Food Safety Management System - Hazards and Risk Assessments. Regulations and Analytical Strategies Short Course – Enviro Analysis 2010, Toronto

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INTRODUCTION

Noteworthy changes have occurred in agricultural and food chemistry and in the critical issues of food safety and food quality. Food safety is an increasingly important public health issue and governments all over the world are intensifying their efforts to improve food safety. These efforts are in response to an increasing number of food safety problems and rising consumer concerns. Food contamination creates an enormous social and economic burden on communities and their health systems. In the USA, diseases caused by the major pathogens alone are estimated to cost up to US $35 billion annually (1997) in medical costs and lost productivity. The re-emergence of cholera in Peru in 1991 resulted in the loss of US $500 million in fish and fishery product exports that year.

The food production chain has become more complex, providing greater dangers for contamination and growth of pathogens. Many outbreaks of food borne diseases that were once contained within a small community may now take on global dimensions.

Environmental pollution, deliberate contamination and natural and anthropogenic disasters; indeed even toxic waste products from food processing can penetrate soil and ground water resources.

As is evident in recent health-threatening deviations of food quality, most of the food industry and instrument vendors are in the learning stage and encountering problems regarding the level and method of implementation of food safety guidance.

Notwithstanding the unique operations and requirements in the food industry. the food supply chain and in its approach to processes and to safety, there are well-defined procedures that should be adopted in establishing a food management system, in determining the QA/QC procedures, in purchasing and commissioning instrumentation that is fit for purpose and selecting compliant methods of analysis that meet international requirements.

COURSE DESCRIPTION

This course is an introduction to the ***food safety system*** - ***ISO 22000***, laboratory protocols, analytical standards, instrumentation and QA/QC procedures in food safety analysis. This course provides participants with practical information as to how to implement the ***Food Safety Management System (FSMS):***

- Definition of the Food Chain
- Definition of a Food Safety Management System
- ISO 22000 - Risk assessment and hazard evaluation.
- HACCP - Factors that control the likelihood of introducing food safety hazards in the product(s) and food product processing environments in accordance with national and international auditable certification requirements and standards as defined in ISO 22000
- Overview of instrumental and methodological resources so that it is capable of assessing the quality of the product and the product process, of detecting in successive steps, possible failures during various links of the food chain

- QA/QC for determining if the final product meets national and international standards and specifications and to make decisions on its acceptance or rejection.

The course includes the following sections:

1. Food Safety Management System (FSMS) - ISO 22000 and HACCP.

In order to ensure food quality, international standards have been promulgated to provide a food safety management system (FSM) incorporating the widely used and proven HACCP principles into the quality management system. What are the tasks?

2. Introduction to HACCP (Hazard Analysis Critical Control Point)

A good knowledge of HACCP will be required for implementing the ISO 22000 Food Safety Management System. It is a system where the food manufacturer or handler identifies potential hazards that can be introduced via the raw materials, while the food is in the production process or in the care of the organization (storage), and determines how those hazards can be eliminated. For example, if there is a point in production where a bacterial contamination can be introduced, then that site becomes a critical control point and controls can then be implemented to eliminate the hazard. If there is a limit on the NaCl concentration in a stage of production, then the it MUST be controlled and the method and accuracy MUST be documented. If a metal contaminated raw material is delivered; for example rice containing high As contents, it will be rejected. In addition, the measures taken if this requirement is not attained.

From the analytical, instrumental and methodological aspect, this is the most important aspect of the food safety management system.

3. HACCP is based on several well-defined principles:

a. Hazard Analysis:

The aim is to identify and evaluate the potential hazards and risks in the various compartments of the organization. Analysis of hazards in the processes and where they can be introduced - raw materials, contamination, terrorism, criminal acts,

storage, packing materials, etc. For example, hazards can be physical, chemical (metal contamination), detergents, metal contaminants, biological (at what points could bacteria or virus contaminate the product). The organization MUST possess analytical facilities and knowhow to make an accurate evaluation of the hazards.

b. Identify the Critical Control Points

What controls need to be applied to prevent or eliminate the hazards that have been identified in the process? These are critical control points. For each critical control point preventive measure must be in place. How to prevent the hazard?:

c. Preliminary Hazard Analysis (PHA)

Classifications of risk assessment sources of contamination

- Intentional contamination
- Unintentional NONDELIBERATE contamination
- Accidental contamination
- Likelihood and contamination severity
- Classification of hazardous ingredient detection probability
- Factors effecting detectability

d.

e. d. Establish Critical Limits

f. The next step is to establish criteria for each critical control point. What criteria must be met to control the hazard at that point? Most probably there are regulatory limits that must meet this control point. The analytical procedures and instrumentation MUST be capable of meeting these requirements.

g.

h. e. Establish Monitoring Procedures

i. What parameters are measured and what methods are used? - they MUST be compliant!! The process must be continuously monitored at the critical control point and records MUST be maintained to demonstrate that the critical limits have been met. Is it possible to perform on-line analysis of the control point? If

not, what is the frequency of measurements that need to be performed to show that the process is under control?

j.

k.

l. f. Corrective Actions

m. Preventive actions need to be established if a critical limit is not met. These MUST be identified ahead of time. The action must ensure that no unsafe product is released. There must also be an evaluation of the process to determine the root cause of the problem and an elimination of the cause.

n.

o. g. Record Keeping Procedures

p. Preparation of records to show that the critical limits have been met, and the system is in control.

q.

r. g. Regulatory requirements

s. What regulations and who establishes them?

t.

u. h. Establish Verification and Validation Procedures

v. The HACCP plan must be validated and the controls working according to the requirements. Instruments and methods MUST be in accordance with the standard operating procedures and ISO 17025. Corrective actions MUST be documented

Level of the course

Type of course (Beginner, Introductory, Advanced, etc.)

Beginner - intermediate

Although the course content is in the beginner-intermediate category, advanced participants will gain a wider outlook on the realistic application of the management system. The level of the material has been designed taking into consideration that participants may have a basic knowledge of management systems - but certainly not compulsory

The instructor intends to promote considerable interaction between the instructor and the participants, and among participants themselves. This always results in a beneficial exchange of data, problems and problem solving.

Benefits of the course

All participants will gain an understanding of the importance of FSMS, and the role of FSMS in laboratory procedures. This knowledge will increase the confidence in the final products, and the confidence of the laboratory staff on the fitness of the analytical data in conformance to quality requirements and regulations,

Target audience

This course is intended for food and agricultural chemists, soil and water scientists, public health technologists, Instrument vendors, crop and feed producers, primary food and second-level food producers, food processors, wholesalers, retailers, public control agencies, laboratory managers, quality control and assurance specialists.
The gathering of this plethora of information will provide an insight to critical stages of the Food Safety Management System, in selection of sample preparation approaches, operation conditions and instrumentation

Biographical sketch of the instructor

Dr. Isaac (Joe) Brenner is as a senior consulting scientist in Brenner Scientific that specializes in compliant routines in environmental and nutrition technologies. He obtained his Ph.D. in Geochemistry from the Hebrew University, Jerusalem, Israel in

1980. Dr. Brenner was a guest professor in the Earth Dynamics Science Center in the National Cheng Kung University in Taiwan. In the past ,Joe Brenner was a guest scientist in the Laboratoire de Chimie Analytique Bio Inorganique et Environnement, (LCABIE) CNRS, Pau, France and the Chuo University, Tokyo, Japan

He was head of the application labs in Jobin Yvon in Longjumeau, France; a senior scientist in the Varian Research Center, Palo Alto, California, USA In these positions, he developed plasma-based analytical methodologies for environmental, high technology, clinical and nutrition samples. Brenner is an independent consulting scientist for the application, marketing and sales for environmental, nutrition and clinical analysis. Brenner specializes in preparing laboratories for ISO 22000 and ISO/EC 17025 accreditation using AOAC, Standard Methods and US EPA procedures. This includes sampling strategies, preparation of SOPs, instruction, QA/QC and internal audits world-wide.

Dr. Joe Brenner has delivered more than 500 oral presentations, short courses, round table discussions, at universities, international symposiums, research institutes, and instrument manufacturers; he has 120 peer-reviewed scientific publications.