FOODINTEGRITY
Ensuring the Integrity of the European food chain

613688: Collaborative Project

Seventh Framework Programme
KBBE.2013.2.4-01: Assuring quality and authenticity in the food chain

Deliverable: D11.5
Dissemination workshop on the feasibility of information sharing and analysis along the food chain to identify emerging food integrity issues.

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Beneficiary(s): Ghent University
Date of preparation: August 2018
Period covered: May 2018
Status: version 1

<table>
<thead>
<tr>
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<tr>
<td>PU</td>
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</tr>
<tr>
<td>PP</td>
<td>Restricted to other participants</td>
</tr>
<tr>
<td>RE</td>
<td>Restricted to a group specified by the consortium</td>
</tr>
<tr>
<td>CO</td>
<td>Confidential, only members of the consortium</td>
</tr>
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</table>

The project has received funding from the European Union's Seventh Framework Programme for research, technological development and demonstration under grant agreement No. 613688.
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Deliverable 11.5 Dissemination workshop on the feasibility of information sharing and analysis along the food chain to identify emerging food integrity issues.

1 Description of Deliverable

The stakeholder workshop ‘Key success factors for a food integrity information sharing system’ was organised on May 28th 2018 in Belfast as a satellite event of the Belfast Summit on Global Food Integrity. This deliverable compiles all information about the workshop, including the objectives, the program of the workshop, content material, participants list and a summary of the interactive break-out sessions.
1. Introduction

The workshop ‘Key success factors for a food integrity information sharing system’ took place at Queen’s University Belfast on May 28th 2018. It was organized by Ghent University and TNO Netherlands, project partners of the EU-funded FP7 project FOOD INTEGRITY.

One of the biggest challenges facing the food industry is assuring food integrity. Information sharing could facilitate the prevention and detection of food integrity issues. As a part of WP17, a stakeholder consultation was organized to assess the attitudes of stakeholders in the food supply chain towards information sharing. This stakeholder study was structured into three rounds and took place between November 2017 and May 2018 (Figure 1). During the first two rounds, different stakeholders were contacted through two online surveys, leading to both quantitative and qualitative data. The third round is a stakeholder workshop to discuss the results of the first two rounds and the feasibility of information sharing to prevent and detect food integrity issues.

![Figure 1: Overview of the stakeholder consultation of WP17](image)

The workshop was held as a satellite workshop of the Belfast Summit on Global Food Security, which took place during the same week. The Summit brought together international food integrity experts, including academia, industry, NGO’s, argiculture and regulators.

2. Workshop objectives and target audience

The workshop is part of a larger stakeholder consultation, thus had two objectives:

- **Dissemination**: share insights from the earlier rounds of the stakeholder study and activities within Work Package 17
- **Interactive discussion**: give stakeholders the opportunity to react to the results and share their opinions on the topic
The workshop was open to all stakeholders within the food supply chain, more specifically:

- Food industry stakeholders
- Researchers
- Policy makers
- NGO experts

To reach interested experts, the choice was made to organize the workshop as a satellite event of the Belfast Summit on Global Food Security, a day before the start of the summit. Participants not joining the summit were also able to register and registration was free.

3. Promotion of the workshop

The workshop was promoted through a number of channels. It was announced on the website of the Belfast Summit on Global Food Integrity and in the registration form for participants of the summit.

An invitation to the workshop with the program can be found in Appendix I and was distributed through email between March 30th and May 10th. During the stakeholder consultation rounds I and II, interested stakeholders could subscribe to receive more information and an invitation to the workshop. A total of 165 people subscribed and thus were contacted.

4. Program and presentations

The workshop schedule consisted of three parts:

Part 1 - Introduction: two short presentations presenting the results of WP17 (15.30-16.15)

Key functions of a future information system to pro-actively support food integrity (TNO)

Early indicators for food non-integrity and the challenges to collect and analyze the data

Results of a large stakeholder consultation (Ghent University)

Insights on attitudes towards information sharing, advantages and disadvantages, conditions, suitable third party, data sharing and transparency.

Part 2 - Break-out sessions (16.15-17.00)

Four groups were moderated by four moderators from TNO and Ghent University, all involved in WP17. All moderators received the discussion guide for the break-out sessions in advance and guided the discussion by using the topic grid

Each break-out group selected a reporter, who took notes during the discussion.

Part 3 - Reporting back and conclusions (17.00-17.30)

Each group gave a plenary feedback talk on the main points of consensus and points of discussion in their break-out session.

Network reception (17.30-18.30)
5. Workshop

5.1. Participants

Although, a total of 64 interested stakeholders registered for the workshop, a final number of 37 stakeholders participated at the workshop. The majority of stakeholders present were active in the field of research, as is presented in Table 1.

<table>
<thead>
<tr>
<th>Type of stakeholder</th>
<th>n= 37</th>
<th>Percent (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Research</td>
<td>19</td>
<td>51.3</td>
</tr>
<tr>
<td>Industry</td>
<td>4</td>
<td>10.8</td>
</tr>
<tr>
<td>Food safety authority</td>
<td>8</td>
<td>21.6</td>
</tr>
<tr>
<td>Government</td>
<td>2</td>
<td>5.4</td>
</tr>
<tr>
<td>Other (e.g. consultants)</td>
<td>4</td>
<td>10.8</td>
</tr>
</tbody>
</table>

Table 1. Types of stakeholders participating at the workshop

The signed participant list can be found in Appendix II.

5.2. Presentations

Two speakers presented preliminary results of the research of WP17. Fred van de Brug of TNO Netherlands presented ‘Key functions of a future information system to pro-actively support food integrity’, with a special focus on indicators. Fien Minnens of Ghent University presented the results of the first two rounds of the stakeholder study.

All presentation slides are attached in Appendix III.

5.3. Pictures of the workshop

Presentation by Fien Minnens (Ghent University) during workshop
5.4. Break-out sessions

During four break-out sessions the topic was discussed in more detail, each break-out session with an ad-random selection of participants. During a total of 45 minutes, the groups discussed the potential of a FI-ISS. Each group was moderated by an expert of the partners of WP17 (Isabelle Sioen, Niels Lucas Luickx, Wim Verbeke and Fien Minnens). All moderators were acquainted with the results from Round I and Round II and had a discussion guide at their disposal which could be used to steer the discussion.

The discussion guide (Figure 3) was developed based on the results of Round I and Round II, and was summarized in a visual guideline, shown in Figure 2.
**Figure 2: Guideline for the break-out sessions**

<table>
<thead>
<tr>
<th>CONSENSUS ON KEY SUCCESS FACTORS</th>
<th>DISCUSSION POINTS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>&quot;A food integrity information sharing system will help prevent and detect FI issues&quot;</strong></td>
<td>▪ Should the new organisation be a public organisation or a private organisation? What are the pros and cons?</td>
</tr>
<tr>
<td>Agreement? Relevance?</td>
<td>▪ Who should take the initiative to set up the organisation?</td>
</tr>
<tr>
<td>▪ Is it indeed a priority to invest in such a data sharing system?</td>
<td>▪ How should it be funded?</td>
</tr>
<tr>
<td>▪ Is it more relevant to invest in good and fast analytical methods?</td>
<td></td>
</tr>
<tr>
<td><strong>&quot;Data and information confidentiality needs to be guaranteed&quot;</strong></td>
<td>▪ Can the system be effective if the participants don’t have access to raw data?</td>
</tr>
<tr>
<td>Agreement? Relevance?</td>
<td>▪ Which criteria need to be taken into account</td>
</tr>
<tr>
<td>▪ Sensitivity of data on volumes and transactions</td>
<td>▪ Does a system really need this information to be effective?</td>
</tr>
<tr>
<td><strong>&quot;Food Safety Authorities need to be involved in the FI-ISS&quot;</strong></td>
<td>▪ How much access to data would the FSA be allowed to have?</td>
</tr>
<tr>
<td>Agreement? Relevance?</td>
<td>▪ How will FSA’s react to alerts in the system</td>
</tr>
<tr>
<td>▪ Uncertainty about reaction FSAs in case of issues</td>
<td>▪ How to ensure that all necessary actors in the food chain (can) take part? Is regulation needed?</td>
</tr>
<tr>
<td><strong>&quot;All actors in the supply chain need to be in the system&quot;</strong></td>
<td>▪ How likely is it that SMEs can take part in data sharing initiatives – and if they cannot, how will this influence the success of such a system</td>
</tr>
<tr>
<td>Agreement? Relevance?</td>
<td>▪ Participation mandatory?</td>
</tr>
</tbody>
</table>

**Figure 3: Discussion guideline for the break-out sessions**
In each of the four break-out sessions, a reporter was selected. The reporter gave a summary of the discussion during the reporting back moment after the sessions. These summarized talks were recorded and transcripted, and the transcript is available in Appendix IV.

6. Conclusions and follow-up

The results and conclusions of the workshop are discussed in detail in Deliverable 17.6.

Overall, the discussion gave insights in different stakeholders’ perspectives on information sharing and the feasibility of a food integrity information sharing system.
7. Appendices

7.1. Appendix I: Invitation to the workshop

Key success factors for a food integrity information sharing system
Insights from a stakeholder study and interactive discussion
Satellite workshop of ASSET 2018 SUMMIT – May 28th 2018

One of the biggest challenges facing the food industry is assuring food integrity. Information sharing could facilitate the prevention and detection of food integrity issues. Are food industry actors interested to participate and what are their conditions for a food integrity information sharing system?

Program

15.30  Results of a large stakeholder consultation (Ghent University)
       Insights on attitudes towards information sharing, advantages and disadvantages, conditions, suitable third party, data sharing and transparency.
       Key functions of a future information system to pro-actively support food integrity (TNO)
       Early indicators for food non-integrity and the challenges to collect and analyse the data

16.15  Break-out sessions for further discussion on most diverging topics
       Which types of data can be shared? Which third party could organize a system? Which first steps can be taken?

17.00  Reporting back and conclusions

17.30  Network reception

Date & Venue

May 28th 2018 (15.30 – 18.00)
Riddel Hall - Queen’s University Belfast (185 Stranmillis Road, Belfast)

Interesting for ...

- Food industry stakeholders
- Researchers
- Policy makers
- NGO's

Registration

- Attending the ‘Belfast Summit on Global Food Integrity’ (ASSET)? Register for the workshop on registration form
- Not attending ASSET Summit? Register here

Organisation and contact details

This workshop is organised as a part of the European Research Project FOOD INTEGRITY. The organisers are Ghent University (Belgium) and TNO (The Netherlands). For more information, please contact Fien Minnens (fien.minnens@ugent.be)
## 7.2. Appendix II: Participant list

<table>
<thead>
<tr>
<th>Name</th>
<th>Institution/Role</th>
</tr>
</thead>
<tbody>
<tr>
<td>ANUGWA</td>
<td>IFEOMA, University of Nigeria Nasirka</td>
</tr>
<tr>
<td>BIRSE</td>
<td>NICHOLAS, Queen's University Belfast - Institute for Global Food Security</td>
</tr>
<tr>
<td>BOUZEMBRAK</td>
<td>YAMINE, RIKILT</td>
</tr>
<tr>
<td>BRADFORD</td>
<td>HOLLIE</td>
</tr>
<tr>
<td>BRERETON</td>
<td>PAUL, Queen's University Belfast</td>
</tr>
<tr>
<td>BUTLER</td>
<td>FRANCIS, University College Dublin</td>
</tr>
<tr>
<td>CHIAH</td>
<td>JANE</td>
</tr>
<tr>
<td>CHRISTOPHE</td>
<td>CAVIN, Nestlé Research Centre</td>
</tr>
<tr>
<td>CUTLIFE</td>
<td>ALANA, Queen's University Belfast</td>
</tr>
<tr>
<td>DE LA ROÇA-DELGAIDO</td>
<td>BESONA, SERIDA</td>
</tr>
<tr>
<td>DEL RIO</td>
<td>ANE, AZTI</td>
</tr>
<tr>
<td>DELGADO</td>
<td>AMELIA, ModBie - UAlgave</td>
</tr>
<tr>
<td>DOAN</td>
<td>THI QE, University of Liege</td>
</tr>
<tr>
<td>EASTWOOD</td>
<td>IAN, Euceda Ltd</td>
</tr>
<tr>
<td>EKPE</td>
<td>SUNGTU ASIEBONG, Ministry of International Development Cooperation</td>
</tr>
<tr>
<td>ELEMBIDE</td>
<td>OYEBOLA ADEBOLA, Federal college of Agriculture Adupe Ondo state Nigeria</td>
</tr>
<tr>
<td>ERASMUS</td>
<td>SARA, Wageningen University &amp; Research</td>
</tr>
<tr>
<td>ESABU</td>
<td>ANTHONY, Concern Worldwide</td>
</tr>
<tr>
<td>FOX</td>
<td>MICHAELA, Queens University Belfast</td>
</tr>
<tr>
<td>HAYES</td>
<td>JOAN, Sea Fisheries Protection Authority</td>
</tr>
<tr>
<td>HEINRICH</td>
<td>KATHARNA, Fere Science Ltd</td>
</tr>
<tr>
<td>HERRMANN</td>
<td>GERALD A, Organic Services GmbH</td>
</tr>
<tr>
<td>HOCOUETTE</td>
<td>JEAN-FRANCOIS, INRA</td>
</tr>
<tr>
<td>JOHNS</td>
<td>JOSEPH BABADI, Masianday Foundation and Poverty Eradication Center - CO Ministry of Agriculture, Food Security and Forestry</td>
</tr>
<tr>
<td>JULIEN</td>
<td>DIFUYAMÉ ZIM, appui au développement pour l'autonomisation des femmes - ADAF-NGO-ASBL</td>
</tr>
<tr>
<td>KAMAU</td>
<td>MERCY, Haulia lands</td>
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<tr>
<td>KEECH</td>
<td>JOHN, Shantalla Inc</td>
</tr>
<tr>
<td>KLEBOTH</td>
<td>JOCHEN, Wageningen University / FoodIntegrityStudio</td>
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<tr>
<td>LAHOUIJU</td>
<td>TAREK, INRA</td>
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<td>LAMPRINAKIS</td>
<td>LAMPROS, NIBIO</td>
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<td>LOPES</td>
<td>MARIA, Faculty of Pharmacy of the University of Coimbra</td>
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<tr>
<td>MAESTRI</td>
<td>ELENA, SITELA PARNARA</td>
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<tr>
<td>MAINOULOTIS</td>
<td>DAMTRIOS</td>
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<tr>
<td>MALLY</td>
<td>EMLIE, Université Laval / INAF</td>
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<tr>
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<td>RICCARDO, CER Groups</td>
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<td>MAXWELL</td>
<td>RACHAEL</td>
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<td>MONACI</td>
<td>LINDA, CNR</td>
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<td>MONTEIRO</td>
<td>MARCIA, Institute for Global Food Security, Queens University Belfast</td>
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<tr>
<td>MORIN</td>
<td>JEAN-FRANCOIS, Eurofins</td>
</tr>
<tr>
<td>MORNISSEY</td>
<td>HELEN, Belfast City Council</td>
</tr>
<tr>
<td>MOJTAHER</td>
<td>NASSER</td>
</tr>
<tr>
<td>MÜLLER</td>
<td>KIRKLY</td>
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<tr>
<td>MOJJAHER</td>
<td>E. H.</td>
</tr>
<tr>
<td>Name</td>
<td>Title/Institution</td>
</tr>
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<tr>
<td>Nieminen Janne</td>
<td>Finnish Food Safety Authority Evira</td>
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<tr>
<td>Obadina Ade Wale</td>
<td>Federal University of Agriculture, Abeokuta</td>
</tr>
<tr>
<td>Okweche Simon Idoiko</td>
<td>University of Calabar</td>
</tr>
<tr>
<td>Oluwafemi Flora</td>
<td>Federal University of Agriculture</td>
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<tr>
<td>Parisi Salvatore</td>
<td>COIF Association</td>
</tr>
<tr>
<td>Perez Marin Lola</td>
<td>University of Cordoba</td>
</tr>
<tr>
<td>Points John</td>
<td>Independent Consultant</td>
</tr>
<tr>
<td>Scullion Lynsey</td>
<td>Food Standards Scotland</td>
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<tr>
<td>Stupak Michal</td>
<td>UCT Prague</td>
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<tr>
<td>Sudbeck Michael</td>
<td>Loehmann &amp; Co AG</td>
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<td>Teye Ernest</td>
<td>University of Cape Coast</td>
</tr>
<tr>
<td>Turrini Aida</td>
<td>Consiglio per la ricerca in agricoltura e l'analisi</td>
</tr>
<tr>
<td>Van de Brug Fred</td>
<td>TNO</td>
</tr>
<tr>
<td>Van Hoore Koenraad</td>
<td>Ghent University</td>
</tr>
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<td>Walker Michael</td>
<td>LGC</td>
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<td>Wall Covney Vanessa</td>
<td>Sea Fisheries Protection Authority</td>
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<td>Whelan Peter</td>
<td>Food Safety Authority of Ireland</td>
</tr>
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<td>White Monica</td>
<td>Dublinn</td>
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<td>Whiteley Fiona</td>
<td>Pernod Ricard</td>
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<td>Wilde Amelie</td>
<td>National Food Institute</td>
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<td>Yang Yuzheng</td>
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</table>
7.3. Appendix III: Presentations during workshop

Key success factors for a food integrity information sharing system
Insights from a stakeholder study and interactive discussion
Satellite workshop of ASSET 2018 SUMMIT—May 28th 2018 - QUB Belfast

EU FOOD INTEGRITY—Ghent University (Belgium) – TNO(The Netherlands)

Food Integrity

Assuring quality and authenticity in the food chain
Comprising 60 participants from 18 European countries and one from China and one from Argentina, FoodIntegrity's key focus is to consolidate, harmonise and mobilise the European capability on food authentication to ensure consumer confidence and protect European added value.

21 Work Packages

WP17 Feasibility study on information sharing and analysis along the food chain to identify emerging food integrity issues

Work Package 17
Partners: TNO, Ghent University

1. To demonstrate the technical possibilities of sharing information without competition issues and the potential of information analytics to identify food integrity issues at an early stage
2. To research the actual feasibility (and willingness) in the food chain of setting up, managing and using a system for the early identification of food integrity issues among food chain stakeholders

This project has received funding from the European Union’s Seventh Framework Programme for research, technological development and demonstration under grant agreement no 613688.

EU FOOD INTEGRITY—Ghent University (Belgium) – TNO(The Netherlands)
**Workshop Organisation**

Ghent University  
TNO  
Prof. Wim Verbeke  
Nels Lucas Luijckx  
Dr. Isabelle Soen  
Fred van de Brug  
Ren Minners

---

**Program**

15:30  
Introduction  
Key functions of a future information system to pro-actively support food integrity (TNO)  
Early indicators for food non-integrity and the challenges to collect and analyze the data  
Results of a large stakeholder consultation (Ghent University)  
Insights on attitudes towards information sharing, advantages and disadvantages, conditions, suitable third party, data sharing and transparency.

16:15  
Break-out sessions for further discussion on most diverging topics  
Which types of data can be shared? Which third party could organize a system? Which first steps can be taken?

17:00  
Reporting back and conclusions

17:30  
Network reception

---

**Food Integrity Information Sharing System?**

[Image of the Food Integrity Information Sharing System]

[www.foodintegrity.eu]
WP17

*Early indicators for food non-integrity and the challenges to collect and analyse the data*

Fred van de Brug, Niels Lucas Luijckx, Christopher Brewster

Contents

- Introduction
- In hindsight
- Indicators
- Conclusions
- Recommendations

Introduction

*Issue cycle applied for fraudulent actions in the food chain*
Is this feasible?

Indicators (analogy to the medical domain; Mainz, 2003)

- **Predictive indicators** attempt to be early signals of an event what may be happening in the future.
- **Process indicators** denote what is actually happening while an event is developing and which lead to the actual outcome (e.g. detection) of the event.
- **Outcome indicators** attempt to describe the final effect of an event, by which the event is diagnosed and which triggers mitigation or treatment.

From hindsight to insight. This is what we did.

- Melamine
- Organic food
- Horse meat
- Fipronil
Melamine (2008)

- 1992
  - "One lab study in 1992 had shown that very high doses of melamine caused harm or even death to urinary bladder inflammation and kidney stones and crystals in rats, as well as in mice."
  - 2006
  - "However, there was no evidence of harm resulting from melamine exposure within the supply chain."

- 2007
  - "In 2007, food imported from China to the UK was found to be contaminated with melamine and other chemicals after it killed at least 2,000 cats and dogs, possibly thousands more, through small rations."

- 2008
  - "In September of 2008, media reports emerged that thousands of infant formula had been tainted with dangerous quantities of melamine."  
  - "A study in 2008 had shown that very high doses of melamine caused harm or even death to urinary bladder inflammation and kidney stones and crystals in rats and mice."

Horsemeth (2012)

- 2012
  - "Straw in meat regulation, a particular focus of deception and melamine contamination in processed meat products."

- 2013
  - "Between January and November 2012, 30,000kg of horse meat was imported to the UK, with a value of £31,000,000 (€41,000,000). In 2013, the value of horse meat imports to the UK were below at just £4,101,000."

Generalised timeline: indicators and where to find them

- Predictive indicators
  - Environmental
  - Regulatory
  - Food technology

- Process indicators
  - Availability, production, storage and trade data of food quality/chemical norms

- Outcome indicators
  - Biological health
  - Human health
  - Laboratory results
  - Food loss

Flow of information & cash within supply chain company

Pre and post harvest

Price data of commodities and cheaper alternatives

Availability, production, storage and trade data of food quality/chemical norms

Availability, production, storage, transport and trade data of commodities and cheaper alternatives (volume)
### Predictive indicators

<table>
<thead>
<tr>
<th>Nr</th>
<th>Indicator</th>
<th>Indicator description</th>
<th>Usefulness (authors opinion)</th>
<th>Possible data sources</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Predictive</td>
<td>“Risk profile” is composed of multiple parameters. (e.g. risk countries, history of product/company integrity issues, low profitable sector, products with low or lowered price level, products with high added value, anomalies in business finance).</td>
<td>High, public data available</td>
<td>Information on products (public recalls), suppliers &amp; countries (public recalls), Business news</td>
</tr>
<tr>
<td>2</td>
<td>Predictive</td>
<td>Mass disbalances</td>
<td>High, but company private data</td>
<td>Private company data</td>
</tr>
<tr>
<td>3</td>
<td>Predictive</td>
<td>(Unexplained) anomalies (e.g. credit card fraud, unusual transactions).</td>
<td>High, but private data</td>
<td>Financial data, private</td>
</tr>
<tr>
<td>4</td>
<td>Predictive</td>
<td>Products produced before a relevant change in regulations AND a change to “risk” supplier or country</td>
<td>Low, partly private company data</td>
<td>EU, US (and others) regulations &amp; company data</td>
</tr>
<tr>
<td>5</td>
<td>Predictive</td>
<td>(Expected) volatile products prices products in combination to possible illegitimate profit that can be made.</td>
<td>Low, public data</td>
<td>Market &amp; economic data in newspapers, specialized websites</td>
</tr>
<tr>
<td>6</td>
<td>Predictive</td>
<td>(Expected) shortage of products in combination to possible illegitimate profit that can be made.</td>
<td>Low, public data</td>
<td>Market &amp; economic data in newspapers, specialized websites</td>
</tr>
<tr>
<td>7</td>
<td>Predictive</td>
<td>(Expected) surplus of products that can be used as alternative for higher priced product.</td>
<td>Low, public data</td>
<td>Market &amp; economic data in newspapers, specialized websites</td>
</tr>
<tr>
<td>8</td>
<td>Predictive</td>
<td>(Expected) surplus of potential chemical adulterants.</td>
<td>Low, public data</td>
<td>Surplus chemicals websites</td>
</tr>
</tbody>
</table>

### Process and outcome indicators

<table>
<thead>
<tr>
<th>Nr</th>
<th>Indicator</th>
<th>Indicator description</th>
<th>Usefulness (authors opinion)</th>
<th>Possible data sources</th>
</tr>
</thead>
<tbody>
<tr>
<td>9</td>
<td>Process</td>
<td>Imbalance between costs vs quality/effectivity/potential supply capacity (“too good to be true”) AND suppliers with a risk profile.</td>
<td>Low, partly private company data</td>
<td>Product information sheets &amp; Market &amp; economic data in newspapers, specialized websites</td>
</tr>
<tr>
<td>10</td>
<td>Process</td>
<td>Missing or otherwise non-intger paperwork.</td>
<td>High, but private data</td>
<td>Private company data</td>
</tr>
<tr>
<td>11</td>
<td>Outcome</td>
<td>Acute effects in humans with (possible) link to feed/food</td>
<td>High, partly public data</td>
<td>Medical reports, social media and scientific literature, NTP, FDA, EFSA, IARC (WHO) and others</td>
</tr>
<tr>
<td>12</td>
<td>Process</td>
<td>Acute effects in animals with (possible) link to feed</td>
<td>High, partly public data</td>
<td>Veterinary medical records, pet food complaint reports, consumer complaints.</td>
</tr>
<tr>
<td>13</td>
<td>Outcome</td>
<td>(Unexplained) anomalies in chemical analysis</td>
<td>High, partly private company data</td>
<td>Analytical data</td>
</tr>
<tr>
<td>14</td>
<td>Outcome</td>
<td>Historical cases may repeat themselves somehow</td>
<td>High, public data</td>
<td>Description of historical cases in e.g. science literature, RASFF data.</td>
</tr>
</tbody>
</table>

### Indicators shortlist (most useful, most feasible)

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Indicator description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Predictive</td>
<td>“Risk profile”. Transactions made with companies with a risk profile (e.g. risk countries, history of product/company integrity issues, low profitable sector, products with low or lowered price level, products with high added value, anomalies in business finance). This indicator is a panel of multiple parameters.</td>
</tr>
<tr>
<td>Predictive</td>
<td>Mass disbalances</td>
</tr>
<tr>
<td>Predictive</td>
<td>(Unexplained) anomalies (e.g. credit card fraud, unusual transactions)</td>
</tr>
<tr>
<td>Process</td>
<td>Missing or otherwise non-integer paperwork.</td>
</tr>
<tr>
<td>Outcome</td>
<td>Acute effects in humans with (possible) link to feed/food</td>
</tr>
<tr>
<td>Process</td>
<td>Acute effects in animals with (possible) link to feed</td>
</tr>
<tr>
<td>Outcome</td>
<td>(Unexplained) anomalies in chemical analysis</td>
</tr>
<tr>
<td>Outcome</td>
<td>Historical cases may repeat themselves somehow</td>
</tr>
</tbody>
</table>
Conclusions

- Indicator shortlist must be dynamic
- What to share: data – information - indicators
- Public vs private data
- Data analysis:
  - The food sector lags behind other sectors: risk of shift of criminal activity
  - Very few use cases published in science (Bayesian network, text mining)

Recommendations

- Data architecture must protect company data / privacy
- Data analysis:
  - Implement above reasoned indicators
  - Learn new indicators from historical/knowns data set
  - Build further on existing methods, e.g.
    - predictive Bayesian networks
    - text mining for early signals
  - More research on predictive models is needed
- Future project: use case, set up architecture, data, test the indicators

Future
Key success factors for a food integrity information sharing system
Food industry stakeholders’ perspectives on sharing information to prevent and detect food integrity issues

Fien Minnens, Isabelle Scen, Niels Lucas Luijckx, Fred van de Brug, Wim Verbeke

Study Design - Delphi method

Round 1
Online survey
November ’17 - February ’18
Only food industry actors

Round 2
Online feedback on survey report
April ’18 - May ’18
All stakeholders

Round 3
Stakeholder workshop
May 28th
All stakeholders

Consulted stakeholders

Round 1: 143 food industry actors

<table>
<thead>
<tr>
<th>Food commodity</th>
<th>No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wine</td>
<td>10</td>
</tr>
<tr>
<td>Gifts and teas</td>
<td>19</td>
</tr>
<tr>
<td>Fruit juices</td>
<td>21</td>
</tr>
<tr>
<td>Olives</td>
<td>22</td>
</tr>
<tr>
<td>Honey and syrup</td>
<td>23</td>
</tr>
<tr>
<td>Fish</td>
<td>25</td>
</tr>
<tr>
<td>Spices</td>
<td>30</td>
</tr>
<tr>
<td>Grains</td>
<td>32</td>
</tr>
<tr>
<td>Milk</td>
<td>37</td>
</tr>
<tr>
<td>Other</td>
<td>39</td>
</tr>
<tr>
<td>Organic food</td>
<td>42</td>
</tr>
</tbody>
</table>
Consulted stakeholders

Round II: 61 stakeholders

<table>
<thead>
<tr>
<th>Category</th>
<th>Participation in Round I</th>
</tr>
</thead>
<tbody>
<tr>
<td>Other</td>
<td>2</td>
</tr>
<tr>
<td>Food authority</td>
<td>5</td>
</tr>
<tr>
<td>Consumer organisation</td>
<td>2</td>
</tr>
<tr>
<td>Law enforcement</td>
<td>3</td>
</tr>
<tr>
<td>Researcher</td>
<td>0</td>
</tr>
<tr>
<td>Service to the food industry</td>
<td>9</td>
</tr>
<tr>
<td>Food industry</td>
<td>30</td>
</tr>
</tbody>
</table>

Research questions

- What are industries’ attitudes towards information sharing?
- Can a F-ISS help prevent and detect food integrity issues?
- Is the use of a F-ISS feasible?
- Which are the key success factors for a F-ISS according to stakeholders?

Key success factors

- All food integrity information sharing systems will help prevent and detect food integrity issues
### Current issues and potential of a F-ISS

#### Round 1
- **Issues occur more than rarely; detection is probable**
  - Small companies & large companies
  - 36%
- **Issues occur rarely; detection is probable**
  - Mix of small, medium, large
  - 36%
- **Issues occur occasionally or less and detection is unlikely**
  - Medium sized companies
  - 21%

#### Round 2

<table>
<thead>
<tr>
<th>Frequency of occurrence</th>
<th>Likelihood of detection</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rare</td>
<td>Unlikely</td>
</tr>
<tr>
<td>Unlikely</td>
<td>Unlikely</td>
</tr>
<tr>
<td>Unlikely</td>
<td>Likely</td>
</tr>
<tr>
<td>Likely</td>
<td>Likely</td>
</tr>
<tr>
<td>Likely</td>
<td>Likely</td>
</tr>
</tbody>
</table>

#### Do industry actors estimate the **Frequency of occurrence of food integrity issues**...

<table>
<thead>
<tr>
<th>Industry</th>
<th>Non Industry</th>
</tr>
</thead>
<tbody>
<tr>
<td>Underestimate</td>
<td>17</td>
</tr>
<tr>
<td>Realistically estimate</td>
<td>10</td>
</tr>
<tr>
<td>Overestimate</td>
<td>3</td>
</tr>
</tbody>
</table>

#### Do industry actors estimate the **Likelihood of detecting food integrity issues**...

<table>
<thead>
<tr>
<th>Industry</th>
<th>Non Industry</th>
</tr>
</thead>
<tbody>
<tr>
<td>Underestimate</td>
<td>12</td>
</tr>
<tr>
<td>Realistically estimate</td>
<td>11</td>
</tr>
<tr>
<td>Overestimate</td>
<td>4</td>
</tr>
</tbody>
</table>

### Current issues and potential of a F-ISS

<table>
<thead>
<tr>
<th>Information sharing facilitates the detection of food integrity issues</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strongly disagree</td>
</tr>
<tr>
<td>13%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Information sharing improves the prevention of food integrity issues</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strongly disagree</td>
</tr>
<tr>
<td>12%</td>
</tr>
</tbody>
</table>
Current issues and potential of a FI-ISS

Number of times following statements were made in Round II (n=61):

- Information sharing will raise awareness on issues: 20
- Information sharing reduces the costs of detection: 22
- Information sharing helps prevent when issue occurs: 4
- Information sharing leads to more insights in weak spots and: 2
- Information sharing helps prevention: 7
- Information sharing helps detect easier and faster: 3
- Barriers for success: 1

Trusted third party

Trusted third party?

Round 1

Organisation established for this specific purpose

- Food safety authority: 65%
- Grifithing organisation: 68%
- Governmental institution: 68%
- Contract research organisation: 62%
- Academic institution: 44%
- Industry organisation: 42%
- Retail organisation: 44%
- Consumer organisation: 49%

Agree: 55%, Neither agree nor disagree: 36%, Disagree: 19%
Trusted third party?

- International vs European level
- Public vs Private organisation

Data and information

- Discussion points: Data and information, Trusted Third Party

- Data on volumes at company level
- Data on shipments at batch level
- Data on sourcing of products
- Certifications
- Analysed data on product content
- Monitoring or surveillance data

- Agreed: Round 1
  - Monitoring or surveillance data: 28.8%
  - Analysed data on product content: 36.9%
  - Certifications: 44.1%
  - Data on sourcing of products: 48.6%
  - Monitoring or surveillance data: 61.3%
  - Analysed data on product content: 68.5%
  - Certifications: 72.1%
  - Data on sourcing of products: 73.0%

- Disagree
  - Monitoring or surveillance data: 25.7%
  - Analysed data on product content: 27.9%
  - Certifications: 12.6%
  - Data on sourcing of products: 4.5%
  - Monitoring or surveillance data: 11.7%
  - Analysed data on product content: 5.4%
  - Certifications: 15.3%
  - Data on sourcing of products: 20.7%

- Neither agree nor disagree
  - Monitoring or surveillance data: 28.8%
  - Analysed data on product content: 36.9%
  - Certifications: 44.1%
  - Data on sourcing of products: 48.6%
  - Monitoring or surveillance data: 61.3%
  - Analysed data on product content: 68.5%
  - Certifications: 72.1%
  - Data on sourcing of products: 73.0%
**Data and information**

Round 2 Criteria to increase industry actors willingness to share data on volumes and transactions (number of times selected in Round II)

- Only anonymized data can be seen by other actors: 38
- Only the trusted third party can access the data: 30
- No raw data can be seen by other actors: 29
- System output consists only of a number of Food Integrity Indicators that are based on the data: 23
- Competitors and other actors along their supply chain will share the same information: 21
- Only aggregated data can be seen by other actors: 16
- Only raw data which underlie Food Integrity Indicators can be accessed by others: 9

**Actors in the FI-ISS**

Round 1
Consensus statements on conditions for joining a FI-ISS

- 'Sufficient actors in the sector need to participate' => 82.3% agree
- 'The identity of companies is protected' => 82.3% agree
- 'Data from authorities, NGOs and science need to be incorporated' => 86.8% agree
Role for Food Safety Authorities

Round 1
74.3% agreed Food Safety Authorities would be a suitable trusted third party for managing a RI-SS.

Round 2

Break out Session

- 4 groups
- 45 minutes
- Moderator
- Discuss your opinion on the key success factors and their feasibility
- Debate on the discussion points
- Reporting back at 17:00
Breakout Sessions

Key success factors for a food integrity information sharing system

Thank you for your participation

www.foodintegrity.eu
fien.minnens@ugent.be
Appendix IV: Transcript of reporting back of the break-out sessions

Group 1

I think I will highlight a very few points. One of the things is, as you know, there will be a very large reluctance to share data and some people said that people with bad intentions will not share. Well that’s of course not the intention of a system, but still, that’s true.

So we are in favour of such a system, but I think, some people said to look at smaller systems, either focused on a sector, like for example the sector of organic food, or either focus on past issues. Then, the interesting thing is, and I think that is important to see, is whether you can knit together the existing systems or smaller systems (and we would expect that smaller systems are easier to get people involved in), than knitted together would be the advantage of this kind of system, and knitted together so analysing the data of several systems. So that’s one point, I think, we can conclude.

Another conclusion is on what is the incentive for stakeholders to join such a system. I think these incentives were, in our discussion, two ways. One is money, is there a profit, an advantage money-wise to enter such a system and what does it bring back.

And the other thing is, I think that was an interesting thing, is, of course, if within the food chain, which includes not just industry as producing, but also retailers and consumers. If there would be a pulling factor from retailers (we are not buying from you if you don’t join the system, if you do not share your data, we do not buy). We know retailers are very powerful in the food chain, so I think that could be a factor, even outside of money, for stakeholders to join.

So the question is, whether real information sharing is important. So, Group 1 member made a triangle of what you can say about a product or a batch of products. There is unique identifier, we can discuss the scale for traceability purposes, whether it is a single package or a pallet. But the smaller the package you can identify, the more easy it is to follow it. Then, if you can, share transformation of the product. If that system should exist, than you already have a very large idea of what is happening in the food chain. And that includes that you need the attributes of these individual food ingredients, the analytical data and transactional data. All these data around the food product, that would be a second or even a last step if people want to share this and use it in a system. I hope I am saying it correctly, 'Group 1 member'.

I think these are the main conclusions, I don't know if people from the group want to add anything specific but I think that's the conclusions of group 1.

Group 1 member

Maybe one addition if you allow me, there was strong voices saying, the 82.3% who are in favour, we said it is more or less lip service.

Reporter group 1:

Yes that is true, you could say this is the answer that you would expect them to give but it’s not an actual implementation consensus.
Group 2

On the new organisation, a little bit of yes and no. Yes and no, because we took a different angle. And, we talked about the precedent in the EU with pharmaceuticals and tobacco. Today, the industry are working with the EU for central databases for pharmaceuticals. And they are also doing it with Tobacco. So, if you take that bottom-up approach and look at the highly regulated sectors of pharmaceuticals and Tobacco, you can see that there is something already happening in these sectors. For Tobacco, they are letting the industry come up with technology, recommend technology companies and we are suggesting that as well. That, maybe it should be a technology company rather than a separate organisation. So the technology company with the expertise and the know-how under a service contract could actually execute that component. With possibly, on top of that, a public-private partnership, looking at the governance of that, and managing the exceptions.

So, again, something happening in the EU and we could learn from it. You don’t want to let the EU play around with technology, please don't do that. Don't suggest that. But, the big companies that are out there, the Atos', the IBM's, and the others, under service contracts they could do that very well and even blockchain the heck out of it.

On the data vs information, we talked about that sharing data is probably an illusion, that companies will share data. But sharing information, yes. We talked about a project in Vietnam, where you have data coming out of a isotope mass spectrometer. You are not going to share ten pages of raw data on all of the tests that you have done but you may want to share information which is maybe a one-liner ‘this has passed or failed for organic or pesticides’ and so on and so forth.

So, we talked about data and not being shared, because it is very confidential. But the information that is extracted from that data, at the micro-level could be shared.

On the types of data as well, we also talked about something that, you are all familiar with this term within food safety we talk about food safety as non-competitive. And we talked about, we need to be recycling/reciting that mantra in this world as well. Food fraud should be non-competitive. To try to take away some of the pressures of sharing data.

On, all actors involved, should it be mandatory? No, not possible. It is very complex to do that. However, we talked about the fact that one-up and one-down is restrictive. And one of the key issues in not sharing data today is because everyone wants to manage their risk. They are sharing data based on one-up and one down, which is regulated in the food sector. However, if you are only doing that, you are creating stove pipes all over the world.

And those stove pipes, there is no incentive to innovate beyond those stove pipes. Again, lucky enough we have this thing called blockchain technologies, which will take away that and help us increase transparency and trust.

On the role of FSA, we talked about possibly the lack of skill sets. I think this came out as well during the horse meat scandal and A. Riley, who many of you know, I talked to him about this and he said ‘we do not have the investigative skills of a police officer’, which is part of the issue.

And, somebody mentioned as well, maybe a focus on risk management, rather than risk assessment. Well, I’ve worn a police officers’ hat in the past, and part of what you need to do is gather evidence.
shared with the group the example of Danone best practice, where they have two executives, both of them report to the CEO, one of them is responsible for food quality and food safety, but the other guy is a former investigative officer from the police. As soon as the food safety and food quality team identifies and finds something, their role stops, they don't do any investigations. They hand it over to a dedicated team that do the investigations. We think that is a good best practice.

In other words, sometimes you need to let the fraud continue a bit more until you gather the evidence, and then you can interact. Of course if the risk is high, you take action immediately. But if it is, water in milk, maybe that could run a bit longer until you find out whose actually doing it. Regulators typically do not have that skills set, which is why Prof. Elliot had recommended to put in these police forces that are dedicated and have that skills. Lucky enough, England, Scotland, Holland, Denmark, and a lot of the countries that we deal with have those skill sets now and are doing a tremendous job. That was the summary from our group, unless I have missed anything? Does any of the team members want to add something?

**Group 3**

I don't have such a neat summary. We had a wide ranging discussion about all kinds of issues. So, food integrity sharing systems, do they have a potential to detect and prevent issues? There was discussion about just sharing, what do we mean by sharing, a need to actually know what is going to happen to the data. So is it just a sharing system, or a collecting one, and are we just collecting data. So, there is some confusion here.

The role of historical data, we need historical data to understand where fraud is committed. And if then, somebody is going to have the role of actually detecting potential fraud, they need the data. But, there is a lot of range between the raw data and sharing the intelligence, let's say, or the information, depending on how you want to call it.

There was considerable emphasis in the conversation on the need to be clear as to the end point or the purpose of the data. If you have the potential to predict some kind of fraud occurring with wine crossing a border, you cannot make that information public, because then you collapse the market so there is a whole issue there. What are you going to do with that data at the end of the day. How are you going to actually intervene in the real world?

On the question about whether the trusted third party should be a new organisation or an existing organisation, some opinions were that the trusted third party should be set up by industry. There were issues about partiality and conflict of interest. Further suggestions were that it should be a joint government plus industry effort. And, there was also an awareness in the group that there is a need to protect industry as well as protect the consumer. There was an interesting discussion about the fact that, with regard to food safety, we take that for granted in a certain sense. We never find a label saying that a food is safe, as opposed to labels which say that a food has a certain characteristic.

And most of the fraud, has to do with the characteristics of the food, you don't know any longer if the food is actually authentic. So, a distinction is begin made there between food safety versus food fraud in the sense of labelling something incorrectly. And here it is obvious that the labelling of food, into particular categories, is driven by the commercial incentive to differentiate and be able to sell more. Which is slightly different from, just making sure that the food is fit for purpose, let's say.
Issues about confidentiality of the data - generally there is the view that you couldn't possibly share raw data. But then, if you didn't share the raw data, would the indicators or the aggregate data coming out of the raw data be sufficient to actually provide a functioning system? It is not really clear that that would work.

So, there is a conflict there between anonymising and aggregating data and then, if you are actually using that, the results of that analysis, if you can't trace back to the origin of what is causing the problem, than it is a bit useless.

That leads me to needing some kind of authority that is able to connect the dots. And then, there was a whole further discussion about the kind of game of hide and seek, as somebody put it, between the industry and public authorities. The industry is not prepared to share the data, most data is on papers, so there would be interesting and possibly unpredictable consequences in shifting to a purely machine readable system where data would (we can argue to what degree) be shared but still that immediate accessibility of the data could have potentially important unintended side-effects.

I think that, we came back several times to this issue of, are we talking about data sharing or intelligence sharing. It is much easier to share intelligence then to share data. Because there is this, very much this concern that companies have that if they share data it is going to come back and hit them. I think that summarizes our discussion.

**Group 4**

**Reporter group 4**

Our group was a 100% 'yes' for a food integrity sharing information system. And why, there are so many organisations and so many sectors, actually doing and wanting the same thing, although separately. And there are no proper links between what they are doing. And they could learn from each other.

An example was given, combined raw analytical data, from huge measurements and, not clear how that should be done and what the benefit is, but there is a believe that when combining measurements data you may find more signals and less noise. We talked about the actors in the supply chain, we talked for a while about the small SME's, the one person companies. First, we identified that there may be, likely, a resource issue, for just one person. So that is a difficulty. And maybe those kind of companies can organize in a cooperation, or maybe we need a kind of sector organisation. Also, we are afraid that small SME’s may be more frightened to share data and also we noted that different countries may be involved when goods are transported across the countries, labels are falsified.

We talked about data and information and we also added there social media data that may be used. We didn't say that in the previous afternoon hours. We talked about consumers, and when should they be notified. On the one hand, SMEs for example, when they share data, and they communicate, they will be building trust. But on the other hand, you can reason that if you notify consumers too early about food fraud, you may lose trust because like 'group member' said, food fraud- food safety, while food fraud is not food safety for us academics, but the consumer may think otherwise.
We talked about when or not to notify authorities, we had some discussion about it. So, when there is an issue, first solve it yourself between the suppliers, and then notify the authorities, for example. That may be a stepwise thing to do.

Anonymised data sharing is much easier, because at that stage you can learn from each other. Well, it is not yet an issue, but it may be far more easier. That could serve like an early warning system. And then, a kind of two-level system, anonymised data sharing, and then it goes to a second level which we didn’t actually talk about, what this second level should be. But that meant, the investigation has perhaps progressed to another stage.

We talked about what kind of new organisation should there be installed. Well, the advantage of a public organisation, definitely on an EU level, without private funding, we thought should gain trust. If there is private funding involved, the trust in such an organisation may be lower. An advantage of a public organisation is also that it can easier communicate with other organisations, like EFSA, or other expertise organisations.

We had little time about the role of food safety authorities. One, in the UK has already the crime unit, so perhaps we can learn from that. There is again a 100% yes for a role for food safety authorities in the institution that we are think of. Because the main reason is because those have a general trust by the private sector.

So this was my report of group 4.