Preparing for HACCP implementation

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Hazard Analysis and Critical Control Point (HACCP) is a systematic method to identify, evaluate and control food safety hazards. HACCP was developed in the early 1960s to help deliver safe food for United States astronauts. At the same time, the US Army was also investigating systems for producing safe food for its troops, following a food poisoning incident with Staphylococcus aureus.

The National Aeronautical and Space Administration (NASA) appointed the Pillsbury Company to develop a zero tolerance food safety system, which became HACCP. An engineering principle called Failure Mode and Effects Analysis (FMEA) was used as the basis of the system of hazard analysis and control.

Identifying hazards

HACCP was first used in the meat industry in the USA, before being adopted by other sectors of the food industry. Different HACCP systems began to be developed for different industries. HACCP as a system provides a means of identifying and assessing potential hazards in food production and establishing preventive control procedures for those hazards. The emphasis on prevention of hazards reduces reliance on traditional inspection and end-product testing.

A properly applied HACCP system is now internationally recognised as an effective means of ensuring food safety. The HACCP concept can be applied to new or existing products and processes, and throughout the food chain from primary production to consumption.

Compatible system

HACCP is compatible with existing standards for quality management systems such as the International Organisation for Standardisation (ISO) 9000-2000 series; HACCP procedures can be fully integrated into an ISO 9000-2000 quality system. The new ISO 22000 food safety standard formally integrates HACCP within the structure of a quality management system.

The application of HACCP at all stages of the food supply chain is being actively encouraged, and increasingly is required worldwide.

Although not intended for primary producers, many are using HACCP or a simplified version, to ensure safety of the supply chain, particularly if supplying to retailers or large companies.

There is also a strong customer demand for HACCP around the world. In many countries, there is a legal requirement for all food business operators to have some form of hazard analysis based on HACCP, as a means of ensuring food safety.

With respect to legislation, in the European Community (EC), a risk analysis approach based on HACCP has been a legal requirement for member states since 1993 for all food processing sites.

More recently, new hygiene legislation, EC Regulation 852/2004 on the hygiene of foodstuffs, has been implemented throughout the EC, requiring all seven principles of HACCP to be implemented to an appropriate level, dependent upon the complexity of the food business.

This means that HACCP, in one form or another, is now required by all businesses producing food for sale to the general public. Other legislation, EC Regulation 853/2004 and EC Regulation 854/2004, lay down specific hygiene rules for food of animal origin, and specific rules for the organisation of official controls on products of animal origin intended for human consumption respectively.
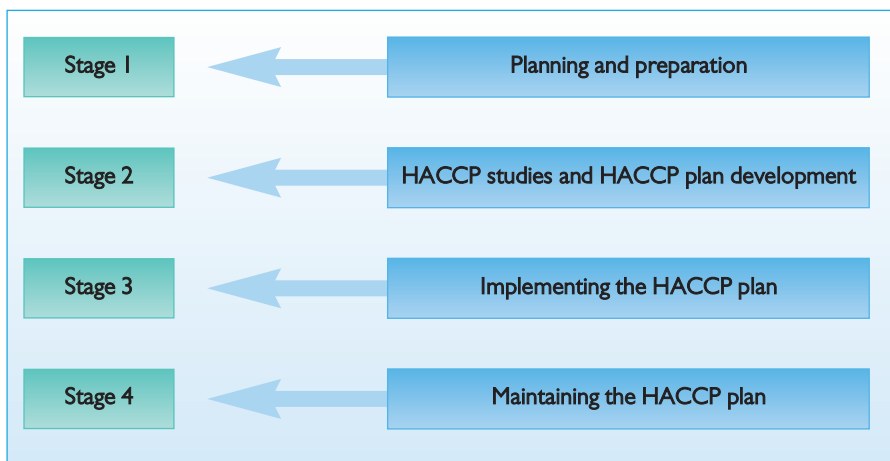
Ensuring safe products

In the UK, the EC Regulation is enforced by the Food Hygiene (England) Regulations 2006. EC Regulation 2073/2005 on Microbiological Criteria is used in conjunction with the hygiene legislation to ensure the safety of processed products for consumer sale (for example, ready meals) and critical ingredients (for example, meat and dairy products).

EC Regulation 2073/2005 states that in the case of microbiological monitoring indicating unacceptable results 'the food business operator shall take measures to find the cause of the unsatisfactory results in order to prevent the recurrence of the unacceptable microbiological contamination. Those measures may include modifications to the HACCP-based procedures or other food hygiene control measures in place'.

Again it states: 'A food management preventative approach such as employing good hygiene practices and a system based on

Fig. 1. Key HACCP stages (adapted from Mortimore and Wallace, 2001).

Stage 1	←	Planning and preparation
Stage 2	←	HACCP studies and HACCP plan development
Stage 3	←	Implementing the HACCP plan
Stage 4	←	Maintaining the HACCP plan

HACCP principles must be in place. Food testing against the appropriate criteria should be undertaken, if appropriate, when validating and verifying HACCP'.

Some businesses may find it difficult to interpret the legislation for their circumstances, for example, small scale caterers; guidance documents are available to help them.

Typically, a HACCP study is divided into the four stages illustrated in Fig. 1 on the previous page.

Essentially, the bulk of the HACCP process is completed after stage two, with stage three concerned with running the process, and stage four, verification.

Good preparation is vital for an effective HACCP study. There may need to be a basic HACCP awareness session to explain what it is, why it is needed and how it works, before the study can start. Basic training needs must also be addressed before the study can start.

Management commitment

Management commitment is essential to ensure that the team has enough time to carry out the HACCP study, and that additional monitoring, calibration or control equipment is provided if required.

Management commitment means that there is an understanding of the benefits of HACCP, both financial and operational, and the degree of continuing commitment required. HACCP does not end with the completion of a study and production of a HACCP manual, which sits on the shelf gathering dust.

HACCP is a continuing, living system, which must be appraised on a regular and scheduled basis. An effective HACCP plan is best carried out as a multidisciplinary team exercise to ensure that the appropriate product-specific expertise is available.

The team should include members familiar with all aspects of the production process as well as specialists with expertise in particular areas such as microbiology or engineering.

If expert advice is not available onsite, it may be obtained from external sources. The leader must understand HACCP and its implementation.

Often some parts of the study will require additional specialist knowledge, for example, supplier assurance, purchasing, research and development, distribution, hygiene or cleaning.

Evaluating risk

An essential requirement is the ability to evaluate risk and make safe judgements. A gap analysis should be carried out before the HACCP analysis is performed, asking some of the questions below:
● Has the HACCP team leader received HACCP training?

● Have staff been adequately trained, both in general food hygiene practices, and more specifically in HACCP?
● Has the HACCP team received training at the right level?
● Is there management commitment to HACCP?
● Is there a requirement for a form of quality manual or other procedure control, which will make the implementation of HACCP easier?
● How is the HACCP study going to be structured; in stages, or looking at the whole process at once?

Before a HACCP system is set up it is essential that another set of basic procedures is in place to ensure that good workplace practices are in operation.

Codex says 'Prior to the application of HACCP to any sector of the food chain, that sector should have in place Pre-Requisite Programmes (PRPs) such as Good Hygienic Practices (GHPs) according to the Codex General Principles of Food Hygiene, the appropriate Codex Codes of Practice, and appropriate food safety requirements'.

Pre-requisite programmes

The term PRPs was first described by the World Health Organisation (WHO), and refers to all those hygienic practices and operational controls, including staff training, which help to ensure that food is produced in the most hygienic manner possible.

PRPs include much of what is often referred to as Good Manufacturing Practice (GMP). PRPs include factors for control of raw materials, operational control, personal hygiene and training, sanitation and maintenance practices, control of food, packaging and sanitary waste, design of buildings and equipment, control of pests, traceability and recall procedures.

Companies that do not take PRPs into account before they set up HACCP systems will find that they have too many Critical Control Points (CCPs) and, because of the dilution of effort, poor control of their HACCP. PRPs control risks that cannot have effective real time monitoring procedures, or those repetitive hazards that occur at different locations in the factory.

PRPs can be considered as those routines and policies that continue even when the food process stops.

PRPs are controlled by a rigorous internal audit procedure; the British Retail Consortium (BRC) has noted the importance of auditing of PRPs by raising internal audits to a 'Fundamental Requirement'; i.e. one that must be in place and followed correctly to ensure adherence to good practices.

The scope should be determined before the HACCP study is started. First, the starting point of the study must be considered as to whether it begins at raw material intake, or before or after that point in the process. It needs to be decided which hazards are to

be examined – all hazards, or just biological, chemical and/or physical.

Alternatively, the study can just examine one particular hazard, as a result of new evidence, for example, Escherichia coli O157:H7. Once the start point and hazards have been determined, the HACCP system needs to be structured in one of three basic ways; as a linear, modular or generic based plan.

Linear approach

A linear approach is where HACCP is applied to each individual product that the company produces. Unless the company only produces a few products, this will lead to a large number of HACCP plans that will become difficult to manage. The plan starts with raw materials, and works through to the finished product. This approach is suited to small businesses or those producing relatively few products. This was common in many food businesses starting out in HACCP; they have usually evolved into the systems described below, or combinations of these, with linear elements.

Modular approach

A modular approach is often used where there are multiple paths for components of the finished product through the factory. For example, there may be three or four mixing and blending processes for raw ingredients, several main processes involving cooking or kill steps, and three or four different ways to assemble and pack the finished product.

If a linear approach was used there would be a large number of individual HACCP plans.

By using the modular method, each subprocess becomes a mini HACCP plan; each is linked to any relevant module before or after it to make the finished product.

The danger with this approach is that transfer stages between modules can be missed.

Generic plans

Finally, generic plans tend to be used where the same basic operations are carried out on the same type of ingredients at more than one site. Franchised restaurants often use this approach.

Generic plans can themselves be modular or linear. Generic plans can be the first attempt at HACCP plans within a company; as experience grows, more individual plans will develop from the generic example.

Good preparation is vital to ensure that the HACCP study is concise and to the point. Lack of attention to detail at this stage can lead to an unwieldy HACCP plan that is difficult to use. ■

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