IAFP 2021 ANNUAL MEETING
18-21 July 2021

ORGANIC FARMING PRACTICES VERSUS CONVENTIONAL PRODUCTION: ASSOCIATED PATHOGENS AND FOOD SAFETY CONCERNS IN A SUSTAINABLE DEVELOPMENT

C. Rodriguez*[1,2], B. Taminiau [3], N. Korsak [3], G. Daube [3]

[1] UGC Aparato Digestivo, Hospital Universitario Virgen de la Victorla, Málaga, Spain
[2] Instituto de Investigación Biomédica de Málaga, Málaga, Spain
[3] University of Liege, Faculty of Veterinary Medicine, Department of Food Science & FARAH, Liège, Belgium

*cris.rdrz@gmail.com

INTRODUCTION

Organic agriculture has been strongly enhanced in the last years, as a consequence of a great consumer demand, a great concern for environmental health and a constant effort for a sustainable development based on green economy. Antibiotic use is less intensive in organic production, which may have a key impact in the circulation of antibiotic resistances in the human population. Organic farm practices seems to contribute to the optimal health status and decrease the risk of developing chronic diseases, may due to the lower content of cadmium and synthetic fertilizers and pesticides. But on the other hand, organic foods could have an important charge of enteric pathogenic bacteria, toxins or others. Practices as the use of natural animal manure or water sources, can increase the risk of freshly organic products contamination and contribute to the spread of foodborne pathogens.

PURPOSE

The aim of this work was to investigated the urgent food risk notifications and product recalls from the market associated with organic production in the last nine years in Europe. We identify the most common foodborne risks associated with organic foods.

METHODS

- ✓ We carried out a literature review of original research articles and systematic reviews that examined the incidence of foodborne pathogens in organic production, compared to conventional production.
- ✓ We use the RASFF portal (the Rapid Alert System for Food and Feed in Europe). This is a key tool to ensure the flow of information to enabling swift reaction when risks to public health are detected in the food chain)
- ✓ We used the interactive searchable online database to identify all official notifications (food recalls in Europe countries) associated to organic foods in the last nine years.

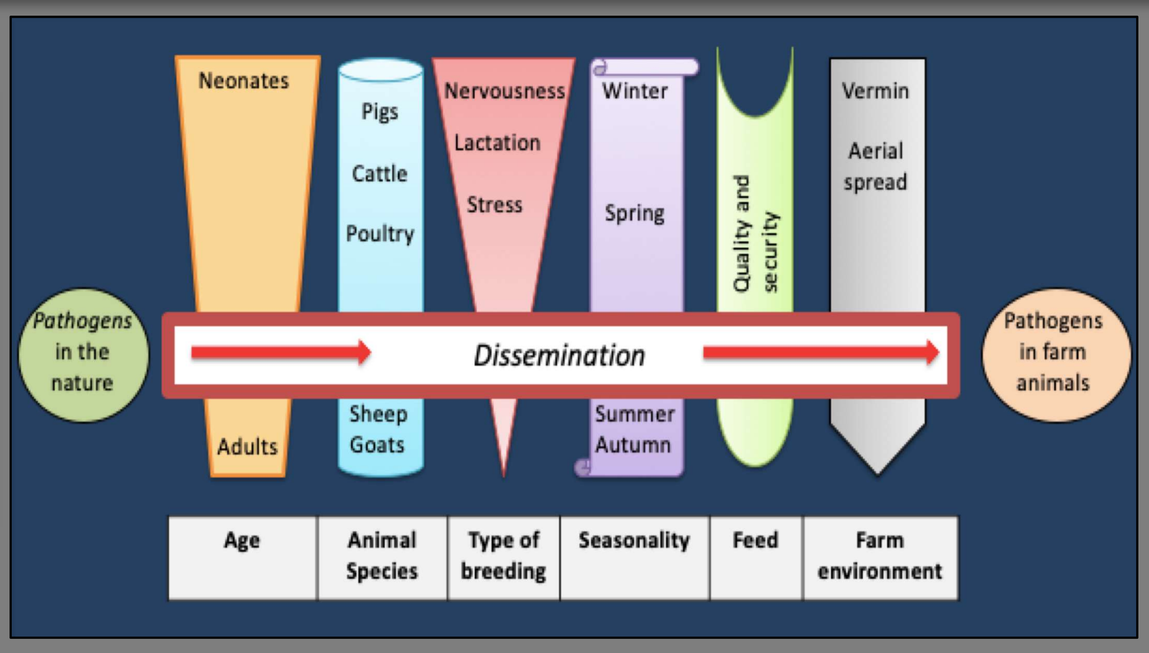

Figure 1. Illustration of the dissemination routes of pathogens during farming practices. Farming practices that could influence the pathogens load during production and harvest

RESULTS

Notifications associated with organic food

- ✓ The product type included “food”, “feed” or “food contact material”, and the notification was classified in ”alert”, “information” and “border rejection”.
- ✓ Original notifications represent a new case reported on a health risk detected in one or more consignments of a food or feed.
- ✓ Between 2012 and Mars 2021 a total of **118 notifications** associated with **organic food and pathogenic microorganisms** were communicated in the **European RASFF Portal**, and **90** of them (76.3%) were classified as a **serious risk decision**.
- ✓ ***Salmonella enterica*** was de predominant pathogen in organic food (92%, 83 out of 90 notifications), and **nuts, nut products** and **seeds** the main products concerned (50%, 45 out of 90 notifications).
- ✓ Other minor pathogens implicated were ***Bacillus cereus*** (3.3%), ***Clostridium sulphite reducer***, and **Norovirus** (both of them with 2.2%), in *fruits and vegetables* (3.3%), **meat and meat products** (other than poultry) (2.2%), and **herbs and spices** (1.1%).
- ✓ Regarding **antimicrobial resistances**, the published literature reported higher resistances in conventional production when pathogens like ***Campylobacter***, ***Salmonella*** and ***Escherichia coli*** were investigated in **poultry**, **swine** and **dairy products.**

Food alerts by country in Europe

CATEGORY	POLLUTANT	LEGEND
Herbs and spices	*Salmonella*	
	Pyrrolizidine alkaloids	
	Ethylene oxide	
Egg and eggs products	*Salmonella*	
Honey and royal jelly	*Oxymatrine*	
Milk and milk products	*E. coli*	
Bivalve mollusc and products	Biotoxins	
Nuts and nut products	*Ethylene oxide*	
	Salmonella	
	Aflatoxins	
Meat and meat products	*Potassium nitrate*	
	Listeria monocytogenes	
	Shigatoxin-producing E. coli	
	Salmonella	
Fish and fish products	*Listeria monocytogenes*	
Fruits and vegetables	Aflatoxins	
	Listeria monocytogenes	
	Salmonella	
Cereals and bakery products	*Ethylene oxide*	
	Ochratoxin A	
	Aflatoxins	
Cocoa and cocoa preparation	*Ethylene oxide*	
Dietetic foods and food supplements	*Ethylene oxide*	
	Salmonella	
Soups, sauces and other foods, fats and oils	*Ethylene oxide*	
	Listeria monocytogenes	
Feed and feed materials	*Ambrosia*	
	Salmonella	

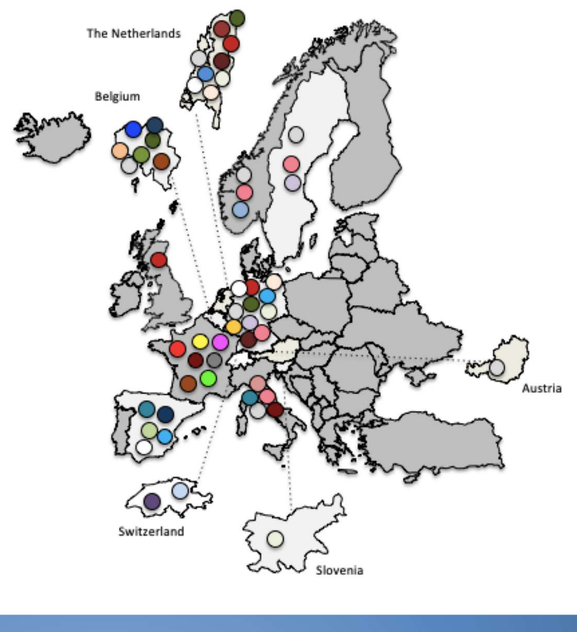

Figure 2 . Some of the main notifications occurring in organic foods in Europe (**2012 – 2021**). Data reflects **the country of the alert detection**, but not the country of origin of the product that could be the same, another from the European Union or abroad. Data was obtained from the **RASFF portal** using the filters “**organic food**” and “**bio products**” . The countries studied were **Portugal, Italy, Spain, Switzerland, Slovenia, Austria, France, Germany, Belgium, The Netherlands, Norway, Sweden and England.**

CONCLUSIONS

Switching to organic agriculture brings promising prospects both in terms of welfare and nature improvement. In this work we highlight the presence of pathogenic microorganism, toxins of different origins, and organic compounds in food products which pose a potential risk for human health. We describe the most common implicated organic foods in product recalls in Europe, all in the context of global evolution towards a green economy.

This work has been performed under the ECVPH resident program (C. Rodriguez, N. Korsak, G. Daube)