QUALITY MANAGEMENT IN FOOD ECONOMICS SECTOR (УПРАВЛЕНИЕ КАЧЕСТВОМ В ПРОДОВОЛЬСТВЕННОМ СЕКТОРЕ ЭКОНОМИКИ)

Magdalena Dykiel, Bernadetta Bienia (State Higher Vocational School im. Stanisława Pigonia in Krosno)

Аннотация

HACCP *Hazard Analysis and Critical Control Points*, т.е. «Анализ рисков и критические точки контроля» - это выражение должно быть объединено со всей системой безопасности производства и потребления продукции. HACCP- системы за счет введения специального анализа рисков и спецификаций как профилактическое средство позволяют управлять критическими, влияющими на уровень здоровья параметрами, указывают на технологический процесс, который обеспечивает создание безопасных для здоровья продуктов питания.

На практике системы HACCP определяют те этапы процесса производства и потребления, в которых есть возможность заражения или загрязнения сырья или готовой продукции.

Introduction

Nowadays quality of produced and delivered to the clients products play the key role in world's economy. What exactly is „quality"? Quality is a certain degree of perfection. It has objective features like mass and shape and subjective, assessed by people differently, like colour and smell. Sometimes quality can be understood as an official norm, however, most often it is defined as a degree of present and future clients satisfaction. Quality described as innovation together with marketing comprises one out of two most crucial issues for the manager managing the company. Quality needs to be managed [9].

Executives responsibility and engagement is a fundament of quality management. It is a type of management through aims, it is a type of a system in which the task of each employee is to reassure the high quality of an individual work. It means constant product or service improvement and the extending of employees qualifications, whereas for the executives it results in the creation of such conditions which motivate the introduction of new technologies and strategies in terms of implementing the established aims. Requirements of the quality management systems enable the organization, planning, maintenance and improvement of the management system, aimed at delivering safe products to the consumers.

The system implemented in the researched organization enables the safety of HACCP food, has a great influence on product quality and particularly on the quality of the produced products and certain aims concerning mechanisms of the organization functioning.

In all entrepreneurships running activity in the scope of production or food turnover, HACCP system is obligatory from 1st May 2004 i.e. from the day of Poland becoming a member of European Union.

Bread is the basic cereal product providing consumers with valuable nutritious ingridients Flour and addings i.e. milk, malt extract, honey, fat, oil seeds constitute its basic ingredients.

The criterion of bread assesment in terms of its commercial value is combined with the quality control of raw materials and final product as well as with their proper storage and transport. Monitoring the technical state of warehouses, production halls and storage methods of raw materials and final products (in terms of cleanliness, aeration, the influence of weather conditions as well as damage and soil of the final product) [3].

Bread belongs to the group of perishable products and unfavourable changes occur directly after its baking. Those processes are bound with partial loss of moisture i.e. bread becomes stale (without microorganisms participation) as well as with the development of bacteria, mould and yeast. Maintaining high microbiological quality of bread is combined with the use of flour which is free of microorganisms contamination, consistent with the recipe of cake preparation, correct packing process and proper conditions of storage. [1,3].

This article presents the process of HACCP system implementation and is based on the example of a small entrepreneurship from the baking branch with the specification of Critical Points of Control on the bread production line.

Presentation of the company

The company operates on the market since 1996, employs 17 employee and has its own means of transport. It works 6 days a week and provides services for over 100 points including hypermarkets, supermarkets, small shops and kindergartens.

HACCAP system was implemented in the company because it ascertains, that the company did everything to provide safety of product and consumer.

HACCP system implementation occurred due to the necessity to adjust to new law regulations, which are consistent with European Union requirements as well as pressure of consumer, who pay much more attention to food safety. The implementation of HACCP system also has an economic aspect as it is based on limiting inefficient traditional forms of control which are focused on the final product examination and reducing the number of costly laboratory studies and also focusing more attention on abnormalities prevention in the course of the whole production process.

The owner has decided to prepare HACCP plan with the help of a consultant, who proved his experience in the baking branch and provided certificates of courses graduation. Implementing HACCP does not require employing the consultant from the outside.

The companies' owner used the fact of new building preparation, to which he has moved his business activity to implement HACCPO system in the range of all processes of the companies functioning.

The process of HACCP system implementation in the entrepreneurship

Quality management in the entrepreneurship constitutes a crucial element of the holistic management of the organization.

The decision of HACCP system implementation was a strategic decision, taking into an account various needs, aims, specificity of its activity, size and organizational structure.

HACCP system protects the interests of both consumers as it guarantees food safety and the producer i.e. the baker as it enables him to prove that he has run his activity properly.

The works on HACCP system implementation to production are long-term and multistage.

They can be divided into:

- preparation stage
- initial conditions realization –GMP/GHP implementation
- proper HACCP system operating (HACCP plan preparation, documents preparation).

Initial conditions constitute GMP) and GHP implementation.

Each entrepreneurship is obliged to prepare GHP program of the company, which is the basis for HACCP system implementation.

Standard GMP guarantees high quality, cleanliness of raw materials and components of the final product. It also provides full control of quality and the origin of raw materials.

GMP/GHP rules are written in the form of a code and are applied not only to companies rooms and the production process but also to the companies surroundings, raw materials, delivery and product distribution i.e. hygienic state of the company and its surrounding, size, room functionality and location, correctness of the technological line and process operating, machines and devices and their functioning, controlling equipment, the process of cleaning and disinfection, work organization, hygiene and staff behaviour, personnel qualifications, protection against pests, water quality, quality of the checked raw and additional materials, food storage and transport. [6, 7].

The requirements of Good Hygiene Practice are often described as Programmes Constituting Initial Conditions. Whereas, in the GMP system not only all of the activities are planned and executed exactly as they are described by procedures and instructions, but also every activity must be registered and confirmed by an appropriate document.

Anything that is not registered in the GMP system does not exist and has not been performed. Such a procedure ensures, among others, a proper control of technical and sanitary condition of locations, production and control machinery, the possibility of a continuous analysis of technological operation parameters, environment conditions, and identification of personnel responsible for execution, supervision and control of critical stages of production [8, 9].

The HACCP system is a system which:

- identifies,
- evaluates,
- controls (contains) biological, physical and chemical hazards relevant to food safety [4].

Sensitive areas in the bread baking process

Food companies, which are aware of the risk of health hazard, should implement appropriate safety measures, starting from deep analysis of a raw material's quality designated for production, through the whole technological process up to the moment of packaging and storing a finished product. Implemented GMP/GHP procedures and the HACCP system ensure monitoring of a production process.

The GMP/GHP instructions include recommendations concerning washing and disinfection, hygiene of personnel, receiving raw materials, water inspection, storing, securing a production plant against pests etc.

Critical Control Points (CCP) are determined on the basis of a hazard analysis in a particular company. In order to determine these points, it is necessary to trace all stages of a technological process; in case of bread production it looks as follows:

- Receiving raw materials;
- Storing raw materials;
- Taking raw materials out of storage and preparing them for production;
- All operations connected with making bread dough;
- Preparing dough for baking bread;
- Bread baking;
- Packaging & customizing;
- Preparing bread for transport.

Critical Control Point is a stage, at which necessary controls can be applied, and a food safety hazard can be prevented, eliminated or reduced to acceptable levels. CCPs are locations, processes, unit operations, which have to be controlled during the whole production process. If they are not appropriately supervised, they can lead to a food health hazard.

In order to minimise the transfer of outside microflora to a production hall, a food company, having implemented the HACCAP, GHP and GMP systems, should have installed appropriate locker rooms and locks as well as a room ventilation system.

Specificity of bread production forces large consumption of water, which microbiological condition has a considerable impact on cleanness and hygiene of all stages of a technological process. Washing the machinery and floors with water contaminated with microorganisms causes its contaminants to transfer easily to raw materials, semi-finished products, additives and packaging. Therefore, an investment in infrastructure of production plants through improvement of sanitary and technical standards of production buildings is a valid requirement.

The basic ingredient of bread production is flour, which is always contaminated with microorganisms present on cereal grains due to their natural microflora. It is composed in 90% from saprophytic bacteria, mainly from gram-negative bacilli of *Pseudomonas herbicola*, *Pseudomonas fluorescenes*, gram-positive bacteria of *Micrococcus* and *Lactobacillus* genus and spore-forming bacteria of *Bacillus* genus, which pose the biggest microbiological hazard to cereal products. This is why the thermal and moisture conditions are important for storing this raw material in appropriate places; remembering that flour with moisture over 15% changes its organoleptic features, increases in acidity and loses its baking properties as a result of deterioration in gluten quality.

The following critical points of microbiological contamination in bread production have been determined during risk assessment:

- CCP 1 - storing raw materials - the factors, which influence flour's quality during storing are the temperature of a place (20÷30°C), humidity (cannot exceed 70%) and the length of a storing period. The temperature of a storage room where flour has been stored amounted to 24÷26°C, and humidity to 60% [1,3].
- CCP 2 - making bread dough - during this process (temperature from 28÷30°C), all ingredients are joined together, which is conducive to populating raw materials with microorganisms present in the environment and their further growth. That is why the purity of air is essential, which properly operating ventilation system of a bakery is responsible for, as well as the purity of water from municipal waterworks. Neglecting hygiene (washing, disinfection) [1,3] can also be the source of potential microbiological contamination.

CCP 3 - bread baking - the hazard comes from the incorrect baking temperature and its length. The temperature of an oven amounts to 260°C. A lower temperature may be conducive to the growth of microorganisms. An incorrect baking temperature can cause an activation of spore forms of microorganisms. The length of baking is a crucial factor influencing microflora of a finished product.

- CCP 4 - packaging - the hazard arises mainly from improper cooling of bread, which can result in a finished product to become moisten inside of packaging. It leads to secondary contamination with *Bacillus subtilis* or to the growth of mould spores, penetrating a product from the environment [1,3].

Summary

Particularly important for a company to achieve a success is the way in which it is perceived by customers. With competition as a factor, quality management becomes a strategic objective for a company. A modern company, to achieve and keep a competitive position on the market, must take into account stricter and stricter quality criteria set by customers. Quality, next to efficiency and costs of production, is a decisive element for maintaining and developing a company.

Management through quality is a philosophy, which assumes subordination of all basic levels of a company's operation to an idea of comprehensive, total quality, in order to improve a company's effectiveness, flexibility and competitiveness [5].

The bread market is going to become more and more diverse. Customers with bigger incomes, however, expect high quality products of exceptional properties, and these demands will surely expand. Therefore, bread producers should be more concerned about quality and health safety of bakery products, taking into account the needs of a more demanding client [2].

Good quality of bakery products is ensured to a great extent by appropriate technological parameters, adjusted to the quality of a raw material.

A consumer during purchase pays special attention to the external factors of bread, its shape, colour and crust's appearance. Whether a client buys it or not, is largely dependent on the appraisal of exposed bread at the time of purchase. The quality of bread is influenced by properties of raw materials, the type of technology, and the way in which a bakery is organised and equipped with machinery.

A consumer looks for good quality bread with proper colour, porosity and crumb flexibility. Crumb should be dry, easy to slice, with even colouration, light or dark, depending on the type of flour used. Pores should be small, even and thin-walled. Additionally, bread attracts a client with a pleasant, characteristic smell and the type-specific taste.

Without preserving the proper sanitary and hygienic status of production, qualified and committed personnel, reliably operating machines and devices, using the highest quality raw materials and choosing and applying optimal process parameters, it is not possible to produce bread of high quality, which will fully satisfy a customer [2].

Conclusions

Implementation of the HACCP system in a company provides:

– the improvement of a production process through proper information and documentation circulation, the increase of employees' awareness and early detection of inconsistencies,
– the increase of efficiency of actions to ensure safety and quality of produced food,

- the discipline among personnel and tight cooperation between people on individual posts,
- the tool for managing risk factors.

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ПОЛУЧЕНИЕ ЗАМОРОЖЕННЫХ ОВОЩНЫХ ПОЛУФАБРИКАТОВ НОВЫМ СПОСОБОМ ПЕРЕРАБОТКИ СВЕЖИХ ТОМАТОВ

Одарченко Н.С., к.т.н., проф., Одарченко Д.Н., к.т.н., доц., Сподарь Е.В.
(Харьковский государственный университет питания и торговли, Украина)

Введение

Проблема здорового питания считается одной из наиболее актуальных проблем человечества, что в свою очередь приводит к созданию продуктов питания на основе натурального сырья [1].

Важная роль при этом отводится продукции растительного происхождения, среди которой отдельного внимания заслуживает сегмент сырья и продуктов переработки овощеводства. Данная группа призвана удовлетворять потребности населения в диетических продуктах питания, а также в консервированных овощах в течение всего года. В овощной продукции содержатся незаменимые для организма витамины, кислоты, белки и минеральные вещества и т.д. Обеспечение овощами населения и овощеперерабатывающей промышленности осуществимо при условии значительного увеличения объема производства овощей, а также возможности сохранить полученный урожай без существенных потерь.

На сегодняшний день ассортимент продуктов переработки овощей довольно развит: ежегодно появляются новые производители и добавляются усовершенствованные ассортиментные позиции на уже функционирующих консервных заводах и фабриках.

Отдельного рассмотрения требует сегмент «Соки, нектары и сокосодержащие напитки», т.к. помимо их приятного вкуса и аромата, эффективного утоления жажды, они имеют высокую пищевую ценность за счет использования в производстве фруктов, ягод и овощей, значение которых для здорового питания исключительно положительно [2].

Поэтому поиск новых рациональных путей переработки сельхоз сырья и производства соков и аналогичной продукции является перспективным направлением развития отрасли.

Основная часть

Целью данного исследования было расширение ассортимента соков и сокосодержащей продукции на основе разработанного замороженного овощного полуфабриката для томатных напитков, максимальное сохранение пищевой ценности, улучшение их вкусовых свойств и качества за счет обратимости фазового равновесия.

За аналог новой разработки был выбран способ переработки томатного сырья [3], который имеет ряд недостатков, а именно: неполное удаление семян, снижение пищевой ценности и органолептических показателей за счет подогрева, а также необратимость фазового равновесия при низкотемпературном хранении.

Для производства овощного замороженного полуфабриката для томатных напитков использовали томаты сорта «Лидер» красной степени зрелости. Согласно технологической схеме производства томаты принимали, инспектировали, мыли, очищали и отделяли семена в количестве не менее 99% от их количества, измельчали, центрифугировали, фильтровали и подвергали отделению жидкой и твердой фаз путем двукратного цикла замораживания-центрифугирования (температура замораживания -18° С) по следующей схеме: замораживание–размораживание–центрифугирование–фильтрование. Причем жидкость, которая выделяется во время центрифугирования твердой фазы, добавляется к общему объему сока, а твердая фаза,