

## PRO-Q FOOD A SOFTWARE MANAGEMENT PROGRAM FOR HACCP

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### Introduction

Companies need to ensure the safety and quality of their end-products. For instance, in the meat processing industry more interest in the implementation of a HACCP system has arisen since the meat products hygiene directive 92/5/EEG came into force. Many companies have difficulties with the approach being followed. TNO has an advisory task in the introduction of the system. The HACCP method enables all the phases of a production process, from raw material to consumption, to be systematically and critically analysed. Potential hazards are identified in order to keep a close check on the risks involved.

But, how do you gain insight into such a process? How can changes in the production process and the related critical control points be simply altered? How can all the related documents be kept up to date?

PRO-Q FOOD is the first software system that can be used to generate and maintain process control plans on the basis of the HACCP method in an interactive way. It provides integral linkage between process steps, critical control points, documents and the underlying HACCP analysis.

### The basic features

The PRO-Q FOOD system is being developed in different stages. The first version offers the following features.

- A clear process control plan can be quickly drawn up through the automatic generation of flow charts, with integral linkage to critical control points and management documents;
- Critical control points and documents can be interactively created and maintained from within the process control plan;
- The entry and maintenance of process data are menu-driven and can be carried out completely using a mouse (MS-WINDOWS);
- The control plans satisfy the ISO 9000 quality requirements for plans.

A process control plan can be printed out at any time. The flow chart of a (sub)process, the defined critical control points and the references to management documents are all printed on a single page. Version 2.0 will be available in the autumn of 1994. This version will provide support in establishing and elaborating the complete HACCP protocol, as set down by various national and international organizations, in the form of a systematic approach following seven principles.

### An interactive process management plan

Various graphics programs enable the user to design process management plans. Steps in the process can be drawn which may be coupled to symbols for critical points and refer to documents. However, a flow chart of this type remains static and does not really link process steps with critical points and documents. There is no real relation with independent data structures (such as the documents the chart refers to). The flow chart can be maintained only via the graphics program.

The PRO-Q FOOD system turns a process management plan into a powerful tool which can be used as a 'desk top' enabling the user to steer the plan (both menu-driven and mouse-driven). In such a process management plan the steps in the process are coupled in an integral manner to critical control points and document references. Starting from the plan the user may:

- approach each step separately

- take each step as a point of departure to make an inventory of critical control points, on the basis of the HACCP method, and enter and change relevant data
- view and change documents directly.

Changes are implemented automatically and made visible graphically in the process management plan. If changes have also a bearing on other process management plans (e.g. references to instructions pertaining to various process management plans), these plans are automatically updated too. The process management plan is no longer a static chart but has become a dynamic plan built up on the basis of the HACCP approach. The PRO-Q FOOD process management plan is exemplified in Figure 1.

### **The HACCP approach**

In the PRO-Q FOOD system (version 2.0) the entire HACCP protocol is implemented on the basis of TNO procedures (refs. 1, 2). First, the user can input for each product or product group all relevant documents (formation of HACCP team, staff responsible, product descriptions) and specify the production process. PRO-Q FOOD subsequently generates the corresponding process flow chart which can be elaborated interactively by the user into a process management plan. The coherence between the diverse HACCP aspects is visualized in Figure 2.

For each step in the process the user can input to the system critical points emerging from the inventory. A critical point is defined as a point, step or procedure that might jeopardize the quality (including safety) of the final product. These potential hazards can be documented. Critical points may also be entered in addition to already documented hazards (e.g. in the literature).

For each critical point the user can formulate preventive measures to control the hazards identified. On the basis of the available measures and a risk analysis a decision tree is run through which helps the user decide whether a critical point should be considered a critical control point (CCP). PRO-Q FOOD provides a graphical representation of the decision tree and records, for each CCP separately, the user's motivated decision. Subsequently, the critical limits and tolerances can be entered which apply to the preventive measures to be taken. At the end, PRO-Q FOOD updates automatically the data in the process management plan, both graphically and textually.

Finally, PRO-Q FOOD enables the user to store documents, for example for verification purposes. Existing documents can simply be copied into PRO-Q FOOD.

In addition to the HACCP theory, the practical implementation of HACCP software must be taken into account. If the company's assortment is very broad, comprising a wide variety of comparable products, it would be rather frustrating if the same concept would have to be repeated for every single item. It is essential, therefore, that similar processes, or constituent processes, can be copied. On the other hand, in reporting HACCP studies need not always be printed completely for all products; job instructions for a specific step in the process may suffice.

Such practical problems must be solved in order to keep the HACCP quality management system under control.

It follows from the above reasoning that more than one discipline is needed to develop a well thought-out HACCP quality management system. Collaboration in a multidisciplinary team, comprising both HACCP experts, food technologists, information technologists and representatives of pilot plants, is required in order to develop such a system. TNO Nutrition and Food Research houses all these disciplines and maintains excellent contacts with a variety of branches in the food industry.

### **References**

1. Hazard Analysis and Critical Control Point System  
The National Advisory Committee on Microbiological Criteria for Foods  
*Int. J. of Food Microbiol.* **16** (1992) 1-23
2. Bryan, F.L., Hazard Analysis Critical Control Point Evaluations; a guide to identifying and assessing risks associated with food preparation and storage, WHO, Geneva, 1992



## Legends

Figure 1. A process management plan based on PRO-Q FOOD.

Figure 2. The essence of the HACCP method.