

Commentary

Should the hazard analysis and critical control point (HACCP) system be checked ? A nutritional viewpoint

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Received 11 December 2002, accepted 18 March 2003.

Introduction

Nowadays, there is a concern about increased recording of foodborne disease as a worldwide problem of major public health due to that a wide variety of agents can cause human illness¹. Microorganisms and toxins found in raw and 'ready-to-eat' foods are probably the most commonly reported agents of foodborne diseases². The presence of these agents can be due to incorrect processing and management practices common in agriculture, such as the growing, harvesting, washing, sorting, packing and transporting³. For ensuring a food safety, three major approaches to achieving food quality; one is the inspection for the Public Health Inspection Department to ensure that manufacturing and processing follows appropriate codes of good manufacturing practice, the other is the use of training foodhandlers in the rules of food hygiene and for preventing foodborne diseases and finally, a system to manage the safety of food products systematically by paying special attention to steps in the process that are essential in the production of acceptably safe foods. This last step is called Hazard Analysis and Critical Control Point (HACCP) system^{4,5} which is obligatory in the European Community according to the Food Safety regulations 1995 implements in the Directive on Food Hygiene (93/43/EEC)⁶. In the early 1970s, the Pillsbury Company jointly with the National Aeronautic and Space Administration (NASA) and the U.S. Army Natick Laboratories developed the Hazard Analysis and Critical Control Points (HACCP) system. This system was presented at the 1971 National Conference on Food Protection⁷ to ensure that the foods for the space program were free of all pathogens that could cause illness to astronauts during space travel. Thereafter, the food industry introduced the same system to prevent any risk to the health of its consumers. To avoid differences in the food safety objectives and criteria, HACCP guidelines were drawn up by several working groups: the International Commission on Microbiological Specifications for Foods⁸, the National Advisory Committee on Microbiological Criteria for Foods⁹ and the Food Hygiene Committee of the Codex Alimentarius Commission¹⁰, among others. They have recognized that to ensure food safety, properly designed HACCP systems must consider chemical and physical hazards in addition to other biological hazards.

A Curious Paradox

Our group began to work with the HACCP concept in the 1990s¹¹⁻¹³ and an initial question arose: "Is the nutrient important in food safety for human beings?" The answer is conclusive. Diet, nutrients and health patterns are implicated in the origin of many diseases that are not manifested until much later in life, and for this reason, the relationship between the frequent consumption of certain foods and aspects of good health is important in human nourishment. If the hazard is defined as a biological, chemical or physical agent that is reasonably likely to cause illness or injury if not controlled¹⁴, Why aren't nutrients considered agents that can cause an unacceptable consumer health risk? For example, overweight and obesity are considered risk factors associated with morbidities or diseases such as hypertension, coronary heart disease, type 2 diabetes, stroke, gallbladder disease, high blood cholesterol and others¹⁵. Yet the situation is somewhat paradoxical, because nutrition is closely connected with the HACCP system, but they are kept apart when both term search for a food safety whether in the final product as in the consumer. We believe in the need to incorporate nourishment in HACCP concept to avoid disease risks in human beings and this attempt is accordance with an increasing awareness in Europe of the importance of nutrition and diet for a healthy lifestyle proposed in the draft Declaration on Food, Nutrition and Health in Europe on May 27, 1991, in Athens during the sixth European Nutrition Conference of the Federation of European Nutrition Societies¹⁶ in addition to the proposed key-actions entitled "Health, Food and Environmental Factors" described for the Fifth Framework Programme (FP5) of Research and Technological Development (RTD) activities (1999-2003)¹⁷.

Application of Nutritional Concept in the HACCP System

The use of HACCP concept in a nutritional sense has been carried out for our team in University restaurants¹⁸. This is based on the following four activities:

Activity 1: *Nutritional assessment of the studied population and comparison with the Spanish recommended intakes.* The nutritional assessment was carried out on the University students. Socio-economic and religious factors, educational level and occupation may or may not be related to dietary patterns. Data were collected from them to look at health-related characteristics and habits and food choices and to investigate daily energy and food intake in comparison with the Spanish Nutritional Recommendations¹⁹. These recommendations were developed by an expert group and include the macronutrient composition of the diet, micronutrient intake and reference values for energy intake. Twenty-four-hour recalls and a questionnaire including information on the age, height and weight were used and information on activities related to health and factors such as smoking, food supplement intake, illness, religion and special diets were obtained by professional personnel in the field of nutrition. The mean nutrient and energy intakes were then determined using a nutritional analysis software package and were compared with the Spanish Nutritional Recommendations. The first principle of HACCP is applied with this activity. Nutritional hazard associated with dietary intakes and food pattern were studied to determine if the studied population removed from the Nutritional Recommendations can cause some diseases.

Activity 2: *Nutritional assessment of the meals consumed in the University restaurants.* The planned cyclic menus are repeated

each fortnight. The calculated nutritional values of the weight of planned menus were obtained from the ingredients used and the total weight of the final product. With the aid of the same nutritional analysis software package the nutrient content of the menus was analyzed. To principle 2 from 6 of HACCP are applied in this activity. In meals served in these establishments are identified the CCPs in each steps of elaboration as well as critical limits, monitoring, corective actions and personnel responsible.

Activity 3: *Informing to the University restaurants about the menu evaluation and the energy and nutrient intakes of the University population studied.* Each restaurateur was given an explanatory face-to-face interview with dietitians. They were given information on the results of the nutritional assessment of the studied population and the consumed menus in its restaurants. The data obtained have provided an important basis for planning food programs and for developing nutritional information and educational programs. The last principle of HACCP is applied in this activity. The HACCP Plan Summary Table can be used by the personnel responsible to improve the menu in nutritional sense.

Activity 4: *Helping the University restaurants to develop menus that are in line with the Spanish Nutritional Recommendations and take into account populations with illness and/or special diets.* Suggesting to the University restaurants about menus that can help to guarantee the health of this group. Elaborating menus that are in line with the Spanish recommended intakes and that incorporate the nutritional and health benefits of the Mediterranean diet for the prevention of chronic degenerative diseases was the principal objective. The Mediterranean diet is considered a relatively low-fat and low-SFA diet, which is beneficial in lowering cholesterol^{20,21}. It includes olive oil, fish, fruit and vegetables, main sources of vitamin C and carotenoids, which play an essential role for maintaining good health. Moreover, alternative menus are suggested for populations with illness and/or special diets as weight reduction, ovo-lacto vegetarian, vegetarian or diets influenced by religious beliefs. The final step is to adapt the nutrient intake to the nutritional objectives for the Spanish population²². This last activity is carried out for develop adequate menus to Spanish Nutritional Recommendations and Principles 6 and 7 can be applied to improve the nutritional health of population with illness and/or special diets²³.

In our view, the introduction of the nourishment complements the HACCP concept to guarantee food and consumer safety, furthermore, it permits to complete the multidisciplinary HACCP team with nutritionist and dietitian that the same concept proposes.

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