

WORKSHOP
ON

Microbial Safety in Food Industry

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The workshop on Microbial Safety in Food Industry using Rapid Methods with special emphasis on Pathogen Detection was held on February 15, 2013 in Hotel Courtyard Marriott and was jointly organised by PFNDAI and Bhavan's Research Center (Microbiology).

Illness resulting from foodborne disease has become one of the most widespread public health problems globally. About two thirds of all outbreaks are traced to microbial contaminated food- some of the most hazardous being Clostridium botulinum, E.coli O157:H7 and Salmonella. These can contaminate food products anywhere in the food chain and hence imply that microbial vigilance in the chain is of prime importance.

Food Safety & Standards Authority of India is mandated under the Act to ensure safe food to the consumer,

while it has some microbial specifications for food products – a greater responsibility is imposed on the FBO under the obligatory Food Safety Management System. The decision to recall food products is critically dependant on the FBO's ability to make a risk based determination that his product is likely to be 'unsafe'. How can he do this if he does not have a risk based safety plan?

A common complaint is that microbiological testing is laborious, time consuming and reveals less about what actions should be taken. However, much progress has happened with an influx of rapid methods – some expensive, some over in a few hours and some conveniently conducted away from a full-fledged laboratory.

The workshop was welcomed by the Chairman of PFNDAI, Mr. R.D. Shenoy. In his opening remarks, he shared the general industry concern for rapid analysis methods. Currently there are many analysis methods available but which are more accurate, authorized by the regulatory authorities and suitable meet their needs is always a question for all. This is one such section which has large scope of innovation and one need to be abreast with the rapid technology

changes and the new scientific discoveries.

Food Safety Commissioner of Maharashtra State, Shri Mahesh Zagade inaugurated the workshop. In his inaugural address, he stated the importance of the analysis methods and the risk factors to be considered with regards to the safety of the consumers. FBO's (Food Business Operators) need to be more concerned towards the analysis of products as they form a part of the FSSAI registration. Maharashtra region has seen a growth in the registrations and licensing, however this needs to be more intensified. There are many rapid analysis kits and methods available in foreign countries and we need to adopt these new methods, but we also need to consider the environmental factors prevailing in our country and the microbial concerns that are specific for individual products.

Dr. Lewis J.I., Convener of the Workshop and Chairman-Regulatory Affairs, PFNDAI, introduced to the workshop with a





positive note for the industry to look at the scientific progresses and acquire them and grow with them. It is not only favourable for the consumer but to the industry at large. Today there are improvisations in the regulations and we are moving from risk assessment to risk analysis and its managements with science as the basis of these regulations.

Various sessions were chaired by Dr. Adhikari V.M., Dr. Shruti Samant, Dr. Tewari and the briefs of the deliberations by the speakers are presented in this report.

Dr. C.R. Behl, Poultry Business Unit Head, Vista Processed Foods, in his Keynote presentation 'Importance of Microbial Analysis in Food Industry', stated that Food is excellent source of nutrients for the consumers & is prone to microbial growth leading to spoilages and nightmares to consumers. Thus there is need of proactive detection and control of pathogens and spoilage organisms to balance the food nutritionally & make it microbiologically safe. Outbreaks of food borne illness occur daily in all the countries, from the most to the least developed. Most of the cases are not reported, the true dimension of the problem

is unknown with the absence of reliable data & hence effective solutions often fail. In India, we face a severe problem that there is no formal surveillance system for food borne disease reporting and statistical analysis.

Even the educated people keep food borne illness to them and the only reported cases are of major disease outbreaks such as during some functions like marriage.

In developed countries the public awareness on the food safety risk is high with clear commitments of the government & in developing countries there are competing priorities in health agenda. WHO estimates that 1.5 billion cases of food borne illness cause about 3 million deaths each year costing up to \$ 40 billion in health care & job related absenteeism. More than 250 different food borne diseases have been described with different symptoms.

Innovative strategies and methods are needed for laboratory based surveillance system with international networking on food borne disease and contaminations. The evaluation procedures should be based on internationally agreed principles. Methods

shall ensure that product is safe before consumption.

Dr.C.M. Joshi, Director-Quality Assurance, Pepsico India, gave an insight into 'Managing Microbial Food safety In Industry'. Microorganisms are everywhere, however few are of major concern and yeast, moulds, non-spore forming bacteria (lactic acid and acetic acid) and spore forming are of concern. Time is one of the crucial factors for controlling bacterial contamination as its growth is exponential growth. Consumer protection and hence



THE SPEAKERS

business continuity is assured with high level of Food Safety Management Process. Although we find microorganisms everywhere around us, we need to take steps such that we are able to prevent their entry into our products from the very beginning of the processing. Second step, if we are not able to prevent their entry, try to reduce them to safety levels and then see that we are protecting what is good in the food and protecting the consumer from harmful effects. Dr. Joshi also presented on the



various types of microorganisms that can cause harm and the preventive measures that can be taken.

Taking the theme of safety, a step ahead, Dr. Nimish Shah, Head-Safety & Environment Assurance Centre, HUL, presented on "Microbial Risk Analysis & Product Safety". The Risk Analysis framework was not developed starting after the SPS agreement. It was under developed since the early 90's, but after the SPS agreement had been agreed on Risk Analysis and most of its component parts experienced a very fast evaluation to final Codex products. The component parts of this are risk management, risk assessment and risk communication.

Microbial Risk Analysis (MRA) provides a harmonised approach to evaluate risk and prioritise issues / solutions. MRA also supports the governmental / societal move away from hazard-based to risk-based decision-making and supports the notion that "zero risk" does not exist. It is equally important for the industry in simulating consumer safety of complex or radical product innovations.

Mr. Nuno Reis, Business Manager - Asia Pacific region - BioMerieux presented on "Challenges in the Food industry" and gave a comprehensive view of the various analysis methods from traditional to modern and the challenges that are faced by industry.

Traditional microbiology results are based on plate count methods. It takes several days until results are available, thus on part of being slow, it delays released finished

products & ingredients and delays response to environment monitoring program data. Results vary with microbial population, media & conditions - can yield false negatives or positives with a large measurement of uncertainty. Thus food industry indeed needs Rapid Methods. But one needs to know which rapid methods are useful for the desired product, on which criteria do I release products?, Quality Indicators (TPC, Y&M) or Pathogens (Listeria, Salmonella...)?

Mr. Nuno also gave an insight into the available methods, Rapid or Classical methods in compliance with ISO, FDA BAM, AOAC and other official compendia. The reference method and alternative validated methods. In Europe, the reference method = ISO whereas alternative methods must be validated according to ISO 16140 and certified. In USA, Reference method = FDA BAM and USDA MLG whereas Alternative methods must be validated by AOAC. In conclusion, Automated alternative methods make it possible to improve food safety testing and enables significant gains in productivity.

Ms. Kavita Kulkarni, Food Safety division, 3M India in her presentation on "Innovative solutions for Food Safety & Hygiene Management" gave a review of the solutions that can be provided by 3M. There is a need of environment monitoring as one study suggests, 'if an organism is found in the environment there is a 70% chance of it getting into the food'. While it is not possible to prevent the introduction of pathogens into food processing facilities, it is crucial to minimize their presence.



Dr. Sandhya Shrivastava, Associate Professor, Bhavan's College, Coordinator, BRC (Microbiology) presented the "Assuring Food Safety through Microbiological Analysis: Rapid or Conventional Methods". To meet the challenges of nutritional complexities and the ensuing shelf as well as omnipresent contaminants, research by microbiologists has been and will continue to be crucial to meeting the global need of ensuring food security and food safety. Currently, as per convention and regulatory requirements all over the globe, most laboratories are following classical methods for evaluating bio-burden, hygiene status and pathogen detection. Although the new methods have been there for a while, they are being adopted rather slowly by the laboratories. After discussions with the laboratories and industries associated with new technology few common reasons have been perceived for why food industry laboratories were reluctant to adopt new technology. These included methods not being approved or having official status and because certain tests, particularly those used for regulatory requirements, often stipulated the use of conventional methods. Furthermore, the high capital investment and cost of consumables associated with some new technologies, together with the need for well-trained technicians, made some new methods too expensive for many industry laboratories. It is thus important to table merits and limitations of contemporary methods in comparison with conventional, to take a balance view regarding method selection to deliver most reliable data regarding the microbiological quality of the





foods; ensuring safety of the consumer as well as the product.

'Rapid & Reliable Detection of Food Pathogens Using Proprietary Enrichment & Immunoassay Detection' was presented by Dr. Adrian Almeida, CEO, BioAzure. The need for Rapid Methods for Food Pathogen Detection is for detection of a single, specific, viable cell in food samples in a minimal amount time. These methods are highly sensitive and highly specific. However one basic principle behind enrichment of this specific viable cells is 'if you can't grow it, you won't show it', and there are methods to enrich these cells and analyze them.

Ms. Sweta Patel, CEO Tara International gave a brief of the workings of the Soleris system; it is a rapid optical system for the detection of microbial contamination. The optical assay measures microbial growth by monitoring pH and other biochemical reactions that generate a colour change as microorganisms in the broth grow and metabolize. The results are displayed by colour-coded monitoring with an alert on samples out of specification. Sensitivity of the technology ranges from a single organism per vial to 108 CFU/mL (upper limit).

Discussing the new challenges to

food safety that are caused by micro-organisms as well as strategies and methodologies to counter these, Dr. Deepa Bhajekar, Managing Director, MicroChem Silliker presented "Food Safety & Challenges in Food Microbiology: Regulatory Perspective". Management of food safety is based on generally accepted principles of Hazard Analysis Critical Control Points and of Good Manufacturing Practices. However, a more pro-



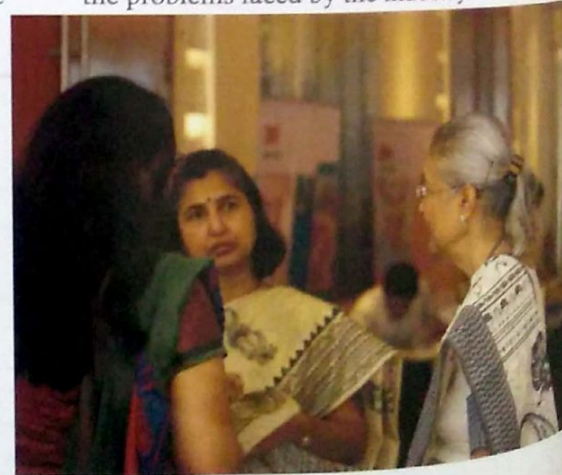
active, science-based approach is required, starting with the ability to predict where problems might arise by applying the risk analysis framework. Developments that may influence food safety in the future occur on different scales (from global to molecular) and in different time frames (from decades to less than a minute). This necessitates development of new risk assessment approaches, taking the impact of different drivers of change into account.

Mr. Udit Parekh, CEO, Sabio, have innovative rapid analysis methods like 'Automated

detection and quantification system for Pathogens in Process Water". New developments in biology and detection systems have enabled rapid detection of low levels of pathogens, down to single cells. Current systems which perform

such detection are few, have a large footprint and are unaffordable in the Indian context. They also do not have the ability to perform sample preparation and detection in a self-contained format, thus making field use infeasible. Sabio has designed a novel pathogen isolation and direct detection system, to replace slow and tedious culture-based techniques. The system is easy to use, versatile and incorporates automated detection and analysis, reducing the number of steps needing trained personnel. The isolation device is also self-contained from sample input to data output, making it possible to use in field or manufacturing settings. With a simple design of the isolation device as well as the fluorescence-based optical reader, the system will have low capital and per-use costs enabling adoption at scale.

The workshop was well appreciated by industry as it was a platform for the various analysis methods to be discussed and get experts opinion on some of the problems faced by the industry.



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