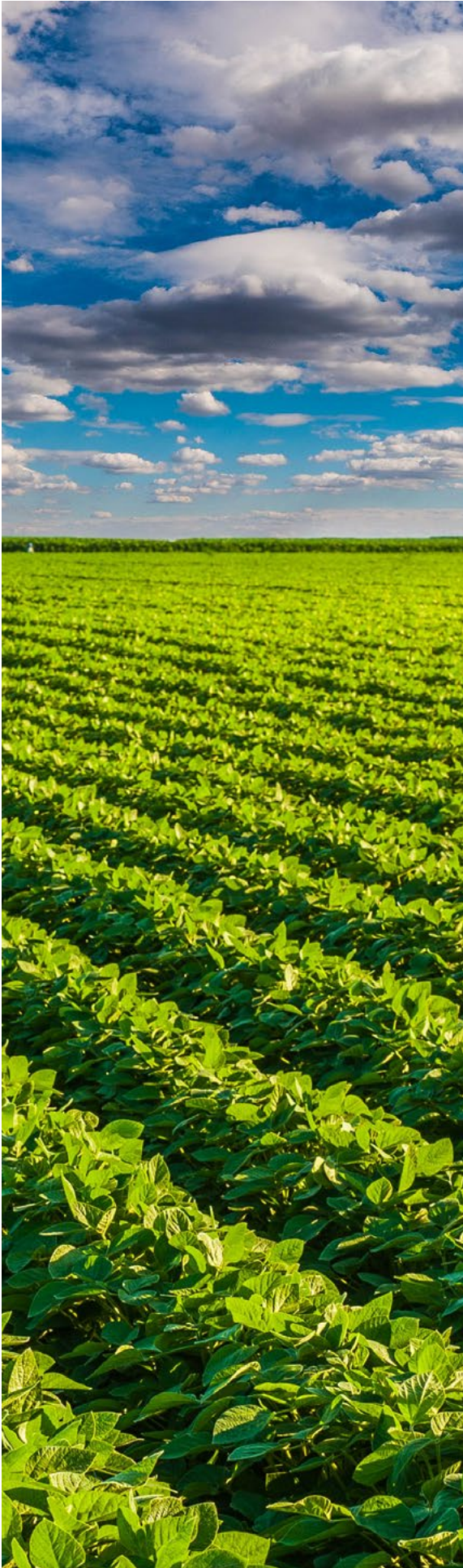




FOOD ANALYSIS LABORATORIES: **AN ALLY FOR YOUR ROI**

Food Microbiology Laboratories
at the Heart of Profitability



SUMMARY

EDITORIAL Prevent rather than destroy
Food analysis laboratories are working with you **03**

CONTEXT In an increasingly global and highly competitive landscape, food companies involved in manufacturing and new product development are facing more and more challenges. **04**

**CONTAMINATED PRODUCT BARES
SIGNIFICANT COST** **06**

PATHOGEN CONTAMINATION VS FOOD SPOILAGE,
FOOD SAFETY VS FOOD QUALITY : UNDERSTAND
THE CAUSE OF PRODUCT RECALL **07**

DIRECT COST : CONTAMINATED PRODUCTS
MUST BE RETURNED AND DESTROYED **08**

INDIRECT COSTS ARE MORE DIFFICULT TO
ESTIMATE, BUT NONE THE LESS REAL. **08**

SO, WHAT EXACTLY IS THE COST
OF RECALLING A PRODUCT? **09**

THE FOOD ANALYSIS LABORATORY,
AN ALLY FOR YOUR RETURN ON
INVESTMENT (ROI)..... **09**

3 QUESTIONS TO John SHULTZ
Head of Food Marketing USA, bioMérieux **10**

USEFUL TOOLS FOR CONFORMITY **11**

HOW TO STANDARDIZE
FOOD SAFETY PRACTICES? **12**

PREVENTIVE TESTING:
WHAT PATHOGENS ARE WE LOOKING FOR? **13**

FOOD SPOILAGE : HOW DO WE PREVENT ? **13**

3 QUESTIONS TO Vikrant DUTTA
Senior Staff Food Scientist, bioMérieux **14**

AN IMPROVED RETURN ON INVESTMENT **15**

A WINNING EQUATION..... **16**

PRODUCTIVITY GAINS
AND ROI OPTIMIZATION **16**

CONCLUSION **17**

bioMérieux is here to help..... **18**

PREVENT RATHER THAN DESTROY — FOOD ANALYSIS LABORATORIES ARE WORKING WITH YOU



JOHN SCHULTZ
Head of Food
Marketing USA,
bioMérieux

The Benjamin Franklin axiom “an ounce of prevention is worth a pound of cure” is as true today as when Franklin coined the term in 1736. While this thought was intended to address the critical issue of fire safety at the time, the philosophy has since been widely applied to various health and safety approaches. The simple idea that proactive improvements we implement now can prevent much larger issues in the future, is at the core of food safety and quality practices around the globe today.

Small efforts applied in anticipating big failures can pay off in spades. It’s in this mindset that we extend our thinking beyond the basics of food safety to look at ways we can use new systems and means of data interpretation to make production more efficient, safe, and responsive to changes in the environment.

The question posed to our industry now is: how can we achieve the goal of making better products by measuring, analyzing, and acting on trends early in the process so that our final quality remains high and our cost to manufacture is minimized? Below the surface of a good quality system lies the ability to detect not just the smoke before the flame, but the risk of fire before it ignites. By working with our various suppliers, logistics chains, operations people, and end customers seamlessly the food industry is adopting tools and best practices to provide the safest food supply in the history of mankind. As with the citywide fires that posed such a threat in Franklin’s time, the microbiological risks that lead to product spoilage, brand image failures, noncompliance, or worse, widespread recalls can be caught much earlier if we know how to collect, analyze, and respond to the mass of information coming from these various upstream inputs.

Food manufacturers now have the exciting but challenging task of looking just beyond the horizon for a few ounces of prevention by investing in innovative solutions that drive bottom line dollars.

CONTEXT

In an increasingly global and highly competitive landscape, food companies involved in manufacturing and new product development are facing more and more challenges. Based on international food standards, various laws and regulations govern the food sector. These relate to the production, processing, distribution, retail, packaging and labelling of food products. Various global regulatory bodies outline food safety, traceability, food labeling and packaging, import and export requirements, and avenues for the withdrawal or recall of unsafe food in the market. Maintaining the best possible methods of storing, packaging, preserving, and distributing products remains a constant challenge.

In a world that is demanding more prevention, more transparency and traceability, food microbiology laboratories and the food industry must work together. Food manufacturers heavily rely on food laboratories to verify that processes, environments, and products meet safety and quality standards to protect both consumers and brands.

CHANGES IN FOOD PRODUCTION SYSTEMS VS. FOOD SAFETY

Increasing global food economy and consumer expectations for diverse and innovative products have resulted in an exponential increase in the diversity of finished products that contain individual components sourced from more places across the world than ever before.

The speed, volume and complexity of food production have brought significant new risks and challenges, including new threats to food safety and quality, changing consumer expectations, and the development of prevention-focused international standards. The need to address these challenges has resulted in international food regulatory agencies recognizing the need for a change in safety and quality management.

Regulatory bodies are changing their approaches to emphasize industry's responsibility to put in place effective hazard control programs. Change is multiplying rapidly and it is clear that regulators cannot continue with traditional approaches to ensure that standards are met. Regulatory bodies are becoming increasingly focused on proactive, prevention-based approach to navigate changing production systems

while supporting industry and meeting consumers' desire for safe food.

VIGILANT CONSUMERS

66% of consumers worldwide consider it likely that their health will be affected by what they eat (vs 53% in 2012). This increase in the perception of risk is true for all countries.*

The increase in this risk induces a greater need for the consumer to have information about the sector. 65% of consumers maintain that it is important or extremely important to know how their food is produced. It was only 42% in 2012**.

Confidence and transparency must be improved since only 34% of consumers consider that food companies strive for transparency.

A need for transparency for consumers to be able to choose their products:

- Freshness (69% of consumers)
- With natural flavorings (46%)
- Without hormones (42%)
- Without antibiotics (42%)
- Without GMO (37%)**

Due to the advancements in science and technology, global food regulatory agencies assure consumers by putting a greater emphasis on preventing risks to food safety. The regulations provide clear and consistent rules for food commodities, so consumers can be confident that food on grocery shelves and retail establishments is safer to eat, regardless of where it is produced.

GLOBAL COMMERCIAL AUTHORITIES ARE TAKING STEPS TO ESTABLISH SANITARY AND AUTOMATED CONTROLS.

Most of the countries are adopting International food safety standards, which forms the basis for modernized food safety regulations that have been, or are being, adopted by the United States (Food Safety Modernization Act, FSMA), Canada (Safe Food for Canadians Regulations, SFCR) the European Union (regulation (EC) n° 178/2002), Australia and New Zealand.

Savvy food manufacturers recognize that good quality assurance adds value and protects brands. There are many roads to achieving this end—no single approach works across the board. If all the quality assurance standards are met, the result of any food processing operation is a high-quality product that is safe and free of any impurities or contaminants.

However, this is not the case in reality, the food processing sector is frequently challenged with various food risks. Laboratories play a vital role in veri-

fying safe foods that consistently meet brand and consumer expectations and ensuring safety and quality through verification testing of raw materials, finished products, and environments.

The laboratory serves as the verification backbone of the control system and are vital to the integrity of the products produced. Further, new trends from innovative thought leaders are utilizing non-traditional laboratory, sanitation, and even human resource data to help predict adverse events before they occur. Scientific experts that typically reside in laboratory functions, are being called upon to bring their expertise and critical thinking into new and innovative realms to further support the distribution of abundant, safe, and quality food.

The impact of adverse events in the marketplace is tremendous. Whether triggered by an issue in sourcing, production, or distribution, safety and quality issues can lead to costly recalls, lawsuits, brand damage, and in egregious cases, criminal charges. Companies investing in tools, systems, and people that prevent and detect these issues realize an unparalleled Return on Investment (ROI).

Robust understanding of preventive measures, data, and trends is the key to compliance and the driver of business excellence. Not only do preventative practices protect the bottom line, but also boosts brand reputation with consumers, suppliers, and industry stakeholders.



Source: *Food STUDY 360 - TNS Sofres (September 2016)-**Study FOOD THINK - Sullivan Higdon & Sink (2016)



CONTAMINATED PRODUCT BARES SIGNIFICANT COST



**Measures are required to ensure
safety and quality**



Indeed, the upfront investment required for effective and efficient verification controls can be costly. However, the return on this investment can pay for itself if even one adverse event is detected and avoided. The ROI will continue to improve as automated solutions are deployed in the laboratories as well.

This represents a real financial opportunity for the food industry. The cost avoidance incurred from scrap of spoiled product, the recall of adulterated product and the staggering associated administrative, legal, and commercial operation costs are considered real and measurable to justify robust quality system investment. The short and long-term financial gains are therefore considerable.

PATHOGEN CONTAMINATION VS FOOD SPOILAGE, FOOD SAFETY VS FOOD QUALITY: UNDERSTAND THE CAUSE OF PRODUCT RECALLS

Before considering the return on investment, we must remember and insist on the fact that a contaminated product is above all a real health risk.

HEALTH RISK FIGURES

— **The World Health Organization, WHO, estimates that each year, in the world, one person out of 10 falls ill through eating contaminated food products. As for the number of deaths, it is estimated at over 400,000*.**

* WHO study (2017)

There is a good reason for this as health risks are numerous and some more dangerous than others: the contamination may come from the presence of microorganisms, chemical hazards such as allergens, or physical hazards.

The most prevalent cause of food product recalls is contamination (microorganisms and allergens), which can affect fresh, raw, and processed foods at raw ingredient and finished product levels.

Allergenic products not declared on the label are a major cause of product recalls. Foreign matter is the other common cause of food contamination. Other causes include defective products, chemical contamination such as pesticides and unapproved ingredients.

FOOD SPOILAGE: A MATTER OF FOOD QUALITY

Within this food contamination issue, we must distinguish food spoilage from pathogen contamination. Food spoilage versus pathogens contamination implies different preventive management techniques and costs. Food spoilage refers to any sensory change which has taken place to the texture, appearance, smell or taste. Food spoilage can occur from a variety of yeasts, moulds or

bacteria which if given enough time, and the right temperature, can contaminate a wide variety of food products.

Spoilage can occur at any stage along the food chain demanding a holistic approach to preventive management especially when we consider the inherent as well as external factors, such as pH, water activity, nutrients, antimicrobial substances, temperature, and environmental conditions for storage that regulates the growth of microorganisms responsible for food spoilage and illness. Food spoilage management is a long term investment for food companies involving the implementation of effective monitoring from production to transportation, distribution and refrigeration both at the retail level and in the home.

PATHOGENS CONTAMINATION: A MATTER OF FOOD SAFETY

One of the major causes of food product recalls, is contamination with pathogens such as Salmonella, Listeria monocytogenes and pathogenic E. coli. This can occur at any stage in the food supply chain. The main way to prevent contamination is to implement hygienic practices to prevent cross contamination.





FIGURES OF PATHOGENS CONTAMINATION

— A study published by the Public Health agency in France states that, each year, in France, there are 1.5 million cases of food contamination, giving rise to 17 000 hospitalizations and 200 deaths.*

*Study by the Public Health agency in France

— According to the World Health Organization, it is almost 1 in 10 people in the world - 600 million estimated - fall ill after eating contaminated food and 420 000 die every year.

Increasing consumer demands push manufacturers to be proactive and address all challenges. Food testing laboratories provide an arsenal of rapid, reliable and validated methods to meet the challenge of verifying food safety control systems.

Microorganism detection is thus critical, ideally before it contaminates ingredients or final product.

DIRECT COST: CONTAMINATED PRODUCTS MUST BE RETURNED AND DESTROYED

Food product recalls are a major threat to food companies. Recalls result in disruption in operations while managing the recall, direct cost of recalling stock and the related activities and the indirect costs caused by the repercussion or knock-on effects, mainly reputational and brand damage.

This impact on consumers can result in significant long-term financial losses for a company due to loss of sales. In the US, the Food Safety Modernization Act (FSMA), the FDA now, has authority to suspend a food facilities' license and initiate a mandatory recall if there is a "reasonable probability that the food it produces can cause serious adverse health consequences or death to humans or animals."

FOOD SPOILAGES COSTS FOR COMPANIES:

— In 2015, the UK Waste & Resources Action Programme (WRAP) released a report which highlighted the monetary benefits of reducing food waste. According to the report, by reducing food waste from 20 to 50 percent, the food industry could save between \$120 billion to \$300 billion.*

— On average, 21 percent of all waste arises from spoilage, and fresh fruits and vegetables make up around half of this waste due to their temperature sensitivity. In addition, these products can largely be affected by other external conditions post-harvest and require constant refrigeration to maintain freshness.

*Source: Rentokil

THE DIRECT COSTS OF A FOOD RECALL INCLUDE:

- Assembling the crisis team
- Removal of the product from the market, which includes:
- Issuing notifications to:
 - Regulatory bodies
 - Businesses affected in the supply chain
 - Consumers
- Collecting the product from warehouses, retailers and consumers
- Storage of the recalled product
- Destruction of the product
- Investigation of the root cause of the factor that resulted in the recall
- Managing the PR to inform customers and protect the business reputation

The other direct costs involve:

- Penalties for non-compliance
- Non-compliance fee (e.g. auditor expenses, including travel, lodging etc.) for: tasks related to re-inspecting facilities found to be non-compliant and tasks related to non-compliance with a recall order.

INDIRECT COSTS ARE MORE DIFFICULT TO ESTIMATE, BUT NONE THE LESS REAL.

The cost of communication and press relations can be very high. This expense enables the brand image and reputation of the company to be restored. This work is essential because the damage caused to the firm's reputation and the fact that people stop buying the product (sometimes the effect will be felt throughout the whole chain) can trigger repercussions for many years to come.

INDIRECT COSTS ARE RELATED TO BRAND REPUTATION AND BUSINESS PERFORMANCE.

A brand's reputation is inherently defined by the perception consumers' have of a brand's safety and quality. Brand reputation can be influenced by the information conveyed in a product recall announcement. Manufacturers risk damage to the reputation of their brand if consumer beliefs and perceptions alter. Whilst brand reputation can suffer, manufacturers can also experience a deterioration in market performance. Firms may withdraw a recalled product from the mar-

ket completely. A recall may result in a firm withdrawing a product and brand altogether from circulation as well as consumers deciding to stay away from the product category or even switching to another brand. Stock markets tend to react adversely to recalls, adding further loss to performance as shareholders lose confidence. Manufacturers have to bear the costs of a product recall which is ultimately a way of protecting consumer rights and respecting the protection laws in place for them.

Indeed, a health crisis can have a direct impact on one's health and sometimes one's life. The shockwave on the public is therefore huge and sometimes even out of all proportion. Another difficulty is that such crises do not correspond to any logical and traditional communication strategies. That is why preparing for such a crisis will mean it can be handled more efficiently. It is therefore a good idea to train certain collaborators in terms of crisis management and to form a crisis team beforehand so that it can be immediately operational when necessary. Other indirect costs such as possible litigations (damages and interests) and criminal convictions should also be mentioned.

CRIMINAL CONVICTIONS - the ex-manager of the firm SEB who was accused of having produced beef burgers contaminated with E. coli bacteria was sentenced by the court in Douai (France) to 3 years in prison of which 2 years were to be served.

SO, WHAT EXACTLY IS THE COST OF RECALLING A PRODUCT?

In 2010, the researchers Moises Resende-Filho and Brian Burr developed a model that is easy to use to calculate the costs directly linked to recalling a product. They based their calculations on the sale price of a product and an approximate estimation of the transport and communication costs, including notification and press relations expenses.

Let's take an example: in 2016, a manufacturer had to recall 4 500 tons of flour during an E. coli epidemic. The flour being sold for 1,10 euros a kilo and using the formula, the losses were estimated to be more than 6 million euros.

THE COST OF FOOD RECALLS IN FIGURES

Food recalls cost American companies in the food sector on average 10 million dollars in direct costs.*

*Study Food Marketing Institute

In both the US and Great Britain, the number of recalled products has been increasing over the years. A study concludes that 58% of companies questioned have been affected by food recalls in the last 5 years.*

*Study GMA

After analysis of 367 insurance claims for recalled products in 28 countries, Allianz Global Corporate & Speciality (AGCS) have estimated a total loss in insurance of 312.4 billion euros. Far from becoming more stable, this trend is increasing from year to year/ the situation is getting worse from year to year

*Allianz Global Corporate & Speciality (AGCS)

THE FOOD ANALYSIS LABORATORY, AN ALLY FOR YOUR RETURN ON INVESTMENT (ROI)

Food analysis laboratories provide invaluable services for food product testing and environmental monitoring for pathogens, sanitation indicators and spoilage organisms.

Various rapid microbiology and analytical testing techniques are available and are crucial for manufacturers to make rapid decisions in regards to microbiological quality and safety.

A wide variety of technologies are used to detect and identify contaminants of concern, from traditional culture-based methods to rapid and more automated methods such as PCR, ELISA / ELFA Immuno assays, and sophisticated confirmation technologies such as MALDI TOFF, GC-MS.

Food manufacturers can reduce final product spoilage by rigorous verification of ingredients, environment, and in-production samples. Through this testing verification, process, ingredients, and products that are found to be out of specification can be addressed before finished product leaves the facility and meets the consumer.

It also reduces investments and expenditure in supply chain infrastructure. The ultra-rapid methods deployed by laboratories can also help to minimize storage times for test-and-hold operations, thus reaching customers faster and improving cash turnover.

Thanks to the emerging technologies in laboratories that provide automated notifications of non-compliant or out of specification results in real-time companies can increase materials usage and yield, and maximize ROI.





3 QUESTIONS TO **John SHULTZ**

Head of Marketing, bioMérieux

Consumers are getting more and more suspicious of what they are eating. Does this behavior have any influence on the generalization of preventive controls?

The problem stems from the fact that historically, there has never been much transparency in food safety between manufacturers and the consumer. A lot of companies are very secretive in their competitive environment, and I think that is one of the things that must be changed in the future. Personally I think the shift in mentality of consumers must force the food industry to show more transparency. On the other hand, food testing is a little challenging for the consumer to understand. What they expect from a supplier or a manufacturer is, above all, to respect good food production processes. The consumer wants a company to have an eco responsible approach and to be really concerned about the social aspect of its activities. You know, nowadays everything becomes public knowledge. If a manufacturer has a food quality or safety event they are dealing with, timely and appropriate

response in the marketplace is very important. Consumers now have decreased tolerance for delay. They expect faster and more decisive actions be taken and wield an increased impact on brand image through social channels that didn't exist in the past.

Can food testing enable a company to improve productivity?

Yes, absolutely. For a great many years, food companies used to set production processes with a few control points, hoping that all would go well according HACCP principles. For the last ten years, the tendency has been to concentrate more on using the information that comes from food testing. Modern tools and data analytics enable the industry to effect real improvements on food safety. This is an important step forward that enables us to react earlier and more quickly. With modern tools and data analytics we can take a step beyond HACCP and begin to affect real improvements in productivity using the data available to us. We can now use these tests to improve the production

chain, the conservation time of a product for example. This way you increase your sales, you make more money. It's a real improvement in terms of productivity and return on investment!

Will it be possible in the future to avoid food crises?

There will always be a risk, but each 10-year period that goes by is more advanced in matters of food safety than the one that went before. The problem at the moment is the economical concentration: fewer and fewer companies control sectors that are getting bigger and bigger. Should there be a problem with one of them, the repercussions are consequently enormous. In a word, nowadays, when there is a problem of sanitary conformity, the whole planet is potentially concerned. Data sharing is the key to better vigilance. The exchange of information between all players of the industry is essential. We will get there, but in order to do that it will surely be necessary to have stricter international regulations.



USEFUL TOOLS FOR CONFORMITY



**Preventive practices
continually being improved
by food testing laboratories**



For a company in the food industry, a substandard product is a financial catastrophe. Undesirable microbial growth in a food processing environment causes severe problems as a result of food spoilage organisms.

The primary cause of food spoilage is invasion by microorganisms. Spoilage leads to both visible and invisible impacts on a product that leaves the consumer turning up their nose, throwing product away, and doubting the integrity of the brand.

The ubiquitous nature of these microorganisms, if not mitigated during the production processes, proves very costly affair for a company. Laboratory analysis provides various rapid detection techniques and aids in the verification and validation of food quality and safety systems. Moreover, the laboratories are continuously evolving technology applications to meet changing needs of the food industry.

HOW TO STANDARDIZE FOOD SAFETY PRACTICES?

The international standard ISO 22 000 has been set to help food manufactures adopt a robust and standardized approach to food safety management.

A STANDARD TO COMPLY WITH

— **ISO 22000 is a Food Safety Management System applied in the food chain from farm to fork. It incorporates the widely used HACCP principles and Prerequisite Programs.**

— **The international standard ISO 22000 defines the danger as being « a biological, chemical or physical agent that is present in foodstuff and which could have a harmful effect on the health». It is to be applied worldwide by all players in the food industry.**

— **In ISO 22000, it is essential to set up a HACCP (Hazard Analysis Critical Control Point), adapted to a company's needs to identify, estimate and control these dangers. These auto-controls have been made mandatory with the law passed on May 9, 1988.**

— **ISO 22000 is a minimum standard to comply with. Many actors of the food industry are exceeding HACCP by holding to higher standards of safety and quality.**

At the heart of this legislation, food analysis laboratories play an essential role by carrying out numerous preventive tests, the efficiency of which is being continually improved. These preventive tests provide the opportunity for the food industry to guarantee production safety before going to market and to control costs.

Due to the health and safety risks posed by chemical, microbiological and environmental contaminants, analytical methods are increasingly becoming a centerpiece of food safety programs.

Innovative analytical approaches are being developed in response to emerging food safety issues. Frequently, new analytical methods are developed or modified rapidly in response to unforeseen issues. In such cases, accurate data derived from sound, validated analytical methods are required to enable industry stakeholders and regulatory bodies to make sound scientific decisions.

The analytical methods have been improved dramatically in recent years, resulting in higher sensitivity for difficult-to-detect contaminants, detection of contaminants in new matrix classes and faster turnaround times for





results. These advances have been made in response to the changing regulations, more rigorous method-validation standards and consumer demands for safe, quality products.

PREVENTIVE TESTING: WHAT PATHOGENS ARE WE LOOKING FOR?

There are numerous controls available to ensure the safety of food products. They enable various harmful substances to be detected.

— **THE MOST FREQUENT TESTS** are those concerning the detection of pathogens, in particular, **Salmonella** and **Listeria monocytogenes**. It is worth pointing out that **Salmonella** causes more hospitalizations and deaths than any other food bacteria. Food testing laboratories also look for the presence of a certain number of food viruses, such as **Norovirus** (the first cause of food infection), and **Hepatitis A** and **E**. The detection of allergens such as peanut should not be forgotten.

— It is also essential for a food company to be able to detect chemical dangers. Lastly, food may also have traces of physical contamination (metal, plastic, glass etc...).

FOOD SPOILAGE: HOW DO WE PREVENT ?

Spoilage may occur at any stage along the food chain. Spoilage may arise from insect vectors, physical damage, indigenous enzyme activity in the animal or plant tissue or by microbial contamination. Enzymes can bring about destruction of polymers in some foods while chemical reactions, such as oxidation and rancid-

ity decompose others, but the main single cause of food spoilage is invasion by microorganisms.

The microbial culprits responsible for spoilage can be detected through various rapid microbiology methods using the raw materials and finished product. Environmental quality indicator testing provide quantitative evidence of presence of microorganisms in the facility.

For producers managing perishable products, the key challenge is keeping those products at optimum conditions, which is intensified as the food makes its way through the various stages of the supply chain. Each step offers a chance for the condition to be compromised which could significantly reduce the shelf life of the produce

5 MAJOR WAYS TO PREVENT FOOD SPOILAGE:

Ensure there are proper hygiene procedures to keep equipment and surfaces clean and personnel handling food maintain personal hygiene.

- Prevent the growth of microorganisms by temperature and moisture control through adequate ventilation.
- Control every incoming ingredients into your products: if a contaminated ingredient enters your product, the risk of spoilage is increased.
- Ensure processes prevent cross contamination between raw and cooked or fresh products, including measures such as separating employees working in each area
- Implement pest control measures to deny harbourage, prevent entry to buildings and prevent access to food and water, including waste food.



3 QUESTIONS TO **Vikrant DUTTA**

Senior Staff Scientist, bioMérieux

How are food testing laboratories adapting to the needs of the food industry?

Food testing laboratories are critical but well-meaning guardians of the food production chain. We are the converging point between the quality of the production process, the health safety of raw materials and the end-result. And today, things must speed up, go even faster and faster. For food companies, time is an essential factor in the production process. So, we have to provide them with a rapid analysis, without however impairing the quality of that same analysis. This expertise inevitably brings added value and it reduces production costs without altering the quality of the end product.

Does specific countries regulations change the way preventive tests are made?

Food safety management systems like HACCP form a backbone of preventive food safety management systems across many countries. HACCP has particularly gained acceptance across the EU, Canada, Australia, New Zealand, the US, WHO and many other countries. Having said this, the specific laws may vary depending upon the industry or the country. In certain cases, the food companies have voluntarily adopted industry code on best practices. Nonetheless, at a global level, the stakeholders in the food supply chain are consistently modifying the food laws to accommodate innovation, knowledge and trade patterns while protecting consumer interests and facilitate fair trade. This is happening while the international food safety standard bodies are steadily working to standardize the systems and methods with a goal to streamline the food safety best practices across industries and countries.

Which technological discoveries can revolutionize food safety?

It is a revolutionary era, which is very exciting for those working in the food safety area. With regards microbiological tests, we are rapidly moving from the era of «linear» testing to that of «dynamic» testing». Indeed, even if we still carry out a lot of traditional tests like those based on the microbial culture method, we can also see some real technological progress, for example, whole genome (DNA) sequencing at a reasonable cost. Even better, in years to come, these technologies will be in continual progress. These tools will then be able to take us to an era of unequalled precision and proactive safety.



AN IMPROVED RETURN ON INVESTMENT



**Detecting a substandard product
before putting it on the market
improves the ROI**



It is clear: a product that does not meet the standards required can be a health hazard and cost companies a great deal of money. Investing in reliable controls and auto-controls will allow food companies to reduce the risks, and even come close to zero food recalls.

When a strong food safety culture is established within the company, it will result in the production of high-quality product and will reduce the product storage costs along with the decreased production times and efforts spent on troubleshooting. It will significantly decrease the production of non-compliance product and costs associated with its recall and to restore the system back to compliance.

In order to maintain such a system, routine validations and verifications in production and the laboratory are required.

AI IN THE FOOD PROCESSING

— **Recently, some of the largest food processing companies (like Coca-Cola and Kellogg's) are turning to AI technology in attempts to improve numerous aspects of the process, including: Sorting products and packages; Food safety compliance; Improved cleanliness; Produce development; and Marketing.**

A WINNING EQUATION

There is a simple method of calculation that a company can use to confirm if the money invested in a food analysis laboratory is worth it.

**FOOD SAFETY COMPLIANCY COST =
FOOD SAFETY COMPLIANCY COSTS + NON-
COMPLIANCY COST ***

A company's aim is to decrease non-compliance cost to a minimum, even to make them disappear completely, by increasing, to a lesser extent, the food safety compliance cost, which must be considered as the associated cost of risk prevention of non-compliance. By working with a food analysis laboratory in charge of setting up all the required control and auto-control processes, a company increases its food safety compliance costs.

*This method is defined by Phillip B. Crosby in his article «Quality is free» (1979). Quality compliance costs correspond to the sum of prevention and evaluation costs. Non-compliance costs correspond to the costs engendered by internal and external deficiencies.

Of course, there are other ways to reduce non-compliance costs, such as fostering a culture focused on quality within the company, investing in staff training and in the control of material, methods and techniques. It is also important to ramp up efforts concerning hygiene.

Moreover, the controls must be carried out and processed rapidly to ensure that an unsafe product never leaves the factory or that it can be traced at minimum cost.

PRODUCTIVITY GAINS AND ROI OPTIMIZATION

Testing is a way of substantially avoiding producing non-compliant products and, more especially, every company's nightmare, recalling products. It is used by Blount Fine Foods, who specialize in the production of ready-made meals and frozen soup.

BLOUNT FINE FOODS PRODUCTIVITY GAINS

Mary T, quality supervisor for Blount Fine Foods

« Blount Fine Foods produces ready-made meals and frozen soup. Our company aims at rationalizing its quality guarantee processes and at improving productivity. Blount has therefore opted for automatized quality control solutions. Since this decision we have considerably increased the volume and precision of our quality tests. Even better, the test results are obtained more quickly so measures can be taken to rectify as quickly as possible any case of suspected contamination. Furthermore, we have also improved our productivity gains as the Quality Department now runs much better. Technicians can indeed carry out other important tasks for our laboratory as they do not always have to be present during the automatic procedures.»

The gains in productivity at Blount Fine Foods would not have been achieved without the precision of the quality methodologies. These methods are used world-wide by reputable laboratories both inside and outside of the food manufacturing space, as, for example, the third party contract laboratory BCN Research Laboratories does:

PRECISION AND RAPIDITY FOR BCN RESEARCH LABORATORIES

Addy Villarreal, supervisor of BCN Research Laboratory

« Our food testing laboratory analyses food, drinks and water. Since 2016 we have decided to use new technology to meet the rising demand in testing and more especially to avoid the results of tests which are often false positive, which is both very frustrating and expensive. Our aim was therefore to significantly improve the precision of our tests with the current staffing level and laboratory space. The results speak for themselves: they are now much more precise and coherent than with the previous system. Today, an entire plate of 96 samples can be analyzed more rapidly and more precisely. The productivity gains are there: we have increased the sample rate by 25%»

_____ Due to increasing international regulations, corporate requirements, and consumer demand, the food industry is pressured to increase the use of robust validated verification activities to ensure safe and quality food supply.

_____ These preventive activities can be measured at the bottom line of profitability in the form of cost avoidance of adverse events such as safety recalls, product spoilage, and brand protection.

_____ Investing in food laboratories by employing advanced technologies for faster, more accurate, and efficient results brings a significant ROI to the operation of food companies. No longer are food laboratories seen as a necessary cost center, but an integral piece of the overall company portfolio.



● ● ● ● ●
BIOMÉRIEUX
IS HERE
TO HELP

With its deep roots and leadership in growth-based microbiology, bioMérieux continuously brings innovation to this diagnostic discipline, which remains unsurpassed in its ability to identify a very wide range of microorganisms as well as their susceptibility to antibiotic treatments. Research and Development efforts focus on enhancing Laboratory automation, reducing time to results, and expanding our range of tests for resistant bacteria.