Preparing a Robust Vulnerability Assessment Plan

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Objectives

- Introduce you to emerging concepts
- Assist you in developing a Robust Vulnerability Assessment Plan

HACCP, VACCP &TACCP- Acronyms

- HACCP (Hazard Analysis Critical Control Point)
- TACCP (Threat Analysis Critical Control Point System), and/or
- VACCP (Vulnerability Analysis Critical Control Point System)

GFSI Definition- Food Fraud

"A collective term encompassing the deliberate and intentional substitution, addition, tampering or misrepresentation of food, food ingredients or food packaging, labeling, product information or false or misleading statements made about a product for economic gain that could impact consumer health. (Reference: Spink, J. & Moyer, DC (2011) Journal of Food Science, 76(9), 157-163.)"

GFSI Definition- Food Fraud Vulnerability

"Susceptibility or exposure to a food fraud risk, which is regarded as a gap or deficiency that could place consumer health at risk if not addressed".

Food Risk Matrix

Source: Adapted from: Spink (2006), The Counterfeit Food and Beverage Threat, Association of Food and Drug Officials (AFDO), Annual Meeting 2006

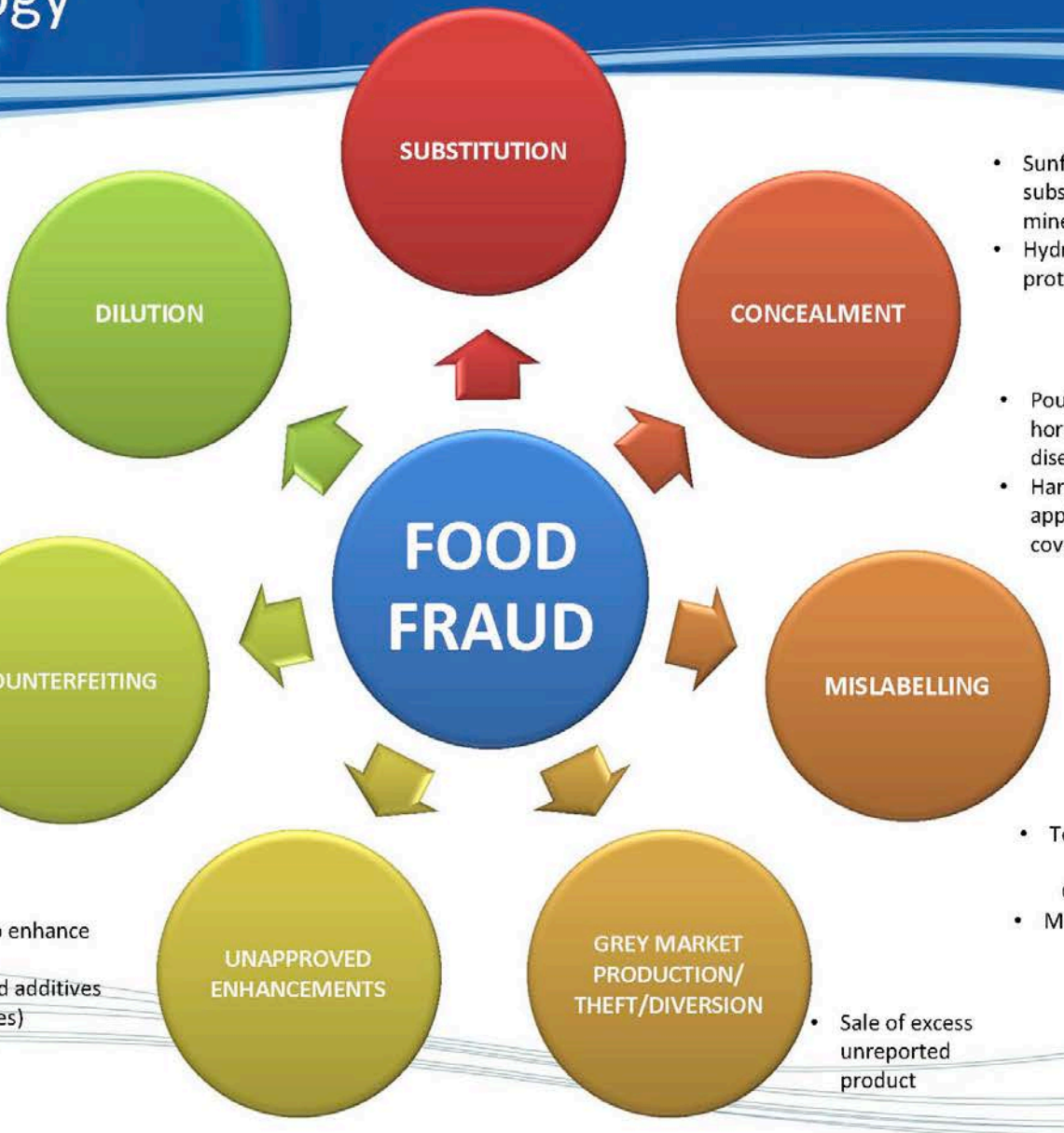
Food Quality	**Food Fraud**	Motivation **Economic gain**
Food Safety	**Food Defense**	Harm **Public Health, Economic or Terror**
Un-intentional	**Intentional**	

Approach to Food Fraud Prevention

Food Safety	Food Defence	Food Fraud
HACCP Hazards	**TACCP** Threats	**VACCP** Vulnerabilities
Prevention of **unintentional / accidental adulteration** • Science based • Food borne illness	Prevention of **intentional adulteration** • Behaviourally or ideologically motivated	Prevention of **intentional adulteration** • Economically motivated

GFSI

Terminology



- Watered down products using non-potable / unsafe water
- Olive oil diluted with potentially toxic tea tree oil

- Sunflower oil partially substituted with mineral oil
- Hydrolyzed leather protein in milk

- Poultry injected with hormones to conceal disease
- Harmful food colouring applied to fresh fruit to cover defects

- Copies of popular foods - not produced with acceptable safety assurances.

- Expiry, provenance (unsafe origin)
- Toxic Japanese star anise labeled as Chinese star anise
- Mislabeled recycled cooking oil

- Melamine added to enhance protein value
- Use of unauthorized additives (Sudan dyes in spices)

- Sale of excess unreported product

GFSI

Types of Threats

- Economically Motivated Adulteration (EMA)
- Malicious Contamination
- Extortion
- Espionage
- Counterfeiting
- Cyber crime

Examples of Economically Motivated Adulteration

- Melamine in milk powder/pet foods
- Lead Chromate in turmeric
- Lead oxide in paprika
- Sudan 1 in chili powder

Examples of Malicious contamination

- In 2005, a major British bakery reported that several customers had found glass fragments and sewing needles inside the wrapper of loaves.
- In 2013, a major soft drinks supplier was forced to withdraw product from a key market when it was sent a bottle which had had its contents replaced with mineral acid. The attackers included a note indicating that more would be distributed to the public if the company did not comply with their demands.

Examples of Extortion

- In 1990, a former police officer was convicted of extortion after contaminating baby food with glass and demanding money from the multi-national manufacturer.
- In 2008, a man was jailed in Britain after being convicted of threatening to bomb a major supermarket and contaminate its products.

Examples of Espionage

- One business consultancy uses the theft of the intellectual property of a fictitious innovative snack product as an example of commercial espionage.
- In July 2014, Reuters reported that a woman was charged in the USA with attempting to steal patented U.S. seed technology as part of a plot to smuggle types of specialized corn for use in China.

Examples of criminal contamination of food products.

Date	Products affected	Type of contamination or contaminant	Impact	Purpose of contamination
1977	Citrus fruits from Israel	Mercury; probably injected by a syringe	Sharp drop in exports from Israel	To damage the Israeli economy
1980s	Beverages and miscellaneous foods in Iraq	Thallium	Several dissidents poisoned	Elimination of political opponents
1989	Chilean grapes imported into the United States	Cyanide	Several countries suspended fruit imports from Chile	To damage the Chilean economy
1996	Various foods from different agri-food groups in Germany	Snake venom (cobras and poisonous snakes)		Extortion of 400M DM in diamonds by a commando

Food Chain

- Crop Producers
- Feed Producers
- Primary Food Producers
- Food Manufacturers
- Secondary Food Manufacturers
- Wholesalers
- Retailers
- Consumers

TACCP

Threat Analysis Critical Control Point

TACCP- Threat Analysis Critical Control Point

TACCP aims to:

- Reduce the likelihood (chance) and consequence (impact) of a deliberate attack;
- Protect organizational reputation;
- Reassure customers and the public that proportionate steps are in place to protect food; and,
- Demonstrate that reasonable precautions are taken and due diligence is exercised in protecting food.

The TACCP Process

It is a 15 step process as indicated below.

1. Assess new information
2. Identify and assess threats to organization
3. Identify and assess threats to operation
4. Select product
5. Identify and assess threats to product
6. Devise flow chart of product supply chain
7. Identify key staff and vulnerability chain
8. Consider impacts of threats identified

The TACCP Process-contd.

9. Identify which supply points are more critical
10. Determine if control procedures would detect the threat
11. Likelihood Vs Impact = Priority
12. Identify who could carry out
13. Decide and implement necessary controls
14. Review and revise
15. Monitor horizon scans and emerging risks.

Assessment of Threats- Risk Assessment Scoring

Likelihood	Score	Impact
Very high chance	5	Catastrophic
High chance	4	Major
Some chance	3	Significant
May happen	2	Some
Unlikely to happen Ref: PAS 96:2014	1	Minor

The TACCP Process-Guidance

1. **Physical protection of access measures**

Purpose: To prevent Break-ins in buildings, facilities and storage sites.

- Perimeter physical protection
- Physical protection of access to buildings, facilities and storage sites
- Intrusion prevention and detection in facilities
- Access to stocks

The TACCP Process-Guidance- contd.

2. Control of traffic flows

Purpose: To rapidly detect any suspect behavior inside a site.

- **Vehicular flow**
- **Flow of persons**
- **Flow of goods**

The TACCP Process-Guidance- contd.

3. Personnel-related security within the establishment

Purpose: To prevent intrusion by ill-intentioned persons

- Recruitment of internal salaried personnel and staff
- Induction of new employees
- Spotting unusual behavior
- Training staff in security measures and spotting unusual events

The TACCP Process-Guidance- contd.

4. Inventory management

5. Processes

6. Computer security

Methods of Threat Assessment

1. Conduct a risk analysis. Evaluate any significant risks and exposures.

2. Determine the critical points for controlling the security.

3. Determine procedures and technical means of verifying each critical point to control security.

4. Determine the corrective measures to be implemented when the surveillance reveals that a critical point for security control is no longer under control.

5.Apply verification procedures in order to confirm that the system is functioning effectively.

6. Build up a file which includes all procedures and reports concerning these provisions and their implementation.

VACCP

Vulnerability Analysis Critical Control Point

VA and Economically Motivated Adulteration (EMA)

Questions which the VACCP team could ask include:

- 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?

VA and Economically Motivated Adulteration (EMA)-contd.

- 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?
- Are we aware of shortcuts to the process which could affect us?
- Are accreditation records, certificates of conformance and analyzes reports independent

Methods of Vulnerability Assessment

1. Conduct a risk analysis. Evaluate any significant risks and exposures.

2. Determine the critical points for controlling the fraud.

3. Determine procedures and technical means of verifying each critical point to control security.

4. Determine the corrective measures to be implemented when the surveillance reveals that a critical point for fraud control is no longer under control.

5.Apply verification procedures in order to confirm that the system is functioning effectively.

6. Build up a file which includes all procedures and reports concerning these provisions and their implementation.

FSMA & Food Fraud

1. Limited to hazards that are related to economically motivated adulteration;

2. Includes only those hazards that can cause illness or injury;

3. Apply the appropriate preventive control (supply-chain)

GFSI Requirements- Food Fraud

- Document a Food Fraud Vulnerability Assessment (Y/N)
- Implement the documented Food Fraud Prevention Strategy (Y/N)
- Conduct an annual Food Fraud Incident Review (Y/N)
- Confirm these meet the “GFSI scope” of all types of Food Fraud (Y/N)
- Confirm these meet the “GFSI scope” of all products from both incoming goods (e.g., ingredients) and outgoing goods (e.g., finished goods) through to the consumer.” (Y/N)

Statistics on Food Fraud

- Over 2000 reported cases (USP Food Fraud Database)
- Level of Fraud (10%)
- Cost to global food industry (est. 30-40 B)

Q &A

Questions?