

Microbiology Insider

Experts in the Field

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Food Safety Priorities and Plans for 2020

Food Safety Magazine's Food Safety Insights program aims to find out what the key priorities are for food safety programs and what key projects, initiatives, and regulatory requirements will hold food safety professionals' attention in the coming year. Food Safety Magazine received responses from more than 200 processors from around the world in a wide variety of processing categories. Insider has highlighted key insights below. To read the full article, visit the link at the end.

“What would you say are your top priorities for food safety for 2020?”

Issues related to microbiology, environmental monitoring, and pathogen control still occupy a primary focus as roughly one in five (21%) responses included some aspect of microbiology and control. Some of the comments mentioned specific targets, such as *Listeria* and, specifically, control of *L. monocytogenes*, with several processors in the meat and protein category looking to improve their *Salmonella* and *Campylobacter* control programs, most likely in anticipation of impending regulatory and enforcement initiatives.

The second-most-mentioned priority was ongoing work to achieve compliance with basic regulatory and third-party certification. Sixteen

percent of the respondents mentioned that they still had work to do to meet regulatory requirements, and another 12% mentioned improvements needed to achieve or maintain compliance with or expansion of third-party certifications and their audit requirements.

Employee training and education also continues to be a high priority, with one in six stating this as a top priority. Many respondents mentioned a need to develop and incorporate new and improved training methods into their training programs over time.

“What improvements in your food safety program or processes are you planning to complete in 2020?”

The most frequently mentioned immediate plan for projects in 2020 related to improvements in training programs. The processors mentioned that in addition to basic compliance, they needed to get their team better

trained and up to speed in several specific areas — including compliance with their certification compliance requirements and specifically “audit readiness.” The other major area mentioned was specific training in plans and procedures for the security requirements for their developing intentional adulteration and food defense programs.

After training programs, the two other areas where processors said they would have the most active projects in the coming year were focused on 1) improved environmental monitoring and microbiology control, and 2) enhancements to their supply chain control programs ■

Article by Bob Ferguson, Food Safety Magazine. Read the full article at www.foodsafetymagazine.com/magazine-archive1/december-2019january-2020/food-safety-priorities-and-plans-for-2020/

Special Focus: Spoilage and Indicator Organisms in Food Production

An estimated 30% of manufactured food is spoiled¹, with microbial food spoilage being the main issue. Spoilage is a wasteful and costly issue affecting food producers and can erode customer confidence and trust in brands.

Food spoilage is a metabolic process through which characteristics like colour, taste or texture change in food, making it undesirable or unacceptable for human consumption. Unlike food contaminated with pathogens, spoiled foods are not always harmful to the consumer and could be consumed without causing illness.

A number of factors can cause spoilage in food, including growth and activity of microorganisms (such as yeasts, moulds, lactic acid bacteria, *Alicyclobacillus*), chemical changes involving oxygen and light, freezing, drying, burning, pressure or radiation, or through the activity of enzymes in the tissue of plants and animals. Spoiled food can present a series of changes, including putrefaction, undesired fermentation, rancidity and changes in appearance of the product and packaging. Products affected by these changes will not only have a

reduced shelf life, but could ultimately be rejected by the consumer.

What are indicator organisms?

Indicator organisms are a range of microorganisms that grow, live and die in very similar conditions to foodborne pathogens. While they themselves do not necessarily cause harm, there is a higher chance that if indicators are present, pathogens could be too and are therefore often used to evaluate quality and hygiene criteria. Indicator organisms include *E. coli* and Enterobacteriaceae (and coliforms in the USA).

What can food producers and processors do to protect against these issues?

There are a variety of ways to reduce the effects of spoilage in food: good manufacturing and hygiene practices, using preservation techniques such as heat treatment, filtration, irradiation or refrigeration, as well as the addition of preservatives to the product.

Testing for spoilage producing bacteria and indicator organisms

An important tool for protecting against the negative impacts of spoilage is regular

testing for microbial spoilage organisms throughout the production process. Early detection of these organisms helps to eliminate contaminated batches from further processing, or allows for further treatment, while testing on finished products prevents the release of spoiled foods to the market. Testing for indicator organisms will also give an overview of the safety and quality of the manufactured goods.

NEOGEN® has a range of solutions to test for spoilage and indicator organisms.

Rapid automated testing: Soleris®

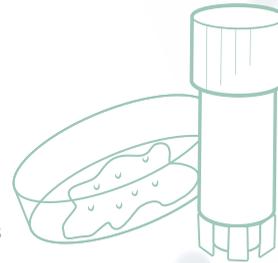
Soleris is a rapid automated optical system designed to speed up total time to result for microbial testing in food and beverage products. The system simplifies the testing workflow to reduce labour input and analysis time in comparison to traditional methods, providing food producers and processors faster reliable results.

Soleris measures microbial growth by monitoring biochemical changes and reactions. Microbial tests are available for yeasts and moulds, lactic acid bacteria, *Alicyclobacillus*, Enterobacteriaceae and *Staphylococcus* as patented ready to use vials.

Traditional testing: NEOGEN Culture Media

NEOGEN's range of dehydrated culture media and easy to use pre-poured plates offer traditional microbiology solutions for yeast and moulds, lactic acid bacteria, Enterobacteriaceae, *Staphylococcus* and *Pseudomonas*. NEOGEN Culture Media offers a wide portfolio of high quality culture media products, innovative product formats, and secure supply chain due to dual manufacturing sites in the UK and the USA ■

You can read more about some of the main spoilage and indicator organisms on the next few pages



Behind the Scenes

“

Time to result was the main factor when we looked at implementing Soleris as an alternative method. When testing for yeasts & moulds we can get results in just 48h, compared to five days when using the ISO method. It means that we can have the results back and be in a position to release the product quickly after manufacture which is a major benefit.

The system is extremely easy to use and the support from NEOGEN has always been great. They were on hand to support us throughout a full validation as well as ongoing verifications.

”

We spoke to Deb Fogg, Microbiology Cell Leader at Nutricia. Their Liverpool, UK site has been using the Soleris system for over 8 years to detect spoilage organisms.

NEOGEN – Your Trusted Partner

For over 30 years NEOGEN has been a trusted partner to the food safety industry. Our laboratory services, R&D department, technical support services, sales and customer service teams can help support you – every step of the way.

We believe in partnerships, that's why we have also created a range of training and support

tools to help you not only learn about our products but build knowledge and skills within your own team, including:

- **Onsite Training** – We deliver in-depth product training where you need it
- **Workshops** – Meet our team and learn about the latest trends and developments

- **LabLive** – Support training and troubleshooting from the comfort of your own facilities with our interactive online video tool

- **Webinars, training tools, and much more!** ■

Contact us to find out more about our added value support

¹ www.newfoodmagazine.com/article/8180/microbial-food-spoilage-a-major-concern-for-food-business-operators/

Organisms Up Close



Yeasts and Moulds

Yeasts and moulds are organisms from the fungus family. Moulds are multi-cellular organisms that grow on the surface of foods and beverages, and are therefore one of the most visible forms of spoilage. Yeasts on the other hand are single-celled organisms that grow within foods and beverages, and can be used in fermentation processes.

Yeasts and moulds can thrive in low moisture environments where other microorganisms struggle. There is often little or no competition to stop their growth, so they have a big influence on a product's shelf life. In addition, they are slow growing organisms and difficult to detect early on, so producers are in need of testing solutions that offer fast and sensitive results.

Lactic Acid Bacteria

Lactic acid bacteria are gram-positive, non-sporeforming bacteria that are routinely used for organic acid production in dairy products, wine and fermented products. However, they can cause spoilage in certain matrices and specific circumstances. Lactic acid bacteria include *Lactobacillus*, *Weisella*, *Leuconostoc*, *Lactococcus*, *Pediococcus*, *Streptococcus*, and *Enterococcus*.

Lactic acid bacteria are anaerobic and thrive in low oxygen environments, presenting a risk in vacuum packaged products. However, differently from other anaerobes, lactic acid bacteria can tolerate oxygen, making it important for producers to monitor their presence.

Enterobacteriaceae

Enterobacteriaceae is a family of gram-negative bacteria naturally found in a range of environments such as water, plants and the intestinal tract of animals. The family includes both harmless environmental and pathogenic organisms, including *E.coli*, *Salmonella*, *Shigella* and *Cronobacter*.

Enterobacteriaceae are important indicator organisms to some of the main foodborne pathogens. In addition, as the family covers such a wide range of organisms, testing for them gives a good indication of the quality and the hygiene of the food and the food manufacturing process. Testing for Enterobacteriaceae is common in food production, and requires fast, reliable and sensitive testing solutions.

Alicyclobacillus

Alicyclobacillus is a gram-positive, spore-forming, thermophilic bacteria, often causing spoilage in fruit juices. Certain *Alicyclobacillus* species produce guaiacol, a natural compound which causes fruit juice to develop a disinfectant-like odour and/or taste, much to the displeasure of consumers.

Alicyclobacillus is able to survive typical pasteurization processes juices go through, as its spores are heat resistant. It is important for producers to test the finished product to avoid release of contaminated batches ■

Yeasts and Moulds

Most at Risk Matrices:

- Bakery products
- Beverages
- Dairy products
- Fresh fruit and vegetables

Effects:

- Unwanted growth and slime
- Unwanted fermentation
- Off odours and flavours

Soleris Solutions:

- Yeast and Mould DYM-109C Vial

NEOGEN Culture Media Solutions:

- Dichloran Glycerol (DG-18) Agar Base
- DRBC Agar

Enterobacteriaceae

Most at Risk Matrices:

- Dairy products
- Fresh fruit and vegetables
- Meat

Effects:

- Indicates the possible presence of pathogenic organisms
- Hygiene indicator

Soleris Solutions:

- Enterobacteriaceae S2-EBAC9 Vial

NEOGEN Culture Media Solutions:

- Violet Red Bile Glucose Agar
- Glucose OF Medium
- Nutrient Agar

Lactic Acid Bacteria

Most at Risk Matrices:

- Vacuum packed and cured meats
- Salad dressings and sauces
- Beverages (wine)

Effects:

- Gas blowing of packages
- Change in texture and appearance
- Slime
- Off flavours

Soleris Solutions:

- Lactic Acid DLA-109 Vial

NEOGEN Culture Media Solutions:

- *Lactobacilli* MRS Broth
- MRS Agar

Alicyclobacillus

Most at Risk Matrices:

- Fruit juices and other beverages
- Canned food

Effects:

- Off odours and flavours

Soleris Solutions:

- *Alicyclobacillus* ACB-109 Vial

Get your free Guide to Food Microbiology Testing

Expert Views: Soleris in Action



Faster, Easier and More Sensitive

In a study by Yiping Chen and Ruth Fowler at Heriot-Watt University UK, the automated Soleris system was evaluated for its ability to detect yeasts and moulds in various food matrices (one matrix of each food category defined by ISO) in comparison with the ISO standard plating method ISO 21527-1.

Soleris detects carbon dioxide, produced by yeast and fungal microbes growing in the system, by measuring colour changes in an agar plug at the base of the vial. The Soleris Direct Yeast and Mould

vial was shown to detect *Candida krusei*, *C. albicans*, *C. tropicalis*, *Saccharomyces cerevisiae*, *Aspergillus caseiellus* and *Penicillium chrysogenum* in a variety of food and beverage matrices. Soleris detected microorganisms at 1 cfu/mL.

The results showed that the Soleris system was more sensitive than the ISO 21527-1 method for all the yeast contaminants and *A. caseiellus*, and at least as sensitive as the ISO method for *P. chrysogenum*, while offering faster results. Both methods performed better at detecting yeast contamination than mould contamination. However, when considering only results that showed a positive result within 48h, the Soleris system was shown to be more sensitive, or at least as sensitive, as the ISO standard for mould detection.



First in the Field



First Official ISO 16140-2 Validation of a Semi-Quantitative Alternative Method

The Soleris S2-EBAC9 vial has recently received MicroVal approval according to ISO 16140-2:2016 for the detection of >10 cfu/g Enterobacteriaceae in dairy products. This is the first time that a semi-quantitative alternative method has been certified and validated according to ISO 16140-2.

A third party expert laboratory, Campden BRI, carried out the validation study, which encompassed a method comparison study between the reference method (ISO 21528-2:2017) and alternative method (Soleris S2-EBAC9); as well as a European-wide inter-laboratory study. The method comparison study involved inclusivity,

exclusivity, relative limit of detection, and sensitivity studies.

The validation study report concluded that the S2-EBAC9 vial is at least equivalent to the ISO 21528-2:2017 reference method, while providing results in less than 24 hours as opposed to up to 3 days for the reference method.

Soleris has also recently received approval as an AOAC® Performance TestedSM Method, providing further independent validation of the ability of the system to accurately detect Enterobacteriaceae in a wide variety of sample types.

Request your copy of the full report by contacting NeogenEMEA@NEOGEN.com

Soleris versus Traditional Methods

Soleris Test	Traditional Methods Time to Results	Soleris Time to Results	Soleris Validations and Approvals*
Yeasts and Moulds	3-5 days	48h	AOAC NSF/ANSI 173
Lactic Acid Bacteria	72h	48h	
<i>Alicyclobacillus</i>	5 days	48h	ISO 16140 (IFU)
Enterobacteriaceae	24-72h	14-18h	ISO 16140 (MicroVal) NSF/ANSI 173
Total Viable Count (TVC)	72h	24h	AOAC NSF/ANSI 173
<i>E. coli</i>	18-24h	18-24h	AOAC
<i>Coliforms</i>	24h	14h	AOAC
<i>Staphylococcus</i>	48h	16h	

*Please check with your NEOGEN representative for full information on validations.



Faster than the Reference Method

A recent validation study was carried out by NEOGEN in collaboration with the IFU (International Fruit and Vegetable Juice Association) to evaluate the performance of the IFU No. 12 standard for the detection and Enumeration of *Alicyclobacillus* spp. according to ISO 17468.

At the same time, a comparison study in accordance to ISO 16140-2 was carried out with the Soleris ACB-109 method/vial as an alternative method to the IFU standard.

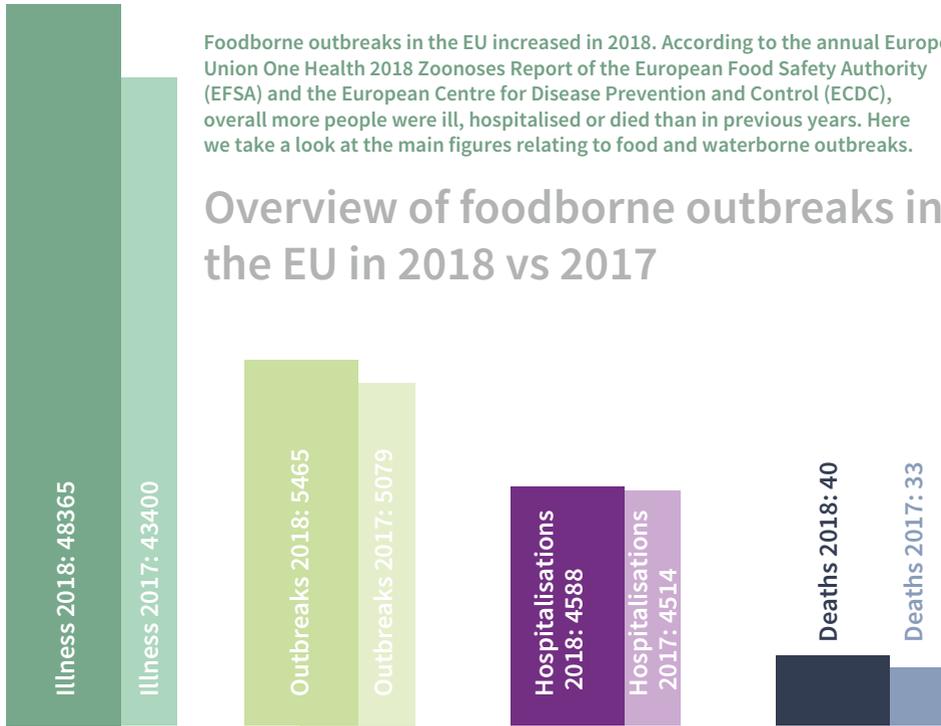
Soleris was found to be a suitable alternative method to the qualitative approach to the IFU 12 method, offering a faster alternative. Qualitative results for the presence of *Alicyclobacillus* spp. were available in only 4 days, in comparison to the 10 days of the reference method ■

Find out more about Soleris at NEOGEN.com or email NeogenEMEA@NEOGEN.com

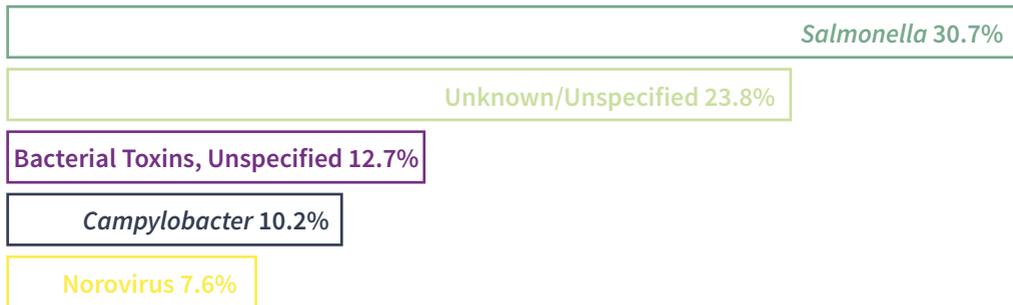
2018: Foodborne Illnesses in the EU

Foodborne outbreaks in the EU increased in 2018. According to the annual European Union One Health 2018 Zoonoses Report of the European Food Safety Authority (EFSA) and the European Centre for Disease Prevention and Control (ECDC), overall more people were ill, hospitalised or died than in previous years. Here we take a look at the main figures relating to food and waterborne outbreaks.

Overview of foodborne outbreaks in the EU in 2018 vs 2017

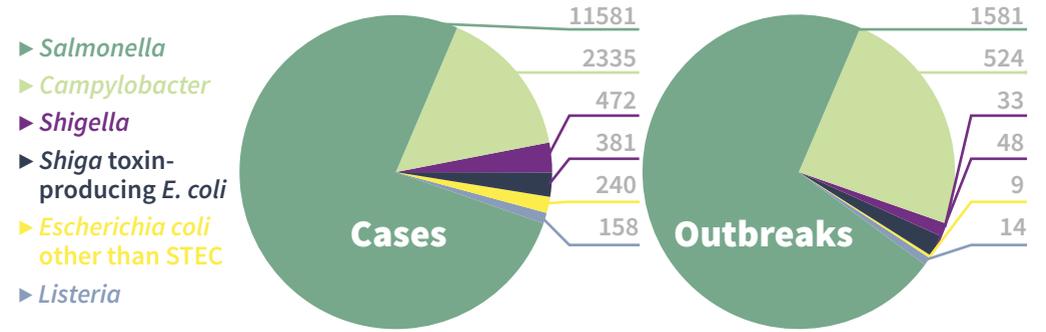


What were the main 5 causative agents of foodborne outbreaks?



Why not contact us to find out more about our rapid alternative and traditional testing solutions for pathogens?

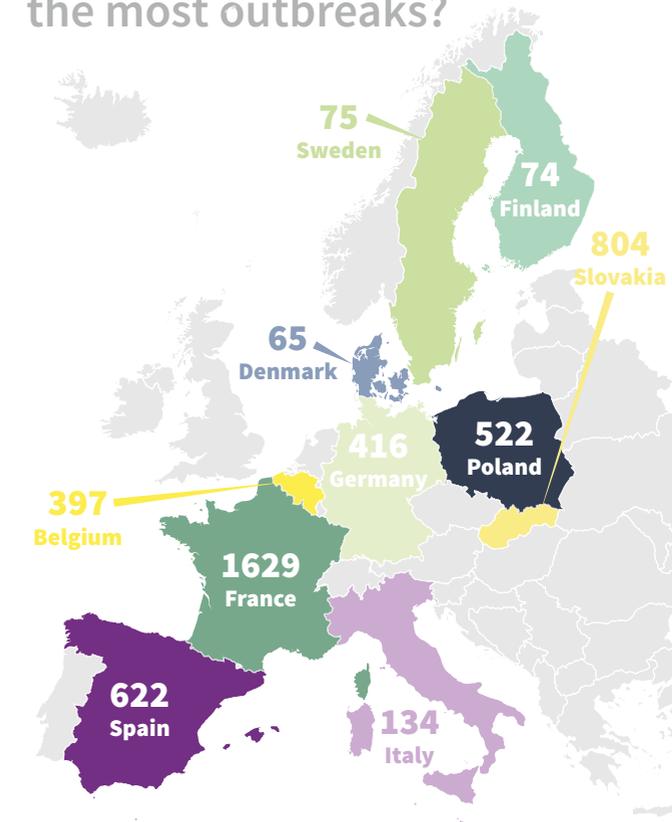
What were the main pathogens involved in foodborne illnesses?



What products where the 5 main carriers?



Which countries reported the most outbreaks?



Microbiology Insider

New and Emerging Methods in Microbiology Workshops



We are continuing our successful industry events this year, and will be hosting our next Microbiology Workshops in Germany and the UK, focusing on the latest advances, news and trends in microbiology.

Our programmes are suited to both food manufacturers and commercial laboratories alike, and bring together experts and specialists from the industry to explore a range of current topics, from innovative alternative test methods to case studies and current developments in regulations. On the day you will be able to meet and share knowledge with our fantastic range of internal and external speakers ■

Register to Attend Today



Braunschweig,
Germany



7th May 2020 –
Hinxtion, Cambridgeshire, UK

You can also email NeogenEMEA@NEOGEN.com for more information or to reserve your place today.

NEOGEN Culture Media

Have confidence in Neogen® as your supplier, providing you with high quality culture media plus:

- Added Value Service and Support
- A Global Culture Media Offering and Secure Supply Chain
- Alternative and Rapid Workflows to Suit Changing Requirements

Contact us today



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