EFFICIENCY OF PRODUCTION OF MEAT AND MEAT PRODUCTS USING SYSTEMATIC APPROACHES

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Introduction

Nowadays safety assurance and quality management is the urgent problem for food establishments in Russia, including those of middle business. Therefore the methodologies, allowing systematization and regulation of the procedures in quality and safety assurance become necessary.

However, at the present time only a small amount of plants recognize and appreciate the advantages of introduction of the management system. Due to the settled stereotypes and opinions, the main attention is paid to certification of quality systems and to the benefits that are connected with acquiring new and expansion of the already occupied markets. The plants having obtained the certificate for quality system are expecting a reduction of the control from the State inspections.

Therefore **the objective** of this study was to analyze changes in the production efficiency in case of the implementation and functioning of the quality system at the plant.

A system of safety assurance and quality management on the basis of HACCP (Hazard Analysis and Critical Control Points) principles was taken as a base model.

Materials and methods.

A plan for conducting investigations included several steps. First, a quality system for a particular technological process was developed and introduced; then the analysis of final products and of the efficiency of production process prior and after the introduction of quality system was conducted. During this work the standard methods of investigation of physical, chemical and microbiological indices of finished products were used and also a special procedure of the evaluation of production process efficiency, the Method of Decision tree, methodology IDEFO, a procedure of expert evaluation of quality system operation efficiency.

Results and discussion.

By comparison of the measured results of the production process with the planned values, the indices of efficiency were determined, including:

fulfillment of the production plan on the volumes of final products;

amount of final products where the deviations were revealed before sending to consumer and by consumer;

return of the main raw materials to supplier on the basis of incoming ingredients control;

amount of half-finished products with deviations connected with key technological processes (temporary storage, defrosting , curing of the main raw materials, thermal processing of sausage products).

For the sake of comparison all the indices of efficiency were calculated in percent.

After a period of functioning of the quality system, the studies of efficiency of production process according to similar indices were conducted again, and the results obtained prior to the introduction of the quality system and after one year of its functioning were compared.

The generalized information about the efficiency of production is presented in Table 1.

Table 1. The most typical comparison of average values with regards to the indices of efficiency of production process before introduction of systematic approaches and after it

Indices	Average before introduction of systematic approach	Average after introduction of systematic approach
Fulfillment of production plan, %	88.05*	97.76*
Amount of products in which deviations were revealed BEFORE dispatching to consumer, %	0.56*	0.22*
Amount of products in which deviations were revealed by CONSUMER, %	0.78%*	0.26*
Return of the main raw materials to supplier, %	25.01*	10.23*
Amount of deviations during curing of the main raw materials, %	6.21*	1.96*

* - the values in the line differ significantly, $p < 0.01$

It was established that after the development and introduction of quality system both the quality attributes of finished products and the results of production activities were stabilized, because the systems of gathering of the necessary information, response and analysis had been arranged.

The results of the investigations indicate that deviations in finished products before the introduction of systematic approaches for safety and quality assurance may reach 0.72%. The analysis of the gathered information has shown that in practical work of the plant the occurring deviations had not been fully analyzed by specialists and not always could be prevented later. The costs, connected with the production of the deviant products had not been considered as the additional ones that led to unjustified rise in the cost of the production process. This rise in the cost has a negative effect on formation of the prime cost of the products.

It has been found that the effectiveness of the production process directly depends on the skills of working staff, involved in different operations. Thus, more than 44% of deviations occur because of carelessness and negligence or lack of knowledge of the personnel (Fig.1).

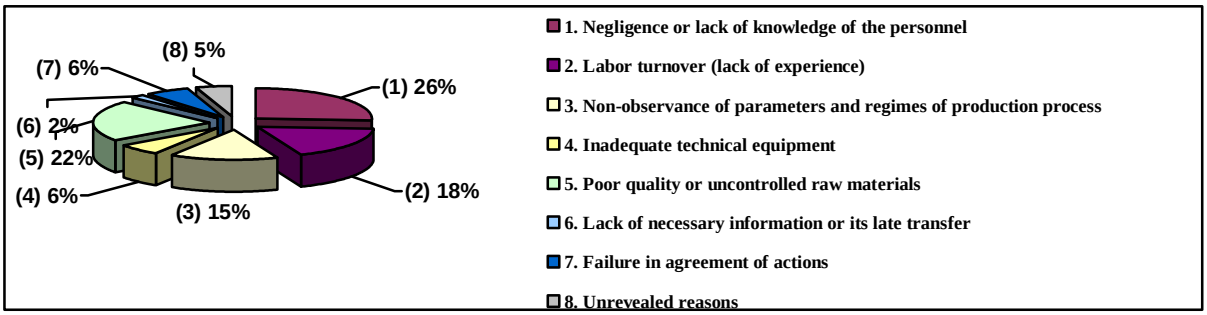

Fig.1. Deviations occurred depending on the following reasons

As a result of the analysis the individual stages of the production process with a large volume of deviations were identified, for example, the stage of curing of the main raw materials. The results of the investigations are presented in Fig. 2. Before the implementation of quality system the deviations recorded at this stage were approximately of equal volume. Training of the personnel and organization of the constant monitoring of this stage allow elimination of the deviations actually to zero.

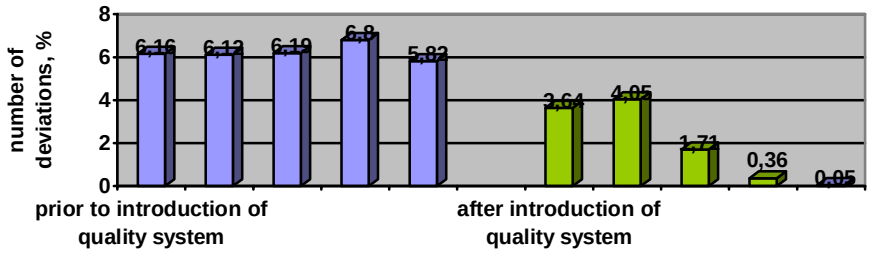

Fig.2. Investigations of the efficiency at the stage of curing of the main raw materials before and after implementation of the system

It was found that due to implementation of the complex system of evaluation of suppliers, the amount of returns of the main raw materials reduced by 2.1 times.

Conclusions

1. The efficiency of the development and implementation of quality system has been proven: the amount of deviant products found before sending to consumer, has reduced by 2.55 times, and those revealed by consumers – 3 times while the production volumes were increased.
2. The results of production processes have been stabilized; the volume of deviations in operations was reduced by 1.5 -3.6 times, depending on the step; the fulfillment of the production plant has increased by 9.71%.
3. It was proven that up to 50% of all the occurred deviations could be prevented.
4. It was found that continuous monitoring in particular points allowed reducing the deviations by more that 3.6 times.
5. It is proved that the implementation of traceability system helps to validate the safety of final product and reduce the amount of deviations on the average by 17%.