



## Times of Trouble – Times of Fraud

Dr. Bert Popping  
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May 24, 2022

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First...

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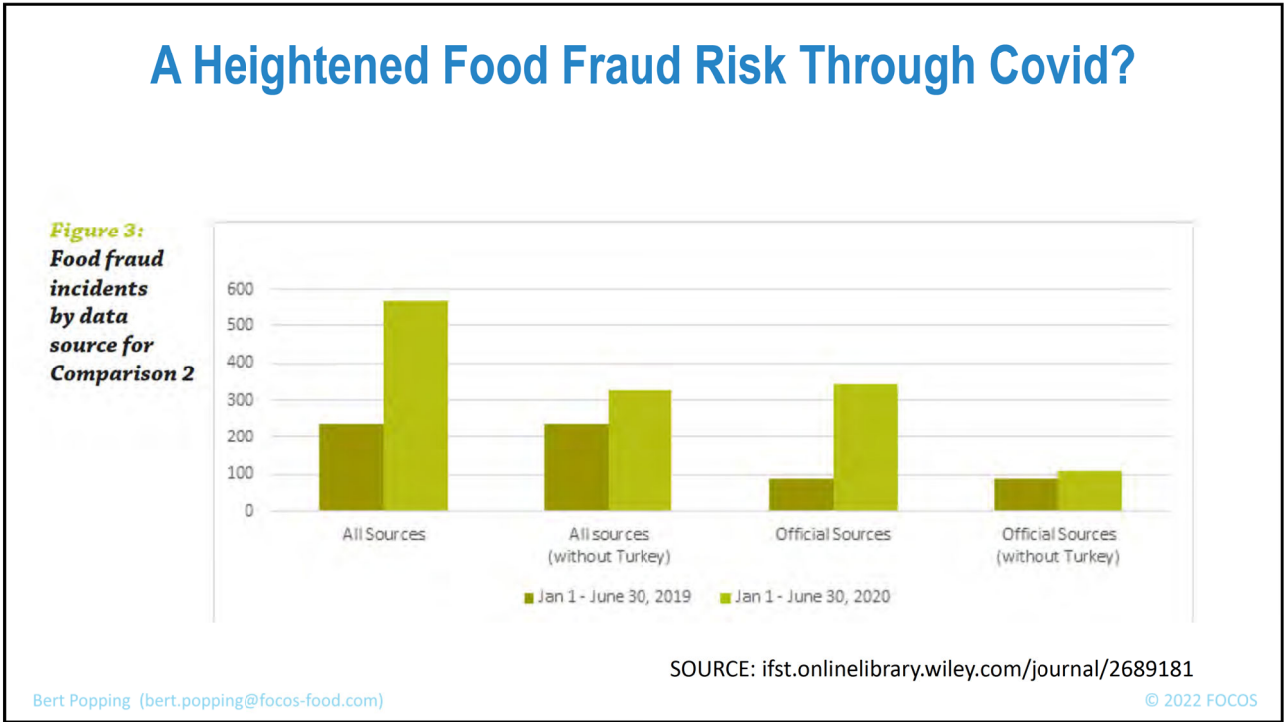
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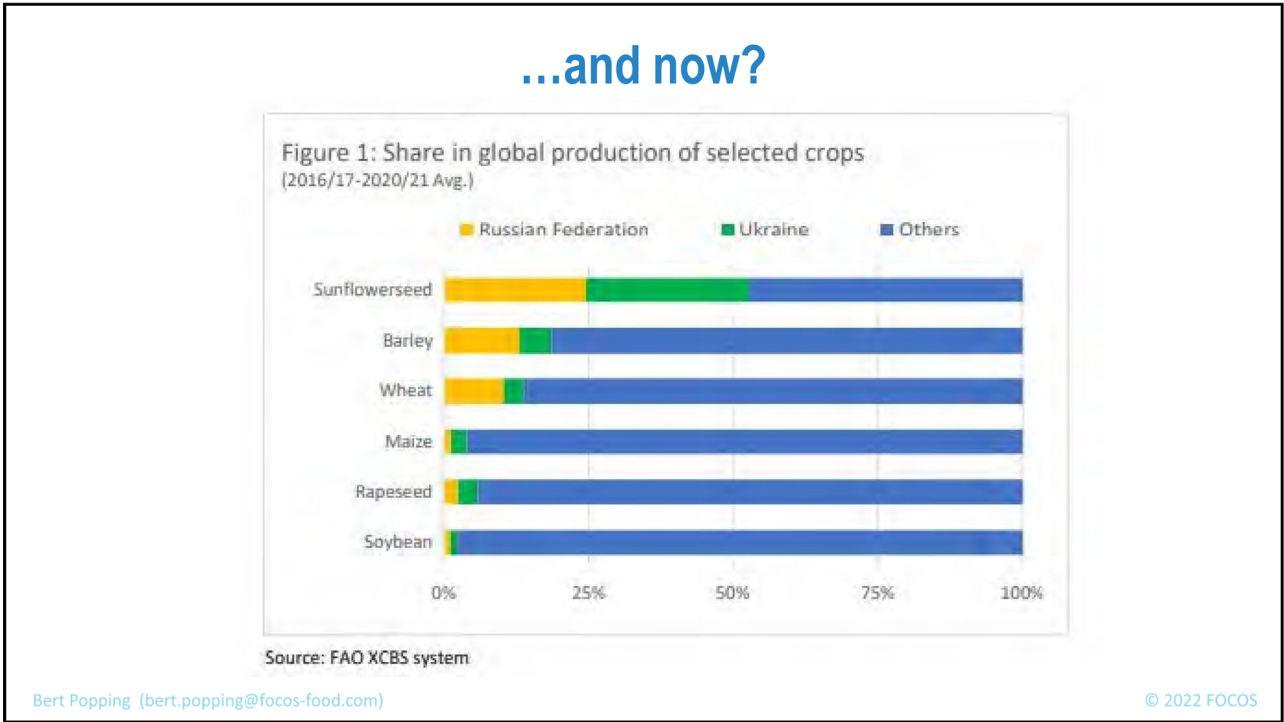


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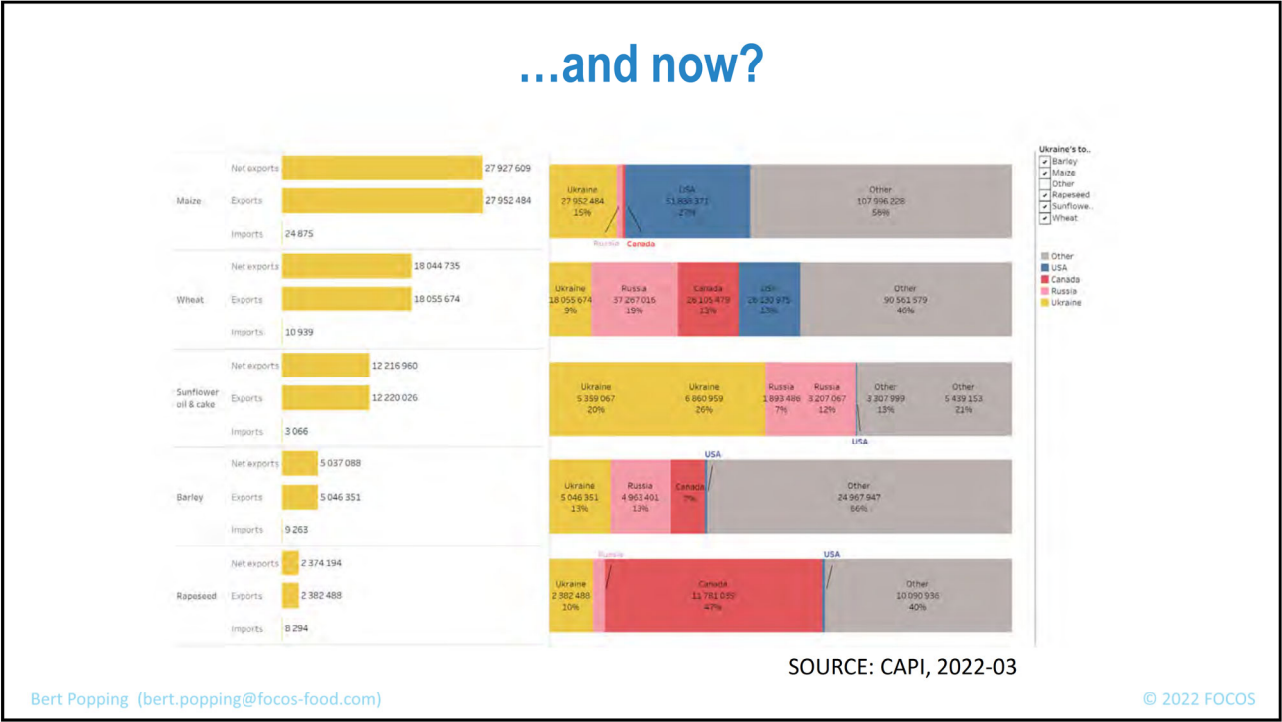




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Ukraine

5 046 351

13%

Russia

4 901 401

13%

Canada

7%

7%

USA

24 907 947

66%

Other

24 907 947

66%

Ukraine

2 382 488

10%

Russia

11 781 659

47%

Canada

11 781 659

47%

USA

10 090 936

40%

Other

10 090 936

40%

Ukraine's to...

☒ Barley

☒ Maize

☒ Other

☒ Rapeseed

☒ Sunflower...

☒ Wheat

Other

USA

Canada

Russia

Ukraine

SOURCE: CAPI, 2022-03

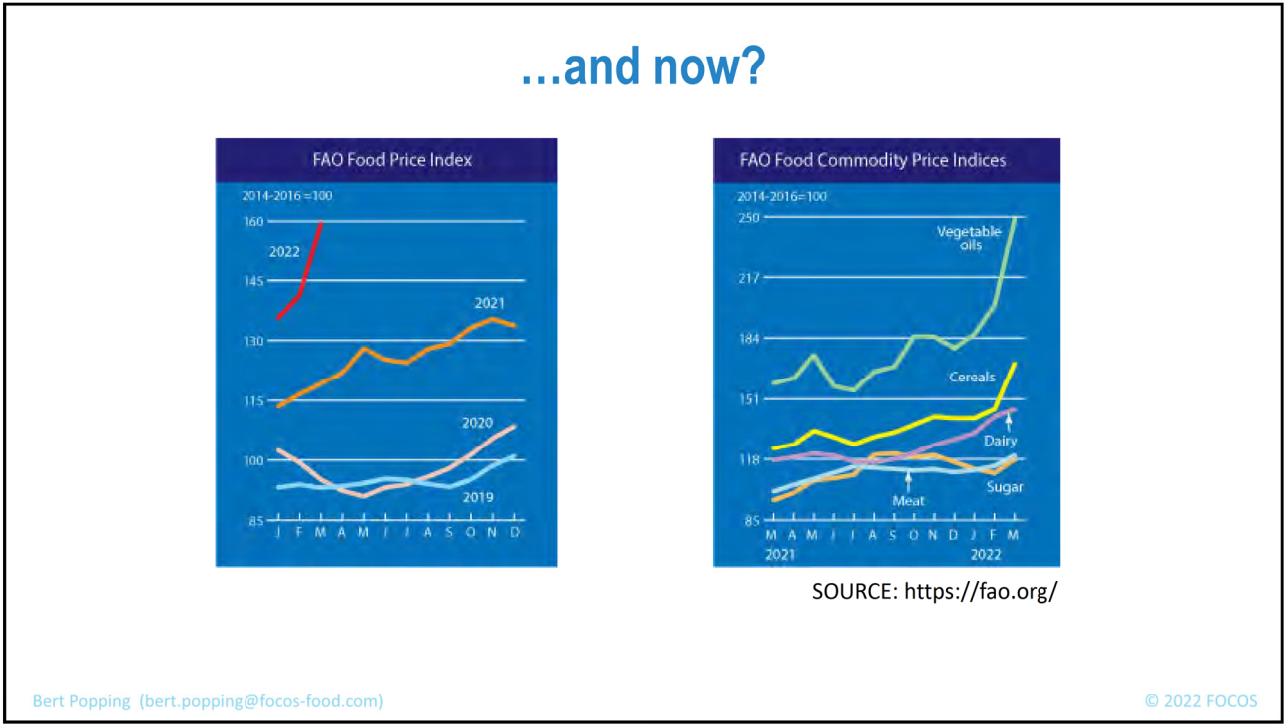
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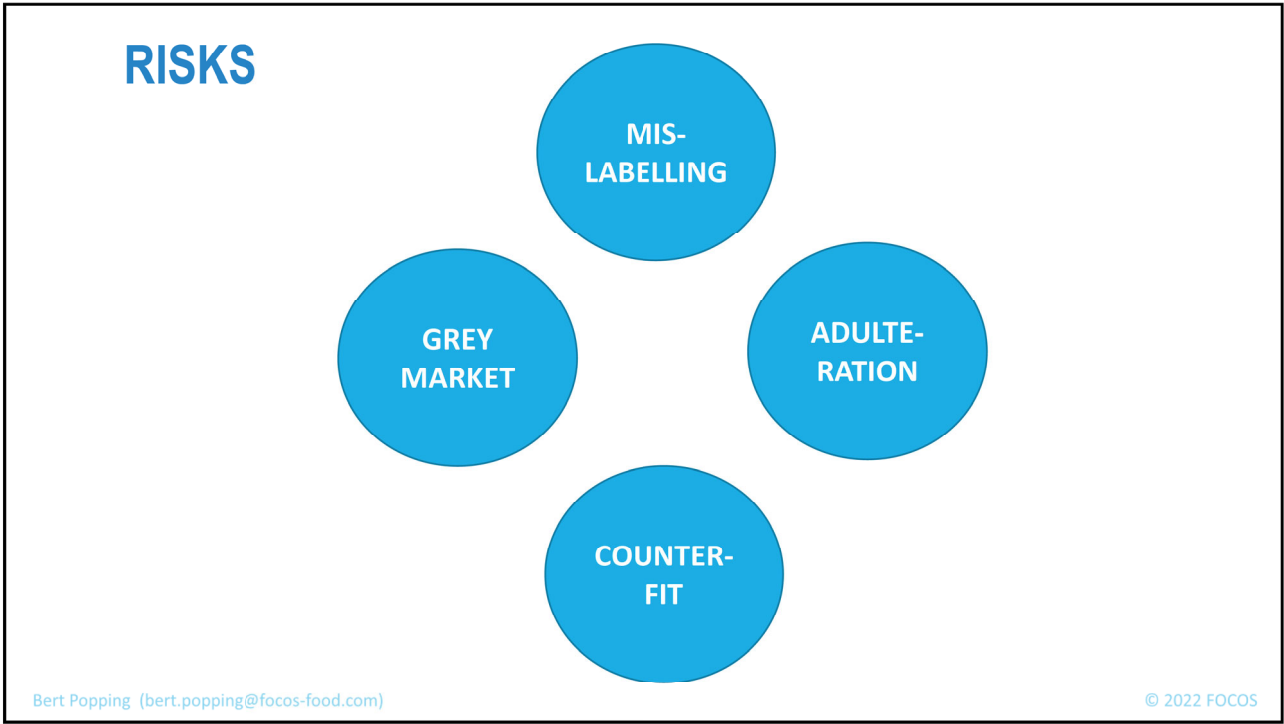
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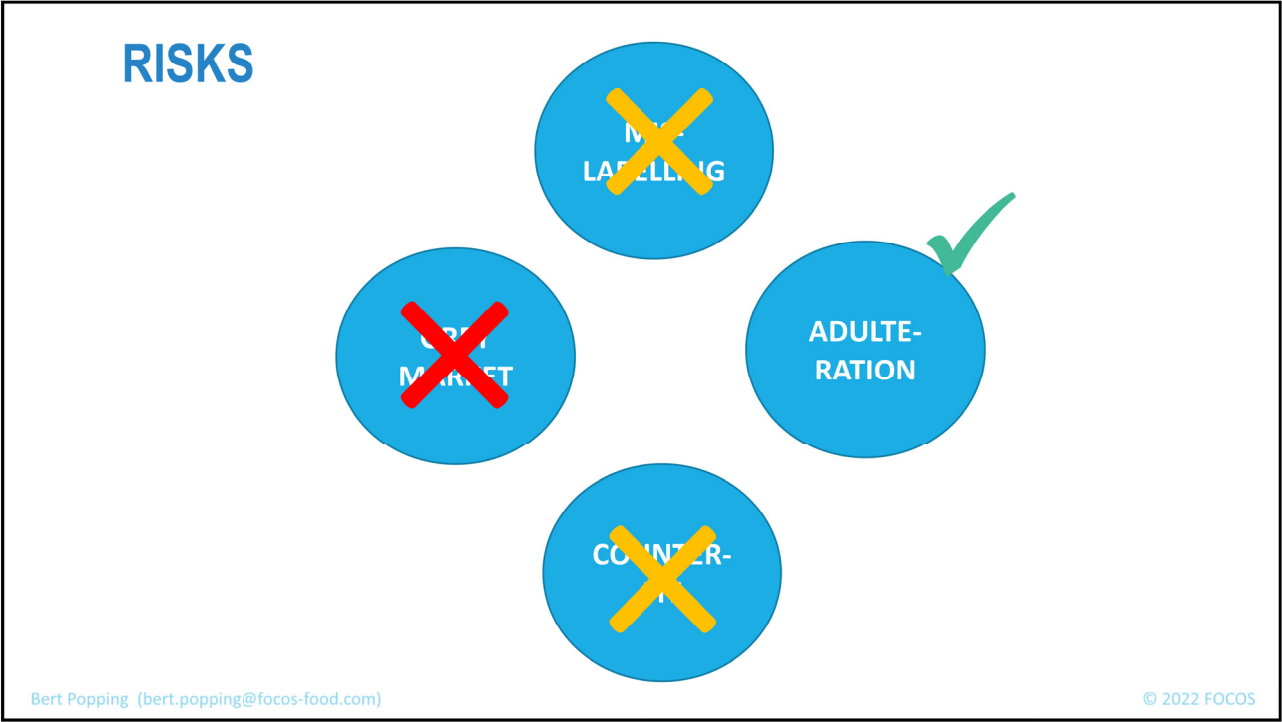


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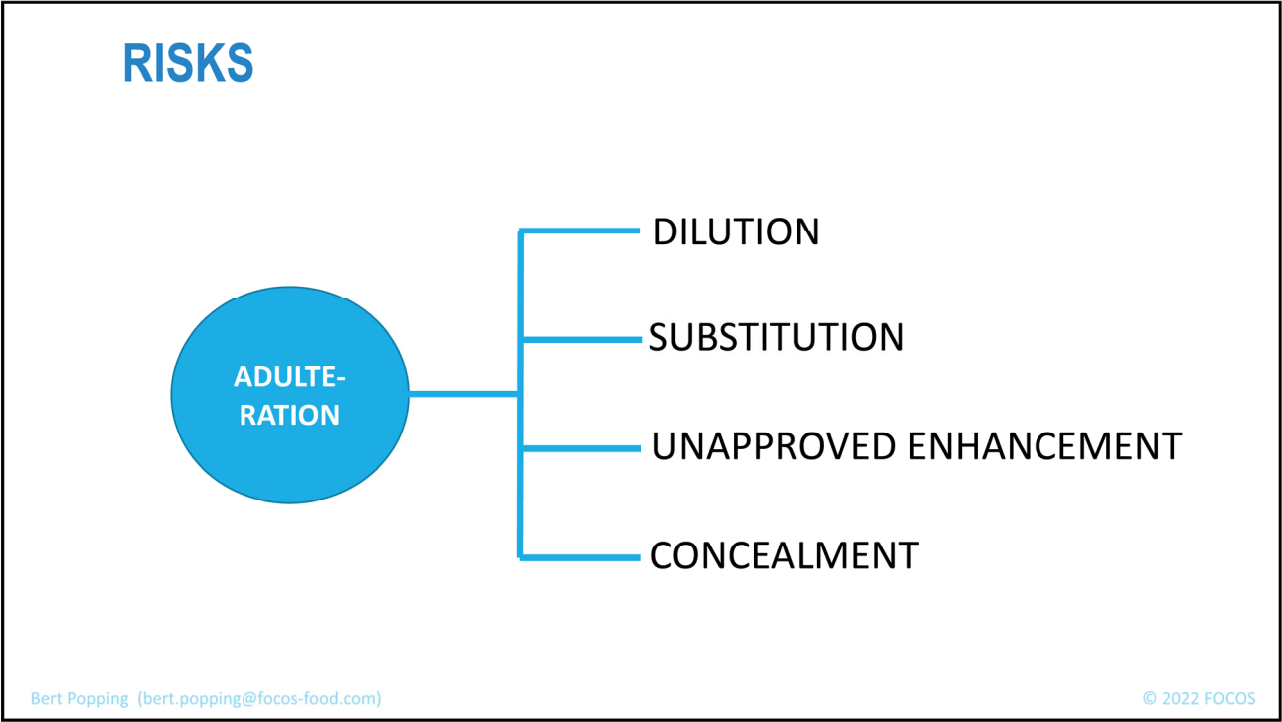


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## Two Types of Risks

### 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:
  - Mycotoxins 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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## Fast Forward 2022

<p><b>2007 – 2008</b></p> <ul style="list-style-type: none"><li>○ High fertilizer prices</li><li>○ Grain shortages</li><li>○ High oil prices</li><li>○ Melamine incident</li><li>○ Food riots</li></ul>	<p><b>2022</b></p> <ul style="list-style-type: none"><li>○ High fertilizer prices</li><li>○ Grain shortages</li><li>○ High oil prices</li><li>○ ....</li><li>○ ....</li></ul> <div><div>}]</div><div>A recipe for disaster?</div></div>
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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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# 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
Ingredient	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/Grained/Highly Processed/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 fraud.	No	Yes	Yes
	2a) Are the ingredients or similar ingredients, even the mixture of all ingredients, used in the product?	The history of fraud in ingredients is important to understanding risk. It is important to understand whether ingredients are used in the product or not, as this may indicate a higher risk of fraud.	Yes	No	No
	2b) Is the ingredient used in many products or products that are important to the company?	The history of fraud in ingredients is important to understanding risk. It is important to understand whether ingredients are used in the product or not, as this may indicate a higher risk of fraud.	Yes	No	No
Supply Chain	3a) Is the ingredient used in many products or products that are important to the company?	The history of fraud in ingredients is important to understanding risk. It is important to understand whether ingredients are used in the product or not, as this may indicate a higher risk of fraud.	Yes	No	No
	3b) Is the ingredient used in many products or products that are important to the company?	The history of fraud in ingredients is important to understanding risk. It is important to understand whether ingredients are used in the product or not, as this may indicate a higher risk of fraud.	Yes	No	No
	3c) Is the ingredient used in many products or products that are important to the company?	The history of fraud in ingredients is important to understanding risk. It is important to understand whether ingredients are used in the product or not, as this may indicate a higher risk of fraud.	Yes	No	No
	3d) Is the ingredient used in many products or products that are important to the company?	The history of fraud in ingredients is important to understanding risk. It is important to understand whether ingredients are used in the product or not, as this may indicate a higher risk of fraud.	Yes	No	No

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**USP Pre-Screening Tool**  
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## 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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## Vulnerability Asseement

Figure 1. Conducting a Prescreen



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## 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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## 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)
- **Re-evaluate when parameters change (price, availability)**

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## Risk Mitigation: Improving Sampling

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## Random Sampling vs Risk-based Sampling

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

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Where testing is  
really needed?

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



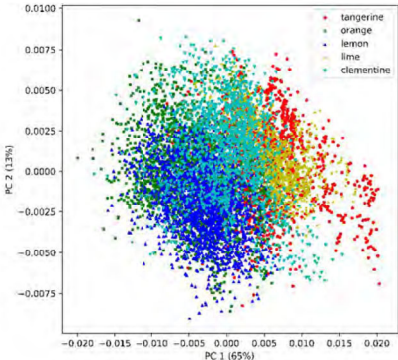
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## Detection of Freshness of Citrus Fruits and Fish Authenticity

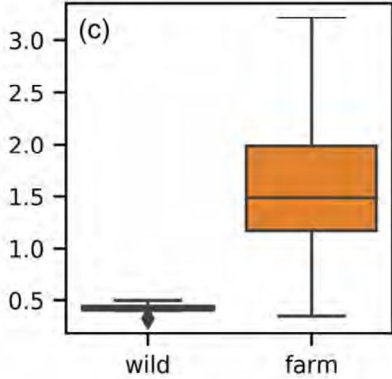


- Testing Methodology: NIR

Freshness of Fruit



Farmed vs Wild Fish

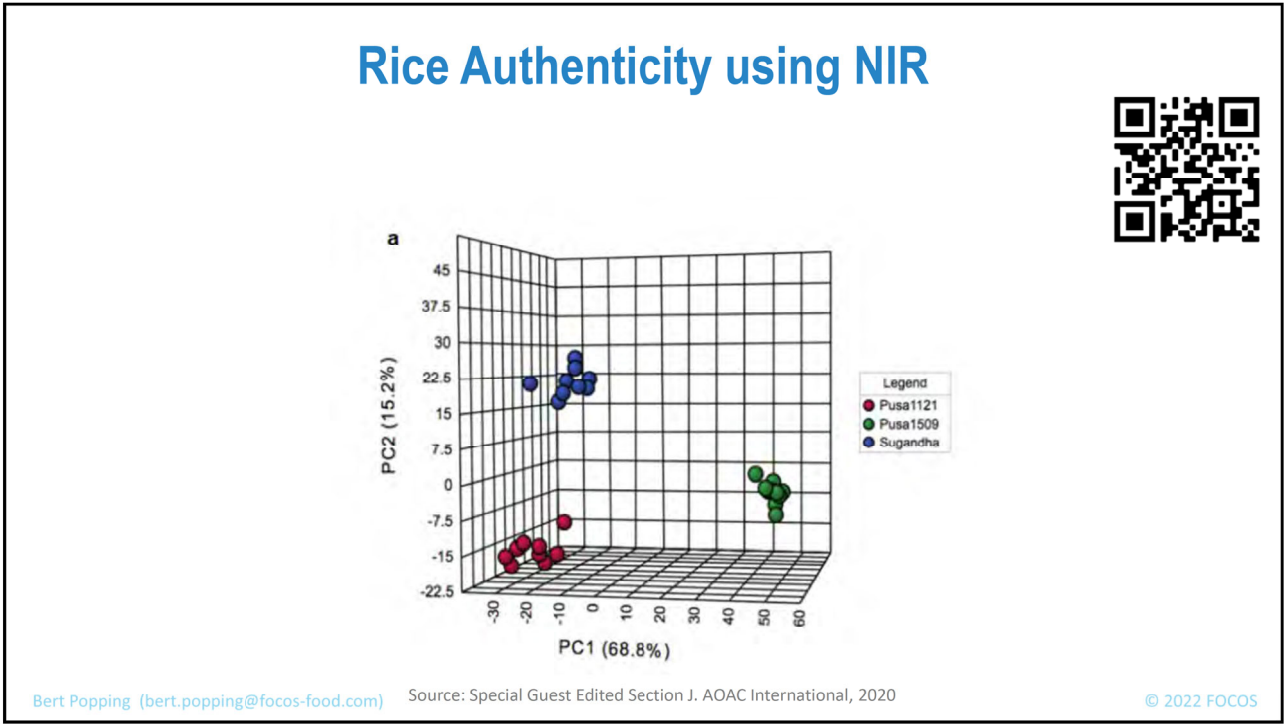


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Source: Special Guest Edited Section J. AOAC International, 2020

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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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**Dr. Bert Popping & Dr. Carmen Diaz-Amigo**

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