

# Evaluation of the effectiveness of internal training of personnel in the HACCP system at the bakery enterprise

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**Abstract.** The effectiveness of internal training in the system of quality management and safety is considered. The ratio of the frequency of the training to the turnover of staff was studied. It is shown that the more experience an employee the more efficiently the employee participates in the system of quality assurance and safety.

**Key words.** HACCP, food safety, quality, system integration, CCP.

## 1. Introduction

Over the past 50 years, quality control systems (with the primary goal of providing safer food products) are steadily growing within the discipline of food safety. Training in the food safety system, like Hazard Analysis and Control Critical Points (HACCP), plays a large role in the practical application of these methods in production. Since the advent of human travel in space and the complexities and risks that can develop as a result of spoilage or contamination of rations in space, strict HACCP systems have been developed and distributed throughout the food industry. The HACCP program has been widely recognized throughout the world as the most effective means of managing food safety. Although HACCP has been criticized for several factors, it has proved its value to society by reducing the incidence of foodborne illness in the last 15 years (CDC, 2011). Recent changes in food safety regulations require that the principles of HACCP should be implemented in other industries and retail trade, like never before.

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Nevertheless, very little is known about the effectiveness of HACCP training and the subsequent professional training of knowledge, since the success of HACCP depends on the preparation of HACCP and is based on the subsequent knowledge of workers involved in maintaining these programs in working order. This study aims to establish the effectiveness of control checkpoints (CCPs) by assessing the knowledge gained from HACCP training and its longevity for a long time among persons who are directly involved in the management of the CCP [1]. If to judge the holistic effectiveness of the HACCP system as a whole in the state, one can see Fig. 1: according to the statistics of the incidence of the population of the Republic of Kazakhstan, infectious and parasitic diseases for 2015 decreased by 15 % compared to 2011, injuries and poisonings decreased by 6 %. Although for this period, diseases of the digestive system increased by 12 % [3]. The basis for the prevention of foodborne diseases of the State rests on the effectiveness of food safety systems, and the HACCP system is a fundamental element of these systems [6, 10].

A deeper understanding of the effectiveness of HACCP based on the evaluation of professional knowledge training, training of food safety specialists and practitioners will help to have data concerning the aspects of HACCP preparation that can be used to expand training programs. This information can potentially be used to draw a correlation between training and changes in knowledge related to food safety in order to identify possible gaps in knowledge that may ultimately lead the enterprise to an inappropriate product and, accordingly, financial losses. This research can potentially serve as the basis for an enterprise, "how, when and who" should be provided for both improving food security and profit, since training does not require capital investment. [1,2] In addition, improving food safety through understanding training needs for food management can help practitioners, trainers and, most importantly, lead to an improvement in the quality of life of mankind. Thus, the study of the effectiveness of training in the HACCP system on bakery enterprise A of the Republic of Kazakhstan is the basis of the modeling of the integrated security management systems. As a pilot study, this work extensively examines the results of HACCP knowledge training and its purpose for obtaining a basic level of information relevant to HACCP knowledge. The research was based on the following tasks:

1. Study of the effectiveness of training in the HACCP system at a bakery enterprise A of the Republic of Kazakhstan for the purpose of modeling an integrated safety management system based on the international systems ISO 9001: 2015 and the HACCP system;
2. Participation of the employee in the system of ensuring the security of the enterprise;
3. Specific activities performed by an employee to ensure food safety;
4. Verification of HACCP effectiveness in the hazard chain, identification of applicable aspects;
5. Study of the adequacy of the HACCP training.

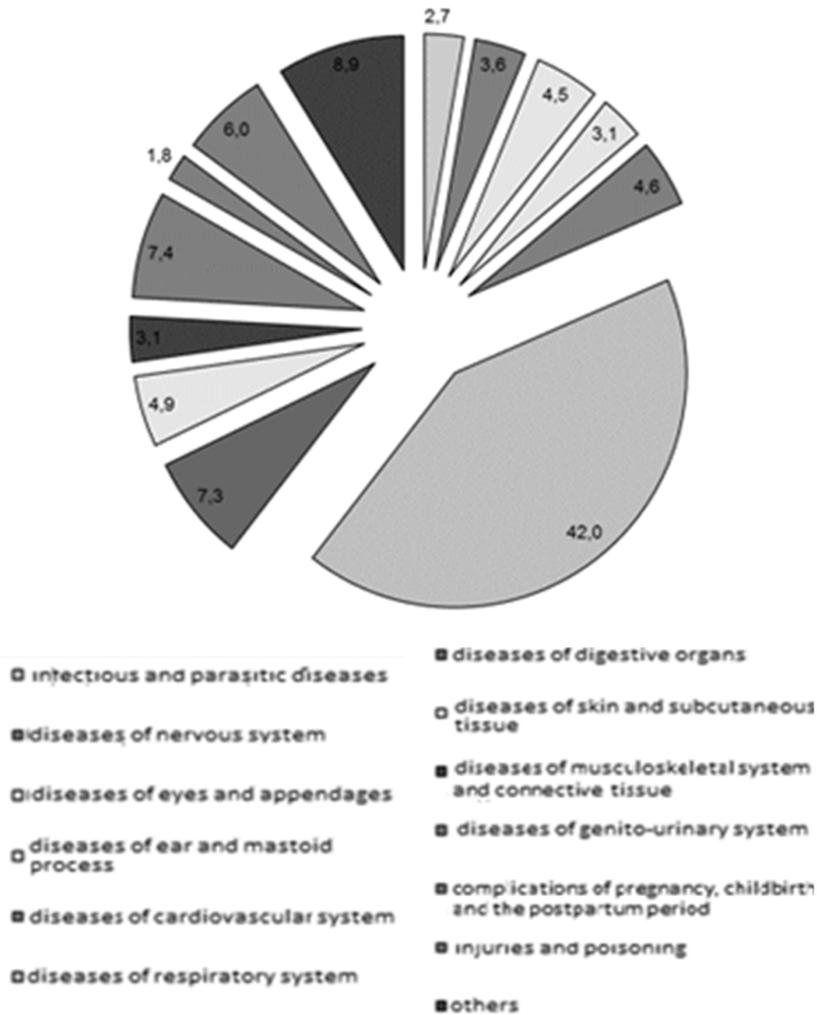


Fig. 1. Structure of the incidence of the population in 2015

## 2. Methods

The research was carried out by conducting a survey of the employees of the enterprise. The questionnaire is focused on studying the opinion of employees in the field of effectiveness of the food safety systems used, regardless of the actual existence of these systems. This can be seen in the question: which of the following food safety systems is used in the enterprise to ensure the safety of the products. In variants of the answer to this question, those systems were proposed that have not officially confirmed the actual application at the given enterprise. This approach was used to identify the human potential for the enterprise in the field of food safety. The questionnaire also examined the ratio of the frequency of training conducted to the

turnover of staff, the actual effectiveness of the developed documented procedures, the difference in knowledge in the field of food safety between an employee who works directly at a critical control point and an employee who is not responsible for a control point. The questions concerning control critical points made it possible to study the information on their actual effectiveness.

Everything starts from the moment when the manager decides to rebuild the entire management system with a focus on quality and safety [4]. Today all the personnel of the enterprise are oriented to produce high-quality and safe products. The analysis of complaints about the quality and safety of the products of this enterprise after the introduction of the HACCP system is as follows:

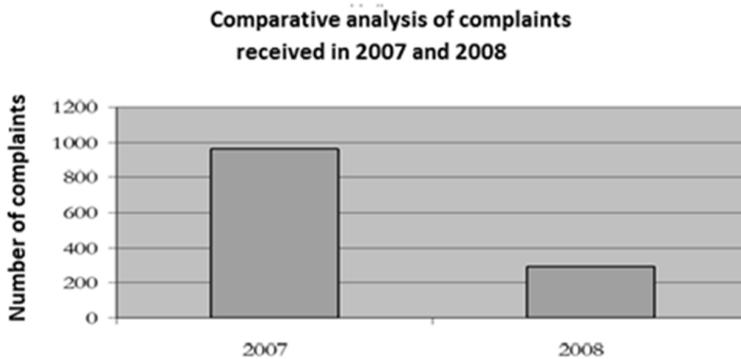


Fig. 2. Comparative sales of 2007/2008

### 3. Results

At this production site, one critical control point is defined - the baking process. Since this stage is the stage at which management can be applied and which is essential for preventing or eliminating the factor causing food hazard or reducing it to an acceptable level [7]. The survey involved 50 employees, including those responsible for monitoring at a critical point. Results of the study:

Based on the results of the research, the company mainly conducts training on the system of hazard analysis and critical control points, it is necessary to expand the amount of information for a deeper understanding of the security management system.

According to the documented procedure of the enterprise, training is conducted once a year. Those workers who recently got a job basically answered once a quarter or once every six months, because employees confuse induction instruction on the HACCP system with training (in the company all newly admitted employees conduct induction instruction on the HACCP system, on the policy of the enterprise in area of the security management system). Nevertheless, the recommendation is to adhere to a certain ratio of the frequency of training conducted with the turnover of staff. That is, in case of increasing staff turnover, it is necessary to increase the frequency

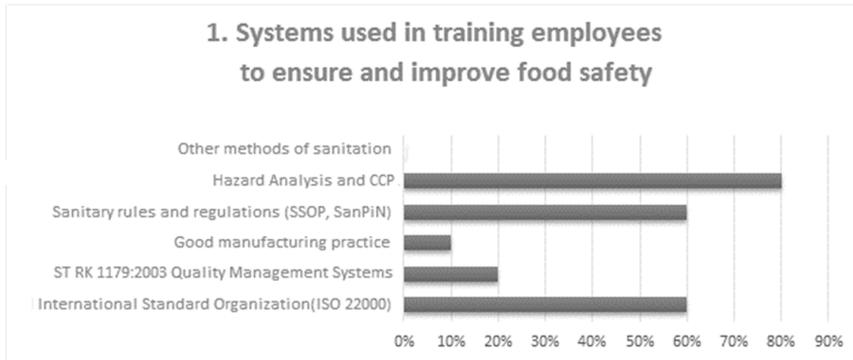


Fig. 3. Used system for food industry safety

## 2. Frequency of training in the field of food safety management system

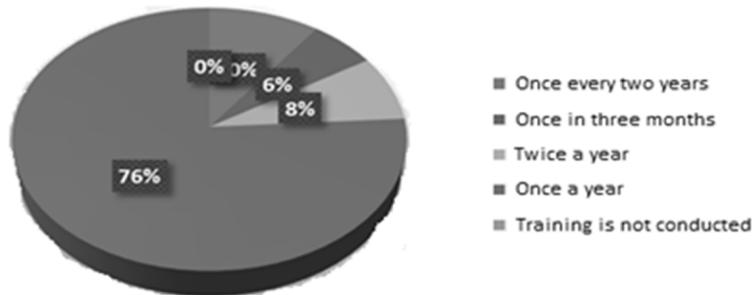


Fig. 4. Food industry management

of training.

According to the block diagram No.1, in the technological process of production, in addition to CCT, there are also control points (CTs). These are the processes that also need to be controlled, but the characteristics do not apply to CCP. They are designated as control points. This survey was conducted to examine the responsibility of employees who are directly responsible for control and control-critical points. According to the results of the survey, all employees feel responsible for the safety system of the product they produce.

Also, all participating workers are aware of the nature of the microbiological hazard that occurs when the critical limit is violated:

Table 1. Questions of survey

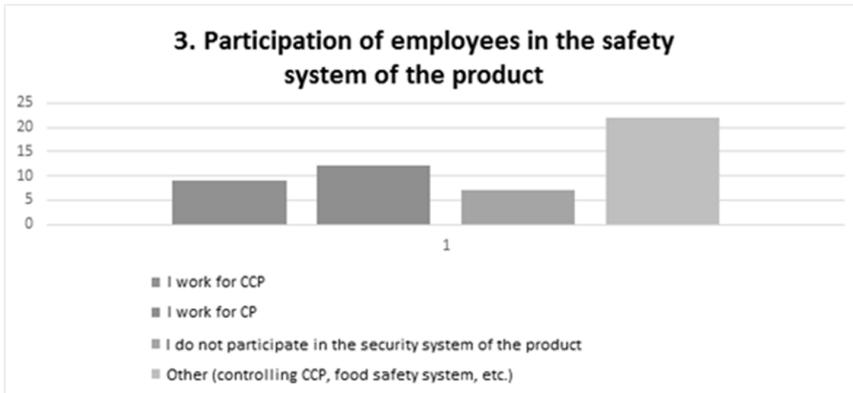


Fig. 5. Participants in safety system

Question/answer	Yes	No
Are monitoring activities carried out according to the instructions / regulations / procedure	50	-
You know the critical limit of the critical control point with which you work	50	-
Do you maintain any records of monitoring the CCP	42	8

Of the participating workers in the research project, 83% have a working experience of 6 to 10 years at the enterprise, the remaining 17% have worked less than 5 years.

## 4. Conclusion

As a result of the research, all the tasks were studied and the following conclusions were drawn:

1. The study of the effectiveness of internal training in the security management system is the basis for modeling an integrated safety and quality management system based on the international systems ISO 9001: 2015 and the HACCP system;

2. From training depends the effectiveness of the implemented system to ensure the safety of products;

3. The frequency of the training was consistent with the turnover of staff. That is, in the case of increasing staff turnover, the frequency of training has increased;

4. The degree of participation of employees in the security system depends largely on the length of service at the enterprise - the more experience, the more impact the employee takes in the safety system of the products.

Based on different systems - the quality management system, the environmental management system, the HACCP system, international, traditional, domestic, the

entrepreneur can from each system take for the introduction those highlights that are suitable for its production, for the mentality of the people who work for him, for its infrastructure and create its own integrated management system. The system at the enterprise is developed on the basis of the most basic logic - providing the society with quality, safe useful products, and enterprises profit.

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Received October 12, 2017

