Final report

Product safety and integrity issues in Australian red meat: reports in international databases

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Abstract

To identify both actual and potential food safety risk and fraud arising from the use of Australian red meat products in Australian and (potential) export markets, the MLA Food safety program has subscribed to the *Food Forensics Newsletter*, Fera HorizonScan, Descernis Horizon Scanning and Risk Plaza. These reporting services for product integrity issues to provide warning of incidents around the world which need to be considered by the Market Access Science team in developing the research programme. Data sourced from this report are from online subscription based information services. These services provide comprehensive, scientific basis for assessing supply chain risks, risk assessments and Supplier Check tools tracking current and historical global food fraud and contamination issues.

From the data it can be concluded that meat is an attractive commodity for fraud, however Australia is of low risk due to its strict regulatory systems. It had 1 case of adulteration/substitution and 1 case of fraudulent documentation, however these cases did not show the Australian industry being the perpetrators. It should be noted that the results are limited to known and published cases, therefore the true extent of fraud may be higher.

For the Australian red meat industry, this report is reassuring that our strict regulatory systems conforms to major exporting partners, which is evident by the lack of reported issues related to Australian red meat products. In addition it also shows Australia has very good hygiene standards.

Executive summary

Background

Food safety regulatory authorities are tasked with safeguarding consumers' interests by ensuring the food they eat meets relevant food safety standards. Sound food safety policies and risk management decisions are required to ensure food safety issues of highest concern are identified, and the appropriate control measures are implemented. Countries face multiple and varied food safety risks and issues depending on consumption patterns, production processes, and trading patterns. Assuring food safety is important for a range of development outcomes, and food safety decision making often plays out at a juncture where interests of various sectors co-exist.

To identify both actual and potential, food safety risk arising from the use of Australian red meat products in Australian and (potential) export markets the MLA Market Access Science programme has subscribed to the *Food Forensics Newsletter*, Fera HorizonScan, Descernis Horizon Scanning and Risk Plaza. These reporting services for product integrity issues provide warning of incidents around the world, which needs to be considered by the Market Access Science team in developing the research programme.

Objectives

The main objective of registering to the reporting services are to:

1. Summarise the risk reported by countries, the trend of Australian risk and risk of other countries.
2. Provide information to assist meat businesses with VACCP (vulnerability assessment) and TACCP (threat assessment) development for the Food safety plan.

Methodology

Data sourced from this report are from online subscription based information services such as Fera HorizonScan, Descernis Horizonscanning, and Risk Plaza. These services provide food safety comprehensive, scientific basis for assessing supply chain risks, risk assessments and Supplier Check tools tracking current and historical global food fraud and contamination issues in near real time.

The data does not scan or may not include all inspection results and port of entry rejections from regulator reports for example the United States Department of Agriculture (USDA) or Japanese's Ministry of Health, Labour and Welfare (MHLW) Inspection.

Results/key findings

From the data it can be concluded that meat is an attractive commodity for fraud, however Australia is of low risk due to its strict regulatory systems. There was 1 case of adulteration/substitution and 1 of fraudulent documentation, however these cases did not show the Australian industry being the perpetrators. It should be noted that the results are limited to known and published cases, therefore the true extent of fraud may be higher.

Benefits to industry

Although meat is an attractive item to fraudsters, for the Australian red meat industry, this reports is reassuring because it demonstrates that our strict regulatory systems conforms to major exporting partners, evidenced by the lack of reported issues related to Australian red meat products. In addition it also shows that Australia has very good hygiene standards.

Future research and recommendations

No further research is required, however it is recommended that the subscription on risk reporting services should continue to ensure changes can be identified early and research and industry can respond.

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1. Background

All countries are concerned with the need to establish clear priorities in order to make best use of finite resources, and to ensure that decisions to ensure food safety do not negatively impact on other dimensions essential for development, e.g. trade, economics, food security, tourism, social well-being. Unsafe food has the potential to negatively impact on certain sectors e.g. nutrition and health outcomes, and food can be unsafe as a result of action or inaction in other sectors e.g. agriculture development, the environment.

Food safety regulatory authorities are tasked with safeguarding consumers' interests by ensuring the food they eat meets relevant food safety standards. Sound food safety policies and risk management decisions are required to ensure food safety issues of highest concern are identified, and the appropriate control measures are implemented. Countries face multiple and varied food safety risks and issues depending on consumption patterns, production processes, and trading patterns. Assuring food safety is important for a range of development outcomes, and food safety decision making often plays out at a juncture where interests of various sectors co-exist.

The Food safety regulators also need to account for food fraud and tampering due to the potential impact of Food safety. Unfortunately, food fraud and food tampering is big business and, like any other business, perpetrators generally have no wish to make their customers sick and thus call attention to their activities. Therefore, it is unlikely they would intentionally put the public health at risk. However, such risks can occur due to inexperienced or untrained food handlers, bad packaging causing food spoilage, unlabelled or mislabelled ingredients.

Vulnerability Assessment Critical Control Points (VACCP) and Threat Assessment Critical Control Points (TACCP) has emerged during the previous decade as standards agencies, government regulators and industry groups started considering methods to prevent food fraud and malicious tampering. VACCP is for food fraud and TACCP is for food defence. The acronyms are designed to leverage the food industry's familiarity with HACCP. However, the critical control 'points' in a VACCP and TACCP plan are, in fact, nothing like the control points in a HACCP plan. The control points in a HACCP plan are operational steps in a manufacturing process; the process is generally linear and the 'control points' are operational processes over which the food manufacturer can exercise direct control.

In contrast, the actions that are required to prevent deliberate tampering within a food supply chain do not sit comfortably on a linear set of operations. The terms VACCP and TACCP are falling out of favour within the food fraud and food defence communities.

To identify both actual and potential, food safety risk arising from the use of Australian red meat products in Australian and (potential) export markets the MLA Food safety program has subscribed to the *Food Forensics Newsletter*, Fera HorizonScan, Descernis Horizon Scanning and Risk Plaza. These reporting services for product integrity issues to provide warning of incidents around the world, which needs to be considered by the Market Access Science team.

2. Objectives

1. Summarise the risk reported by countries, the trend of Australian risk and risk of other countries.
2. Provide information to assist meat businesses with VACCP (vulnerability assessment) and TACCP (threat assessment) development for the Food safety plan.

3. Methodology

3.1 Source of data

Data sourced from this report are from online subscription based information services such as Fera HorizonScan[1], Descernis Horizonscanning[2], and Risk Plaza[3]. These services provide food safety comprehensive, scientific basis for assessing supply chain risks, risk assessments and Supplier Check tools tracking current and historical global food fraud and contamination issues in near real time. The data reported from these databases are from published sources available on the internet including:

- Official websites such as Canadian Food Inspection Agency, The European Union, Rapid Alert System for Food and Feed (RASFF) Portal or
- News websites such as *Food Safety News*, *Food Navigator* or
- Publications such as Wiley Online library

The data does not scan or may not include all inspection results and port of entry rejections from regulator reports for example the USDA or Japanese's Ministry of Health, Labour and Welfare (MHLW) Inspection.

3.2 Types of risk for Fraud

Table 3 below shows different types of fraud that criminals use and also examples of how it's used.

Table 3.0 – Type of fraud risk

Type	Description	Example
Substitution/Counterfeiting	Replacing the product with another undeclared product or copying product such as brands and packaging	Beef substituted for horse meat, or fake country of origin
Concealment	Hiding the low quality of a food product or increase volume by adding unlabelled product	Treating meat with chemicals such as preservatives to mask deterioration or unapproved ingredients
Mislabelling / Fraudulent documentation	False or fake information on product packaging.	Beef claimed to be Wagyu but could be from Angus instead. Meat that has been frozen but thawed then sold as fresh.
Dilution or Addition	Patrial replacing or adding product with another undeclared ingredient or product.	Mixing of any other type of meat or adding water and passing off as 100% beef sold as beef burger patties.
Black market	Trading or producing products that are illegally obtained.	Criminal skilled in stealing animals, illegally slaughter and introducing into the supply chain with fake documents.

[1] https://horizon-scan.fera.co.uk/
[2] https://decernis.com/solutions/food-fraud-database/
[3] https://riskplaza.com/

4. Results

4.1 Global risk assessment of fraud in meat products

The data sourced below are from Risk Plaza, which collects data from the online databases and news websites and adds in-house analytics. The risk of fraud of meat are highlight in the table below which can contribute to VACCP and TACCP plans, however the assessment is based on a global assessment of fraud.

Due to the price premium for Meat products it becomes a worthy target for fraud and criminal targets. Table 4 gives a list of fraud type and how often it occurs for product, High rating means it has occurred more than 10 times within the last 5 years.

Table 4.0 Types of fraud

Types of fraud	Risk rating*
Substitution/counterfeiting	High
Concealment	High
Mislabelling/fraudulent documentation	High
Dilution	High
Black market	High

***High:** More than 10 incidents in the past 5 years

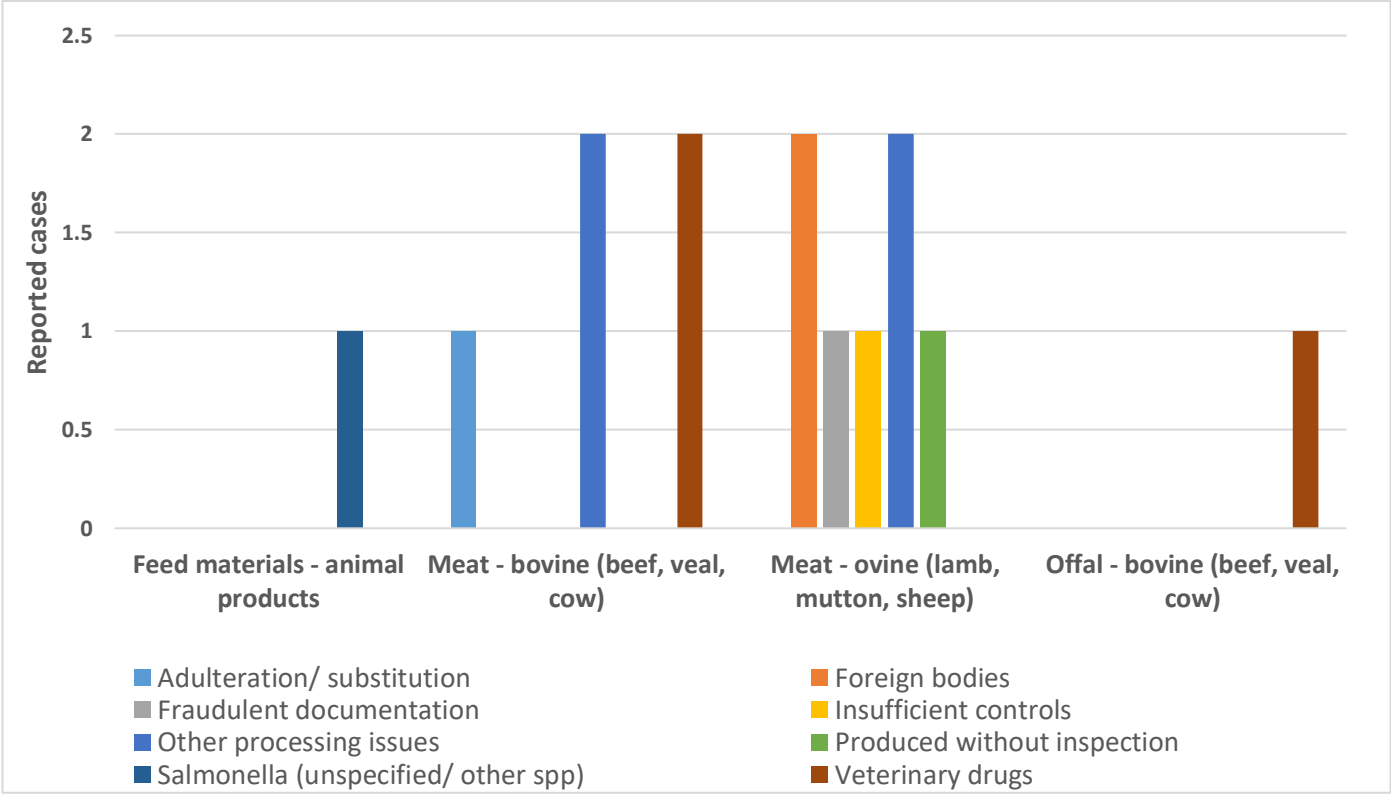
Due to the many types of fraud there is not one method which would provide protection from them all, you would need a combination, Table 4.1 gives the potential control measures for fraud and can be used in your plans.

Table 4.1 – Control measures for Fraud

Potential control measures	Examples
Streamline the supply chain or purchase from primary producer	Reduce the number of parties/supply chain partners involved by streamlining the supply chain or buy from the primary producer otherwise a supplier as close as possible to the source.
Prefer single ingredients over pre mixed ingredient supplier	Purchasing whole product or ingredient where possible, and consider using single ingredients and mixing in-house.
Audit suppliers, agents and traders	Consider auditing the supplier, agents or traders to the same standards of the food authority to ensure the supplier has a robust food fraud management system in place. Things to consider during audit are whistleblowing policy, integrity manager and food fraud in the supplier assessment.
Purchase raw material from countries with fewer food fraud incidents or low corruption index	Contemplate purchasing raw material that originates from through a country or countries where fewer or no food fraud incidents (RASFF portal, USP database, FAIR database, EC Knowledge Centre for Food Fraud and Quality) or with a low corruption index (www.transparency.org).
Use tamper proof or evident packaging	Using tamper proof or evident packaging if possible.

4.2 Reported issues related to Australian meat products (excluding Poultry)

Figure 4.0 – Number of reported issues for Australia in the past decade by Meat commodity - excluding Poultry



The graph above (Fig 4.0) shows the number of reported cases in the past 10 years based on different meat commodities from Australia

Table 4.2 - Reported issues for Australian products in the past decade 2010 - 2020

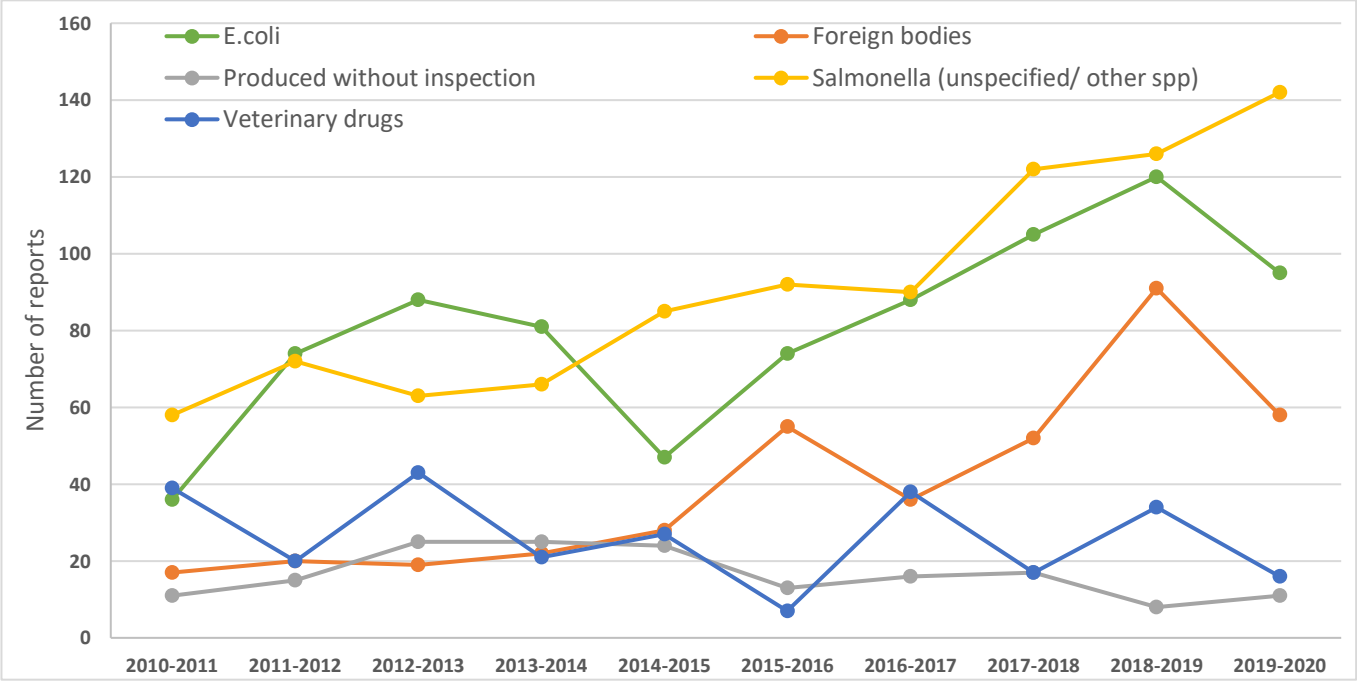
Commodity group	Hazard	Reason	Country of notification	Link	Date
Bovine (beef, veal, cow)	Processing issues	China suspends imports from four Australian slaughterhouses amid trade tensions	China	Read	13-May-20
Bovine (beef, veal, cow)	Processing issues	long delay before freezing of frozen beef from Australia, via Germany	Greece	Read	9-Oct-19
Ovine (lamb, mutton, sheep)	Processing issues	incorrect use of packaging for frozen lamb meat from Australia	United Kingdom	Read	13-May-19
Ovine (lamb, mutton, sheep)	Processing issues	incorrect use of packaging for frozen boneless lamb trimming from Australia	United Kingdom	Read	20-Aug-18
Ovine (lamb, mutton, sheep)	Fraudulent documentation	attempt to illegally import frozen lamb from Australia	Norway	Read	20-Jul-18
Feed materials - animal products	*Salmonella* (unspecified/ other spp)	Salmonella (present /25g) in meat meal from Australia	The Netherlands	Read	19-May-17
Ovine (lamb, mutton, sheep)	Foreign bodies	poor hygienic state (faecal contamination and hair) of frozen lamb foreshank from Australia	United Kingdom	Read	26-Apr-16
Ovine (lamb, mutton, sheep)	Insufficient controls	poor temperature control - rupture of the cold chain - (between -6.5 and -11.2 °C) of frozen sheep meat preparation (Ovis aries) from Australia	United Kingdom	Read	9-Sep-15

Ovine (lamb, mutton, sheep)	Produced without inspection	Firm Recalls Lamb Products Imported Without Benefit of Inspection	United States	Read	2-Jan-15
Bovine (beef, veal, cow)	Veterinary drugs	temporary ban on Australian beef imports contaminated with trenbolone	Kazakhstan	Read	22-May-14
Ovine (lamb, mutton, sheep)	Foreign bodies	lamb shank (Ovis aries) from Australia contaminated with faeces	United Kingdom	Read	5-Feb-14
Bovine (beef, veal, cow)	Veterinary drugs	impose temporary ban on shipments of Australian beef contaminated with trenbolone.	The Russian Federation	Read	28-Jan-14
Bovine offal (beef, veal, cow)	Veterinary drugs	impose temporary ban on the import following discovery of banned hormone trenbolone.	The Russian Federation	Read	17-Jan-14
Meat - bovine (beef, veal, cow)	Adulteration/ substitution	US beef labelled as South Korean or Australian beef in South Korea	The Republic Of Korea	Read	22-Oct-13

The items listed in Table 4.2 are as reported from the information source; the lack of reports demonstrate that it may not be a big problem with Australian products.

4.3 Analytical prioritisation for country

Figure 4.1 - Number of reports by hazard (top 5) for Meat and meat products (excluding poultry) globally per annum.



The graph Fig 4.1 shows the top 5 cases reported on meat and meat products (excluding poultry) for the past decade ranging from microbial contamination, chemical contamination and fraud. The graph shows there has been an increase trend for *Salmonella* reports in the past decade, which can be an indication health officials or countries are gaining interest on the topic or started to test more, therefore report more.

4.3.1 Microbial contaminants

The Analytical prioritisation is based on number of reports associated to the **country of origin** (where the product was from) and the frequency; the table below gives the criteria used for scoring. The risk rating results are in Figure 4.2 – 4.4, higher the number the higher the risk for products within that category, if scores are above 4 meaning there is more than one category that is of high risk.

Table 4.3 - Risk rating table

Risk Rating	Explanation	Score
High	Issues within the last 12 months	4
Medium	Issues within the last 2 years	3
Low	Issues within the last 3 years	2
Very low	Previous history of issues (more than 3 years ago)	1

In product category of - Meat - bovine (beef, veal, cow), Meat - caprine (goat, kid), Meat - ovine (lamb, mutton, sheep), Meat, minced, ground - bovine (beef, veal, cow), Meat, minced, ground - ovine (lamb, mutton, sheep), Offal - bovine (beef, veal, cow), Offal - ovine (lamb, mutton, sheep).

Figure 4.2 – Risk rating for microbial contaminants in Meat and meat products (excluding poultry) by country of origin.

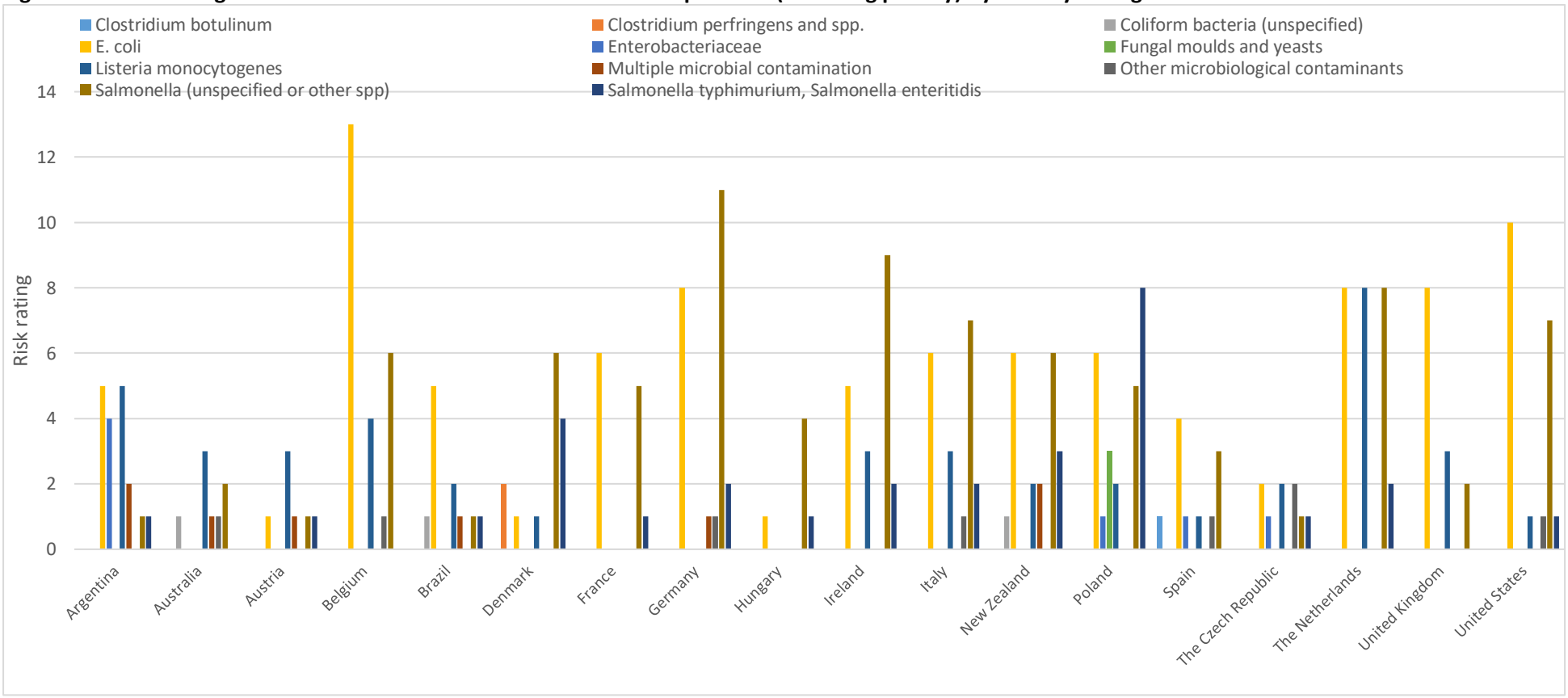


Fig 4.2 shows the Risk rating from each country for microbial contaminant, (higher the number the higher the risk, refer to table 4.2) and is based on product from Country of origin, meaning the total risk of that country for a particular microbial contamination. For example E.coli is rated as High risk for Belgium due to it scoring over 4 points and having those events has happened in the past 12 months. Appendix 7.1 will have an expanded view of all countries in table format which aren't shown in Fig 4.2.

4.3.2 Fraud in Meat and meat products (excluding poultry)

Figure 4.3 - Risk rating for fraud in Meat and meat products (excluding poultry) by country

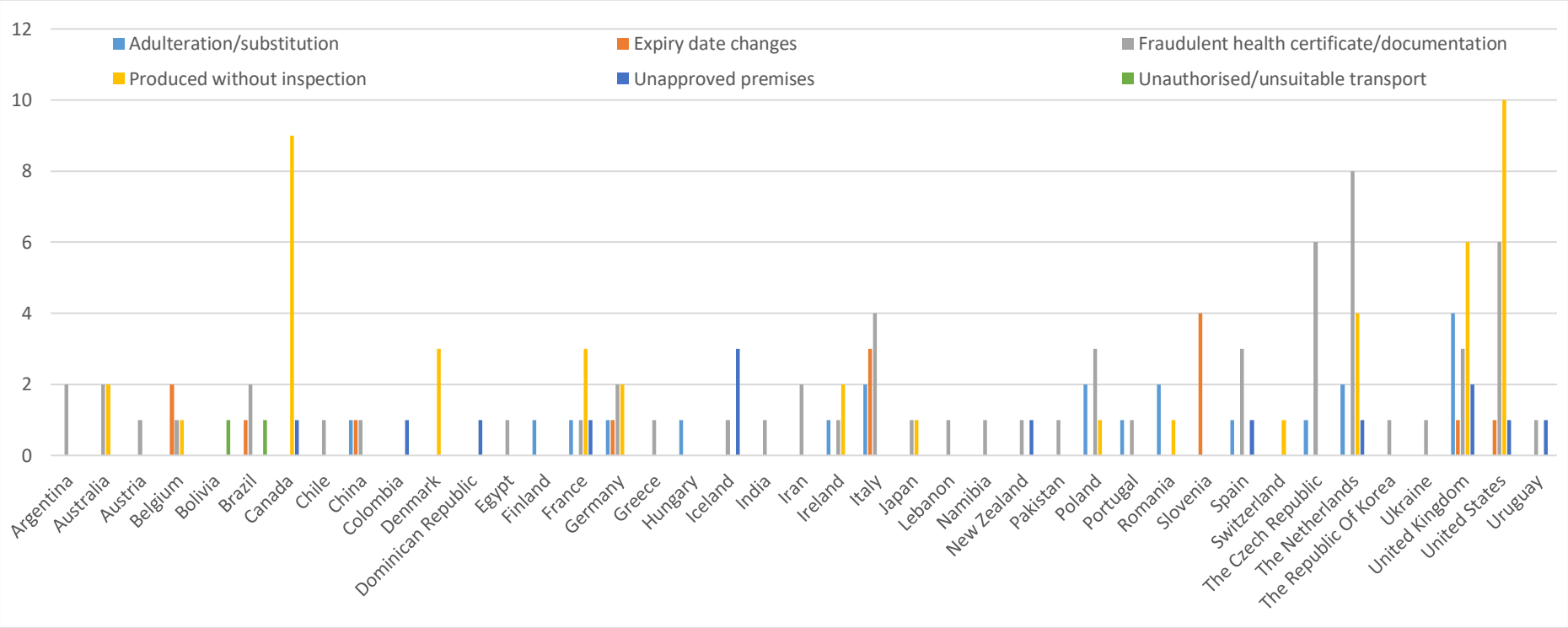


Fig 4.3 shows the Risk rating for each country of origin for fraud related risk, (higher number means higher the risk, refer to table 4.2). Once again referring to the Risk table, a score of higher than 4 means the problem has occurred more than once within the year. Once again the data only shows reported cases which are available to the public, thus we may not see the true impact of in-market fraud.

4.3.3 Vet chemical contaminants

Figure 4.4 - Risk rating for Vet chemical contaminants in Meat and meat products (excluding poultry) by country

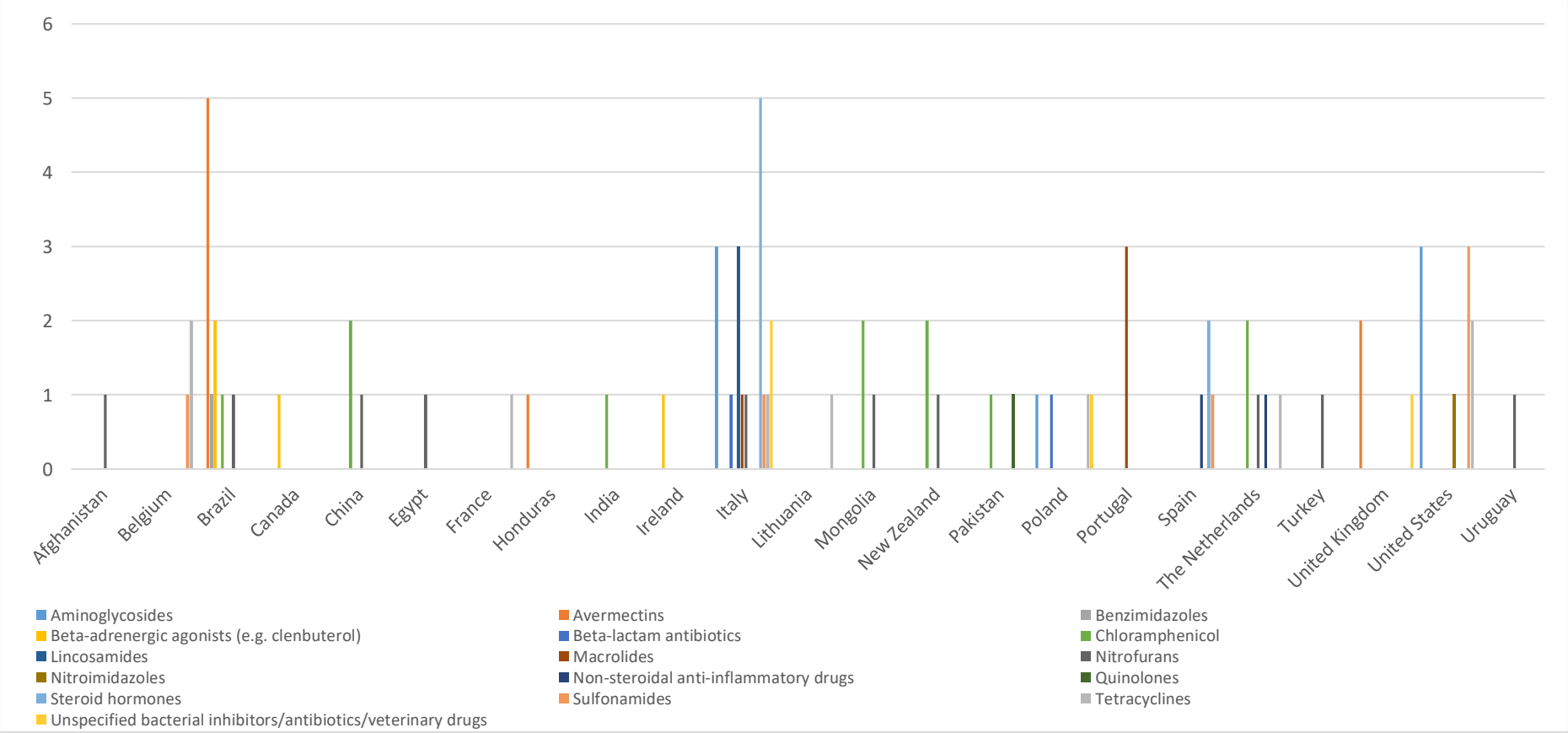


Fig 4.4 shows the Risk rating for each country of origin for veterinary chemical related risk, (higher number means higher the risk, refer to table 4.2) It appears Australia has not had a detection in the past 3 years.

4.4 Country of reporting in the past decade

The total number of reported cased between 2010 – 2020 by country, there may be cases which are not in this report for reasons such as the exporting country has decided to remove the product prior to entering the country. The data does not include inspection results and port of entry rejections from summarised regulator reports for example the USDA or Japanese's Ministry of Health, Labour and Welfare (MHLW) Inspection.

Australia like other countries also test and report on imported products via the "Imported Food Inspection Scheme", however Figure 4.5 – 4.7 does not show Australia on the graph, this is due to Australia not finding any issues on imported products that are in the product category of "Meat and meat products (excluding poultry)".

4.4.1 Reported E.coli cases including STEC

Figure 4.5 – Total number of reported detections by importing country for *E. coli* including STEC in the past decade.

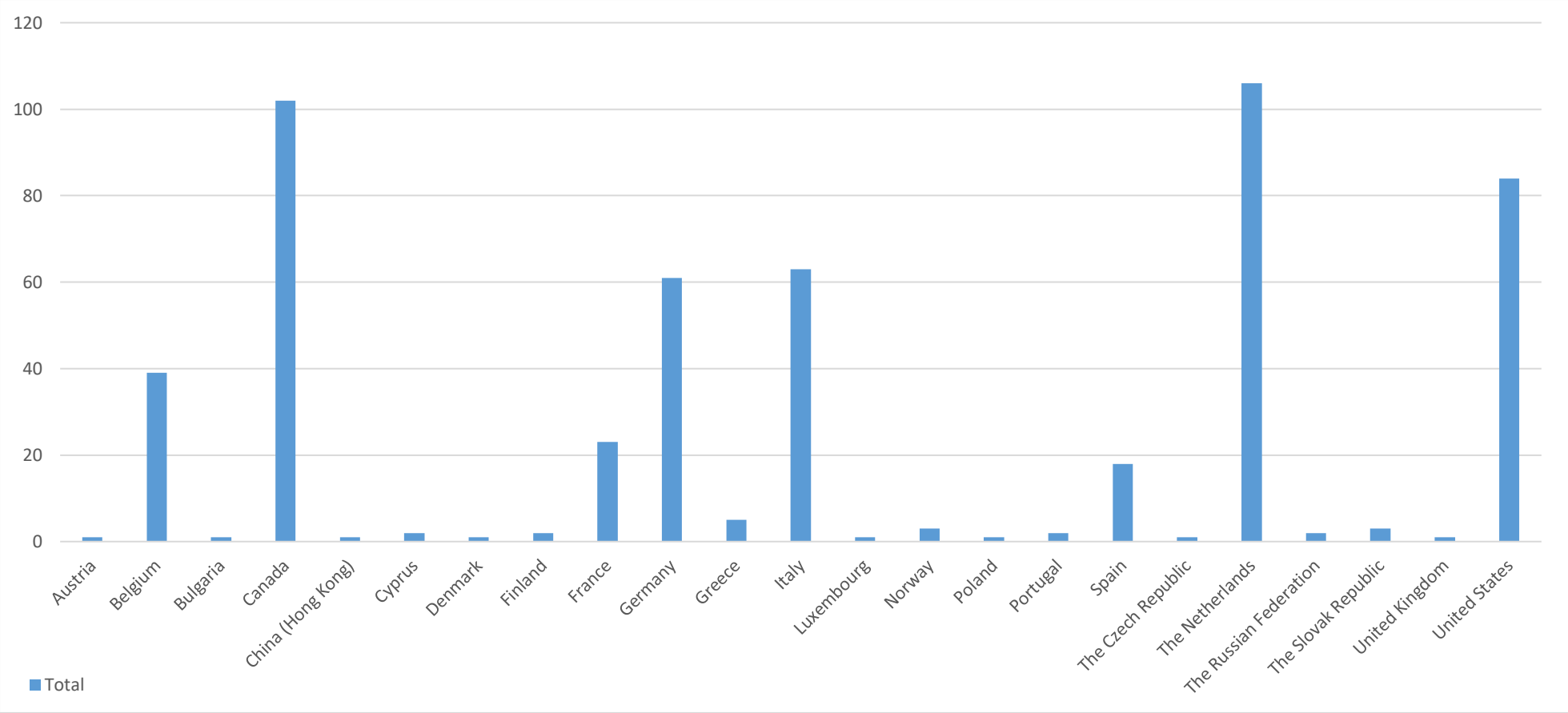


Figure 4.5 shows the number of reported cases by country, this will give the indication of the amount of testing of product entering the destination country. This will give suggestion of that countries interest for STECs, as the figure above shows United States, Canada and The Netherlands are reporting the most cases. The high numbers could also be due to the imported products having higher prevalence of STECs.

4.4.2 Reported *Salmonella* detection

Figure 4.6 - Total number of reported detection by imported country for *Salmonella* in the past decade.

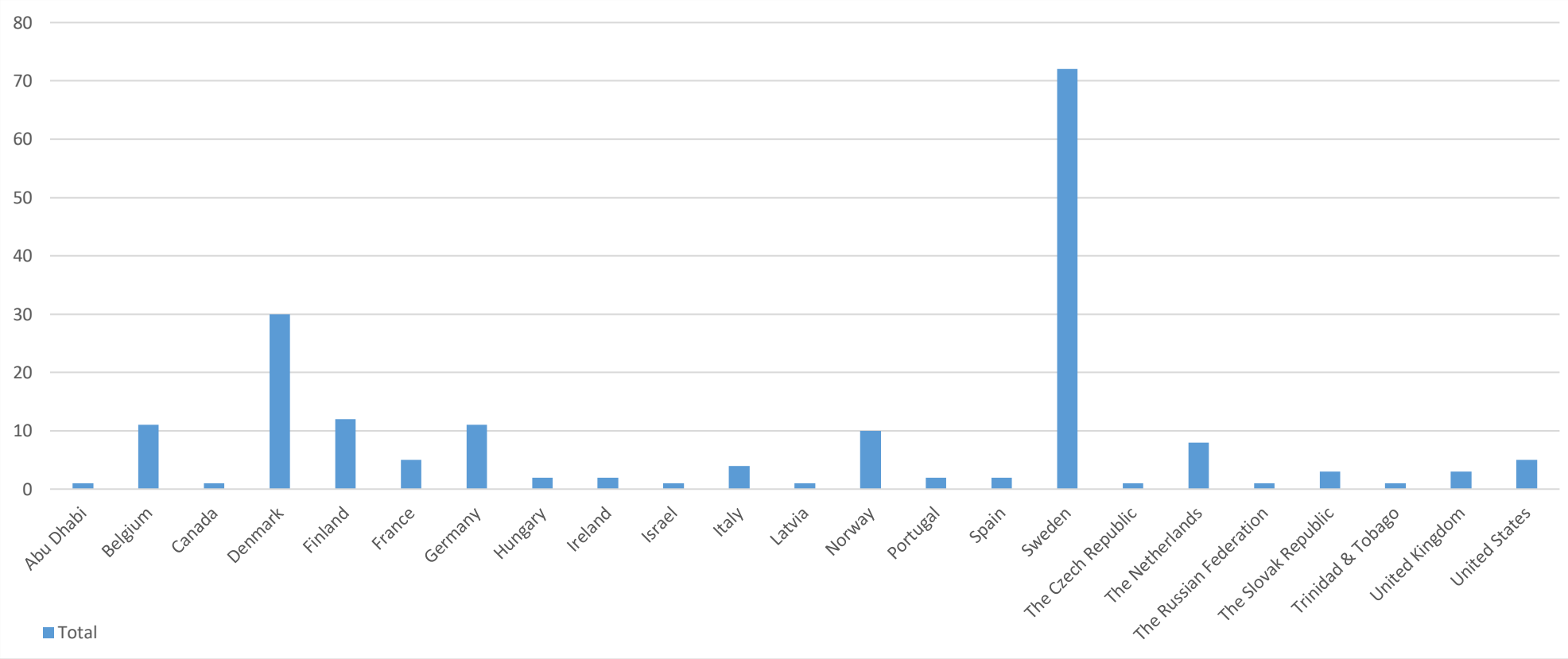


Fig 4.6 shows the number of reported cases by country, which will give an indication of the amount of testing of product entering the destination country. The results may be a result of that country's interest in *Salmonella*, as the figure above shows Sweden is reporting the most cases. In recent times, markets are starting to be interested in testing for *Salmonella*.

4.4.3 Reported fraud type cases

Figure 4.7 - Total number of reported cases of fraud, by importing country in the past decade.

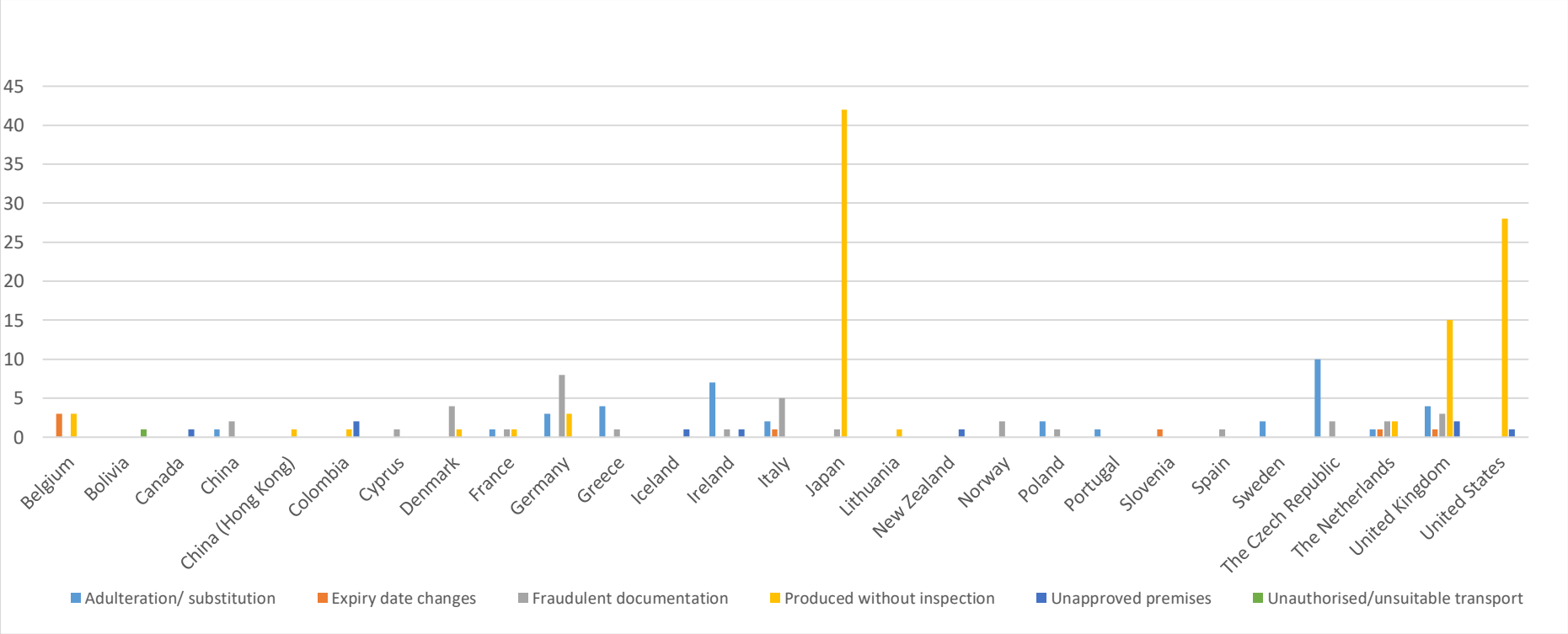


Fig 4.7 shows the number of reported fraud cases by importing country, this will give the indication of the type of fraud issues the destination country is interested in. This will give suggestion of certain issues importing country should pay close attention to. For example Japan has reported high number of cases of product produced without inspections, this could mean the documentation was not completed to the requirements.

5. Conclusion

Around the world meat is an attractive commodity for fraud and criminal activity due to the price premium it can get. The Food safety regulators need to account for food fraud and tampering due to the potential impact of Food safety. Therefore, the term VACCP and TACCP has emerged during the previous decade as standards agencies, government regulators and industry groups started considering methods to prevent food fraud and malicious tampering

Australia, due to its high standards, regulatory controls and compliance has a total of 16 reported cases from other countries in the past decade. Of that, it has 1 case of adulteration/substitution and 1 case of fraudulent documentation, it should be noted these cases did not show the Australian industry being the perpetrators.

VACCP and TACCP should be considered in the food safety plan, however due to the high standards Australian businesses should consider themselves as being in the low risk category.

Ultimately the results are limited to known and published cases, therefore the true extent of fraud may be higher.

5.1 Key findings

- Meat is an attractive commodity for fraud
- Australian meat is low risk due to its highly regulated system
- Results are limited to known and published cases, therefore the true extent of fraud may be higher

5.2 Benefits to industry

Although meat is an attractive to fraud, for the Australian red meat industry, this report is reassuring that our strictly regulated systems conform to the requirements of major trading partners. This is evident by the lack of reported issues related to Australian red meat products. In addition, it also shows Australia has very good hygiene standards.

6. Future research and recommendations

- No further research is required; however, it is recommended that the subscription on risk reporting services should continue to ensure changes can be identified early and responded to by the industry.

7. Appendix

7.1 Risk rating for microbial contaminants in Meat and meat products (excluding poultry) by country

Table 7.1 below shows the Risk rating from each country for microbial contaminant, (higher the number the higher the risk and is based on product from Country of origin, meaning the total risk of that country for a particular microbial contamination. Fig 4.2 is a shortened version in graph format of selected country.

For example, *E. coli* is rated as High risk for Belgium due to it scoring over 4 points and having those events has happened in the past 12 months.

Country	Clostridium botulinum	Clostridium perfringens and spp.	Coliform (unspecified)	E. coli	Enterobacteriaceae	Listeria monocytogenes	Multiple micro contamination	Other micro contaminants	Salmonella (unspecified or other spp)	Salmonella typhimurium, Salmonella enteritidis
Argentina				5	4	5	2		1	1
Australia			1			3	1	1	2	
Austria				1		3	1		1	1
Belgium				13		4		1	6	
Botswana							1		1	
Brazil			1	5		2	1		1	1
Bulgaria								1		
Canada	1			9					1	
Chile						1				
China			1							
Croatia									2	
Denmark		2		1		1			6	4
France				6					5	1
Germany				8			1	1	11	2
Hungary				1					4	1
India								1	1	
Indonesia			3							
Iran		3								
Ireland				5		3			9	2
Israel						4			2	
Italy				6		3		1	7	2
Kazakhstan								1		
Latvia									1	
Lithuania									2	2
Malta									1	

Namibia						3			1	1
New Zealand			1	6		2	2		6	3
Norway									3	
Pakistan								1		
Paraguay			1	1			1		1	1
Poland				6	1	2			5	8
Portugal									1	
Romania								1		
Spain	1			4	1	1		1	3	
Swaziland									1	
Sweden									7	
Switzerland							1	1		
Thailand			1							
The Czech Republic				2	1	2		2	1	1
The Netherlands				8		8			8	2
The Slovak Republic								1	1	1
Turkey									2	
Ukraine							1			
United Kingdom				8		3			2	
United States				10		1		1	7	1
Uruguay			1	6		3			2	1