



Food Fraud in the current geopolitical Situation: Risks and How to Avoid Them

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1

First...

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2



3



4



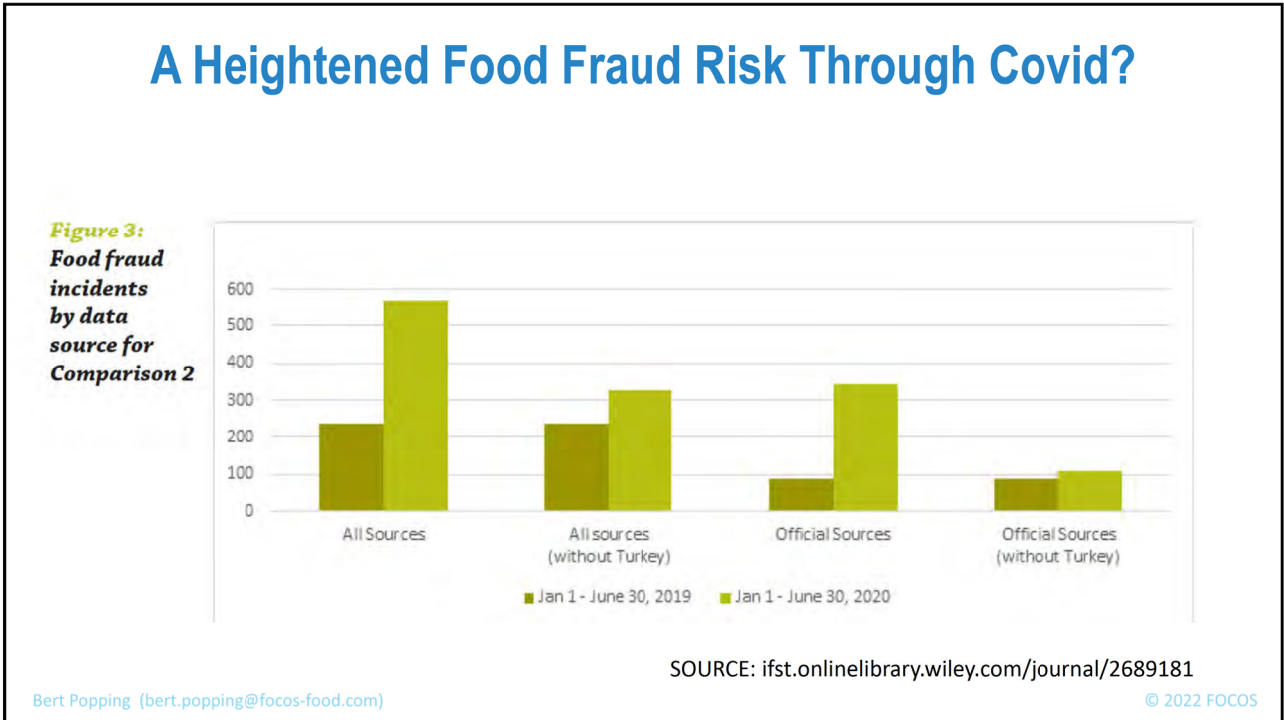
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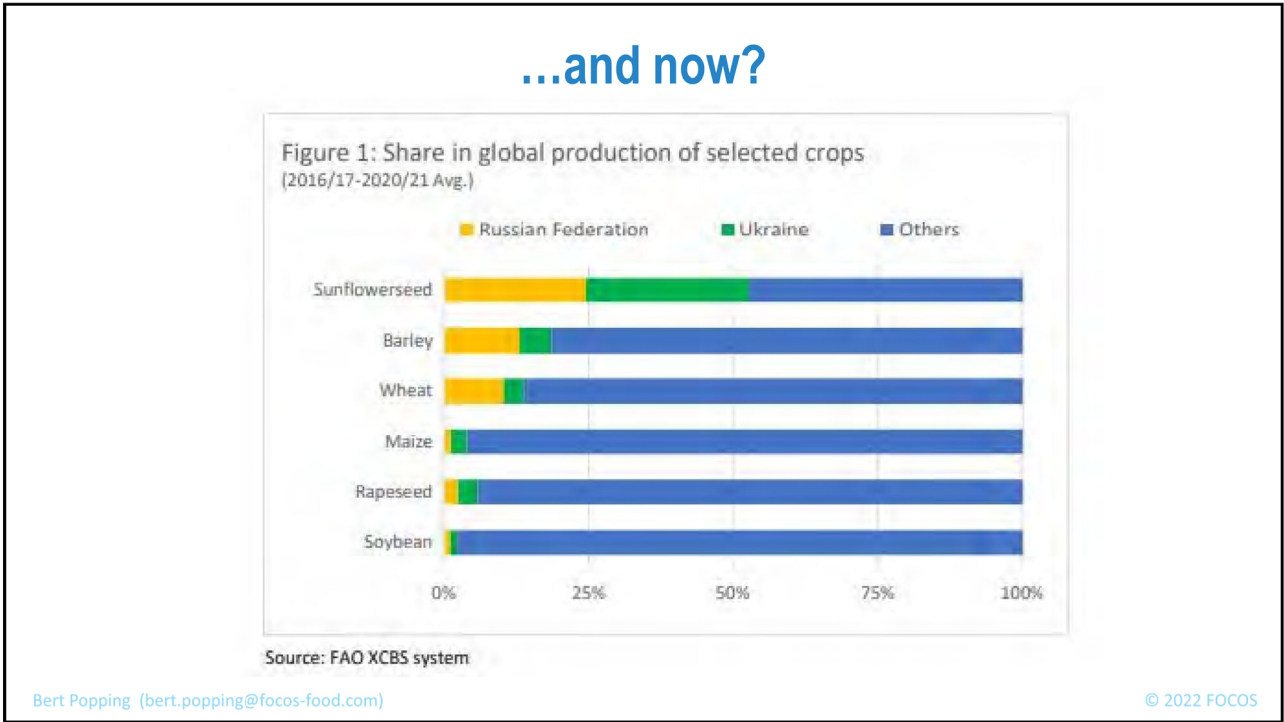
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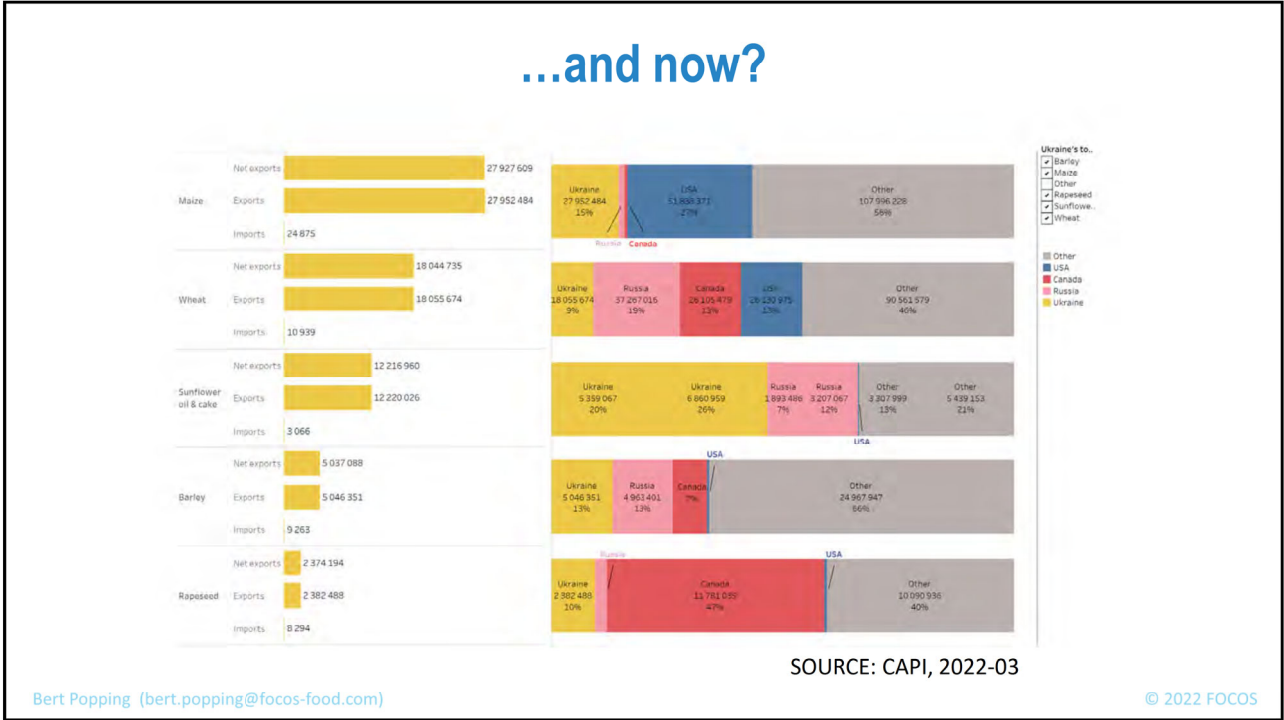
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...and now?

Food fraud and the Ukraine war

By Alison Johnson
28-Mar-2022 - Last updated on 28-Mar-2022 at 09:01 GMT

POST A COMMENT

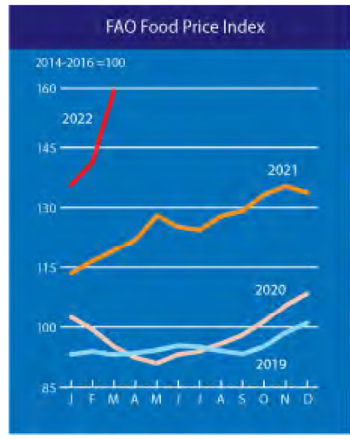
Johnson: 'Ukraine accounts for 17% of the globally exported corn'

SOURCE: <https://www.foodmanufacture.co.uk/>

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...and now?

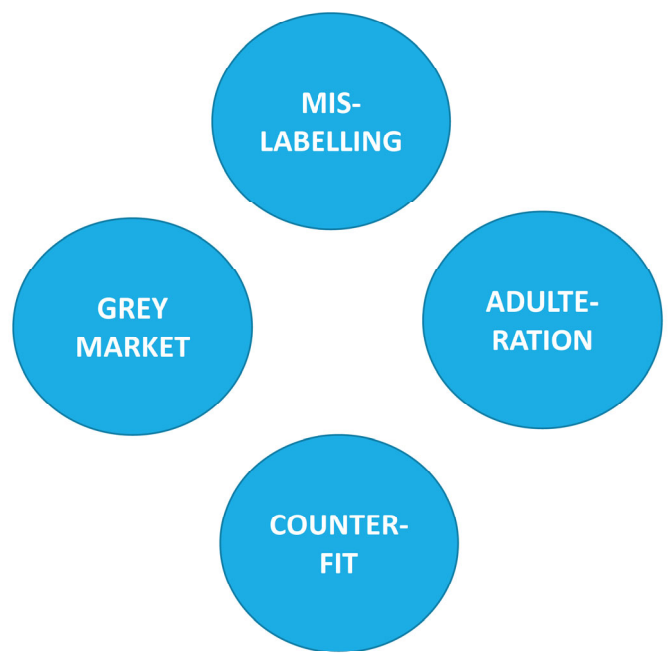


SOURCE: <https://fao.org/>

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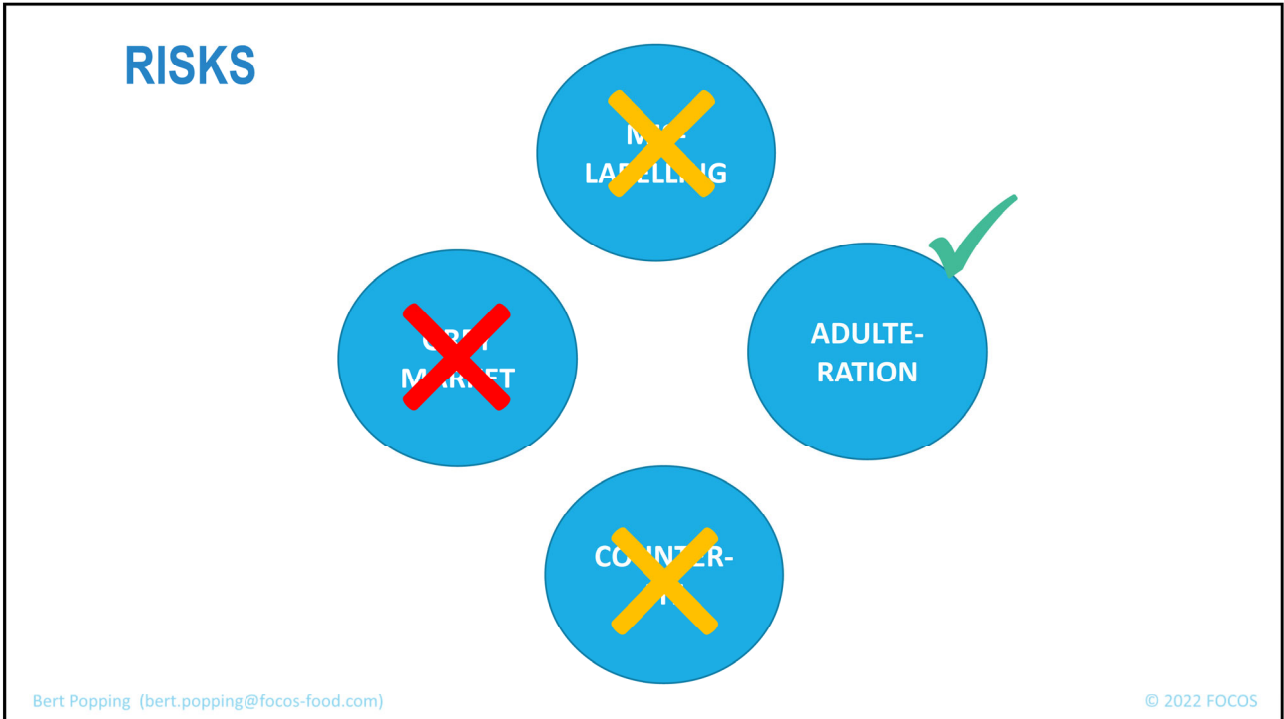
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RISKS

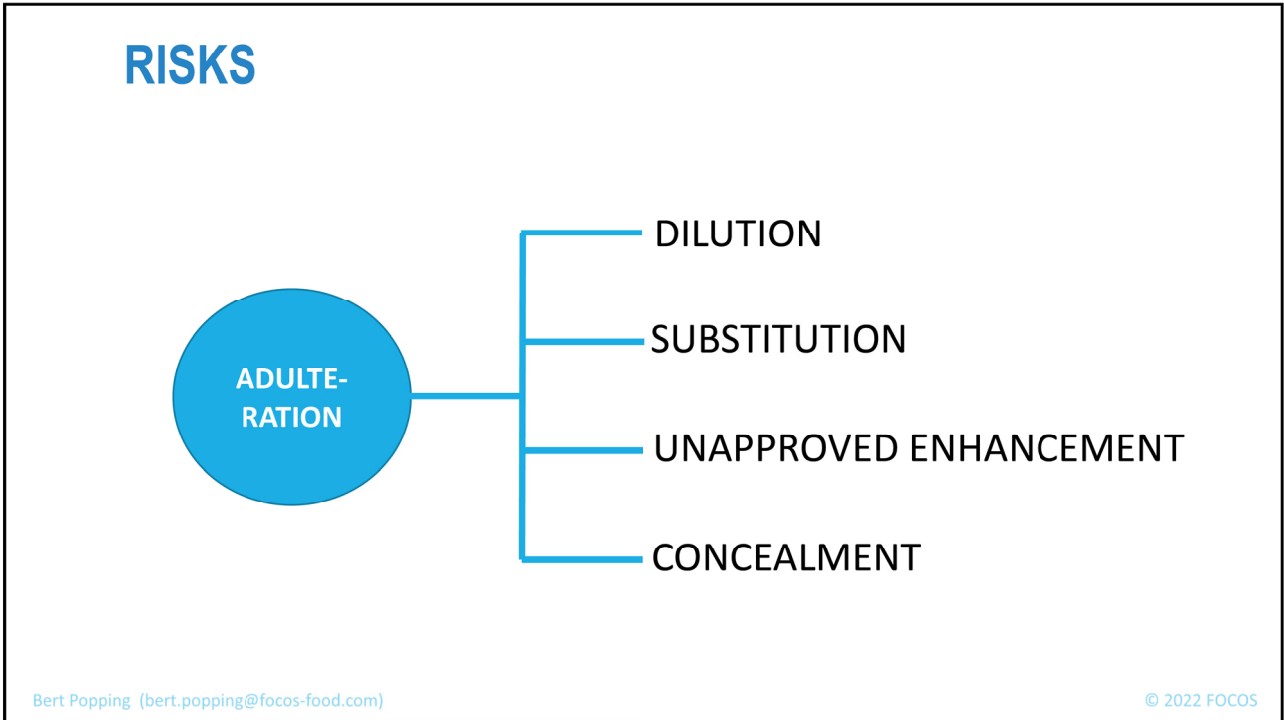


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15



16

Two Types of Risks

1) DIRECT

- Due to agricultural production losses in Ukraine
- Due to agricultural export bans from Russia

2) INDIRECT

- Due to the increasing cost of fuel & production
- Due to increasing fertilizer prices

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Direct Risks: Wheat

What we might see:

- Lower quality wheat with added high protein flour (e.g. legumes)
- Risks:
 - Myotoxins high
 - Undeclared allergens from legumes

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Direct Risks: Sunflower Oils

What we might see:

Mixes of sunflower oils with other (low quality) oils

Risks:

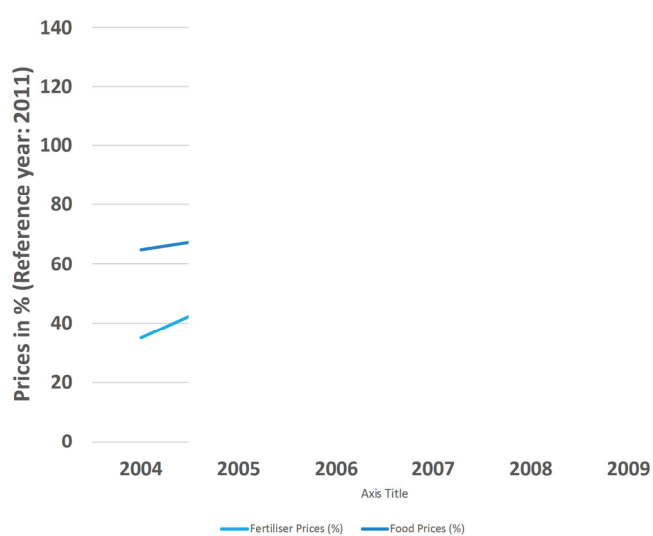
- Contaminated oils

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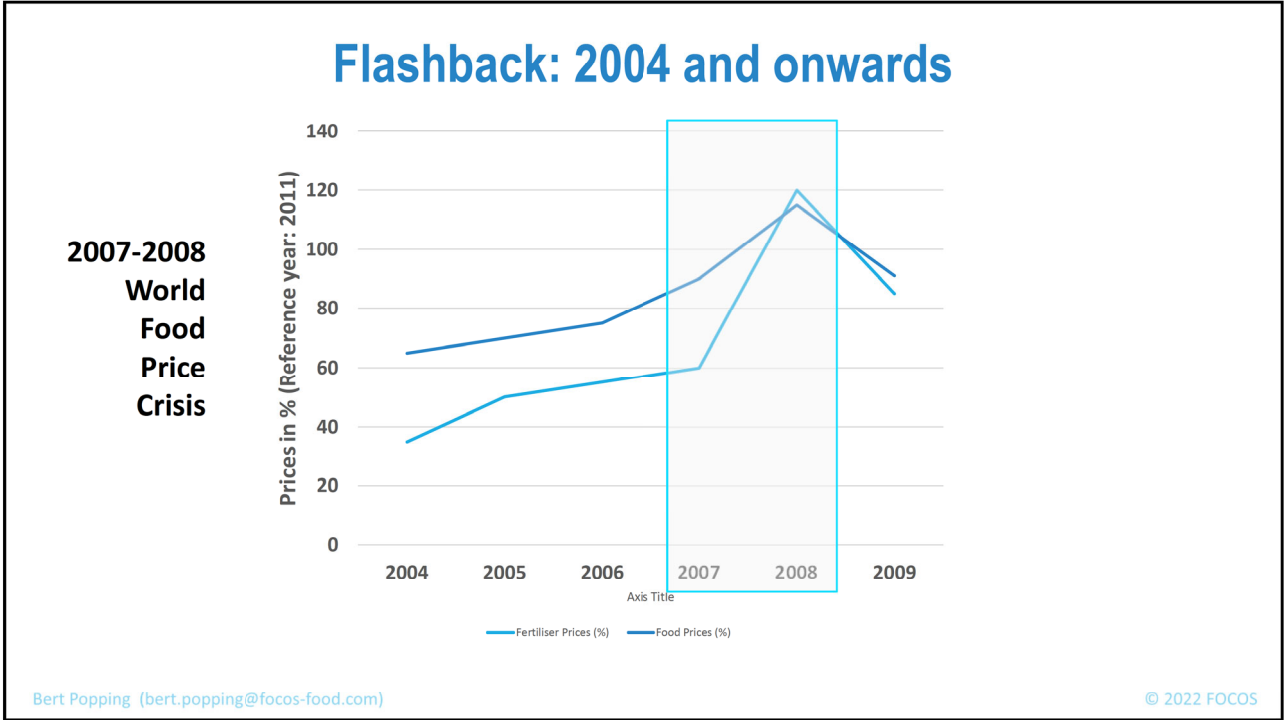
Flashback: 2007 and onwards



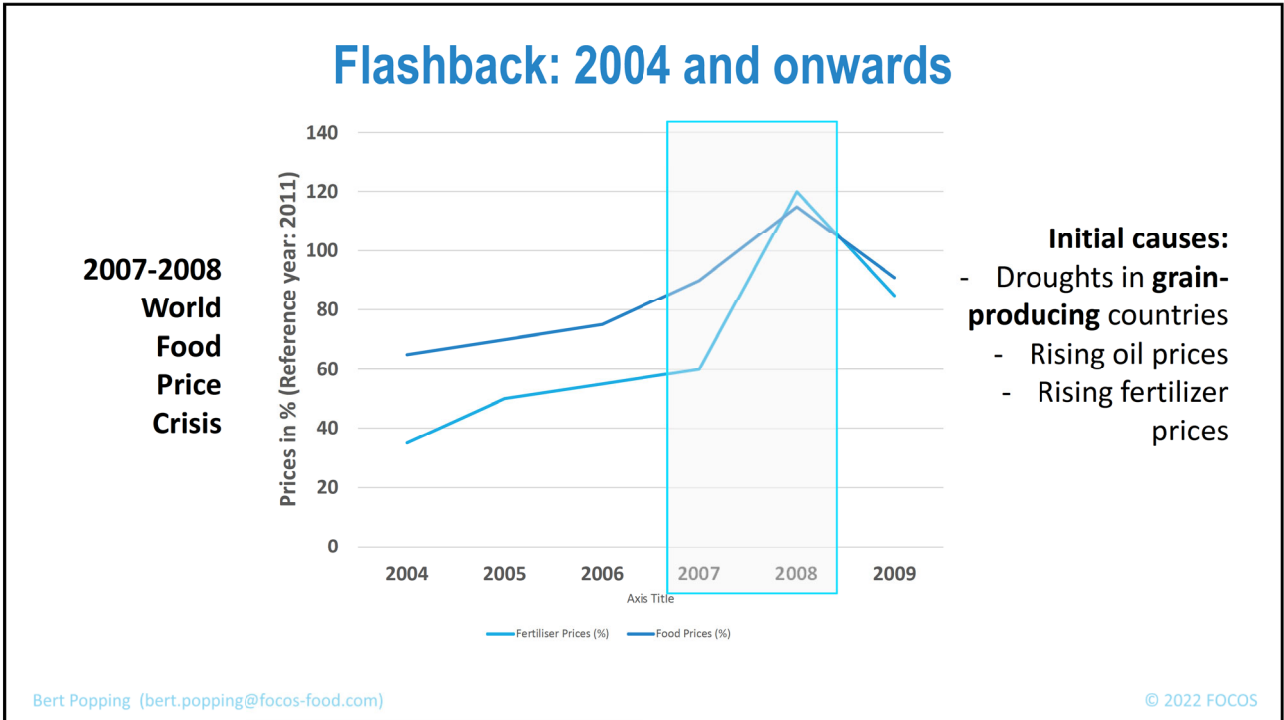
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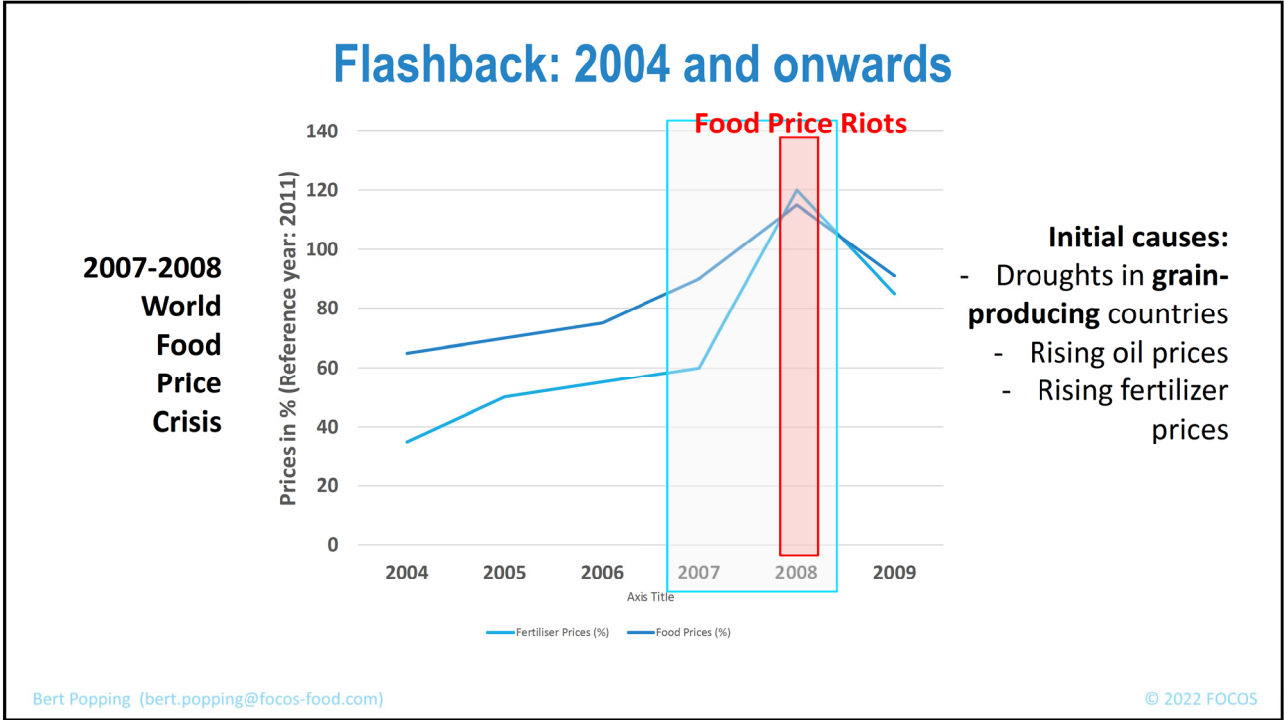
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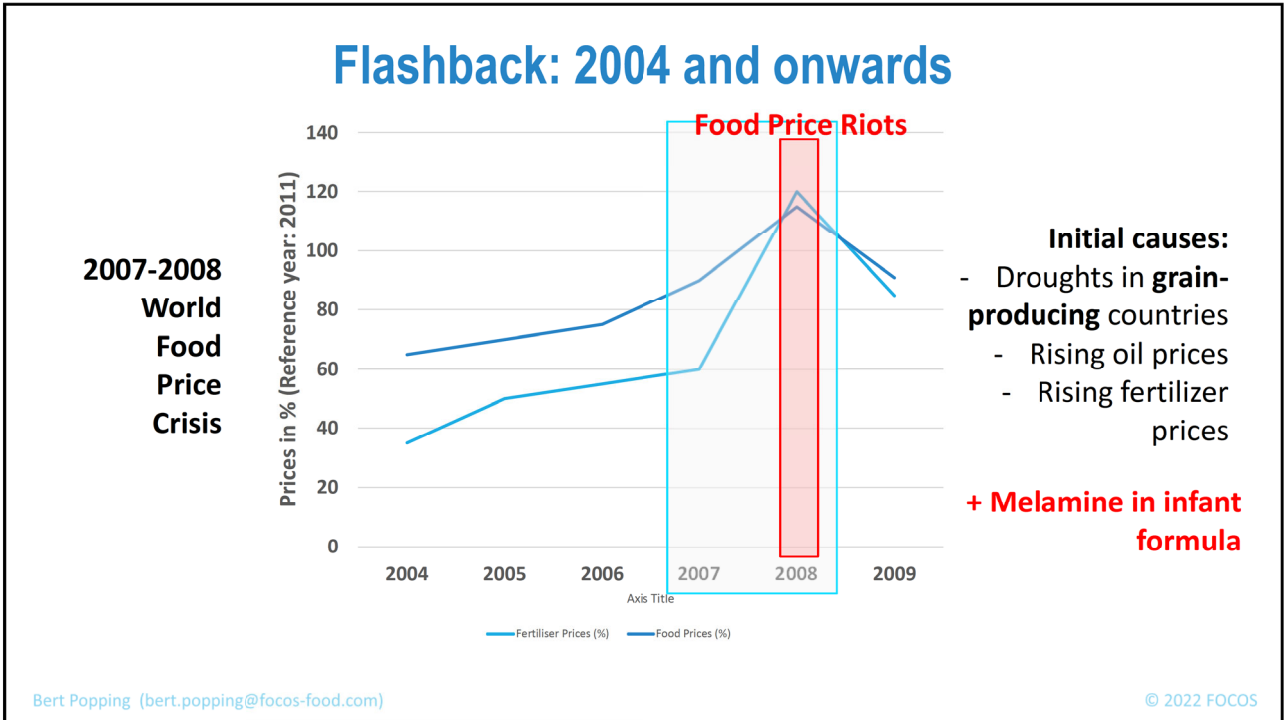
21



22



23



24

Fast Forward 2022

2007 – 2008

- High fertilizer prices
- Grain shortages
- High oil prices
- Melamine incident
- Food riots

2022

- High fertilizer prices
 - Grain shortages
 - High oil prices
 -
 -
- } **A recipe for disaster?**

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Risk Mitigation for Food Manufacturer

- Vulnerability Assessment / Management
- Testing

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Vulnerability Assessment

- Revisit your vulnerability assessment in light of the changing market and price situation
- Use Pre-Screening tools (e.g. USP tool)

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Link to publication (open access):

<https://www.iftevent.org/ift/home/news-and-publications/food-technology-magazine/issues/2020/november/features/prescreening-ingredients-for-a-food-fraud-vulnerability-assessment>

Vulnerability Assessment

Figure 1. Conducting a Prescreen



USP Pre-Screening Tool

SOURCE:
<https://www.iftevent.org/ift/home/news-and-publications/food-technology-magazine/issues/2020/november/features/prescreening-ingredients-for-a-food-fraud-vulnerability-assessment>

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Vulnerability Assessment

Table 2. Prescreening Questions

Question	Rationale	Potential Vulnerability		
		LOW	MEDIUM	HIGH
1a) Is the ingredient purchased and/or delivered whole?	An ingredient delivered in a processed, liquid, or powdered form is easier to adulterate than one that is intact (e.g., whole fish vs. fish filets; fruit vs. fruit juice).	Whole/Raw	Partially or minimally processed	Powdered, Ground, Milled, Granulated, Liquid
1b) Does the ingredient have properties that distinguish its quality or perceived value, such as different grades, nutrient content, or another property that distinguishes its quality?	Premium/high value products (e.g., extra virgin olive oil), adulterated with lower quality versions that are not obvious to the user (e.g., adulterated honey or grape seed oil) are at greater risk of food fraud.	No	Yes, but with small grade differences	Yes
1c) Are low-cost, non-food grade substitutes available?	The availability of low-cost substitutes increases vulnerability.	No	Yes, but with small grade differences	Yes
1d) Has the ingredient, or similar ingredients, been the subject of economic adulteration or other types of fraud?	The history of fraud in various food commodities, such as the adulteration of olive oil, is a key indicator of vulnerability. Consider similar or related ingredients to assess the adulteration potential. Adulteration may be more likely in low-value ingredients, but examples there may be of high value products (e.g., adulterated honey) that have been detected in other types of products.	No	Yes, but with small grade differences	Yes
1e) Is the ingredient used in many products or products that are important to the company?	Ingredients used in many products or products that are critical to the company are more vulnerable to adulteration because of their widespread use.	No	Yes, but with small grade differences	Yes
1f) Is the ingredient used in products marketed to vulnerable populations (e.g., children)?	Products marketed to vulnerable populations are at greater risk of food fraud.	No	Yes, but with small grade differences	Yes
2a) Is the ingredient sourced from, or has it transited through, a country or region known to be at higher risk for food fraud?	Ingredients sourced from countries or regions with a history of food fraud are at greater risk of food fraud.	Geographical origin of low concern	Geographical origin of moderate concern	Geographical origin of high concern
2b) How many steps are involved in the supply chain, from raw material production to your facility (including transiting, storage, and processing)?	Complex supply chains are at greater risk of food fraud.	A single step	A few steps	Many or an unknown number of steps
2c) How well established is your relationship with each supplier of the ingredient?	A supplier with no known track record or a long-term relationship may be at greater risk of food fraud.	Long-term relationship with no identified problems; regular audits	Intermediate or short-term relationship; no identified problems; regular audits	New supplier; no relationship; no audits; no identified problems

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29

Table 2. Prescreening Questions

Question	Rationale	Potential Vulnerability		
		LOW	MEDIUM	HIGH
1a) Is the ingredient purchased and/or delivered whole?	An ingredient delivered in a processed, liquid, or powdered form is easier to adulterate than one that is intact (e.g., whole fish vs. fish filets; fruit vs. fruit juice).	Whole/Raw	Partially or minimally processed	Powdered, Ground, Milled, Granulated, Liquid
1b) Does the ingredient have properties that distinguish its quality or perceived value, such as different grades, nutrient content, or another property that distinguishes its quality?	Premium/high value products (e.g., extra virgin olive oil) and products with market characteristics that are not obvious to the user or consumer (e.g., organic) are at greater risk of food fraud.	No	Yes	Yes

USP Pre-Screening Tool

SOURCE: <https://www.iftevent.org/ift/home/news-and-publications/food-technology-magazine/issues/2020/november/features/prescreening-ingredients-for-a-food-fraud-vulnerability-assessment>

Vulnerability Assessment

Table 3. Prescreen Example

Question	Potential Vulnerability		
	Ingredient A	Ingredient B	Ingredient C
1a) Is the ingredient purchased and/or delivered whole?	High	High	High
1b) Does the ingredient have properties that distinguish its quality or perceived value such as different grades, nutrient content, or another property that distinguishes its quality?	Low	Low	Low
1c) Are low-cost, non-food grade substitutes available?	Low	Medium	Medium
1d) Has the ingredient, or similar ingredients, been the subject of economic adulteration or other types of fraud?	High	High	Low
1e) Is the ingredient used in many products or in products that are important to the company?	High	Low	Low
1f) Is the ingredient used in products marketed to vulnerable populations (e.g., children)?	Low	Low	Low
2a) Is the ingredient sourced from, or has it transited through, a country or region known to be at higher risk for food fraud?	High	High	Low
2b) How many steps are involved in the supply chain, from raw material production to your facility (including transiting, storage, and processing)?	High	Low	High
2c) How well established is your relationship with each supplier of the ingredient?	Medium	Low	Low

USP Pre-Screening Tool

SOURCE: <https://www.iftevent.org/ift/home/news-and-publications/food-technology-magazine/issues/2020/november/features/prescreening-ingredients-for-a-food-fraud-vulnerability-assessment>

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30

Vulnerability Assessment

Figure 1. Conducting a Prescreen



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31

Vulnerability Assessment

- Revisit your vulnerability assessment in light of the changed market and price situation
- Use Pre-Screening tools (e.g. USP tool)
- Deep-dive in top risk ingredients identified by Pre-Screening tool
- Monitor changes / issues (e.g. via DigiComply)

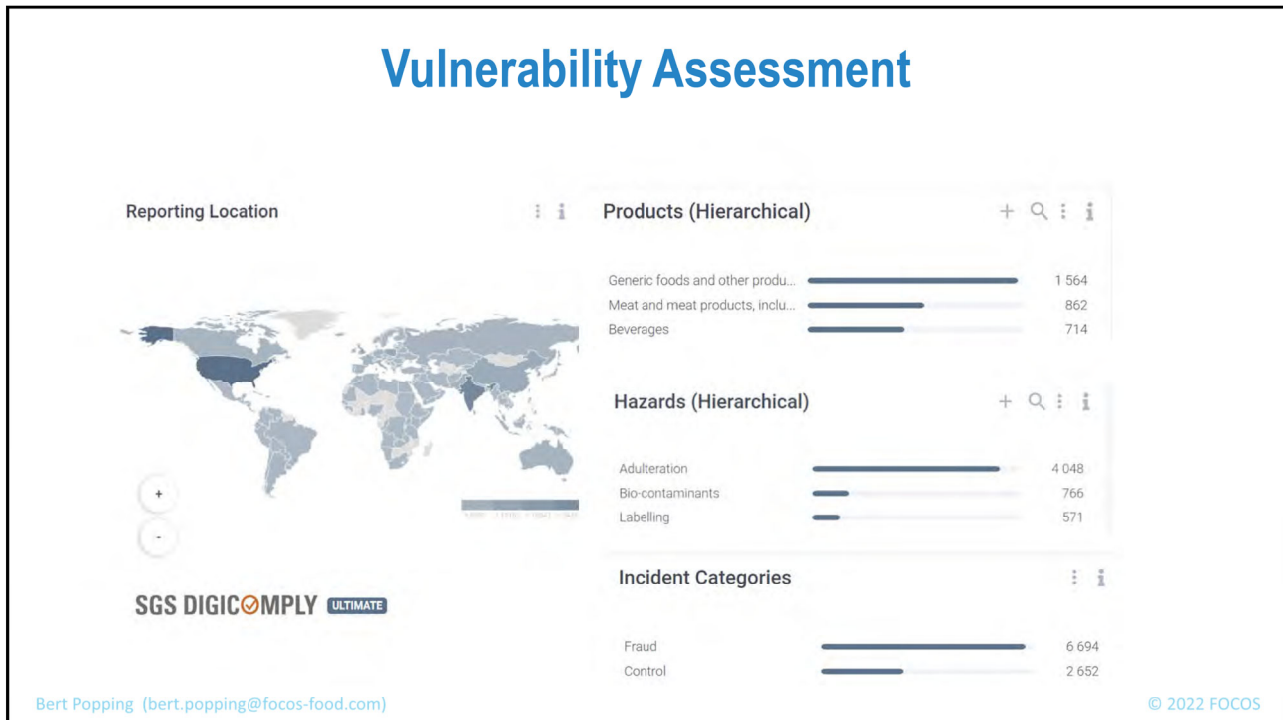
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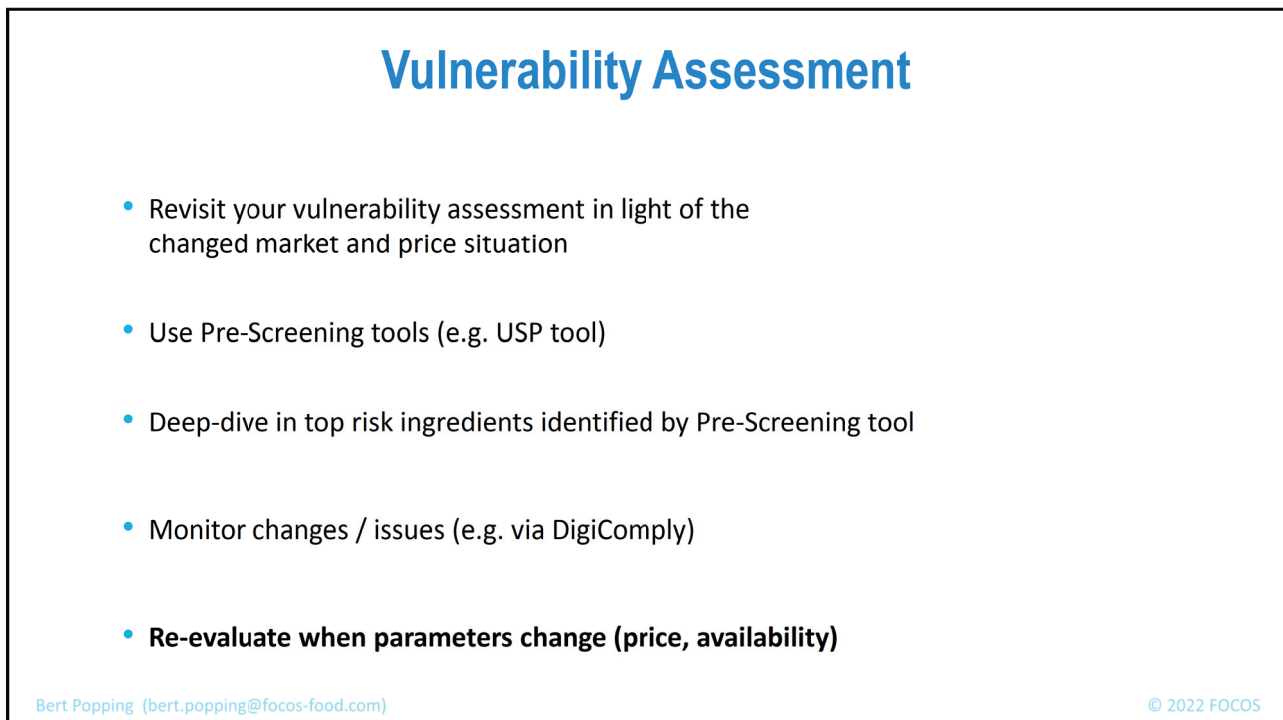
32

Link to DigiComply:

<https://www.digicomply.com/>



33



34

Risk Mitigation: Improving Sampling

35

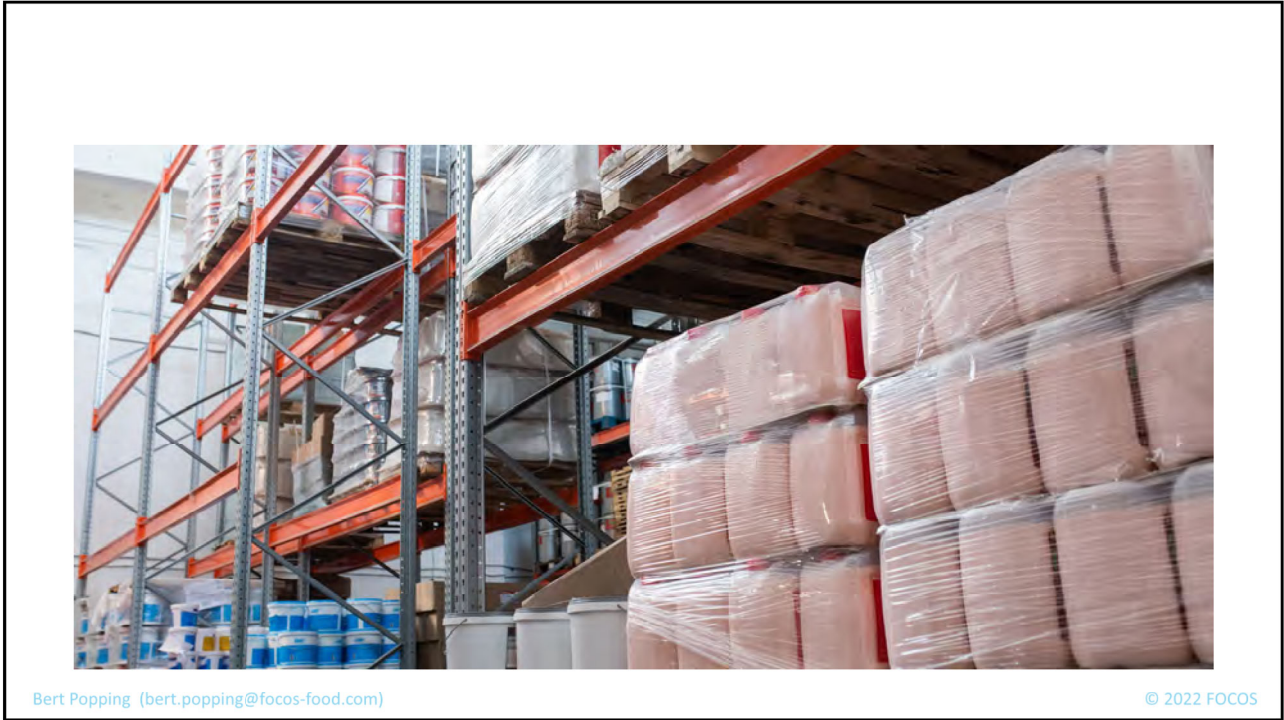
Random Sampling vs Risk-based Sampling

- Random Sampling vs Risk-Based Sampling
- Laboratory Analysis vs PreScreening

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36



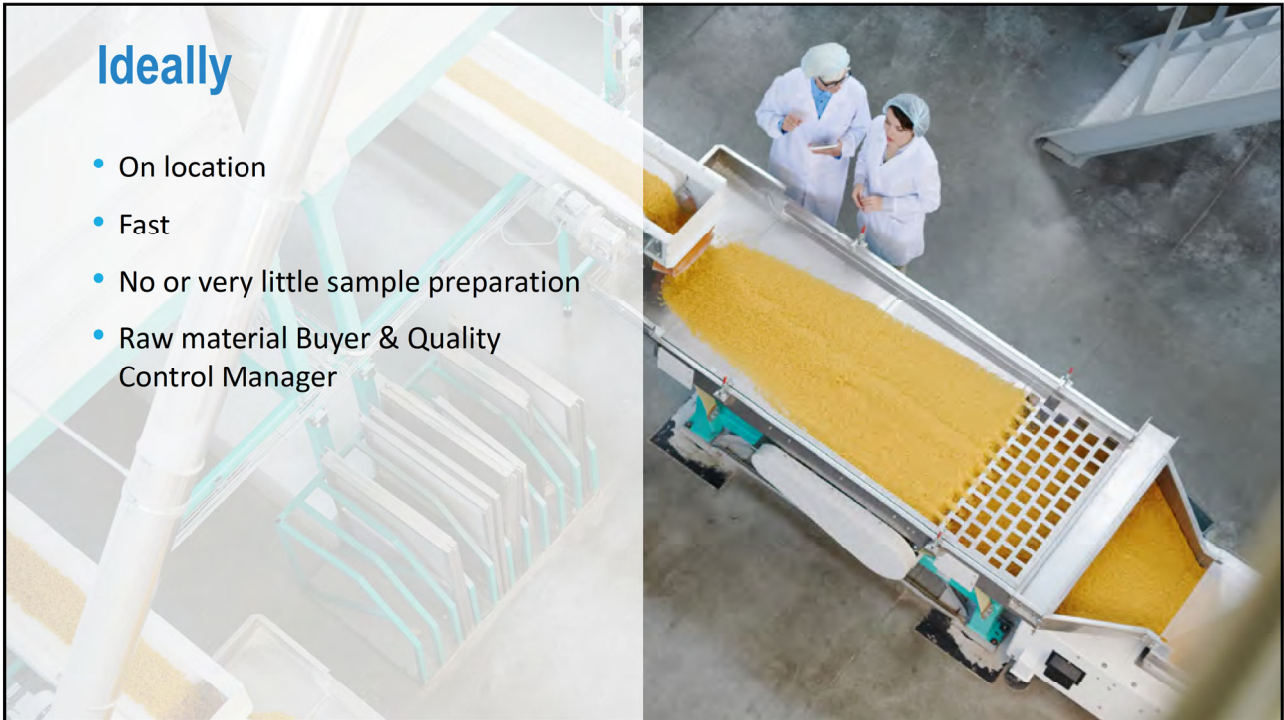
37



38



39



40

GOAL
SMART SAMPLING



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41

Link to publications (open access):
<https://bit.ly/Poznan22>

**J. AOAC Special Section on Portable
Food Safety Testing Devices**

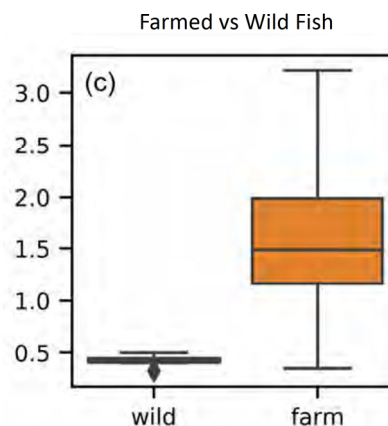
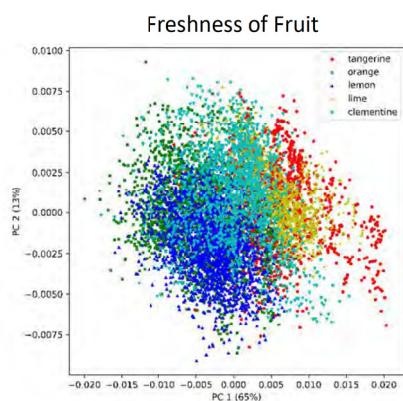


42

Detection of Freshness of Citrus Fruits and Fish Authenticity



- Testing Methodology: NIR



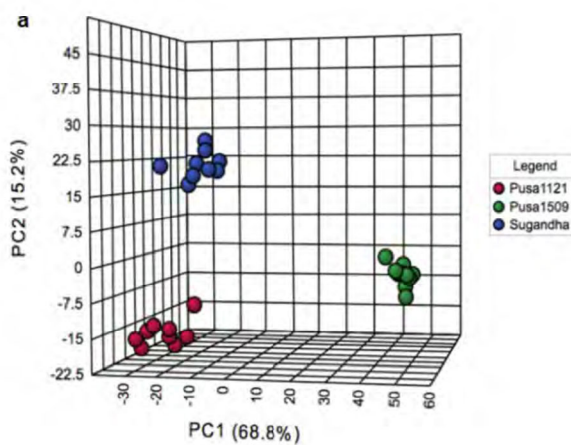
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Source: Special Guest Edited Section J. AOAC International, 2020

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Rice Authenticity using NIR



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Source: Special Guest Edited Section J. AOAC International, 2020

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Authenticity of Olive Oil using Multi-Sensor Approach



Sample	Combination (Decision tree)	Only FLUO	Only NIR	Only VIS
EVOO	75%	70%	89%	75%
Olive oils composed of refined olive oils and virgin olive oils	100%	100%	37%	99%
Olive-pomace oils	100%	100%	50%	100%
Other edible oils	100%	100%	67%	100%
Adulterated EVOOs with non-EVOO olive oils (10, 25, 50 % (v/v))	97%	97%	31%	83%
Adulterated EVOOs with other edible oils (10, 25, 50 % (v/v))	91%	89%	52%	56%

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Source: Special Guest Edited Section J. AOAC International, 2020

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46



47