HACCP AND ISO
DEVELOPMENT OF A FOOD SAFETY MANAGEMENT STANDARD

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ABSTRACT

There is an increase in the customer demand for safe food. This has lead food processing companies to develop food safety management systems, which are based on HACCP. In 2001, ISO has undertaken the development of an auditable standard, which further defines HACCP's role in a food safety management system. This standard is not intended to define the minimal regulatory requirement, however it is intended to define the requirements for companies that desire to exceed the regulatory requirements for food safety. It is expected that this standard will be published by ISO in 2004.

TEXT

Hazard Analysis Critical Control Points (HACCP) is a systematic method that serves as the foundation for assuring food safety in the modern world. The HACCP system is designed to be used to prevent the occurrence of food borne hazards from production through manufacturing, storage and distribution of a food product

HACCP has it roots in the late 1950s when NASA contracted with the Pillsbury Company to manufacture foods for manned space flights. The government placed strict safety requirements for the foods that would be consumed by the astronauts. As a result, Pillsbury developed a process that would prevent the occurrence of food safety hazards. This concept was named Hazard Analysis Critical Control Points or HACCP. Initially, HACCP consisted of the following three principles (Stevenson and Bernard, 1999).
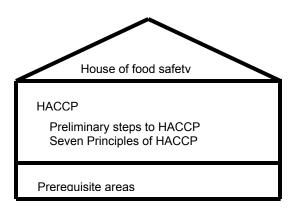
1   Identification of hazards
2   Determination of critical control points to control any hazard
3   Establishment of monitoring systems.

This original concept of HACCP was first presented to the public during the 1971 National Conference of Food Protection. Since 1971, HACCP has continued to evolve. Currently it is defined as five preliminary steps, and seven principles. (Table 1). HACCP does not rely on end product testing to ensure that the food is safe. Instead, it builds food safety into the manufacturing process and relies on process controls to prevent or reduce to an acceptable level the presence of known hazards in a food product.

Current, HACCP standards recognize that a HACCP based food safety system must be supported by a foundation of prerequisite areas .(Table 1 and Figure 1). If these areas are not addressed, there can be failure of the food safety system

The National Advisory Committee on Microbiological Criteria for Foods developed the United States definition of HACCP. The latest definition was published in 1997 (NACMCF, 1997). In

Figure 1
House of food safety

Adapted, Ciafrani et al. 2002

Table 1	
Components of a HACCP program and a prerequisite program for HACCP	
Functional area	Contents of the functional area
HACCP Preliminary Steps	Assemble the HACCP team Describe the product and its distribution Describe the intended use and the users of the product Develop the process flow diagram Verify the process flow diagram
Seven Principles of HACCP	Principle 1 Conduct a hazard analysis Principle 2 Determine the Critical Control Points (CCPs) Principle 3 Establish Critical Limits (CLs) Principle 4 Establish monitoring procedures Principle 5 Establish corrective action Principle 6 Establish verification plan Principle 7 Establish recording keeping and documentation procedures
Prerequisite areas for HACCP	Training Personnel practices Premises equipment and facilities Good Manufacturing Practices Cleaning, sanitation and pest control Receiving, transportation and storage Traceability and recall Suppler control Hazardous material handling

1985, the National Academies of Sciences recommended that all food processing companies in the United States adopt HACCP as the method to prevent food borne hazards from entering the food supply published (NAS, 1985).

Slowly HACCP has been incorporated into the U.S. food processing regulations. The USDA Food Safety Inspection Service made HACCP mandatory for the meat and poultry industry with the issuing of the HACCP/Pathogen Reduction rules (USDA, 1997). The Food and Drug Administration has made HACCP mandatory for the seafood and the juice industry ,(FDA, 1995 and FDA, 2001. In addition, food processing companies and food distribution companies have made HACCP mandatory for all of their suppliers thus extending HACCP beyond the mandatory regulatory requirements.

HACCP has become an international standard. The Codex Alimentarius Commission (Codex) incorporated HACCP into the Recommended International Code of Practice – General Principles of Food Hygiene (CAC, 2001).   Codex standards play an important role in international trade. However, their adoption by the member nations of Codex are voluntary.

In addition to the development of a Codex HACCP standard, HACCP standards and related standards have been developed by national standards organization, and industry groups (Table 2),

Table 2	
Examples of National, International, and Industrial Standards in HACCP and prerequisite areas for HACCP	
Standard	Title
CAC/RCP 1-1969 Rev 3 (1993), And. 1999	Recommended international code of practice general principles of food hygiene
National Advisory Committee On The Microbiological Criteria For Foods	Hazard Analysis and Critical Control Point Principles An Application Guidelines August 14, 1997l
DIN 10503:2000	Food Hygiene Concepts
Irish standard I.S.343:2000	Food Safety Management
Danish Standard 3027	Food Safety according to HACCP
Dutch National Board of HACCP Experts	Criterion for the Assessment of Operational HACCP Systems
National Sanitary Foundation	Application of ISO 9000 and HACCP requirements to global food and beverage industry
CIES-Business Forum	Global Food Safety Initiative, May 2000
British Retail Consortium	Technical standard and protocol for compiles supplying retail or Biomedical food products
Food Safety Initiative	Vendor Certification Program
National food Processors Association	NFPA Safe Program – Auditor check list

Recently, there has been a desire to develop auditing systems to assess a company's HACCP system. In response to this need the Food Drug and Cosmetic Division developed the ASQ certification Quality Auditor – HACCP certification. In addition the Division published training material to support this certification (ASQ Food Drug and Cosmetic Division, 2002). In Europe, there has been a desire for food processing companies to obtain third party certification of their HACCP systems.

As a result of the latter issue, A New Work Proposal was submitted to ISO Technical Committee 34 (Food Products). This proposal requested the development of an ISO standard that defines a food safety management system. As a result of TC 34 approving this request, the Technical Committee authorized the development of ISO 22000:200x (Food Safety Management Systems – Requirements). This standard has the following objectives:
   Compliance with the Codex HACCP principles.
   Harmonize the voluntary international standards.
   Provide an auditable standard that can be used either for internal audits, self-certification or third party certification.
   The structure is aligned with ISO 9001:2000 and ISO 14001:1996.
   Provide communication of HACCP concepts internationally.
The tentative timetable for the development of this standard is given in Table 3.

Table 3	
Tentative time table for the development of ISO 22000:200x	
Date	Event
March 2003	ISO CD 22000:200x
September 2003	Publication of ISO DIS 22000:200x
May 2004	Publication of ISO FDIS 22000:200x
September2004	Publication of ISO 22000:200x

ISO 22000:200x is not intended to define the minimal food safety system, it is a voluntary standard. The standard is intended to be used by any organization within the food chain "to seek a more focused, coherent and integrated food safety system" than normally required by food processing rule and regulation. It provides a framework for a structured food safety management system and incorporates the system into the overall management activities. The standard can also be used by management to communicate food safety efforts to stakeholders throughout the food chain.

ISO 22000:200x will enable an organization to align its food safety management system with other management systems such as quality management systems or environmental management systems. This is being done by aligning the standards clauses with ISO 9001:2000 and making the standard compliant with ISO Guide 72 (ISO, 2001). The standard will be written as an auditable standard. The outline for ISO WD 22000:2000 is provided in Table 4.[1] This standard will include all of the requirements of HACCP as define by Codex .

The ISO 22000:200x developed a new definition for prerequisite areas[2]. In addition ISO 2200:200x will require that the organization develop, maintain, monitor and assess the effectiveness of the SSMs. Current, HACCP assumes that a company must comply with GMPs, SSOPs and other prerequisite programs.

Conclusions

As a result of globalization and international trade, customers around the world are demanding safe and wholesome food products. As a result, food processing companies around the world are implementing food safety management systems to ensure the production and distribution of safe foods. To assist food processing companies to meet this marketplace requirement, ISO is developing an international standard that defines the requirements of a food safety management system. It is expected this standard will be published during the last half of 2004.

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[1] At the time of writing this paper ISO 22000:200x was currently in the working draft form. This is not the final standard. The contents of the final standard are subject to change.

[2] SSM is a Supportive Safety Measure. ISO WD 22000 defines SSM as a "specified control measure other than a critical control measure which affects food safety by preventing, eliminating or reducing the probability of a hazard occurring. Alternative terms for SSM may be used. For instance the terms Good Manufacturing Practice (GMP), prerequisite programmes, Good Agricultural Practices (GAP), Good Hygienic Practices (GHP), Good Distribution Practices (GDP), Good Veterinary Practices (GVP), The actual SSMs needed depend on the type of business or segment of the food chain" (ISO, 2003).

Table 4 Clauses of ISO WD 22000:200x	
Clause	Title
1	Scope
2	Normative reference
3	Terms and definitions
4	Food safety management system
4.1	General system requirements
4.2	Documentation requirements
5	Management responsibility and commitment
5.1	Food safety policy
5.2	Responsibility and authority
5.3	Food safety team
5.4	Communication
5.5	Contingency preparedness and response
5.6	Management review
6	Resource management
6.1	Provision or resources
6.2	Human resources – competence, awareness and training
7	Realization of safe products
7.1	Product and process data
7.2	Hazard analysis
7.3	Design of the CCP plan
7.4	Designing of the SSM programmes
7.5	Operation of the food safety management system
7.6	Control of monitoring and measuring devices
8	Measurement, analysis and updating of the FSM system
8.1	General
8.2	FSM system verification
8.3	FSM system validation
8.4	FSM system updating
Annex A	(Informative) Correspondence between ISO 22000:200x and ISO 9001:2000
Annex B	(Informative) Examples of check list of control measures
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Source: ISO, 2003

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