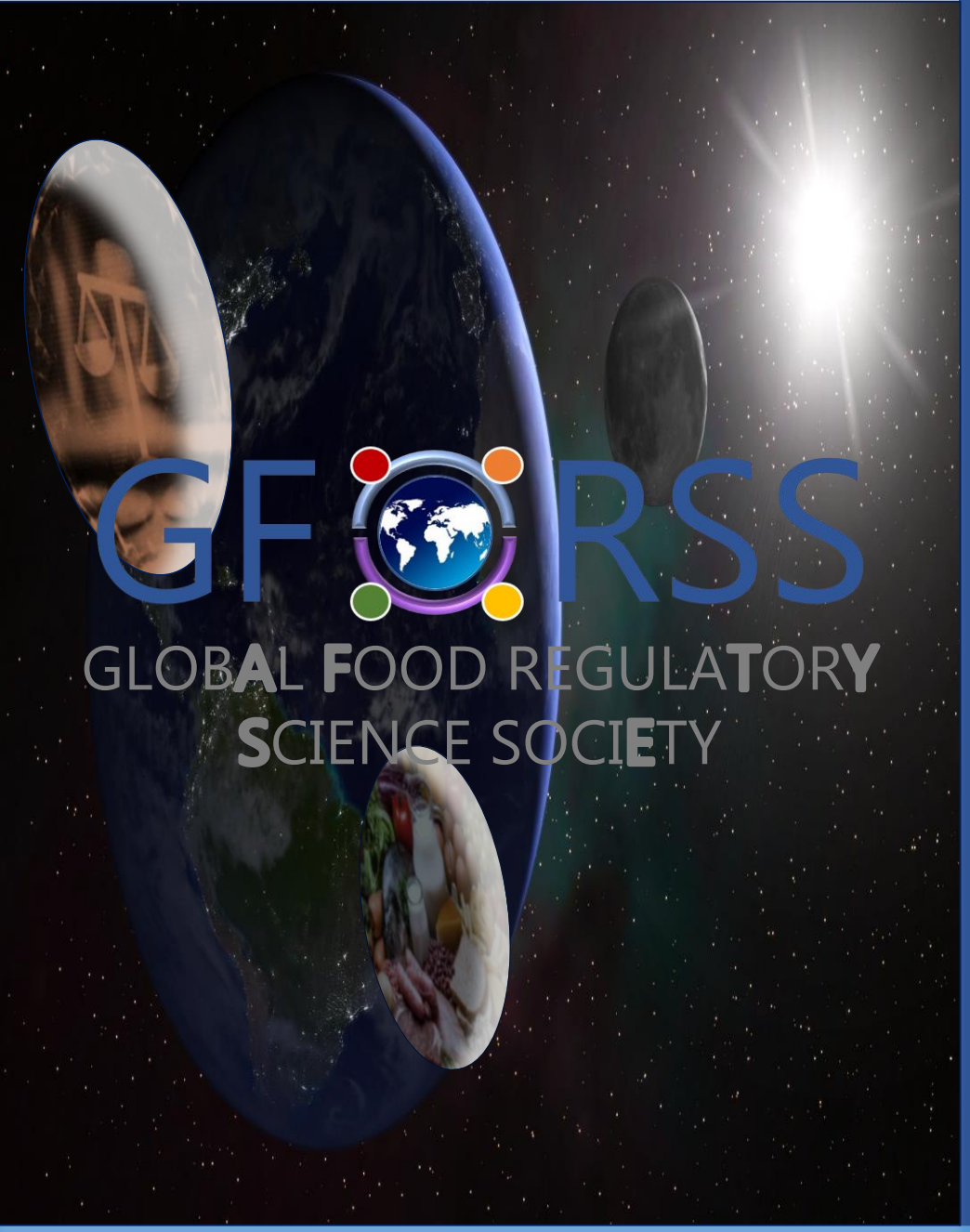


Introduction of the Arab Food Monitoring Database

Methodology of Development and Implementation

Day 1 – 26 February, 2023

13:45 – 14:30

Dr. Jérémie Théolier | *Global Food Regulatory Science Society (GFoRSS)*

Objectives

- ❑ Building a database to help for future risk assessments
- ❑ Countries of the MENA region
  - 22 countries
- ❑ Food contaminants in food
  - Pesticides, mycotoxins, heavy metals, antibiotics, veterinary drugs, etc…
- ❑ Based on published data

Methodology: Data collection

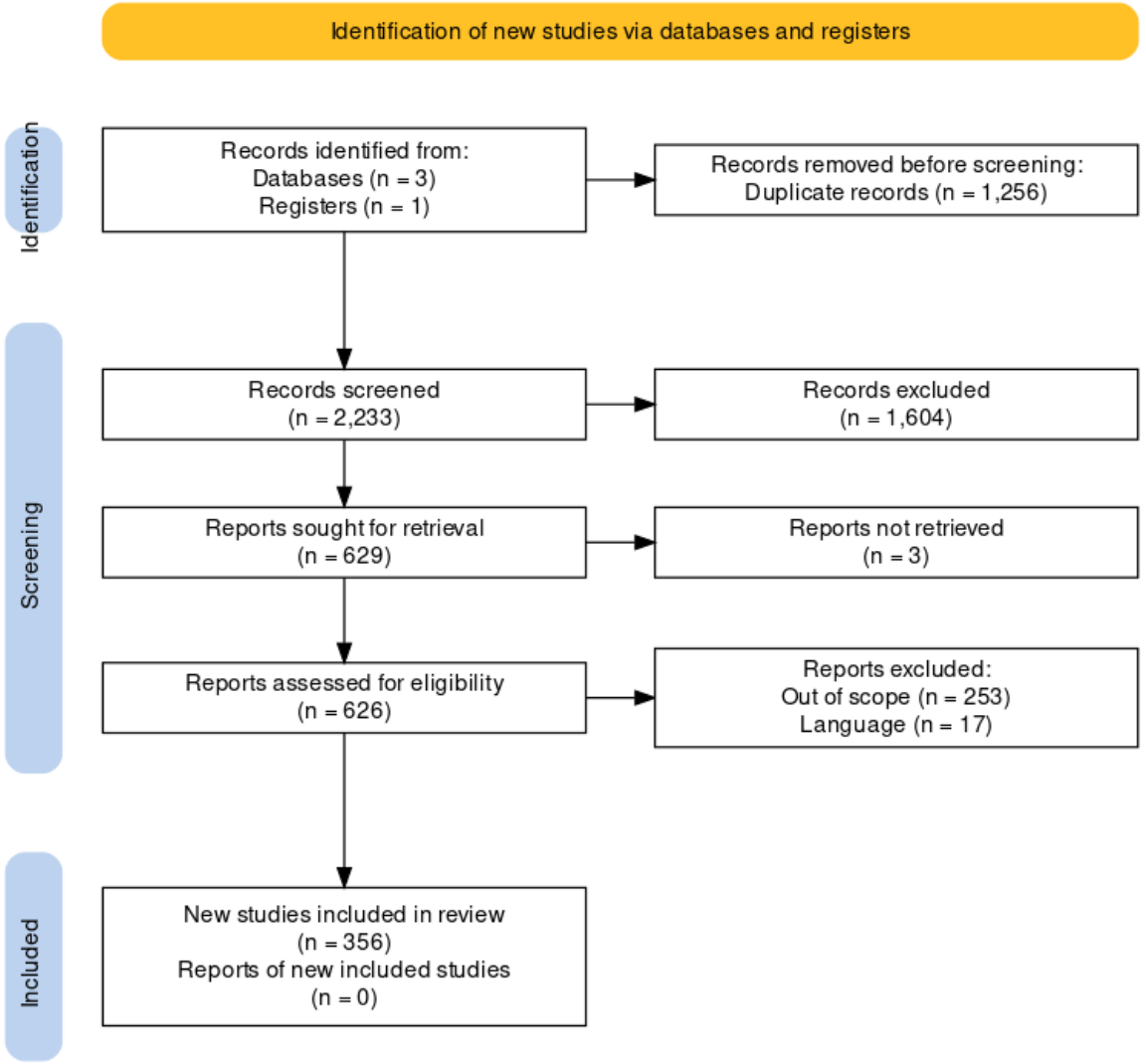
- ❑Systematic review of the litterature
- ❑Articles included in this review were selected using research engines such as PubMed, Ovid, Cochrane, Elsevier/ScienceDirect, Research Gate, and Google Scholar.
- ❑Collect ALL of the retrieved records from each search into a reference manager, such as Endnote, Zotero or Mendeley, and de-duplicate the library prior to screening.
- ❑Period: 2005 – Present days
- ❑So far, Pesticides and heavy metals are done, mycotoxins is ongoing

Methodology: Data collection (cont'd)

Results of literature review for pesticides and heavy metals only.

Several journals have been excluded de facto.

Evaluation of data reliability will be done case by case



Methodology: Data collection (cont'd)

- ❑ All peer-reviewed papers found were screened for relevant content
- ❑ Determination of exclusion criteria
  - Peer reviewed journals
  - The lack of sampling plan is prohibitive
  - The lack of stats is prohibitive
  - Occurrence and concentration results
  - No shady peer reviewed journals without analytical quality assurance
  - No duplicate results (e.g no review… or results published twice?!)

Methodology: Data collection (cont'd)

- Were taken into consideration
  - Publications about occurrence and concentration of mycotoxins in Food (not feed)
  - Validation studies using commercial samples
  - Environmental publications when they used potential food samples (crustaceans or molluscs for example)

- Were discarded
  - Publication without analytical results for food
  - Water samples from environmental sampling
  - Review

Methodology: Data collection (cont'd)

Environ Monit Assess (2015) 187: 68
DOI 10.1007/s10661-015-4269-0

Environmental Science and Pollution Research (2021) 28:68090–68110
https://doi.org/10.1007/s11356-021-16558-8

REVIEW ARTICLE

Check for updates

A review on occurrence of emerging pollutants in waters of the MENA region

Imen Haddaoui[1,2] · Javier Mateo-Sagasta[3]

Methodology: Data processing

- Data coming from scientific paper
  - DATA = INFORMATION + NOISE
- Number of data needed
  - As many samples as necessary to certify the reliability and representativeness of your model
- The quality (difficult in our case)
  - The instrumental noise
  - The composition of the sample and the possible interferences
  - The influence of the environmental conditions

Methodology: Data processing (cont'd)

What kind of variables?

- Obvious one: Countries and Contaminant
- Year of sampling
- Food group/name
- Food origin (for import/export purpose)
- State of the food (liquid/solid/paste/raw…)
- Technical variables: Analytical technique, LOD/LOQ, Analytical quality assurance, recovery
- Analytical variables: Concentration min/max, Average, Median, RSD, Number of samples below LOD, Individual/pooled sample

Implementation

Proof of concept: www.foodsafetylebanon.org

Excel CSV Print

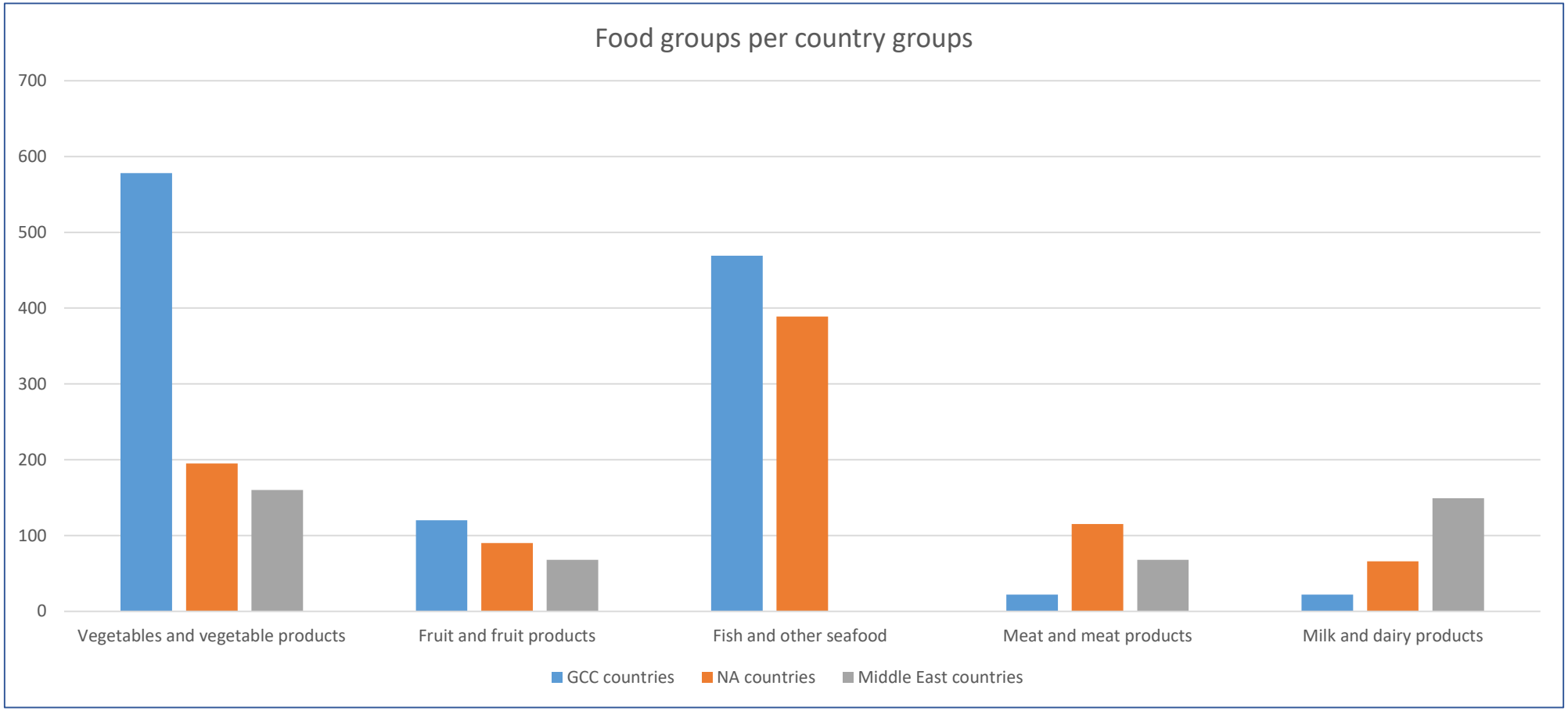
Show 10 entries

clear	Year	Country	Contaminant	Food Group	WHO Food Identifier	WHO Food Code	Food Name	Food Origin	State of the Food Analyzed
	Search Year	Search Country	Search Contaminant	Search Food Group	Search WHO Food Iden	Search WHO Food Cod	Search Food Name	Search Food Origin	Search State of the Foo
R	2013	Lebanon	Fe	Legumes and pulses	Chick-pea	VD 0524	N/A	Locally consumed	Canned (liquid+seeds)
R	2013	Lebanon	Sn	Legumes and pulses	Chick-pea	VD 0524	N/A	Locally consumed	Canned (liquid+seeds)
R	2013	Lebanon	Pb	Legumes and pulses	Chick-pea	VD 0524	N/A	Locally consumed	Canned (liquid+seeds)
R	2013	Lebanon	Cd	Legumes and pulses	Chick-pea	VD 0524	N/A	Locally consumed	Canned (liquid+seeds)
R	2019	Lebanon	As	Cereals and cereal-based products	White bread	CP 1211	N/A	Locally consumed	Baked

Results (pesticides)

- Valid data for 16 countries
- 108 articles in total
- 3302 data points
- 491 different pesticides
- 136 food commodities

Results (pesticides) cont'd



Results (pesticides) cont'd

Food commodities with more than 100 data points

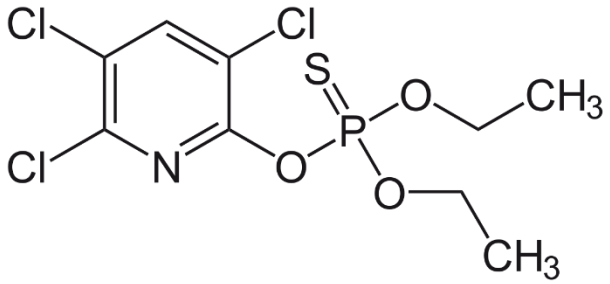
FOOD COMMODITIES	Total number of data points/food commodity	Egypt	# articles
Marine fishes	263	0	0
Cucumber	190	82	4
Honey	181	47	4
Tomato	156	23	2
Fresh water fishes	155	155	9
Oysters	123	0	0

Results (pesticides) cont'd

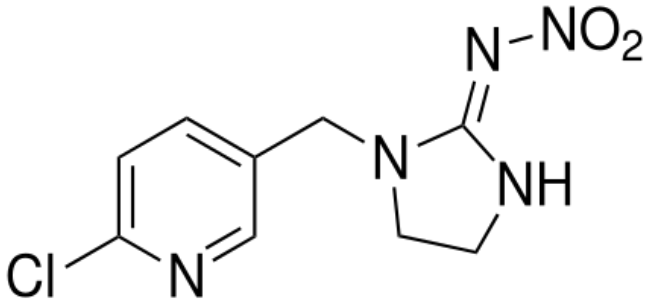
Countries	Number of real articles	Number of Data points	Number of Pesticides	Classes of Pesticides	Most Common Pesticides	Number of Food group tested	Most Common Food Groups	Most Common Food Commodities	Year Range
Egypt	29 (26%)	607 (18%)	106 (15%)	Acaricide and Insecticide (20) Fungicide (41) Insecticide (391) Miscellaneous (146)	DDT + DDD derivatives (75) Aldrin + Dieldrin (57) Heptachlor (32) Chlorpyrifos (28) Lindane (28) Hexachlorobenzene (26) HCH (24)	10	Fish and other seafood (155)	Fresh Waters Fishes (155) Cucumber (82) Honey (47) Potato (40) Tomato (23)	[2008 - 2021]
TOTAL	110	3300	695						

Results (pesticides) cont'd

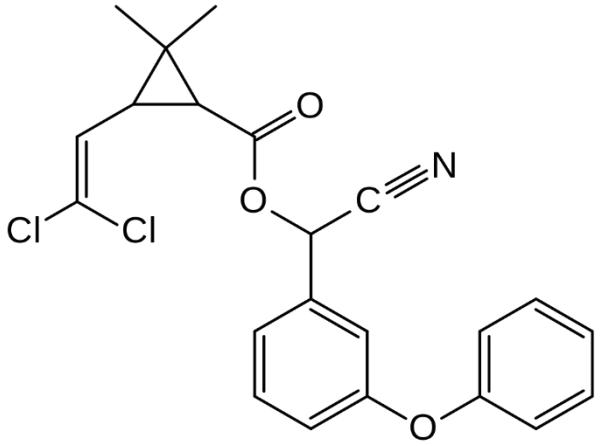
5 most tested pesticides:



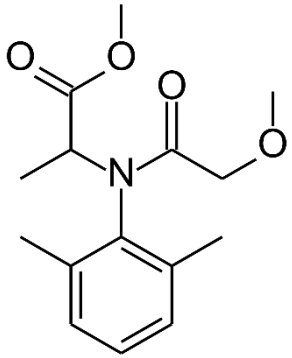
Chlorpyrifos (insecticide and acaricide)
Banned in several countries



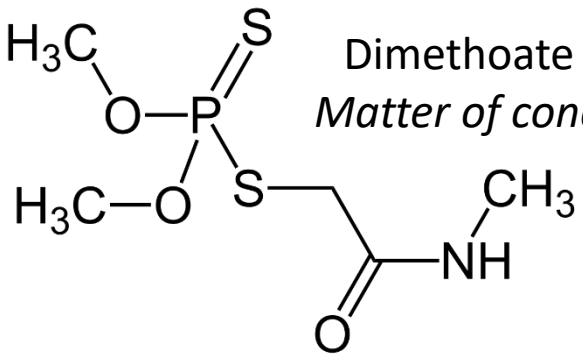
Imidacloprid (insecticide)
Most widely used pesticide in the world (Neonicotinoid)



Cypermethrin (insecticide)



Metalaxyl (fungicide)
Resistance issue



Dimethoate (insecticide)
Matter of concern in the EU

Results (heavy metals)

- Valid data for 20 countries (no data for Comores and Somalia)
- More than 192 articles in total
- 3560 data points
- 41 different heavy metals
- About 175 food commodities

Results (Heavy metals) cont'd

Countries	Number of real articles	Number of Data points	Number of Heavy metals tested	Most tested Heavy metals	Number of Food groups tested	Most Common Food Groups	Most Common Food Commodities	Year Range
Egypt	47 (24%)	638 (18%)	23 (56%)	Cadmium (133) Lead (112) Copper (96) Zinc (88) Chrome (50) In total 75% of the samples	20	Fish and other seafood (143) Vegetables (107) Fruits and derived (77)	Fresh Waters Fishes (155) Cucumber (82) Honey (47) Potato (40) Tomato (23)	[2006 - 2022]
TOTAL	192	3559	41					

Results (Mycotoxins)

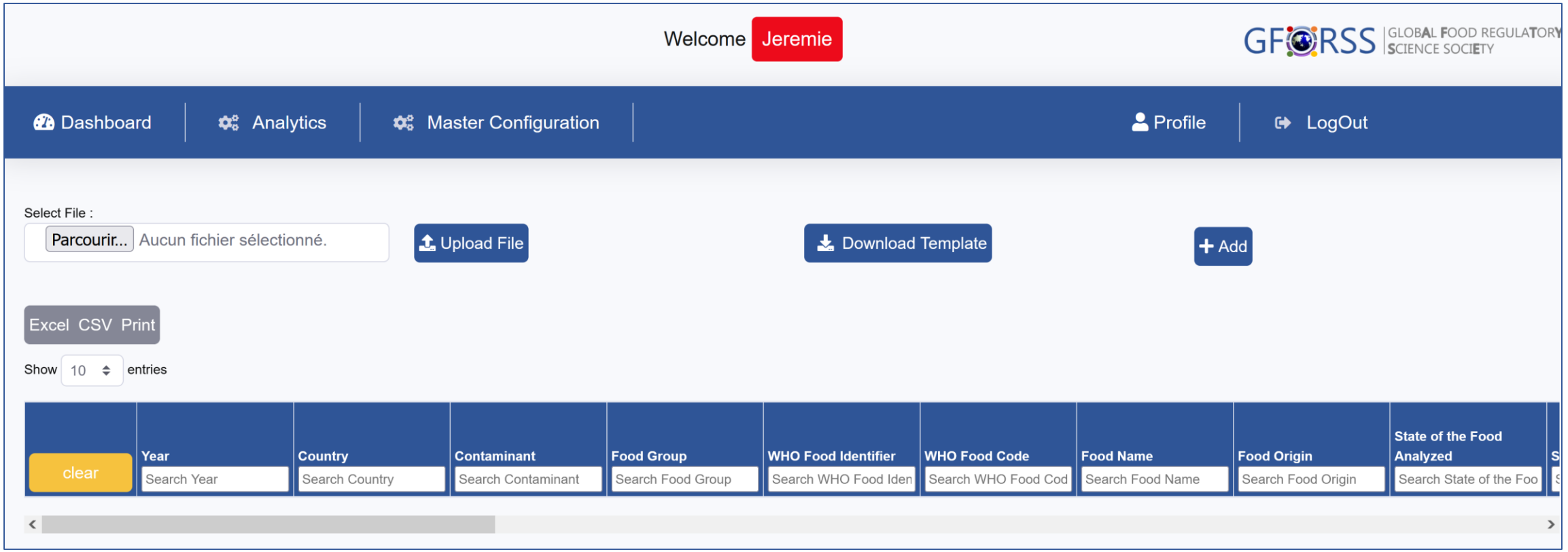
- Ongoing data collection
- 62 articles collected so far
- 587 data points
- More than 30 mycotoxins (Warning)
- About 100 food commodities so far

Results (Mycotoxins) cont'd

Countries	Number of real articles	Number of Data points	Number of mycotoxins tested	Most tested Mycotoxins	Number of Food groups tested	Most Common Food Groups	Most Common Food Commodities	Year Range
Egypt	10 (16%)	75 (13%)	15 (47%)	OTA (14) AFB1 (12) AFB2 (9) AFG!(8) AFG2 (8) In total 68 of the data points	6	Cereal and cereal based products (38) Milk and dairy (9)	Maize (12) Wheat (12) Barley (6)	[2008 - 2021]
TOTAL	62	587	32					

Next step

Arab Food Monitoring Database: www.arabfoodsafety.org



Next steps

- ❑Completion of the database for mycotoxins
- ❑Other contaminants (veterinary drugs, antibiotics, etc…)
- ❑Completion of already implemented food contaminants with:
  - New studies (2022 and 2023)
  - Old data previously not identified
  - Other data sources (e.g. government food monitoring results)
- ❑Complete review of the database (to find mistakes)
- ❑Two reviews in preparation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