

BUSINESS ASSURANCE

Understanding Food Fraud and Mitigation Strategies

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Learning Objectives

- Understand what is food fraud and how it fits in the big picture of risk for the food and beverage industry
- Gain overview related to food fraud in certification standards
- Identify the relevant key items within the **EUROPEAN*** legislation
- Learn about risk mitigation activities, including
 - Vulnerability Assessment, and other risk assessment methodologies
 - Control measures / assurance controls



What is food fraud?

Emerging issues of ancient history

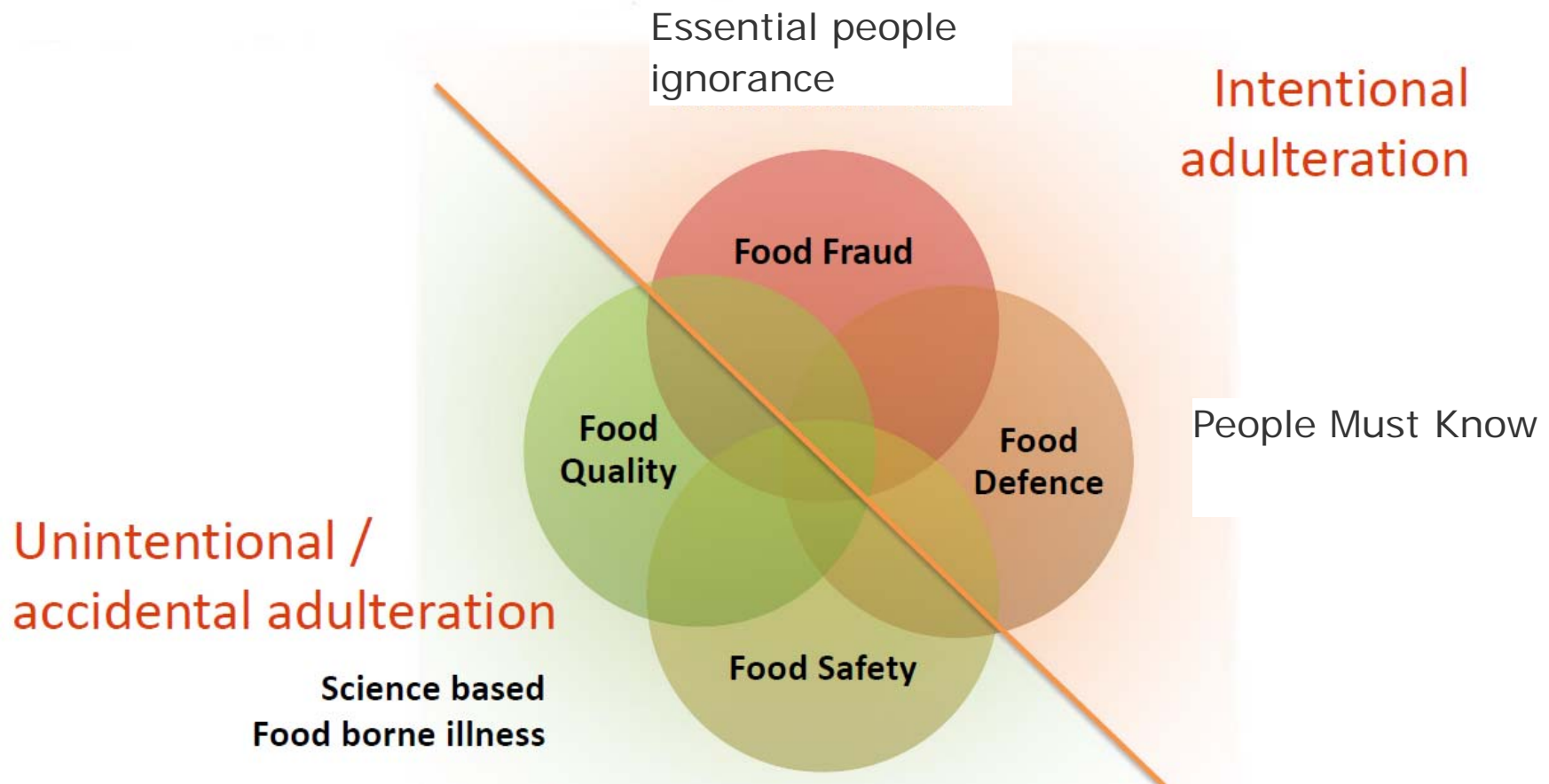
Emerging Issue in the Food & Beverage Industry

- Codex of Hammurabi, written in 1790 BC in Babylon, high concern to ensure the right exchange of wine for grain...
 - 108. If a wine-seller do not receive grain as the price of drink, but if she receive money by the great stone (i.e. weight), or make the measure for drink smaller than the measure for corn, they shall call that wine-seller to account, and they shall throw her into the water.
- In ancient Rome and Athens, there were laws regarding the adulteration of wines with flavors and colors.
- In mid-13th-century England, there was a guideline prescribing a certain size and weight for each type of bread, as well as what ingredients it should have and how much it should cost.
-
- 1906, USA Congress passed both the Meat Inspection Act and the original Food and Drugs Act, prohibiting the manufacture and interstate shipment of adulterated and misbranded foods and drugs

What is food Fraud ?

- EU: no definition of food fraud. “fraudulent or deceptive practices” mentioned in Reg 178:2002 art 8
- USA: FDA adopted a working definition of Economically Motivated Adulteration: “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, i.e., for economic gain.”
- Fraudulent and intentional substitution, dilution or addition to a product or raw material, or misrepresentation of the product or material, for the purpose of financial gain, by increasing the apparent value of the product or reducing the cost of its production (BRC Food Issue 7: 2015)
- Food fraud: committed when food is deliberately placed on the market, for financial gain, with the intention of deceiving the consumer (PAS 96:2014)
- **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** (Spink, J. & Moyer D.C. -2011: Defining the public health threat of food fraud. J Food Sci, 76(9): R157-163).

Food Industry: the general risk framework



EU CHAFEA Conference on Food Fraud 2014 – Threats & Impacts: The Industry's response - YVES Rey, GFSI

http://ec.europa.eu/chafea/food/food-fraud-conference_en.html

Why is Food fraud increasing ?



Food supply is becoming more global



EU CHAFEA Conference on Food Fraud 2014 – Threats & Impacts: The Industry's response - YVES Rey, GFSI

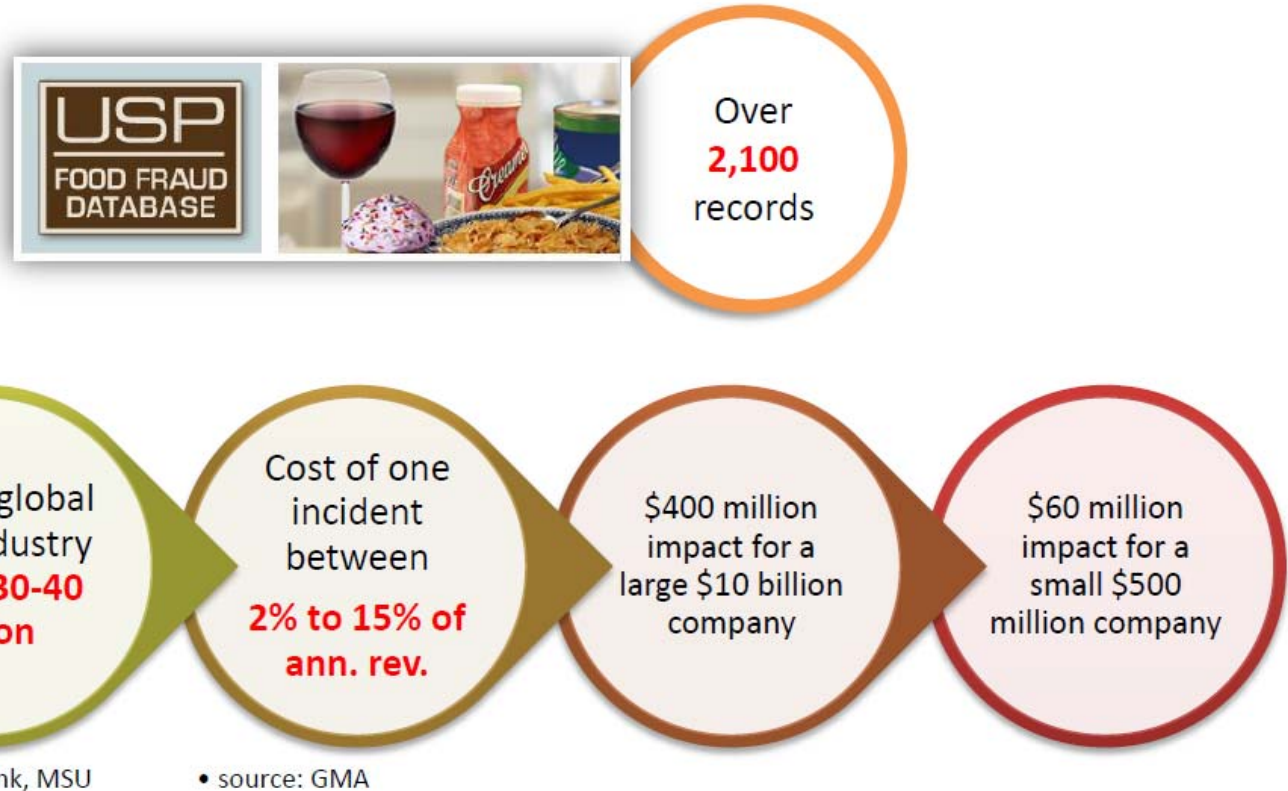
http://ec.europa.eu/chafea/food/food-fraud-conference_en.html

Poll Question

- **Was your company ever involved in an incident related to Food Fraud?**

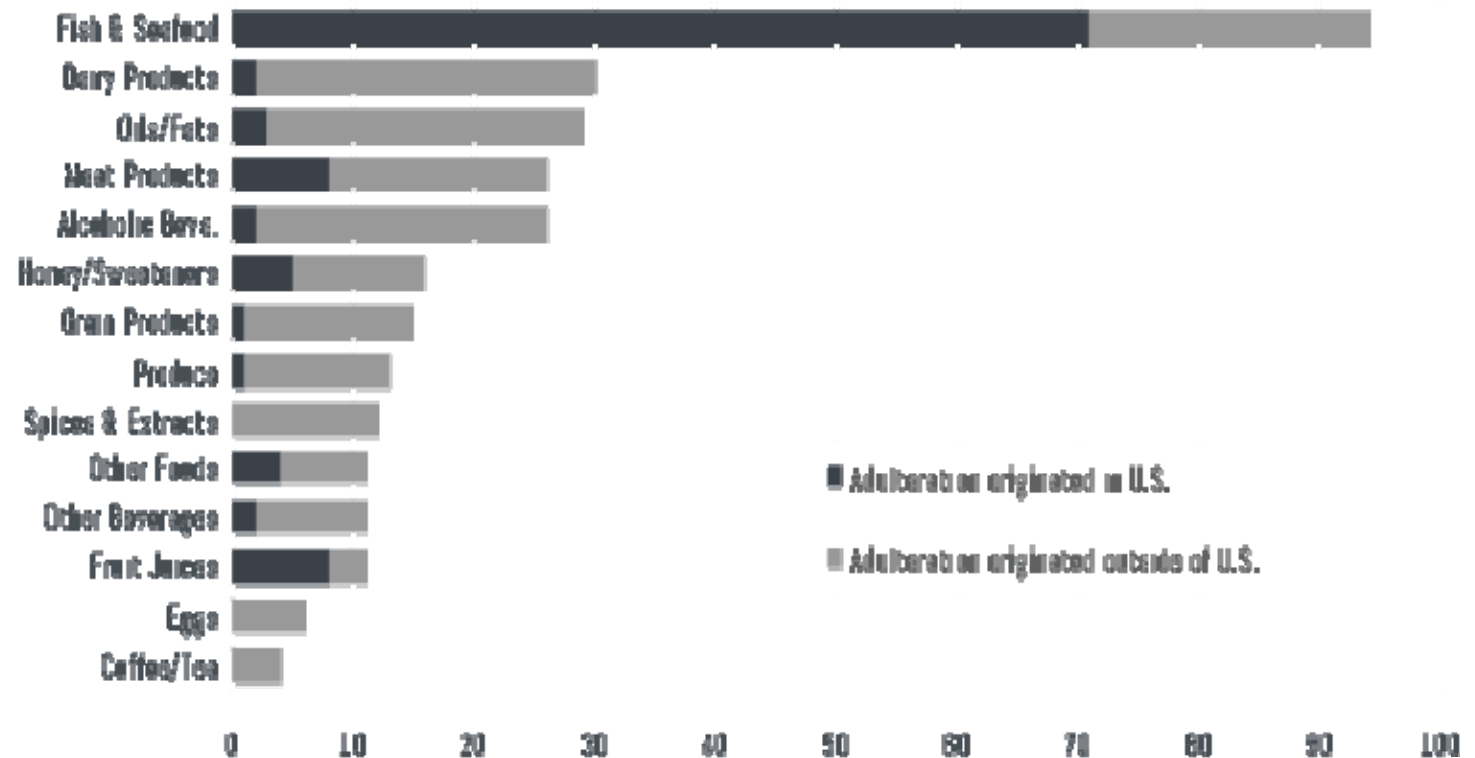
Vote: Yes or No

Business Impact



EU CHAFEA Conference on Food Fraud 2014 – Threats & Impacts: The Industry's response - YVES Rey, GFSI
http://ec.europa.eu/chafea/food/food-fraud-conference_en.html

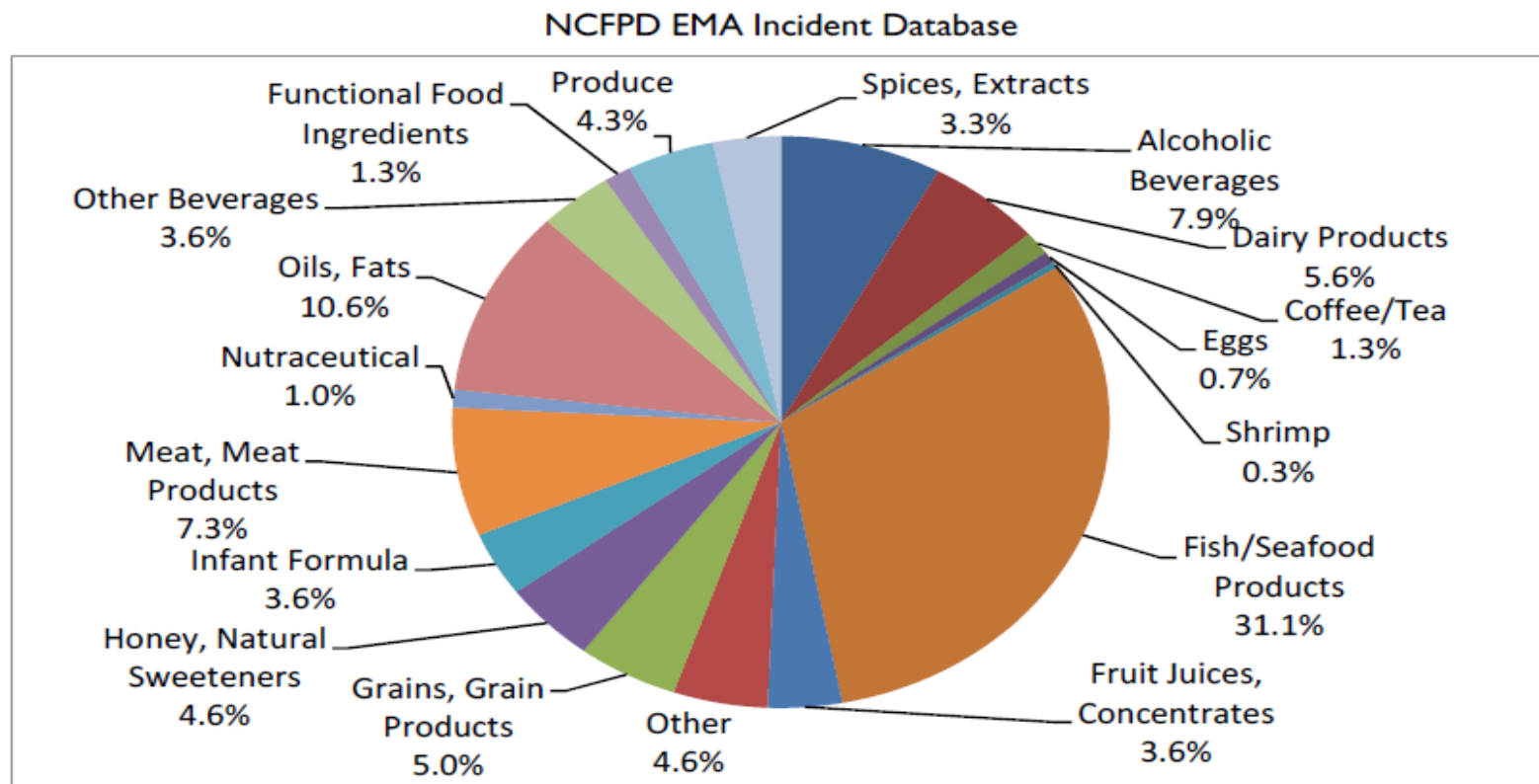
EMA Incidents Categorized by Food Group



National Center for Food Protection and Defense:
<http://www.foodfraudresources.com/ema-incidents>

National Centre for Food Protection and Defense (NCFPD) EMA Incident Database

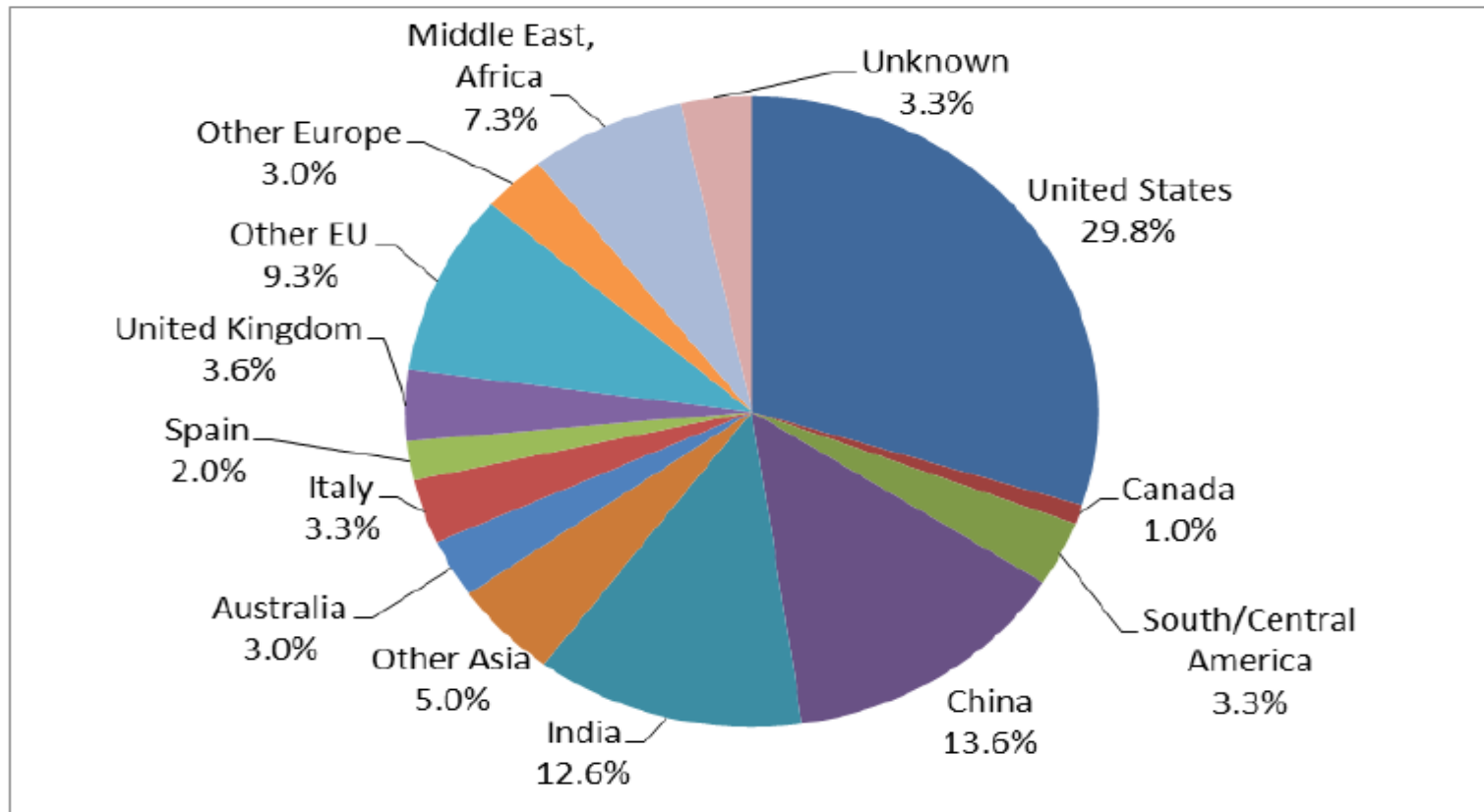
Figure 5. Leading EMA Incidents by Food Ingredient Category (1980 to date)



Source: Compiled by NCFPD CRS from records in the NCFPD EMA Incident Database (database accessed November 14, 2013) and based on 302 reported incidents. These incidents were also reported by A. Kircher, "Building Capabilities to Find and Mitigate." Presentation at the USP Workshop of Economically Motivated Adulteration of Food Ingredients and Dietary Supplements, September 26–27, 2013.

Adulteration (EMA Incidents) by Location Produced

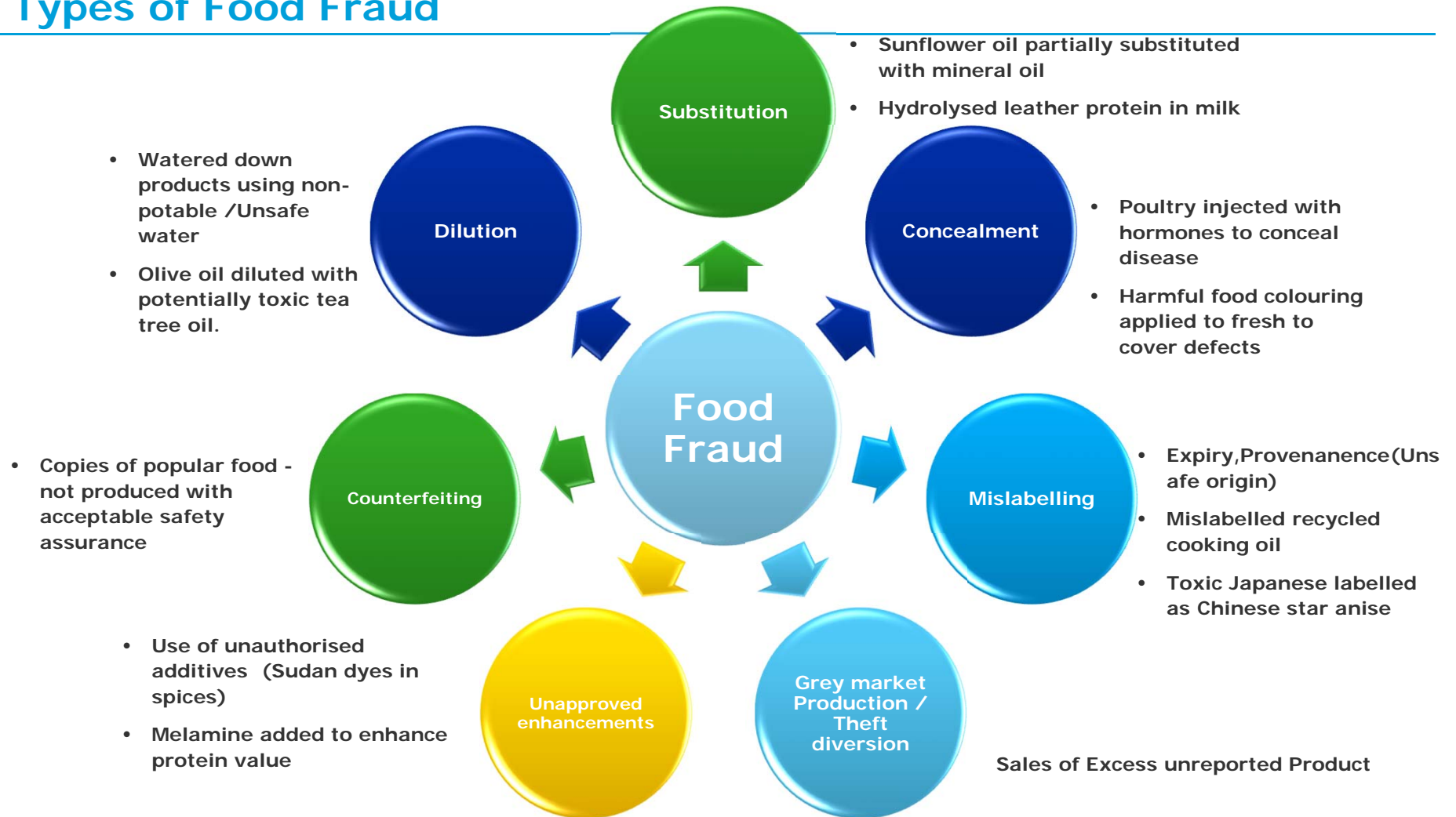
Figure 7. Leading EMA Incidents by Location Produced (1980 to date)
NCFPD EMA Incident Database



Source: Compiled by CRS from records in the NCFPD EMA Incident Database (database accessed November 14, 2013) and based on 302 reported incidents.

Types of Food Fraud

Types of Food Fraud



EU CHAFEA Conference on Food Fraud 2014 – Threats & Impacts: The Industry's response - YVES Rey, GFSI

http://ec.europa.eu/chafea/food/food-fraud-conference_en.html

Types of Food Fraud

Type	Definition
Adulteration	A component of the finished product is fraudulent
Tampering	Legitimate product and packaging are used in a fraudulent way
Over-Run	Legitimate product is made in excess of production agreements
Theft	Legitimate product is stolen and passed off as legitimately procured
Diversion	The sale or distribution of legitimate products outside of intended markets
Simulation	Illegitimate product is designed to look like but not exactly copy the legitimate product
Counterfeit	All aspects of the fraudulent product and packaging are fully replicated

Spink, J. and Moyer, D.C. 2011b. Backgrounder: Defining the Public Health threat of Food Fraud, in Research Grants. National Center for Food Protection and Defense (NCFPD) <http://www.ncfpd.umn.edu>. Minneapolis, MN. p. 7.

Types of Food Fraud

Dilution	Partial replacement; addition of an alternate food product / ingredient to an authentic food product / ingredient to increase the overall weight or volume.	dilution of honey with other sugar syrups, dilution fruit juices with alternate juices or water and flavorings, "overicing" of fish
Substitution	Complete replacement of a food product/ingredient with an alternate food product/ingredient.	fish species fraud, substitution of olive pomace oil for extra virgin
Artificial Enhancement	The addition of an unapproved chemical additive to artificially enhance the quality or other attributes of a product (additives such as industrial dyes, fungicides, artificial ripening agents, etc.).	use of malachite green in fish production, Sudan dyes in chili powder
Mislabelling	Intentional misrepresentation with respect to quality, harvesting or processing techniques.	organic and/or cage-free eggs, Kosher, halal, re-labelling date markings on expired products

National Center for Food Protection and Defense

Types of Food Fraud

Transshipment/ Origin Masking	Misrepresentation of the geographic origin of a product through false declaration of customs documents or mislabelling at retail.	honey trans shipment, protected designation of origin fraud
Counterfeit	Fraudulent labelling of a product by an unauthorized party as a brand name product	brand-name Infant formula, Heinz ketchup
Theft and Resale	Theft of a food product and resale into commerce through unapproved channels	retail thefts of infant formula, cargo thefts
Intentional Distribution of Contaminated Product	Product was sold despite knowledge of foodborne contamination	intentional sale of Salmonella-contaminated peanut products

Types of Food Fraud - Replacement

Replacement	Subtype	Examples
Complete or partial replacement of a food ingredient or valuable authentic constituent with a less expensive substitute without the purchasers' knowledge	Addition, dilution, or extension of an authentic ingredient with an adulterant or mixture of adulterants	<ul style="list-style-type: none"> • Addition of melamine to milk to artificially increase apparent protein contents measured by total nitrogen methods. • Addition of water and citric acid to lemon juice to fraudulently increase the titratable acidity of the final juice product. • Over treating frozen fish with extra water (ice)
	False declaration of geographic, species, botanical, or varietal origin	<ul style="list-style-type: none"> • Substitution of cow's milk for sheep or goat's milk. • Substitution of common wheat for durum wheat • Substitution of Greek olive oil for Italian olive oil.
	False declaration of the raw material origin or production process used to manufacture an ingredient	<ul style="list-style-type: none"> • Substitution of synthetically produced vanillin for botanically derived (natural) vanillin
	False declaration of origin to evade taxes or tariffs	Import into the United States from Vietnam of catfish labelled as grouper to avoid antidumping duties or transshipment of Chinese shrimp through Indonesia to avoid antidumping duties

U.S. Pharmacopeial Convention - USP Food Fraud Database

Types of Food Fraud - Addition

Addition	Subtype	Examples
The addition of non authentic substance to mask inferior quality ingredient without the purchasers' knowledge	Colour enhancement	<ul style="list-style-type: none">• Addition of Sudan Red dyes to enhance to the colour of poor-quality paprika
	Taste enhancement	<ul style="list-style-type: none">• Addition of sugar to mask the astringent taste of poor-quality pomegranate juice

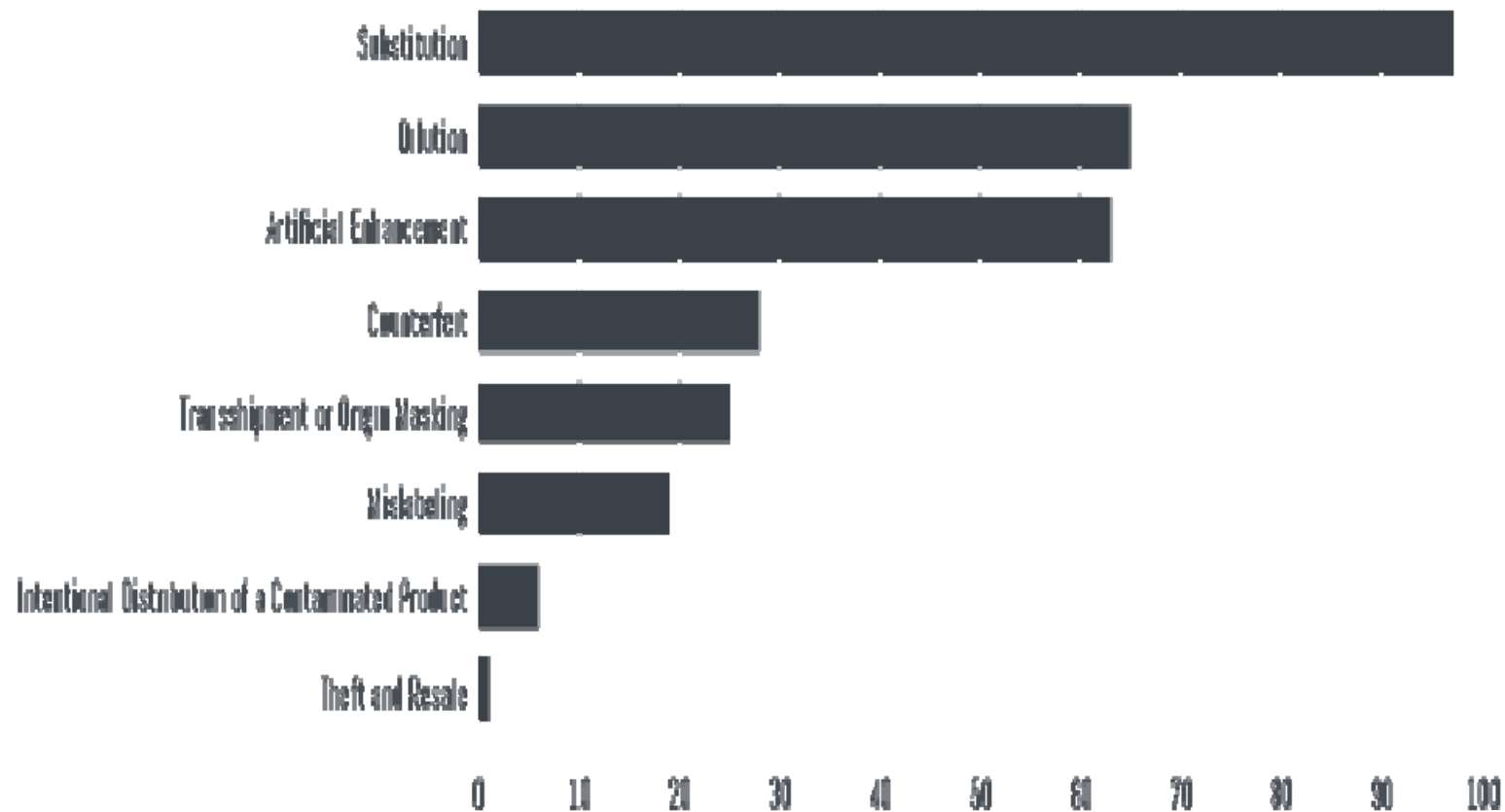
U.S. Pharmacopeial Convention - USP Food Fraud Database

Types of Food Fraud – Removal

Removal	Subtype	Examples
Removal of an authentic and valuable constituent without the purchasers' knowledge	N/A	Removal of nonpolar constituents from paprika (for example, lipids and flavour compounds) to produce paprika-derived flavouring extracts. The sale of the resulting defatted paprika, which lacks valuable flavouring compounds, as normal paprika is a fraudulent practice

U.S. Pharmacopeial Convention - USP Food Fraud Database

EMA Incidents Categorized by Adulteration Type

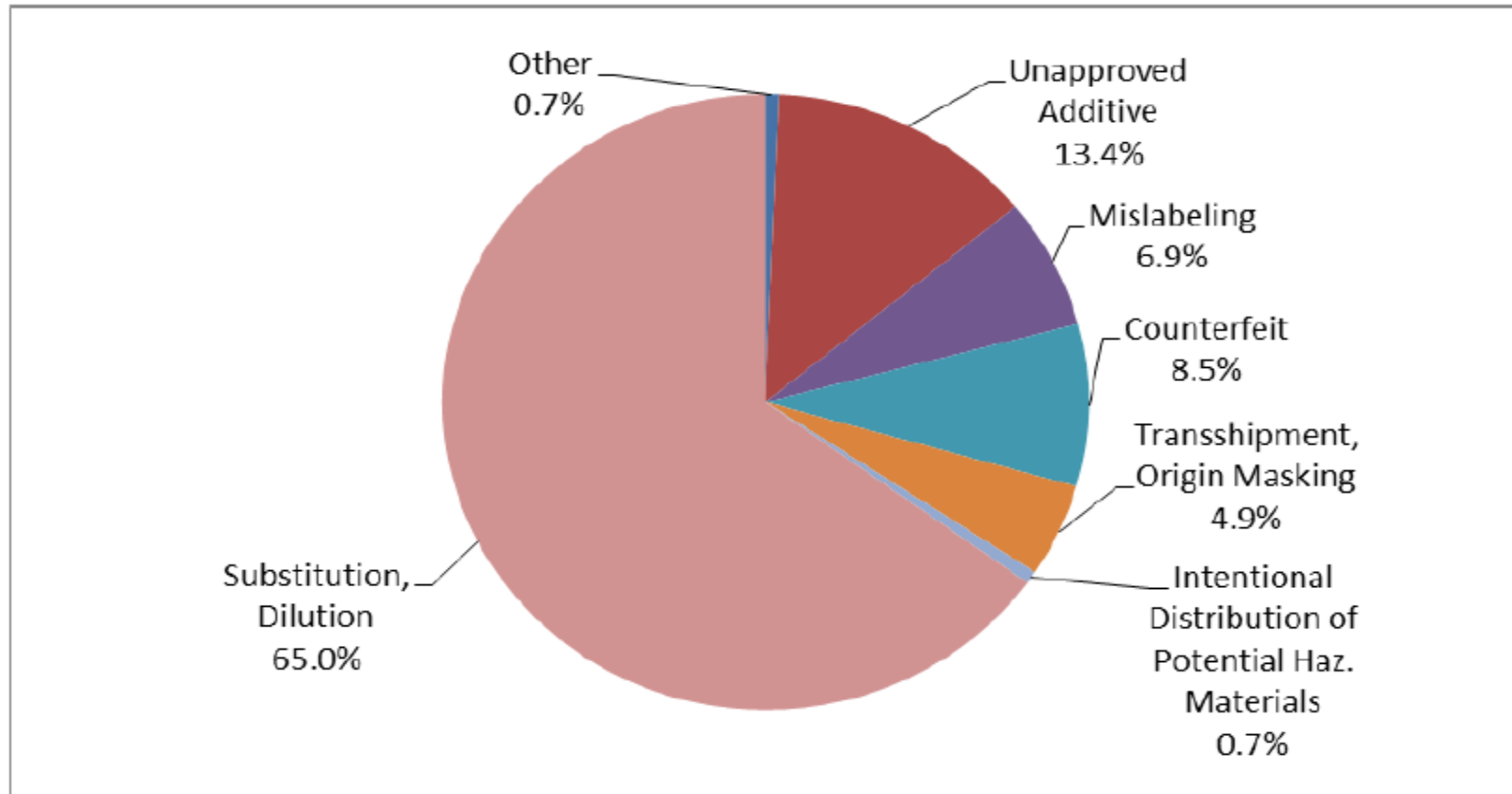


National Center for Food Protection and Defense:
<http://www.foodfraudresources.com/ema-incidents>

Type of Adulteration (EMA Incidents)

Figure 6. Leading EMA Incidents by Type of Adulteration (1980 to date)

NCFPD EMA Incident Database



Source: Compiled by NCFPD EMA Incident Database (January 6, 2014), based on 306 reported incidents.

Certification Schemes Overview

GFSI Position – July 2014

'Food fraud vulnerability assessment' requirements	The standard shall require that the organisation have a documented food fraud vulnerability assessment in place to identify potential vulnerability and prioritise food fraud vulnerability control measures.
'Food fraud vulnerability control plan' requirements	<p>The standard shall require that the organisation have a documented plan in place that specifies the control measures the organisation has implemented to minimize the public health risks from the identified food fraud vulnerabilities.</p> <p>This plan shall cover the relevant GFSI scope and shall be supported by the organisation's Food Safety Management System.</p>

BRC Food Issue 7 (January 2015)



1.1.6	<p>The company's senior management shall have a system in place to ensure that the site is kept informed of and reviews:</p> <ul style="list-style-type: none">•• new risks to authenticity of raw materials
3.5.1.1	<p>The company shall undertake a documented risk assessment of each raw material....to identify potential risks.....:</p> <ul style="list-style-type: none">•• substitution or fraud (see clause 5.4.2).
5.4	<p>Systems shall be in place to minimise the risk of purchasing fraudulent or adulterated food raw materials and to ensure that all product descriptions and claims are legal, accurate and verified</p>
5.4.1	<p>The company shall have processes in place to access information on historical and developing threats to the supply chain which may present a risk of adulteration or substitution of raw materials</p>



5.4.2	<p>A documented vulnerability assessment shall be carried out on all food raw materials or groups of raw materials to assess the potential risk of adulteration or substitution. This shall take into account:</p> <ul style="list-style-type: none">• historical evidence of substitution or adulteration• economic factors which may make adulteration or substitution more attractive• ease of access to raw materials through the supply chain• sophistication of routine testing to identify adulterants• nature of the raw material. <p>The vulnerability assessment shall be kept under review to reflect changing economic circumstances and market intelligence which may alter the potential risk. It shall be formally reviewed annually.</p>
5.4.3	<p>Where raw materials are identified as being at particular risk of adulteration or substitution appropriate assurance and/or testing processes shall be in place to reduce the risk.</p>

4.4.1	The company shall control purchasing processes to ensure that all externally sourced materials and services, which have an impact on food safety and quality, conform to requirements
4.4.5	<p>The purchased products shall be checked in accordance with the existing specifications and their authenticity, based on hazard analysis and assessment of associated risks.</p> <p>The schedule of these checks shall, as a minimum, take into account the following criteria; product requirements, supplier status (according to its assessment) and impact of the purchased products on the finished product. The origin shall be additionally checked, if mentioned in the specification.</p>

4.14.1	All incoming goods, including packaging materials and labels, shall be checked for conformity against specifications and to a determined inspection plan. The inspection plan shall be risk based. Test results shall be documented
5.6.8	Based on hazard analysis, assessment of associated risks and on any internal or external information on product risks which may have an impact on food safety and/or quality (incl. adulteration and fraud), the company shall update its control plan and/or take any appropriate measure to control impact on finished products.

Risk Mitigation – Food Protection Vulnerability Assessment

Poll Question

- **Is Food Fraud included in your FSMS?**

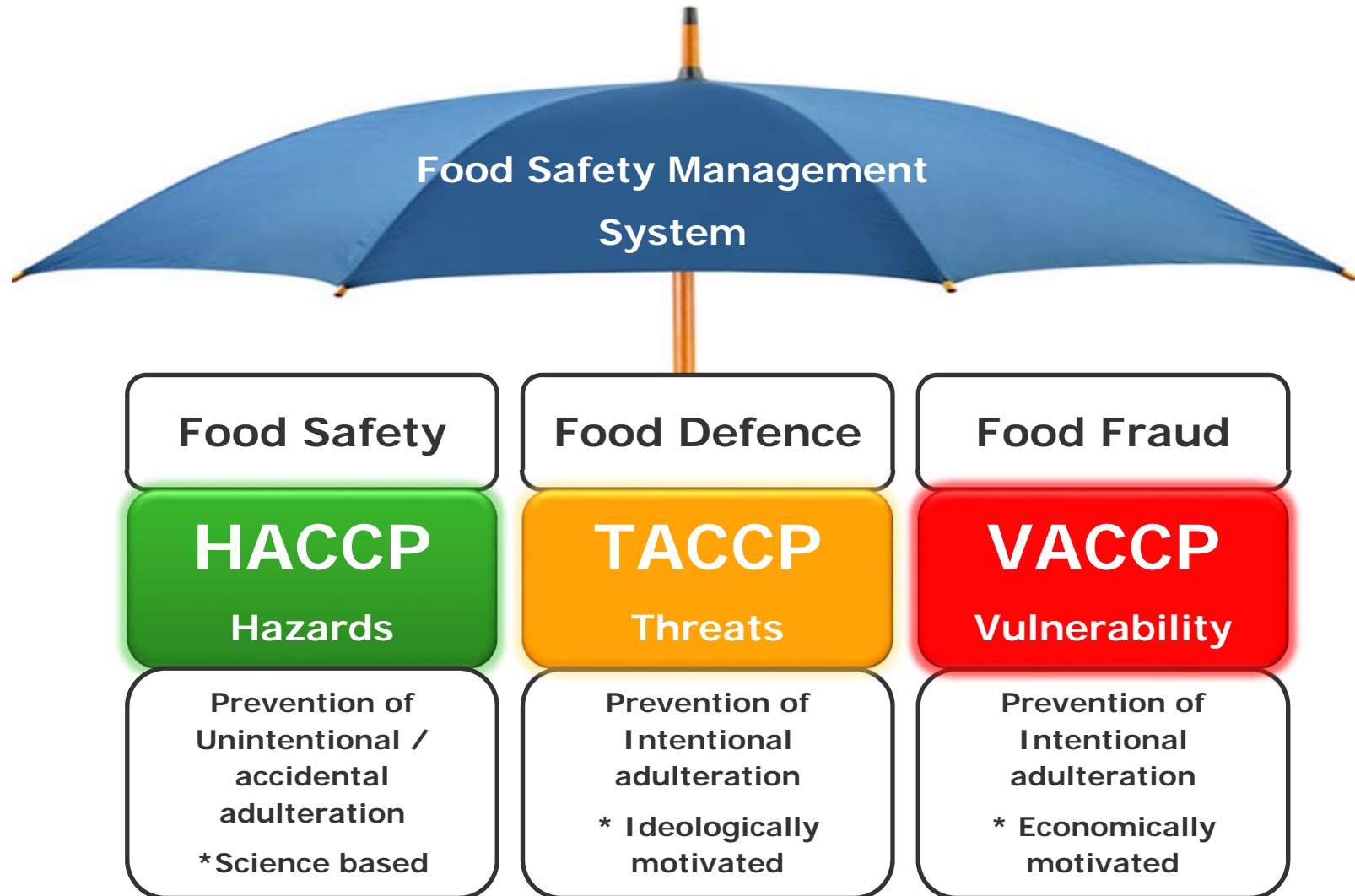
Vote: Yes

No

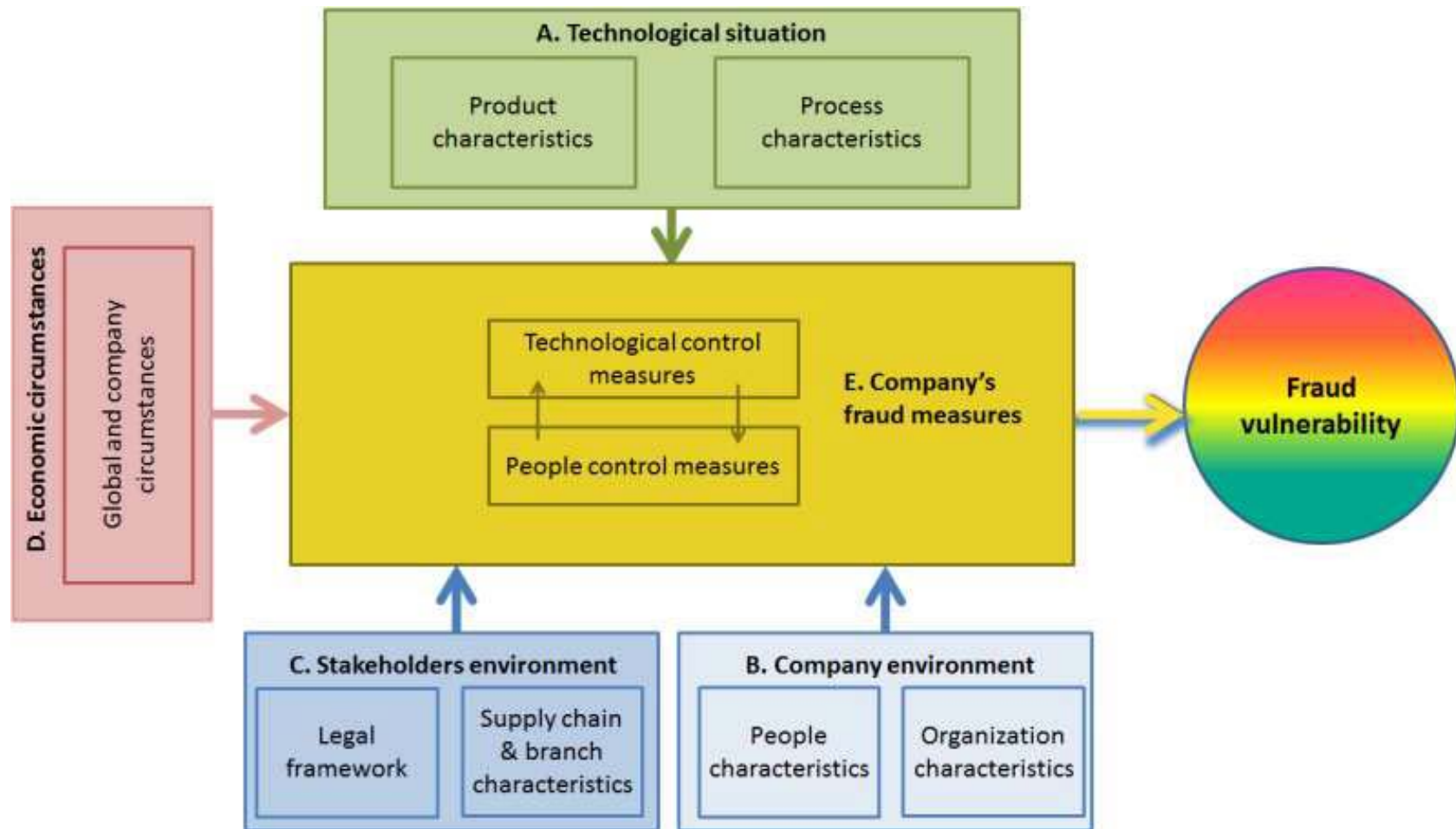
I don't know

NA

GFSI – Position – Integral Part of the FSMS



Food Fraud Vulnerability Assessment



PAS 96:2014 – Guidance

PAS 96:2014

Guide to protecting and defending food and drink from deliberate attack

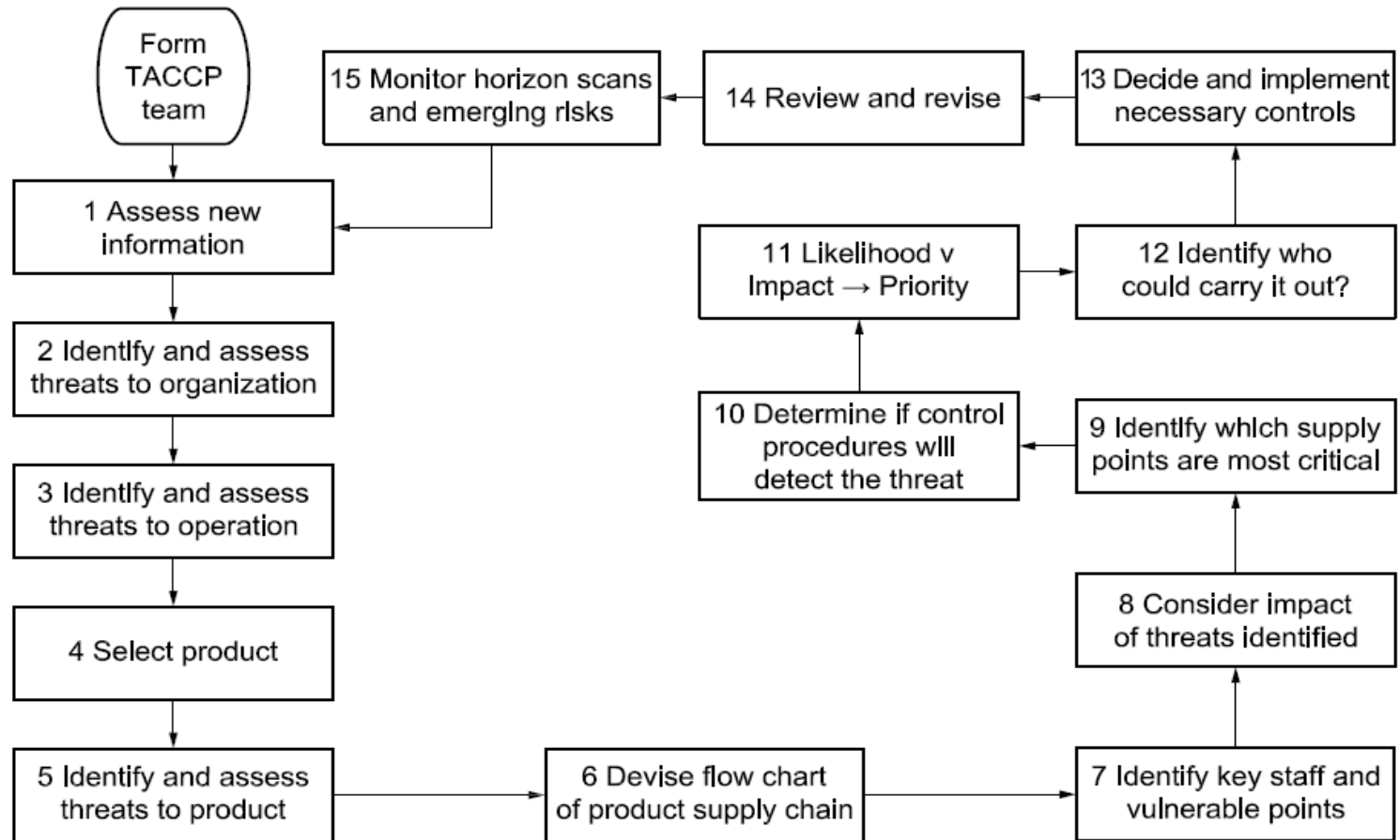


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Outline of TACCP process

Figure 2 – Outline TACCP process



TACCP - Threat Assessment Critical Control Point

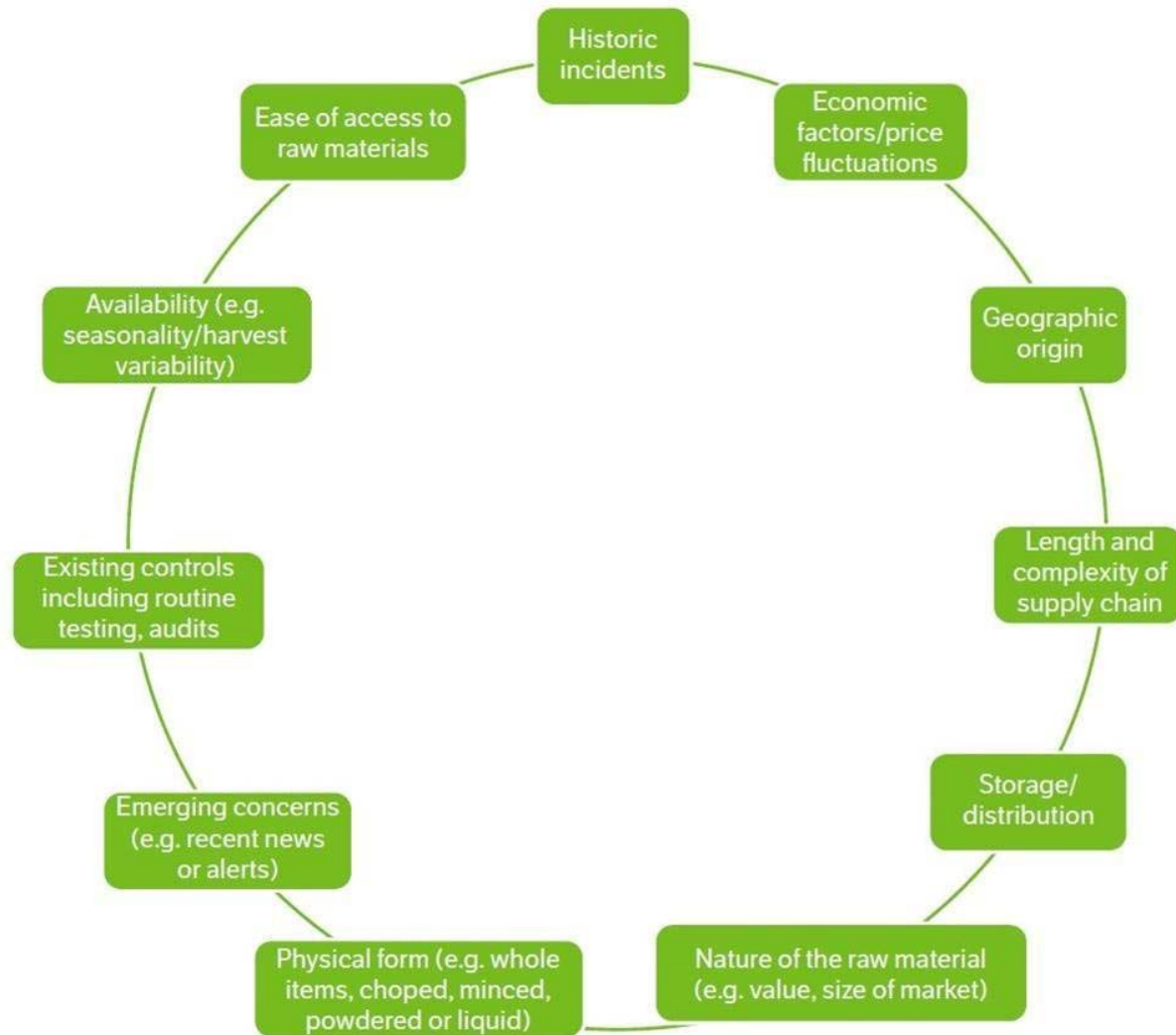
- Are low cost substitute materials available?
- Have there been significant material cost increases?
- Has pressure increased on suppliers' trading margins?
- Do you trust your suppliers' managers, and their suppliers' managers?
- Do key suppliers use personnel security practices?
- Do suppliers think that we monitor their operation and analyze their products?
- Which suppliers are not routinely audited?
- Are we supplied through remote, obscure chains?
- Are major materials becoming less available (e.g. from crop failure) or alternatives plentiful (e.g. from overproduction)?
- Have there been unexpected increases or decreases in demand?
- How do suppliers dispose of excessive amounts of waste materials?
- Are we aware of shortcuts to the process which could affect us?
- Are our staff and those of suppliers encouraged to report concerns (whistleblowing)?
- Are accreditation records, certificates of conformance and analyzes reports independent?

Prioritization - Risk Scoring matrix

Figure 3 – Risk scoring matrix

Impact	5				Threat A	
	4		Threat C			
	3					Threat B
	2	Threat E				
	1			Threat D		
		1	2	3	4	5
	Likelihood					
Very high risk		Threat A				
High risk		Threat B				
Moderate risk		Threat C				
Low risk		Threat D				
Negligible risk		Threat E				
NOTE This is an example risk scoring matrix, organizations may choose different criteria for the different risk categories.						

Input information



Input information

- US Pharmacopeial Convention (USP): <https://www.foodfraud.org/>
- US National Center for Food Protection and Defense (NCFPD): <https://www.ncfpd.umn.edu/>
- US Michigan State University: <http://foodfraud.msu.edu/>
- US Food and Drug Administration (FDA): <http://www.fda.gov/Food/FoodDefense>
- UK Food Standards Agency (FSA): <http://www.food.gov.uk/enforcement/foodfraud>
- UK Serious Fraud Office: <http://www.sfo.gov.uk/fraud>
- UK Food and Drink Federation (FDF): http://www.fdf.org.uk/corporate_pubs/Food-Authenticity-guide-2014.pdf

BRC quadratic model

- Considering the dimensions
 - likelihood of occurrence (Probability)
 - likelihood of detection (INSTEAD OF SEVERITY)

		LIKELIHOOD OF OCCURRENCE				
LIKELIHOOD OF DETECTION		Very unlikely	Unlikely	Fairly likely	Likely	Very likely/ certain
	Very likely/ certain					
	Likely					
	Fairly likely					
	Unlikely/remote					
	Very unlikely					

Priority risk numbers

- Likelihood of occurrence
- Likelihood of detection
- Profitability (i.e. how profitable the activity would be for a fraudster).

RATING	LIKELIHOOD OF OCCURRENCE (O)	LIKELIHOOD OF DETECTION (D)	PROFITABILITY (P)
1	Very unlikely or none	Certain	Very low
2	Unlikely or minor	High	Low
3	Moderate or significant	Fairly unlikely	Moderate or significant
4	High	Unlikely or remote	High
5	Very high	Very unlikely	Very high

$$\text{PRN} = \text{Occurrence (O)} \times \text{Detection (D)} \times \text{Profitability (P)}$$

(between 1 and 125)

Vulnerability Self Assessment Tool

- Science based methodology, based on criminology
 - “Think like a criminal”
- 50 questions questionnaire, assessing both the internal and the external environment of the company
 - Opportunities
 - Motivations
 - Control measures
- Select 1 of the 3 options for each question, and specify the grade of certainty / reliability of the answer
- Result: Spider web graphs, representing the areas of the vulnerability factors (motivations and opportunities) and of the control measures, allowing assessment of adequacy / level of vulnerability.

Example question self assessment

How **simple** or **complex** is **adulteration** of your raw materials?

- Rationale: Easy alteration of the composition of the raw material provides **opportunities** for potential offenders to commit fraud
- ANSWER 1 Composition of the material cannot be modified and products can only be replaced, i.e. it concerns large objects such as fruits
- ANSWER 2 Composition of the raw materials can be modified by mixing with low-quality product-own material or foreign material, i.e. as is feasible with ground products (e.g. powders, ground meat, etc.)
- ANSWER 3 Composition of the raw materials can be modified by mixing with low-quality or foreign material (e.g. powders, ground meat, etc.) and by altering valuable food components (e.g. protein content)
- Source of Information: <https://www.foodshield.org/discover-tools-links/tools/> ;
<http://www.foodfraud.org/node?destination=node> ;
http://ec.europa.eu/food/safety/rasff/index_en.htm
- Competence needed: QA/laboratory

Example question self assessment

How would you describe the **financial strains** imposed by your own company on your direct supplier(s) ?

- Rationale: Financial strains imposed by your company on your direct supplier(s) can **motivate** the supplier to commit fraud
- ANSWER 1: The company sets fixed prices for direct supplier(s) in line with market prices, and supplier(s) have more customers
- ANSWER 2: The company typically buys from suppliers that offer lowest prices and suppliers are highly dependent on sales volumes as requested by your company
- ANSWER 3: The company typically buys from suppliers that offer lowest prices
- SOURCE of Information: Annual report of external company, company financial Reports
- Competence needed: Management/ procurement

Example question self assessment

How extensive is the information system for internal control of mass balance flows in your company?

- Rationale: Systematically collected, accurate information on mass balance flows of all raw materials, ingredients, and final products throughout the company (including internal suppliers) and systematic analysis of the integral dataset, enhances **discovery** of flaws in mass balances, and provides **evidence** of fraud control (assurance)
- ANSWER 1: Basic administrative system with limited information or no specific information on mass balances of incoming materials and final products. Data only analyzed in case of inspection requirements
- ANSWER 2: Process monitoring information system with accurate information on mass balances of mainly bulk ingredients. No integral analysis of mass flow data throughout the company (including internal suppliers)
- ANSWER 3: Established and comprehensive (accurate mass balance data, of all crucial ingredients, materials, & final product flows) process monitoring information system dedicated for control of mass balance flows. Structured record keeping of mass flow information and systematic analysis of integral data of whole company (including internal suppliers)
- Source of Information: information and documentation system
- Competence needed: Finance

Contributing Factors

- Supply chain
- Audit strategy
- Supplier relationship
- History of supplier quality and safety issues
- Testing frequency
- Susceptibility of QA methods
- Geopolitical considerations
- Fraud history
- Economic anomalies.

Contributing Factors Assessment

	Contribution to Vulnerability				
Contributing Factor	Low	Medium Low	Medium	Medium High	High
Supply chain	<i>Firm vertically integrated</i> —The ingredient is not sourced from third parties but is sourced directly from another part of the food-producing firm	<i>Supplier vertically integrated</i> —The ingredient is sourced from a known, <i>trusted supplier</i> who produces the raw agricultural product that is the starting point for the ingredient	<i>Supplier manufactures</i> —The ingredient is sourced directly from a primary supplier who manufactures the ingredient but buys either raw or processed agricultural products from another party.	<i>Upstream supplier manufactures</i> —The ingredient is either composed of a blend of components each manufactured by a third party, or the ingredient is subject to processing by a third party manufacturer before final processing by the supplier.	<i>Open market</i> —This scenario describes the situation where in an ingredient is sourced in the open market and none of the other scenarios described above can be verified as being applicable

Contributing Factors Assessment

	Contribution to Vulnerability				
Contributing Factor	Low	Medium Low	Medium	Medium High	High
Audit Strategy	<i>Robust , onsite with numerous anti fraud measures</i>	<i>Robust , onsite with limited anti fraud measures</i>	<i>Immature, onsite with no anti-fraud measures</i>	<i>Currently developing an onsite audit strategy</i>	<i>No onsite Audits</i>

Contributing Factors Assessment

	Contribution to Vulnerability				
Contributing Factor	Low	Medium Low	Medium	Medium High	High
Supplier Relationship	<i>Trusted supplier with previously purchased ingredients.</i>	<i>Trusted supplier and new ingredient.</i>	<i>Established supplier and some relationship.</i>	<i>Established supplier and no prior relation ship.</i>	<i>Unestablished supplier and no prior relationship</i>

Contributing Factors Assessment

	Contribution to Vulnerability				
Contributing Factor	Low	Medium Low	Medium	Medium High	High
History of supplier Quality & safety issues.	<i>No Known issues</i>	<i>Few Minor issues , Quickly resolved.</i>	<i>Recurrent issues or Resolution concern.</i>	<i>Multiple persistent issues ; Some evidence of inadequate controls.</i>	<i>Strong evidence of Quality or safety concerns ; Inadequate controls</i>

Contributing Factors Assessment

	Contribution to Vulnerability				
Contributing Factor	Low	Medium Low	Medium	Medium High	High
Testing Frequency	<i>Intensive – Every lot independently tested by the buyer.</i>	<i>Random lot-independently tested by the buyer.</i>	<i>Independent testing done at yearly or other limited intervals as part of the supplier qualification.</i>	<i>No independent analysis done, reliance on Certificate of analysis given by the supplier.</i>	<i>COA either not present or not specific to Lot / shipment, No Independent testing.</i>

Contributing Factors Assessment

	Contribution to Vulnerability				
Contributing Factor	Low	Medium Low	Medium	Medium High	High
Susceptibility of QA methods and Specs.	<i>Methods are very selective and specific; Specifications only allow for natural variability.</i>	<i>Methods are very selective and specific; Specifications allow for natural and analytical variability.</i>	<i>Methods are selective but not specific; Specifications reflect the same.</i>	<i>Methods are of limited Selectivity /specificity and Specifications reflects the same.</i>	<i>Methods are not Selective and specific; Specification ranges are broader than Ideal.</i>

Case 1

Powdered whey Protein specification

Total (crude) protein
level of not less than
90%

Test method :
Kjeldahl nitrogen
method

Vulnerability to adulteration

Low ?
Medium ?
High ?

Highly vulnerable to adulteration

The lack of
selectivity and
specificity of Kjeldahl
method could fail to
identify non-whey
protein nitrogen
adulterants such as
vegetable proteins or
other highly
nitrogenous
compounds (e.g.,
melamine, urea,
cyanuric acid).

Case 2

Powdered whey Protein **specification**

Total (crude) protein level of not less than 90%

Test method :

Kjeldahl nitrogen method
amino acid fingerprinting
Non-protein nitrogen test
HPLC method for lactose
Weight loss on drying test

**Medium-low or Low
vulnerable to adulteration**

Compositional difficulties and Testing Power.

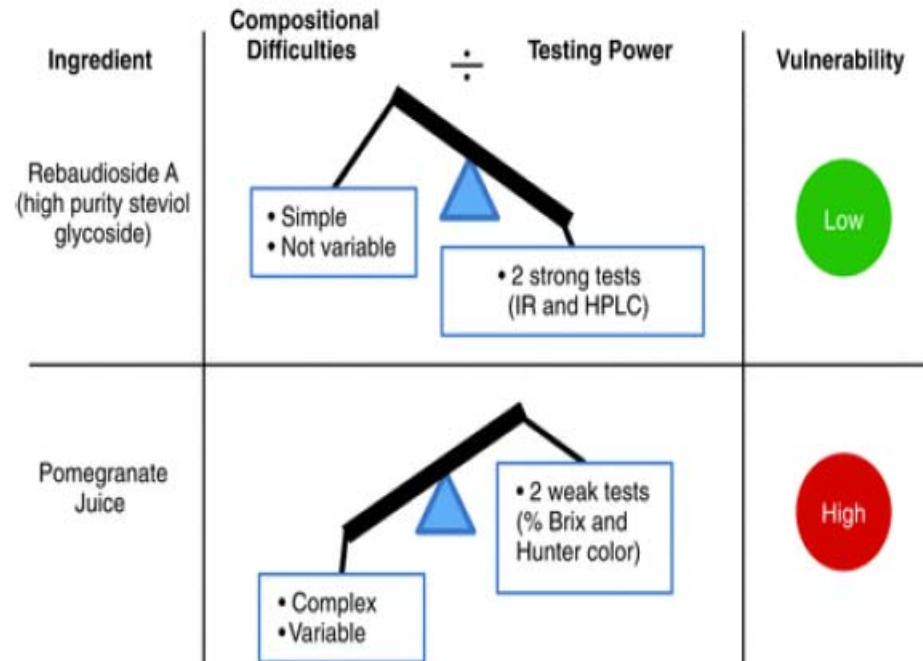


Figure 4. Examples of Analytical Method Susceptibility. The term "compositional difficulties" is used to describe the complexity and inherent variability of an ingredient's composition. The term "testing power" is used to encompass the concepts of analytical method selectivity, specificity, and sensitivity.

Contributing Factors Assessment

	Contribution to Vulnerability				
Contributing Factor	Low	Medium Low	Medium	Medium High	High
Geopolitical considerations	<i>Ingredient is single component Sourced from a single Geographic origin of low concern</i>	<i>Several components sourced from Geographic origin(s) of low concern.</i>	<i>Single component; Originated transited through regions with some Geopolitical concern.</i>	<i>Several component; Some Originated transited through regions with some Geopolitical concern.</i>	<i>One or more components originated or transited through one or more regions exhibiting several characteristics of Geographical concerns.</i>

Contributing Factors Assessment

	Contribution to Vulnerability				
Contributing Factor	Low	Medium Low	Medium	Medium High	High
Fraud history	<i>No or few known reports; no substantiating evidence.</i>	<i>Moderate volume of reports; no substantiating evidence.</i>	<i>Numerous reports; limited substantiation evidence.</i>	<i>High volume of reports ; some substantiating evidence.</i>	<i>High volume of reports; good substantiating evidence.</i>

Contributing Factors Assessment

	Contribution to Vulnerability				
Contributing Factor	Low	Medium Low	Medium	Medium High	High
Economic Anomalies.	<i>Nothing unusual.</i>	<i>Isolated anomalies.</i>	<i>Frequent but unrelated anomalies.</i>	<i>Common but focused anomalies.</i>	<i>Common but broad anomalies.</i>

Potential Impact Assessment

	Low		Moderate		High
Food Safety	Food grade-known safe	Food grade-No known risks	Food grade-known sub-population risks	Non-food/non-food grade-unknown risks	Non-food/non-food grade-known risks
Economic Impact	No significant balance sheet impact		Operational Risk		Enterprise risk

Potential Multipliers

Focused Consumption	No focused consumption	Temporally focused	Low level	Potential target populations	At-risk populations
Nutritional Sufficiency	No sufficiency impacts		Important micro-nutrient food	Core food for a sub-population	Primary/critical sub-population food
Public Confidence	Specific food	Specific commodity	Industry sector	Industry wide	Authorities & industry

Vulnerability characterization

		Contributing Factors (Composite of Step 1)				
Potential Impact (Composite of Step 2)		Low		Moderate		High
	Low Economic	New controls optional	New controls optional	New controls optional	New controls optional	New controls should be considered
	Moderate Economic	New controls optional	New controls should be considered	New controls should be considered	New controls should be considered	New controls strongly recommended
	Low Public Health/High Economic	New controls optional	New controls should be considered	New controls should be considered	New controls strongly recommended	New controls strongly recommended
	Moderate Public Health/High Economic	New controls optional	New controls should be considered	New controls strongly recommended	New controls strongly recommended	New controls strongly recommended
	High Public Health/High Economic	New controls optional	New controls strongly recommended	New controls strongly recommended	New controls strongly recommended	New controls strongly recommended

Risk Mitigation – Food Protection Control Measures / Assurance Control Critical Control Points

Incoming material Control System

- Documented procedures, and relevant records available
- Detailed Product Specification, including specific anti fraud items.
- Analytical testing strategy
- Anti-tampering packaging or tamper evident seals for each consignment

End product Control System

- Documented procedures, and relevant records available
- Detailed Product Specification, including specific anti fraud items.
- Analytical testing strategy

FOOD FRAUD MITIGATION

Vulnerability Assessments

- Supply chain mapping
- Socio-economic
- Behavioural
- Geo-political
- Historical



'Think like a Criminal'

Vulnerability Control Plan

- Monitoring strategy
- Origin/label verification
- Specification management
- Supplier audits
- Analytical testing strategy
- Anti-counterfeit technologies

EU CHAFEA Conference on Food Fraud 2014 – Threats & Impacts: The Industry's response - YVES Rey, GFSI

http://ec.europa.eu/chafea/food/food-fraud-conference_en.html

Analytical testing strategy



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Detecting Fraud



Targeted Analysis

⇒ **target list of components**

**we know what to look for and
only find what we are looking for**



Non-Targeted analysis

⇒ **product/ingredient profile**

**we also find what we are NOT
looking for**

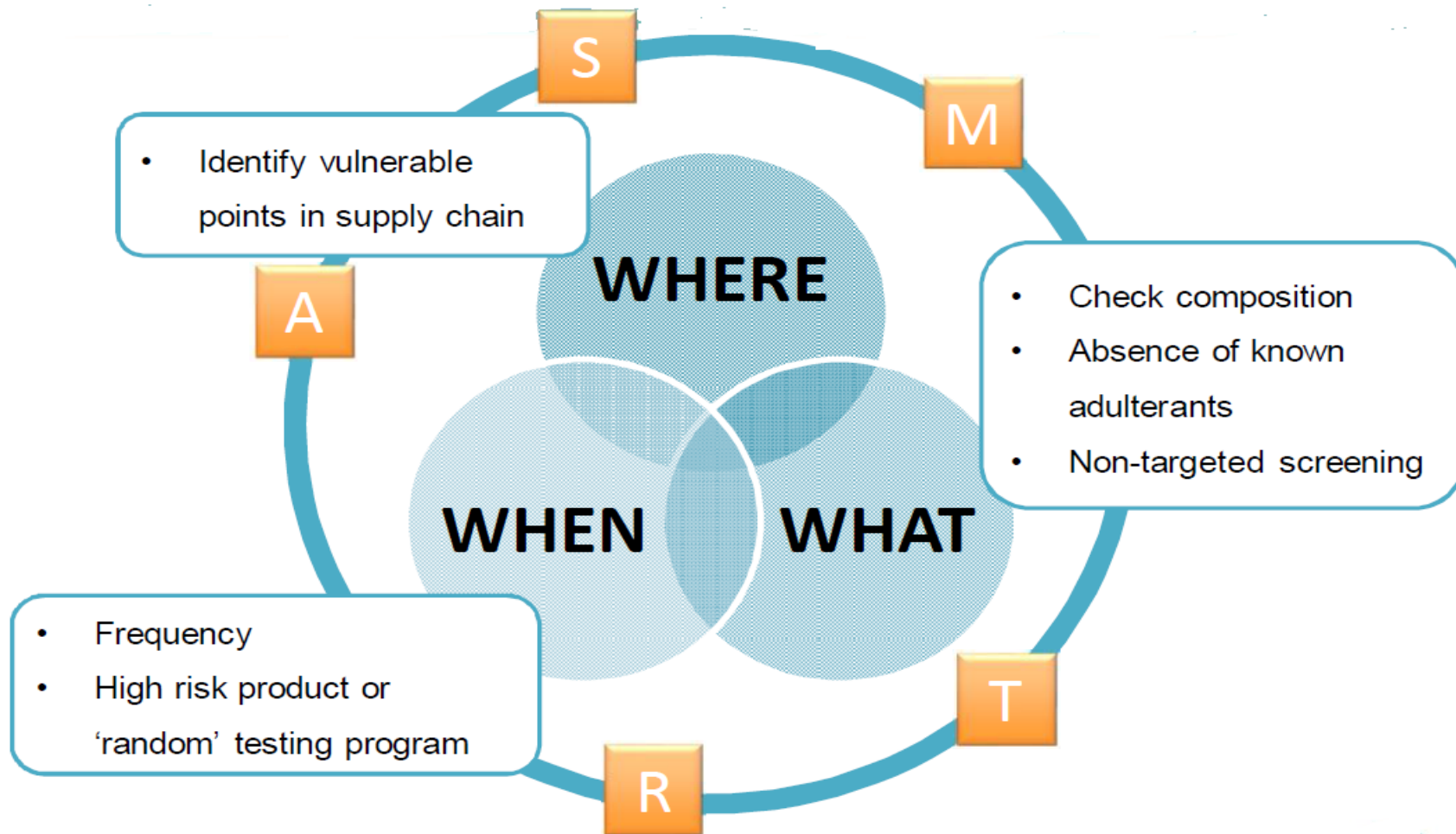
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Analysis

- **Targeted analysis** involves screening for pre-defined components in a sample
 - liquid chromatography
 - gas chromatography
 - mass spectrometry (LC-MS and GC-MS)
 - nuclear magnetic resonance spectroscopy (NMR)
 - PCR Technique
- **Non Targeted analysis**
 - Isotopic measurement-determination of whether ethanol and vinegar and flavourings are natural or synthetic
 - Metabolomics-Maturation and shelf life
 - Proteomics-Testing for pork and beef additives in chicken, confectionery and desserts

Requirements of Smart Testing



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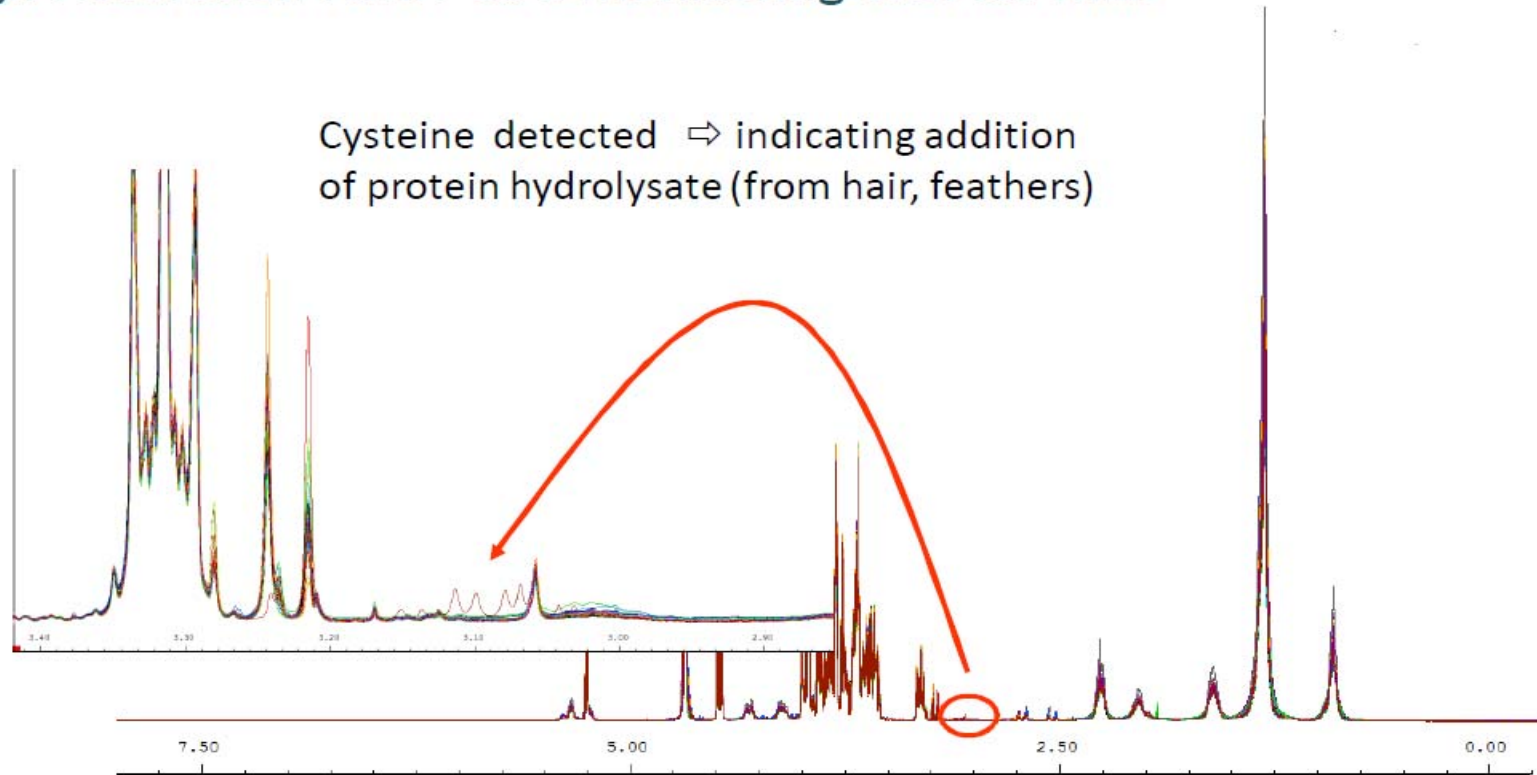
Non-Targeted Screening – Early warning Strategy

Example:

High Resolution NMR as a monitoring tool for milk



Cysteine detected \Rightarrow indicating addition of protein hydrolysate (from hair, feathers)



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Traceability System

- The traceability system including information relevant to fraud issues, from the supplier throughout the organization up to the customer
- Traceability data management (data capturing and data retrieval system) fully automated and fraud proof.
- Data management system regularly verified to ensure accuracy and robustness.
- Mass balance verification
- Suppliers' Traceability System: same requirements!

Personnel Management

- Documented code of ethical conduct
- Whistle blowing system in place; fraudulent practices can be reported to independent officer and anonymity of whistle blower must be strictly protected.
- Ethical conduct highly valued and rewarded by higher management
- Recognized integrity screening methods for all employees (when allowed by applicable legislation)

Supplier Management

- Contracts/agreements including requirements on adoption of ethical code/guidelines, and adoption of similar technical fraud control measures
- Fixed prices for suppliers in line with market prices, in the framework of long term relationship
- High level of transparency and communication within the supply chain network
- Relevant certification schemes widely implemented within the supply chain network

Verification and Improvement

- The food fraud prevention system included in the Internal Audit program
- Other verification activities, such as documents and records analysis, observations, and trend analysis are systematically carried out according to a documented plan
- The verification activities fully documented and carried out by independent and competent personnel
- On the basis of the verification activities results, designated competent personnel systematically start the needed Corrective Actions, which are implemented and verified according to a documented plan.

Key Items in the European Legislation

The European Legislation

- No definition of food fraud, nor specific tools and mechanisms to counter the criminally relevant facts
- “Fraudulent or deceptive practices” mentioned in Reg 178:2002 art 8
- National laws in each EU Member State provide various definitions for facts that represent a certain type of **violation of statutory agri-food chain requirements**. They are qualified by the **intention to deceive and** motivated by the prospect of financial or economic gain, though constitutive elements vary from one national system to the other. In a number of Member States those facts may be relevant for the application of criminal penalties and of procedural rules on criminal prosecution

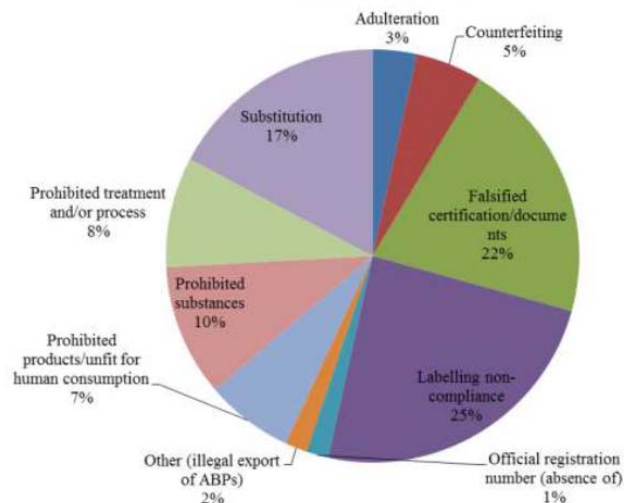
EU 5-point action plan

- In the wake of the horse meat scandal in February 2013, the Commission proposed a 5-point Action Plan
 - Develop synergies between enforcement authorities, ensure rapid exchange of information on intentional violations of food chain rules, promote the involvement of Europol in investigations.
 - Ensure that rules on horse passports are enforced correctly, that passports are delivered only by competent authorities and that national databases are created.
 - Require that financial penalties for intentional violations of food chain rules be established at sufficiently dissuasive levels, and that control plans in the Member States include unannounced controls.
 - Adopt rules on mandatory origin labelling of meat (sheep, goat, pig, poultry, horse, rabbit, etc.) and deliver a report in autumn 2013 on the possible extension of mandatory origin labelling to all types of meat used as ingredient in foods.
 - Present and assess the results of the controls currently carried out in the EU countries.

The Food Fraud Network

- The Commission decided therefore to activate a **dedicated network of administrative assistance liaison bodies** that would handle specific requests for cross-border cooperation in cases of “food fraud”. The dedicated liaison bodies are referred to as “**Food Fraud Contact Points**” (FFCP). They act, as all administrative assistance liaison bodies, within the legal framework provided in Title IV of Regulation (EC) No 882/2004. The group of FFCPs is collectively referred to as the “**Food Fraud Network**” or **FFN**
- The Commission is currently working to equip the FFN with a dedicated IT tool

Cases exchanged on the FFN by type of alleged violation in 2014



Thank you On behalf of DNV GL

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