Technews

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For Efficient Dairy Plant Operation

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FOOD SAFETY AND QUALITY MANAGEMENT SYSTEMS

This bulletin includes technical information based on latest developments on products, systems, techniques etc. reported in journals, companies' leaflets and books and based on studies and experience. The technical information in different issues is on different areas of plant operation. It is hoped that the information contained herein will be useful to readers.

The theme of information in this issue is **Food Safety and Quality Management Systems**.

It may be understood that the information given here is by no means complete.

In this issue:

Very Happy New Year to all Readers

1. INTRODUCTION

Food safety is a growing concern all over the world. The food industry has the responsibility to provide safe food to the consumer for which it utilizes the food safety standards in the national food legislation as well as applies voluntary food safety measures. Over a period of time several food safety and quality systems have been evolved by the standard setting bodies against which the operators in the food chain can obtain certification of their food safety practices. This has resulted in proliferation of diverse standards on food safety that differ significantly with regards to intended target segment in the food chain, scope of provision, and final market acceptance.

This issue of *Technews* provides information on scope and applicability of the food safety and quality system standards that have been elaborated by various standard setting bodies and generally recognized and implemented by the food industry in different parts of the world. A general procedure for certification of food safety system is also provided.

2. INTERNATIONALLY RECOGNIZED STANDARDS FOR FOOD SAFETY AND QUALITY MANAGEMENT

Standards of the Codex Alimentarius Commission

Codex Alimentarius Commission (CAC) is a body established in 1963 jointly by FAO/WHO to implement a joint FAO/WHO Food Standards Programme with the primary objective of protecting consumers' health and ensuring fair practices in international food trade. To this end, the CAC is involved in preparing food standards.

Global trade of food products follows the guidelines of World Trade Organization (WTO). In its relevant agreements - Agreement on

Application of Sanitary and Phytosanitary Measures (SPS) and Agreement on Technical Barrier to Trade (TBT) – WTO recognizes the Codex standards and guidelines as reference standards in the international trade of food products.

Codex does not provide certification for application of food safety systems developed by it. Many international food safety certifying agencies have, however, developed food safety system standards based on the guidance in Codex standards, against which these agencies have been providing certification to the food business operators.

The following Codex standards are internationally accepted as benchmark standards for ensuring food safety:

1. **Recommended International Code of Practice – General Principles of Food Hygiene (CAC/RCP 1-1969, Rev. 4-2003)[1]**

   This Code provides essential principles of food hygiene applicable throughout the food chain (including primary production through to the final consumer) and sets out the necessary hygiene conditions for producing food which is safe and suitable for consumption (Refer *Technews* Issues 35, November–December 2001; 36, January–February 2002; and 37, March–April 2002).

2. **Hazard Analysis and Critical Control Point (HACCP System)**

   The HACCP system is a scientific, rational and systematic approach to identification, assessment and control of hazards during production, processing, manufacturing, preparation and use of food to ensure that food is safe when consumed (i.e. HACCP can be applied throughout the food chain from the primary producer to final consumer and its implementation should be guided by scientific evidence of risks to human health). With the HACCP system, food safety control is integrated into the design of the process. It does not rely exclusively on the end product testing which is often ineffective in preventing hazards in the foods in the first place. Therefore, the

HACCP system provides a preventive and thus a cost-effective approach to food safety.

The Codex Code of Practice - General Principles of Food Hygiene (CAC/RCP 1-1969, Rev. 4-2003) specifies the Hazard Analysis and Critical Control Point (HACCP) System as a food safety system (refer *Technews* Issue 11, November–December 1997) and provides guidelines for its application. The guidelines provide adequate flexibility for the small and/or less developed businesses (SLDB) in the application of HACCP without compromising the objective of achieving food safety.

3. Code of Hygienic Practice for Milk and Milk Products (CAC/RCP 57–2004)[2]

This Code provides principles for the hygienic production and manufacture of milk and milk products and guidance on their application (Refer *Technews* Issues 72, January–February 2008; and 73, March–April 2008). It applies to the production, processing and handling of milk and milk products, except raw drinking milk. The objective of this Code is to apply the recommendations of the *Recommended Code of Practice: General Principles of Food Hygiene* to the specific case of milk and milk products.

This Code takes into consideration, to the extent possible, the various production and processing procedures as well as the differing characteristics of milk from various milking animals used in different countries. It focuses on acceptable food safety outcomes achieved through the use of one or more validated food safety control measures, rather than mandating specific processes for individual products.

Standards of the International Organization for Standardization

International Organization for Standardization, called ISO, is the world's largest developer and publisher of International Standards. It is

a non-governmental organization that has membership both from public and private sectors.[3]

ISO standards are recognized worldwide. The food quality and safety management standards developed by the ISO are briefly described below:

1. **ISO 9001:2000[3]:** the ISO 9001:2000 standard provides requirements for quality management systems (QMS). It is an auditable standard on good quality management practices. It does not deal with the food safety issues but has been widely used to provide the management system elements to consistently manage food safety under a separate food safety management system, e.g. HACCP system.

   The latest version of this standard is the ISO 9001:2008 that revises the ISO 9001:2000. It provides a set of standardized requirements for a quality management system to ensure that the organizations consistently turn out products that satisfy customers' expectations. It is a standard against which organizations can be certified – although certification is not a compulsory requirement of the standard.

   Some salient features of the ISO 9001:2008 are briefly provided below:
   - Generic: Applicable to all organizations regardless of their type, size and the product provided.
   - Flexible:
     - Lays down requirements for the quality system but does not dictate how they should be met, leaving great scope and flexibility for implementation in different business sectors and business cultures, as well as in different national cultures.
     - Allows exclusions under certain circumstances, provided such exclusions do not affect organizations' ability or responsibility to provide products that meet customer, and applicable statutory and regulatory, requirements.

   ISO 9001:2008 is an improved version of ISO 9001:2000, and not its 'upgrade', with changes to make it simple to use, clear in language,

readily translatable, easily understandable and to improve its compatibility with other management systems. It does not introduce additional requirements or change the intent of ISO 9001:2000.

The ISO 9001:2008 has been published as an international standard on 13.11.2008. The schedule of its application, as agreed jointly between the ISO and the International Accreditation Forum (IAF), is as follows:

- One year after publication of ISO 9001:2008, all accredited certifications issued (new certifications or re-certifications) shall be to ISO 9001:2008.
- Twenty four months after publication by ISO of ISO 9001:2008, any existing certification issued to ISO 9001:2000 shall not be valid.

During the above specified periods for transition, the organizations that are certified to ISO 9001:2000 have the same status as those who have already received the ISO 9001:2008 certification.

2. **ISO 22000- 2005[4,5]:** This auditable standard specifies requirements for a food safety management system to ensure that food is safe at the time of human consumption. Prior to the development of this standard, guidance documents on HACCP system existed which were used as the basis to develop auditable food safety management systems by different food safety certification agencies resulting in considerable diversity in the implementation of such systems.

   ISO 22000 combines the following generally recognized key elements to ensure food safety:

   - System management: The ISO 22000 includes the necessary management system elements similar to those in the ISO 9001:2000.
   - Pre-requisite programmes, which have been divided into the following two sub-categories:

- Infrastructure and maintenance programmes that address basic requirements related to infrastructure and facilities for ensuring good hygiene. These are the generally accepted practices of a more permanent nature. E.g. sanitary design of equipment, cleanable floor etc.
- Operational pre-requisite programmes that control or reduce the impact of identified food safety hazards in the products or the processing environment. E.g. CIP procedures, pest control programmes etc.

- HACCP principles to manage the critical control points determined to eliminate, prevent or reduce the specified food safety hazards from the product.

Thus, the ISO 22000 standard combines the HACCP principles and application steps with pre-requisite programmes and supports these food safety concepts with a necessary management system. It is an auditable standard with clearly stated requirements that fills the gap between ISO 9001:2000 (now revised by ISO 9001:2008) and HACCP System – the former does not address food safety while the latter does not include auditable management system elements.

In addition, it also emphasizes upon effective communication along and across the food chain to ensure food safety and upon continuous improvement in the food safety management system being implemented by the organizations in the food chain.

ISO 22000 is applicable to all organizations, regardless of size, which are involved in any aspect of the food chain and want to implement systems that consistently provide safe products. Therefore, it is applicable to primary producers, food manufacturers, transport and storage operators and subcontractors to retail and food service outlets – together with related organizations such as feed producers and producers of equipment, packaging material, cleaning agents, additives and ingredients etc.

ISO 22000 does not address food quality but is compatible, and can be integrated, with the Quality Management System standard ISO 9001:2000. It is also compatible with the ISO 14000 standard which is an Environment Management System. Therefore, operators in the food chain can opt to implement an integrated food safety, quality and environment management system in a simple and coherent manner.

3. REGIONAL / PRIVATE STANDARDS FOR FOOD SAFETY AND QUALITY MANAGEMENT

Various private standards have been elaborated by different agencies for addressing food safety issues at regional levels. The private food safety standards are intended to be used in business-to-business relationships and hence, not directly visible to the consumer on the product label[4].

Some of these private standards that have gained wide acceptance are briefly described below:

1. **INTERNATIONAL FOOD STANDARD (IFS)[4]:** The IFS was set up in 2002 by the German retail association *Hauptverband des Deutschen Einzelhandels (HDE*) and was joined by the French retail association Federation of Commerce and Distribution (FCD) in 2003. It is a food safety and quality management protocol based on HACCP system and designed for manufacturers and processors of all kinds of food products.

2. **SAFE QUALTY FOOD (SQF) PROGRAMME[4,6,7,8]**: The SQF programme, owned by the Food Marketing Institute of the United States, is an integrated food safety and quality management protocol designed to be applicable at all the links in the food supply chain. It advocates use of good practices and HACCP, and specifies requirements for food safety and quality management systems. SQF certification provides an independent and external validation that a

product, process or service complies with international, regulatory and other specified standard(s).

The SQF provides two HACCP based supplier assurance codes that outline general food safety and quality system requirements. These are:

- SQF 1000 Code: It is for use by primary producer for field packing of fresh produce and pre-farm gate production, harvesting and preparation of primary products intended for further processing. It requires that a producer implement Good Agricultural Practices (GAP) and develop and maintain food safety and quality plans to control those aspects of their operations that are critical to maintaining food safety and quality.
- SQF 2000 Code: It is for use by all sectors of the food industry, including manufacturing, catering and food service companies, for the supply of raw materials and ingredients, food products and processed or prepared foods, beverages or services. It requires that a supplier implement Good Manufacturing Practices (GMP) and develop and maintain food safety and quality plans to control those aspects of their operations that are critical to maintaining food safety and quality.

The Codes provide food safety and quality system requirements for the following three levels:

- Level 1: Food safety fundamentals
- Level 2: Certified HACCP based food safety plans
- Level 3: Comprehensive food safety and quality management system

A producer/supplier can opt to get the certification for the above SQF codes at any of these three levels depending upon the level of development of the food safety and quality management system being implemented by him.

3. **BRITISH RETAIL CONSORTIUM GLOBAL STANDARD – FOOD[4,9,10]:** It has been elaborated and adopted by the British Retail Consortium (BRC), a trade association representing the whole range of retailers in UK.

   The principal requirements of this food safety standard are adoption and implementation of GMP, GHP and HACCP, and control of factory environment, products, processes and personnel. It also requires that a manufacturer develop and implement procedures for handling specific materials such as those containing allergens. It is designed for use by food manufacturers and is acceptable to all major UK and Scandinavian retailers. It is increasingly being viewed as a benchmark for best practices in food manufacturing.

4. **GLOBALGAP (FORMERLY EUREGAP)[4,11]:** GLOBALGAP is a private sector body that sets voluntary standards for the certification of agricultural products around the world with an aim to establish one standard for Good Agricultural Practices (GAP) applicable worldwide.

   GLOBALGAP standard is primarily designed to reassure consumers about how food is produced on the farm by minimizing detrimental environmental impacts of farming operations, reducing the use of chemical inputs and ensuring a responsible approach to worker health and safety as well as animal welfare.

   It is a pre-farm gate standard covering the process of farm inputs like feed or seedlings and all the farming activities until the product leaves the farm. It incorporates Integrated Pest Management and Integrated Crop Management practices into the framework of commercial agricultural production. It gives companies the flexibility to benchmark already existing local food safety schemes against the umbrella standards, thus driving wider acceptance.

   The GLOBALGAP standards are subdivided into three types as follows:

- Crop base
- Livestock base
- Aquaculture base

The dairy sector is covered in the 'Livestock base'.

5. **DUTCH HACCP[9]:** This technical specification has been designed by the Dutch National Board of Experts, which is made up of government, enforcement and trade agencies, food retailers, food producers and processors, trade associations and consumer organizations.

   The Dutch HACCP Code is a technical specification which sets out the requirements for a HACCP based food safety system for food manufacturers. This provides a basis for compliance of a HACCP-based food safety system with international and national legislation and codes of practice within a management system framework.

4. INDIAN FOOD SAFETY SYSTEM STANDARDS[12]

STANADRDS AVAILABLE

1. **Indian Standard IS/ISO 9001:2000 Quality Management Systems - Requirements**

   This is a Joint IS/ISO standard and is an adoption of the ISO 9001 standard.

2. **Indian Standard IS: 15000 Food Hygiene - Hazard Analysis And Critical Control Point (HACCP) - System And Guidelines For Its Application**

   This is based on the HACCP system as described in the Codex Recommended International Code of Practice – General principles of Food Hygiene (CAC/RCP-01) (Refer *Technews* Issue 11, November–December 1997).

3. **Indian Standard IS / ISO 22000: 2005 Food Safety Management Systems - Requirements For Any Organization In The Food**

   This is a Joint IS/ISO standard and is an adoption of the ISO 22000 standard.

STANDARDS UNDER ELABORATION

The following draft standards have been prepared by the Bureau of Indian Standards and are at different stages of their elaboration:

- FAD 15 (1681) Good Manufacturing Practices - Requirements for Organizations in the Food Processing Sector
- FAD 15 (1701)C Draft Indian Standard – Food Safety Management – Requirements for Good Hygienic Practices
- FAD 15 (1830)C Draft Indian Standard – Food Retail Management – Basic Requirements
- FAD 22(0) National Agriculture Code: Vol. 1 (Indiagap) Good Agricultural Practice - Code of Practice

5. GENERAL PROCEDURE FOR CERTIFICATION OF A FOOD SAFETY SYSTEM[9]

The steps involved in implementation and certification of food quality and safety management systems are generally similar for the different system standards available. Once a decision to implement a system standard is made by the management, a logical sequence of the steps to be followed is presented in the Figure. Some of these steps may not be sequential and totally exclusive of each other. That is, some steps may be undertaken simultaneously and their activities may overlap.

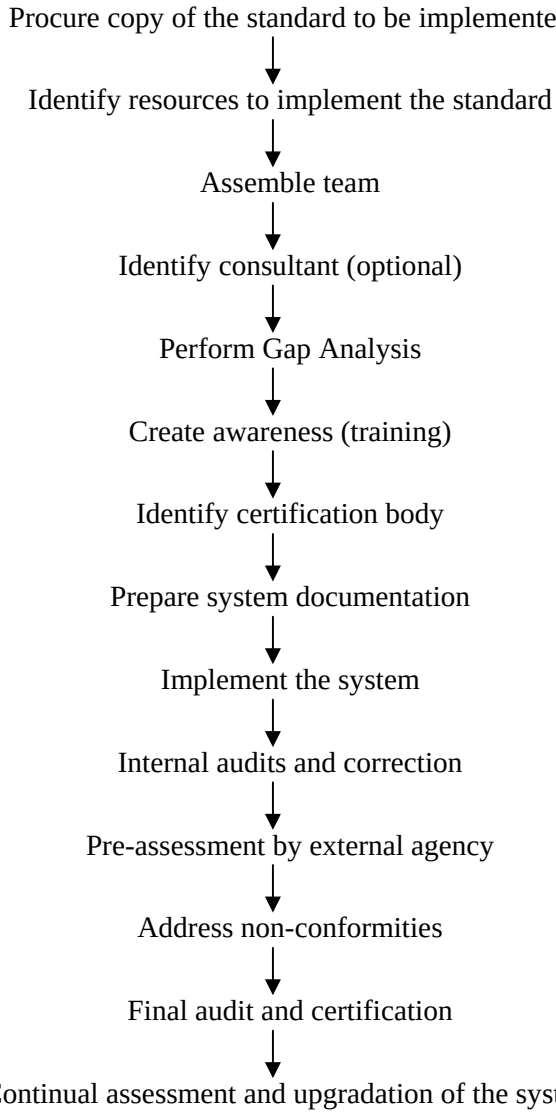

Figure: Steps in implementation and certification of a food quality and safety management system

The steps are briefly describes below:

1. **Identify the system standard(s) to be implemented:** There are numerous food quality/safety standards depending upon the market and corresponding legislation, regulatory and customer requirements. An appropriate system standard should be chosen commensurate with the organization's mission and objectives.
2. **Procure a copy of the standard identified:** A copy of the standard identified for implementation should be procured and examined to get familiar with its requirements.
3. **Identify and commit resources to implement the standard:** The organization should identify and commit resources that would be required to implement the standard. These include people with appropriate expertise, time and equipment. The expertise required may not always be available within the organization. The organization may address this through training of the existing people and/or hiring of a consultant.
4. **Assemble a team and define a strategy:** A multidisciplinary team should be assembled to address the different aspects of the system. The implementation is effective if the top management prepares an organizational strategy to implement the system. Presence of senior management personnel of the organization in the team is vital as the responsibility of a management system lies with the senior management.
5. **Identify a consultant (optional):** Organizations may opt to receive advice from independent consultants on how best to implement their food quality and safety management systems. The consultant chosen should have experience in implementation of the food quality and safety management systems, preferable in the relevant food sector.
6. **Perform a gap analysis:** A gap analysis between the existing practices in the organization and those required as per the chosen standard should be carried out to know the extent of efforts required

in implementing the system in true spirit. The assembled team in coordination with the consultant (if any) should perform a Gap Analysis and share the results with the top management of the organization.

7. **Create awareness (training):** The personnel involved in various activities of the organization should be trained to develop their competencies, as relevant, for effective implementation of the system.
8. **Identify a certification body:** The certification body is a third party who judges effectiveness of the implementation of the food quality and safety system and issues a certificate if it meets the requirements of the standard. Industry and auditing experience, geographic coverage and the service level offered should be considered while choosing a certification body.
9. **Prepare system documentation:** The system documentation should be carried out that outlines the organization's intentions to operate in safe manner. It outlines the policies and objectives of the organization and its procedures to be used in the implementation of the management system(s).
10. **Implement the system(s):** The key to implementation is communication and training. During the implementation phase everyone starts operating as per the procedures and collects records that are intended to demonstrate compliance with the system(s) requirements.
11. **Internal audits and correction:** Internal audits are undertaken by the trained personnel from within the organization to know the extent of compliance with the system(s) being implemented. Steps are taken to address any non-conformity observed.
12. **Pre-assessment by external agency:** Once the organization is confirmed that due efforts have been made on its part and is confident to face an external audit, a pre-assessment audit is carried out by the certification body. Steps are taken by the organization to

address any non-conformity determined by the external auditor.

13. **Final audit and certification:** The certification body conducts a final audit and determines whether the non-conformities identified in the pre-assessment audit have been addressed appropriately and the system is operating as required. Once satisfied, the certification body registers the organization as certified for the systems being implemented.
14. **Continual assessment and up gradation of the system:** Once an organization is registered and awarded a certificate, it can refer to it in its advertisements to promote business. To maintain the certification, the organization must continue to implement the system(s) sincerely. This is periodically audited by the certification body to ensure that the implementation of the system by the organization continues to be as per the standard. Where, necessary the system can be up-graded to improve its effectiveness.

6. GLOBAL FOOD SAFETY INITIATIVE [4,13,14]

The Global Food Safety Initiative (GFSI) was launched in May 2000 by the Global Food Business Forum (CIES) to respond to the proliferation of diverse standards on food safety that differ significantly with regards to intended target segment in the food chain, scope of provision, and final market acceptance. The Table on the next page provides a comparison of the features of different standards described above.

The GFSI Foundation Board, a retailer-driven group, with manufacturer advisory members, provides strategic direction and oversees the management of the GFSI.

One of the main objectives of the GSFI is to maintain a benchmarking process for food safety management schemes to work towards convergence between food safety standards.

Table: Comparison of features of some food safety and quality management systems standards

Standard	Target segment in the food chain	Scope	Acceptance
ISO 22000	All operators	QMS and HACCP	In progress
BRC Global Food*	Manufacturers	QMS, HACCP & HACCP	Majority of UK and Scandinavian retailers
IFS*	Manufacturers	QMS, HACCP & HACCP	Majority of French and German retailers
SQF*	Primary producers	QMS	Numerous US and Australian retailers
GLOBALGAP*	Primary producers	GAP and principles of HACCP	Numerous European retailers
Dutch HACCP	Manufacturers	QMS and HACCP	Dutch retailers

* Benchmarked by the GSFI

The GFSI itself is not involved in certification or accreditation activities. It has implemented and has been maintaining a scheme to benchmark private food safety standards which serves as an 'equivalency framework' by outlining key elements that a food safety management standard should contain. The recognized important key elements are as follows:

- Food Safety Management System;
- Good practices such as Good Agriculture Practices (GAPs), Good manufacturing Practices (GMPs) and Good Distribution Practices

(GDPs); and

- HACCP principles as defined by the Codex Alimentarius Commission or the National Advisory Committee on Microbiological Criteria for Foods (NACMCF).

The owners of the private standards can apply for recognition by the GFSI. The GFSI recognized food safety management standards can be applied by food suppliers throughout the supply chain and are accepted by major retailers. Such standards make buying simpler for food retailers and reduce the number of audits for the food suppliers. There is a desirable influence on audit consistency, customer confidence and cost.

The benchmarking work undertaken by the standard owners and other key stakeholders on four food safety schemes (BRC, IFS, Dutch HACCP and SQF) has now reached a point of convergence. Each scheme has now aligned itself with common criteria defined by food safety experts from the food business, with the objective of making food manufacture as safe as possible. As a result, this will also drive cost efficiency in the supply chain and reduce the duplication of audits.

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NEWS SECTION

Indian Food Laws

- **Notification GSR 805 (E) of 20 November 2008 of the Ministry of Health and Family Welfare:** The notification is a latest corrigendum to an earlier notification GSR 356(E) of 7 June 2005 (Refer *Technews* Issue 60, January–February 2006). The Corrigendum indicates that the provisions in the GSR 356 (E) on the definitions, food additive provisions and microbiological specifications for specified dairy products (cheese, processed cheese, processed cheese spread, ice cream/kulfi/chocolate ice cream/softy ice cream, dried ice cream mix/dried frozen dessert/confection, frozen dessert/frozen confection, milk ice/milk lolly and yoghurt) shall come into force after 3 years and 9 months from the date of publication of GSR 356(E). Therefore, these provisions are now likely to be applicable from 7 March 2009.

- **Notification S.O. 2678 (E) of 18 November 2008 of the Ministry of Health and Family Welfare:** The notification informs that the Central Government has appointed 18 November 2008 as the day on which several provisions of the Food Safety and Standards Act, 2006 shall come into force. The provisions put into force include, among others, those relating to the duties and functions of the Food Authority, and power of the Food Authority to make rules under the Act.
- **Notification GSR 865 (E) of 19 December 2008 of the Ministry of Consumer Affairs, Food and Public Distribution:** This notification indicates that existence of packages without the declaration of retail sale price within the manufacturer's premises would not be construed as a violation of the Standards of Weight and Measures (Packaged Commodities) Rules, 1977. It also emphasizes that all the packages leaving the premises of manufacturer for their destination shall have declaration of retail sale price on them as required in the SWMA Rules.

Codex Alimentarius Commission (CAC)

- The period March–April 2009 features meetings of the following Codex Committees:

  → Codex Committee on Methods of Analysis and Sampling, 9-13 March 2009, Balatonalmadi, Hungary
  → Codex Committee on Food Additives, 16-20 March 2009, Shanghai, China
  → Codex Committee on Contaminants in Foods, 23-27 March 2009, Rotterdam, Netherlands
  → Codex Committee on General Principles, 30 March – 3 April 2009, Paris, France

Issues of *Technews* during 2008

Issue	Month	Theme
72	Jan-Feb	Code of Hygienic Practice for Milk and Milk products – 1
73	Mar-Apr	Code of Hygienic Practice for Milk and Milk products – 2
74	May-Jun	Advanced Instrumental Techniques for Milk and Milk Product Analysis
75	Jul-Aug	Codex Standards Relevant to Dairy Industry
76	Sep-Oct	Emerging Food-borne Pathogens
77	Nov-Dec	Food Safety and Quality Management Systems

FOOD SAFETY AND QUALITY MANAGEMENT SYSTEMS

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