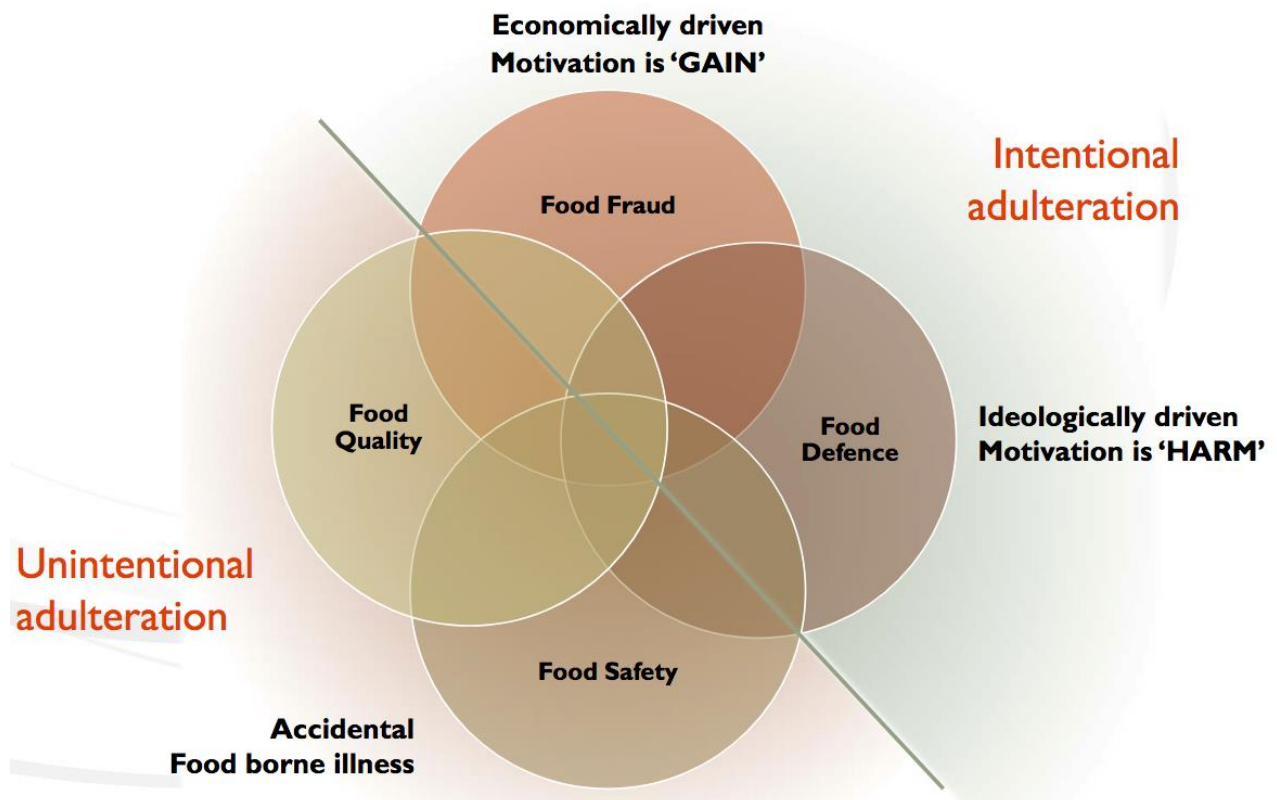
Food defense und Food Fraud means the protection of food to prevent intentional attacks and/ or adulterations. Food Fraud is financially and/ or economically driven. Food defense is dealing with the prevention of maliciously tampering food by physical, chemical and/ or microbiological treatment. Intention for tampering products is to harm end consumer and/ or to damage the food company economically.

A specific vulnerability assessment should be part of a food defense/ food fraud management system. It is important to mention that within a HACCP management system only a few risks are already covered (if there is given an overlapping with food safety issues).

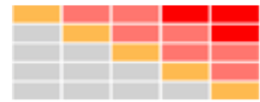
Food safety refers to all activities of handling, producing and storing food to reduce as far as possible the risk for end consumers becoming sick from foodborne illnesses.

The objective of a HACCP System is to identify, monitor and control hazards which are significant to food safety.

In this context food quality means food placing on the market in line with the legal requirements and fulfilling the defined quality standards.



Source: GFSI



4. Risk analysis and evaluation of the parameters for Food Fraud and evaluation of the Food Fraud process

Statements can be found in the annex called „Food Fraud/ F01“. This part can be skipped if there is no management system as regards DIN EN ISO 9001 necessary.

5. Food Fraud Team

5.1 Members of the Food Fraud Teams

Team leader:	i.e. QM/QA
deputy team leader:	i.e. deputy QM/QA or purchase
team member:	i.e. purchase, R&D, incoming goods department, production, engineering department, managing director, executive board

5.2 Team responsibilities

- Vulnerability assessment and evaluation Food Fraud
- Identifying, definition and reviewing the criteria of the vulnerability assessment
- Development of a mitigation strategy with mitigation measures
- Defining methods to control the identified hazards/ risks
- Annually review of the vulnerability assessment (also part of the HACCP/ food defense and food fraud system)
- Determination of action points with prioritization

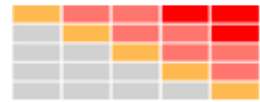
6. Food Fraud vulnerability assessment

In scope of the vulnerability assessment are all raw materials, food contact materials and third-party activities. For third-party activities also all raw materials and packaging materials have to be taken into account. The selection, qualifying and monitoring of the owner of third-party activities has to follow the same standards in place as for the own raw materials and food contact materials. It is the objective to identify the potential risks regarding fraud activities like substitution, mislabelling, adulteration or imitation.

The SAFEFOOD-ONLINE database is used for the vulnerability assessment. For all raw materials and/ or groups of raw materials questions regarding the likelihood of occurrence and detection have to be answered. To simplify the process, it makes sense to group similar raw materials. Based on the results the next step is to evaluate the risks.

Food Fraud management is mainly based on the following three tasks:

- **Specific raw material vulnerability:**
The most important and essential task is the database-supported collection of all available and relevant information about the raw materials and packaging materials regarding supplier, producer and origin. A systematically monitoring of the production volumes, economic factors and supply chain gives an indication related to food fraud. It is recommended to focus on those sources being conspicuous in the past. Based on these data the relevant risks and the likelihood of occurrence can be derived.
- **Training and information of the persons responsible for food fraud management**
An important part is also the behaviour of all persons involved in food fraud management (especially from purchase and sales department). Specific know-how, sensitivity, implementation of specific KPI's and if necessary, adaption of existing inspection plans can significantly complicate to attack a company.
- **Cooperation with suppliers, authorities and other business partners**
A close cooperation with suppliers, authorities and other business partners ensures a reliable exchange of information.



6.1 Criteria for vulnerability assessment and related questions

Regarding the vulnerability assessment the following criteria have to be considered: (factors to be influenced and factors which cannot be influenced)

- 1) **History of supplier issues regarding quality and food safety (also evaluation of the history and frequency of verification)**
- 2) **Economic issues**
- 3) **Geographical and geopolitical factors**
- 4) **Supplier relationship**
- 5) **Supply Chain**
- 6) **(Supplier-) Audit strategy**
- 7) **Sensitivity and weakness of specifications and test methods**

For further information see 6.3 likelihood of occurrence and 6.4 likelihood of detection.

The influencing factors for every raw material and/ or raw material group are analysed and evaluated based on the information available in the Safefood Online database.

6.2 Query using the Safefood Online Food-Fraud Tool

By using the Safefood Online query „Food Fraud“ the following notifications and risks are taken into account:

- radiation
- GMO (notification regarding genetically modified organisms and/ or food)
- Novel food
- Adulteration/ fraud
- Colours (illegal addition and/ or wrong labelling)
- Composition (illegal addition of raw materials)
- Labelling (i.e. misleading labelling or tampering of health certificates)

The query is resulting in a risk matrix where all selected raw materials, raw material groups and/ or packaging materials are clustered in fields (A1 – A5) depending on the risk evaluation. The result of the likelihood of occurrence and likelihood of detection are also summarized in the risk matrix.

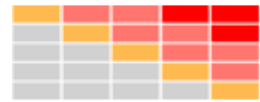
It is important to mention that this tool is only working if the query is including raw materials or raw materials groups with existing notifications (or own notifications from the user). See also example for honey under 7.2

6.3 Likelihood of occurrence

The likelihood of occurrence is based on the answers to the following questions:

- Are there known fraud incidents? New information about fraud incidents from notifications and/ or publications? (Question A 1/4)
Answer can vary from „no known incident/ no information“ to „a lot of issues related to quality and food safety“
- Economic factors, i.e. market price fluctuation (Question A 2/4)
(Purchase information varying from “low” to “highly volatile”)
- Origin of the raw material? How long is the transport time, how complex is the supply chain? Adulteration possible? (Question A 3/4)
Also regarding country of origin, Corruption Perception Index (CPI), Global Competitiveness Index (GCI)
- Market for the raw material? (i.e. quantity, profitability? Is the availability depending on seasons? (Question A 4/4)
The result can vary from „only one ingredient from a single region with low geopolitical relevance“ to „one or more ingredients with a high geopolitical relevance“

The **likelihood of occurrence** is graded as follows:



field 1: unlikely (no incident within the reviewed period)
Feld 2: very rare (1 to 3 incidents within the reviewed period)
Feld 3: rarely (4 to 6 incidents within the reviewed period)
Feld 4: possible (7 to 10 incidents within the reviewed period)
Feld 5: often (11 and more incidents within the reviewed period)

The classification for the likelihood of occurrence is based on the answer to all above mentioned questions. The highest risk regarding vulnerability from the four questions can found in the matrix (field 1-5). The answer for questions A 1/4 and A 3/4 is derived from information available in the Safefood Online database.

6.4. Likelihood of detection

The likelihood of detection is based on the answers to the following questions:

- Packaging of raw materials? Tamper-proof closure, sealed and/ or numbered seals? (Question E1/4)
„low“ to „high“ risk regarding adulteration
- Consistency of the raw material and number of companies involved in supply chain from cultivation, harvest (farmer/ food producer) to supplying the raw material to our own company? (Question E 2/4)
„Reliable“ with a long history of business to „unknown supplier“
- Are measures actually in place like supplier audits where issues regarding adulteration, traceability, mass balances and ethical aspects are checked? (Question E 3/4)
Ranking is varying from „strong“ audits at the suppliers site with many anti-fraud measures to „no audits“ at the suppliers site
- Are control measures available for detecting food fraud? Is analysing easy, i.e. possible within the incoming test-procedure. How is the testing frequency? (Question E 4/4)
Varying from „frequent“ testing to „no CoA“ (Certificate of Analysis) or „no CoA referred to the delivery available“. Regarding the test method: varying from „very specific“ to „non-specific“ to detect adulteration

The likelihood of detection is graded as follows:

Feld A: sure
Feld B: probably
Feld C: quite likely
Feld D: rather rare
Feld E: unlikely

Also, in case of the likelihood of detection the highest ranking for the four questions determines the final result in the corresponding field (A – E).

7. Evaluation of the Food Fraud vulnerability assessment:

When the query in SAFEFOOD-ONLINE is done, an Excel file is opening with 4 spreadsheets.

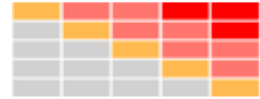
7.1 Food Fraud results

The first spreadsheet „Food Fraud Results“ is presenting the summarized results of the selected raw materials, group of raw materials and/ or packaging materials showing the answer to every single question. The fields are coloured depending on the ranking within the risk matrix.

[illegible]

It is recommended to extend this file after the query. A raw material is often delivered from more than one supplier. It is possible to register the individual results for every supplier, i.e. an additional column with the results of the supplier evaluation, for the economic stability, the history of business and the commercial business. It is also helpful to add columns with i.e. the actual pricing and/ or other relevant data. This spreadsheet can be used for further information on raw materials and/ or suppliers and is the source for additional evaluations and actions.

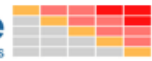
Depending on the results the Safefood Online database is calculating a risk ranking for every raw material, group of materials and/ or packaging material where a query was done. The final result is allocated to a specific field within the risk matrix. The risk matrix is showing all identified risks and the vulnerability depending on the likelihood of occurrence and the likelihood of (spreadsheet "matrix" in the Excel file).



FOOD FRAUD - Vulnerability Assessment

for raw material, food-contact material, animal feed

safefood-online GmbH 24.09.2019



The data output has been limited to: 01.01.1979 - 24.09.2019

Selection: FOOD

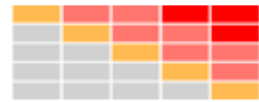
Group: hazelnuts

Likelihood of occurrence	often 5			hazelnuts		
	possible 4					
	rarely 3					
	very rare 2					
	unlikely 1					
Copyright: Dr. Bernhard Mueller safefood-online GmbH		sure A	probably B	quite likely C	rather rare D	unlikely E
Likelihood of detection						

Honey“ as an example for a risk classification: The table shows the summary after the evaluation with the Safefood Online database. Depending on the selection of raw materials the information given in the table can be also more complex.

7.3 Instructions and Product Fraud Mitigation Plan

Every query presents an overview “recommended instructions for the selected raw material, group of raw materials or packaging materials“ with control and monitoring measures to mitigate the risk regarding food fraud. There are defined process instructions and rules for the assignment in the risk matrix. Detailed information about the process instructions and rules are given in the Manual [Food Fraud Tool](#).



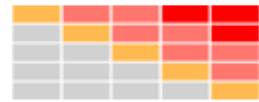
FOOD FRAUD - Mitigation Plan	
for raw material, food-contact material, animal feed	
safefood-online GmbH 24.09.2019	
The data output has been limited to: 01.01.1979 - 24.09.2019	
Selection: FOOD	
Group: hazelnuts	
hazelnuts	
Question	Mitigation plan
Any known incidents of food fraud in the past? Actually any concerns, e.g. current notifications or alerts?	Review the inspection plan so that the known counterfeits / fraud cases are detected as far as possible during the incoming goods inspection.
How strong are the economic influences, such as price fluctuations on the market?	If the price is permanently very volatile and/ or the prices are increasing significantly, an exchange of the raw material should be considered.
From which country of origin the raw material is sourced? How long (time) and how complex is the supply chain? Are manipulations possible?	Choose, where feasible, countries of origin with a high CPI and a GCI as high as possible with no or acceptable risks. The Corruption Index (CPI) ranges from 0 to 100, where 100 indicates the lowest perception of corruption and is therefore the best possible result. The Growth Competitiveness Index (GCI) is an indicator of a country's competitiveness, with 100 indicating the highest growth competitiveness.
What is the market for the raw material (e.g. value of raw material / size of the market)? Is the raw material always available or what is the availability outside the harvest?	If the price is very volatile and/or the market is not transparent and there is little competition, an exchange of the raw material should be considered.
What's the transportation route? How are the raw materials packaged? Are there tamper-evident closures / seals?	No further measures required.
How is the quality of the raw material (unprocessed or processed, i.e. peeled, cut, crushed, ground, liquid or otherwise further processed) and how many stages are there from cultivation / extraction (farmer/ producer) to the delivery of the raw material to our company?	No further measures required.
Are there already control measures, such as supplier audits, in which topics such as adulteration, traceability, mass balance and ethical aspects are audited?	Further development of risk-based audit planning for suppliers based on estimated raw material risks. The frequency of supplier audits should be reassessed at least once a year through a hazard analysis and assessment of the associated risks. If adulterations and fraud are known, the audits should at least cover adulteration, traceability, mass balance and ethical issues. The audits may also cover the production of the raw materials.
Is it easy today to detect the known or possible adulterations in routine examinations? Are there any investigations or possibilities of discovery at all? What does the test plan look like?	No further measures required.
Own remarks:	

„Honey“ as an example for instructions after the evaluation with the Safefood Online database.

The Food Fraud team has thoroughly to assess and comment the recommended instructions. The results are documented in the field „own assessment“ in the spreadsheet „Food Fraud Results“ or separately. The control and monitoring measures have to be defined and implemented (also as part of the inspection plan for the given raw material). With this procedure it is possible to increase the likelihood of detection of adulterations.

7.4 Food Fraud Analysis

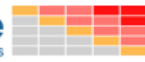
The last spreadsheet „Food Fraud Analysis“ shows all fraud incidents for raw materials which have been queried. So, it is easier to understand the risk classification. More details can be found in the Manual [Food Fraud Tool](#)



FOOD FRAUD - Incidents

for raw material, food-contact material, animal feed

safefood-online GmbH 24.09.2019



The data output has been limited to: 01.01.1979 - 24.09.2019

Selection: FOOD

Group: hazelnuts

Art.Nr	Article	Known hazards	Country of origin
	hazelnuts	food fraud / deception	
		radiation	
		not known	
		GMO	
		not known	
		novel food	
		not known	
		adulteration / fraud	
		absence of health certificate(s) [2]	Serbia [1], Turkey [1]
		illegal import [1]	Turkey [1]
		improper health certificate(s) [8]	Turkey [8]
		incorrect labelling [1]	Turkey [1]
		food additives and flavourings	
		not known	
		composition	
		magnesium phosphide [1]	Turkey [1]

* = Own records included

„Honey“ as an example for the food fraud analysis with the Safefood Online database

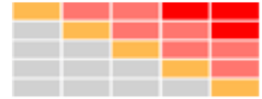
8. Checking and changing the Food Fraud Mitigation Plan

Checking the risk evaluation and the actual evaluation of the control measures (critical risks - not acceptable risks - conditional acceptable risks) the Food Fraud assessment team is taking the decision on the required control measures. The critical and not acceptable risks have to be prioritized.

The evaluation is ranking from „no action necessary“ to „stay to the supplier“ (with and without restrictions, i.e. on-site audits), „checking, if it is possible to stop the raw material or the product containing the raw material“ to „changing the actual control measures“ or any other action. By implementing appropriate measures, the likelihood of occurrence and the likelihood of detection can be decreased. It is recommended to fully document any changes to the food fraud mitigation plan.

9. Verifying the Food Fraud System

The Food Fraud team has to check and update the risk evaluation annually to maintain the control and monitoring measures for the risk mitigation. Statements on the changes are included in the management review.



10. Further applicable documented information

Food Fraud/ F01

Process SPxx

Process SPxx

Process MPxxxx

I

Safefood Online database

Monthly Summary of Articles
on Food Fraud and Adulteration

spreadsheet for analysing the process and risk analysis with evaluation of the influencing issues regarding the process „food fraud“

inspection planning

Purchasing – selection and evaluation of suppliers

internal audits

<http://www.safefood-online.de>

<https://ec.europa.eu/jrc/en/research-topic/food-authenticity-and-quality>

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