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The System Of Pasta Production Safety Management Based On The HACCP.

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ABSTRACT

The adoption of the Technical Regulations of the Customs Union 021/2011 "On food safety" prescribes to ensure the safety of food products during their production (manufacture), storage, transportation (transportation) and sale. The HACCP system is a fairly effective management tool whose main function is protection. HACCP certificate testifies to the company's compliance with international standard requirements. The presence of a HACCP certificate gives the manufacturer a certain confidence that the products are safe. The certificate of the HACCP system is a competitive advantage in the Russian consumer market. The use of HACCP confirms compliance with regulatory and legislative requirements in the production, sale, and consumption of products. Thus, the HACCP system brings together and systematizes the principles of conscientious food production that are natural for a normally operating enterprise. By introducing a quality management system in the enterprise, and informing the consumer about it, manufacturers, firstly, increase their confidence, trust of trade networks, supervisory bodies and potential partners, secondly, strengthen and enhance the brand image and image of the enterprise, demonstrating a commitment to producing safe food. The aim of this work is to develop a HACCP system for the macaroni factory «Macprom». The article describes all the stages of development and implementation of the system, starting with the definition of the Security Policy and ending with the HACCP pan-maker using the example of pasta production. The introduction of a food safety control system based on the principles of HACCP in pasta production allows you to organize quality control, ensures the production of safe products and, as a result, increases the competitiveness of products on the market.

Keywords: HACCP; critical control point; product safety; macaroni production

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INTRODUCTION

Manufacturers of pasta to date presented a huge selection of various types of pasta. Competition in this segment is very high and in the end, the consumer makes a choice of products not only by the price criterion but also by the quality.

The requirements of TR TU 021/2011 "On food safety" prescribe to ensure the safety of food products in the process of its production (manufacture), storage, transportation (transportation) and sale, which is achieved by the development, implementation and maintenance of procedures in control systems based on HACCP principles [3].

When implementing the HACCP system or developing its own quality control system, the producers of any industry should not only explore and analyze their own product and methods of production but also apply this system and its requirements to the suppliers of raw materials and auxiliary materials [1].

MATERIAL AND METHODS

The studies were carried out at the enterprise of «Makprom» in Balakovo in the Saratov region. The object of the research is the development of a security management system at the enterprise for the process of making pasta.

A flowchart has been developed to analyze possible manifestations, increase the significance or introduce hazards that threaten food safety (Figure 1).

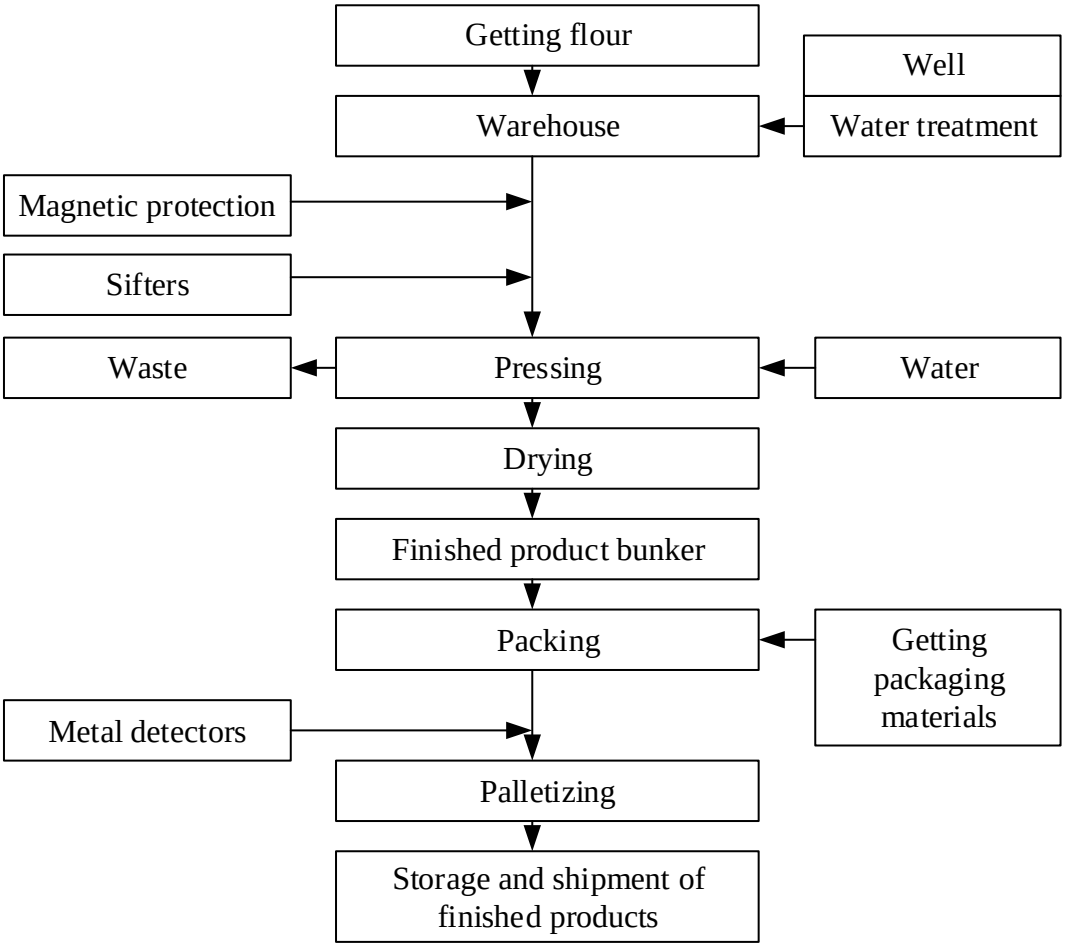

Figure 1: Block diagram of macaroni production

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Hazard analysis was conducted to determine which hazards should be managed and to what extent it is necessary for food safety, as well as which combinations of management measures are required for this [2].

First of all, the possible types of hazards inherent to the pasta industry are considered.

Further analysis was conducted for each type of hazard. Each danger to the safety of food products was evaluated according to severity, taking into account the possible adverse effects on human health and according to the likelihood of their occurrence.

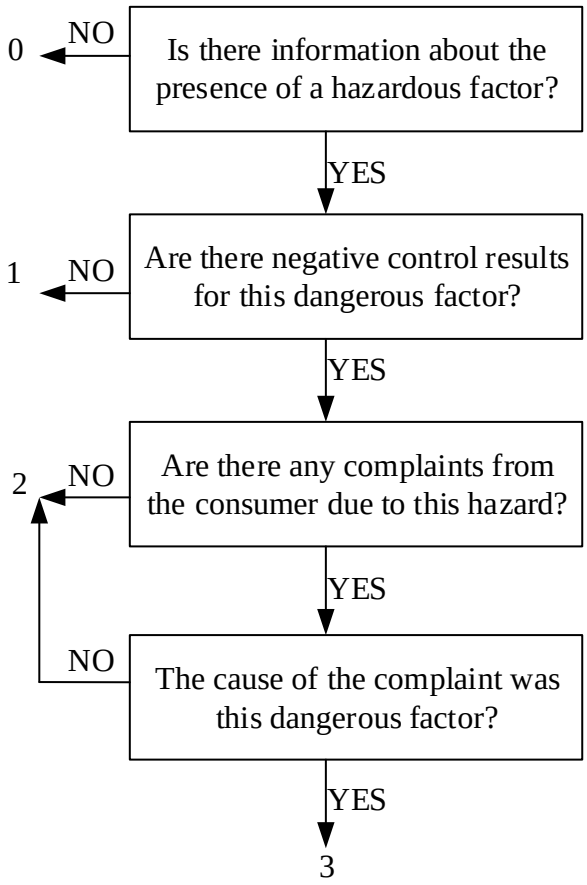

Figure 2: Algorithm for determining the probability of occurrence of a dangerous factor

Using the algorithm shown in Figure 2, the probability of occurrence (BB) of a hazard was determined, based on the following assessment options:

0 is incredible; 1 - unlikely; 2 - probable; 3 - frequent.

Also, expertly evaluated the severity (T) of the consequences of the occurrence of a hazard, based on the following assessment options:

0 - light (minor effects without damage);
1 - average (possibly drug treatment for several days);
2 - high (causing serious damage to health, illness);
3 - very heavy (leads to death).

The overall risk analysis (AR) is based on an assessment of the severity (T) of the hazard and the probability of occurrence (BB) that this hazard poses. AP = T × BB

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The distribution of assessments for hazardous factors was carried out on the basis of the professional knowledge of the safety team, as well as data analysis in the field of the pasta industry.

The results of the risk analysis are summarized in Table 1.

Table 1: Risk analysis

Danger	T (0<T<3)	BB (0<BB<3)	AP=T×BB	Cause of occurrence
Biological (microbiological) hazard				
CGB	3	1	3	Raw materials, water and/or hygiene of the production environment; insufficient heat treatment
Mold	2	1	2	Raw materials (storage) and/or favorable environmental conditions
Toxins	3	1	3	Raw materials, water
Chemical and radioactive hazard				
Toxic elements	3	1	3	Raw materials, water
Pesticides	3	1	3	Raw materials, water
Allergens	3	1	3	Raw materials
Radionuclides	3	1	3	Raw materials
Physical danger				
Metal bodies	3	2	6	Raw materials; corrosion, deterioration and equipment failure.
Non-metallic bodies	3	2	6	Raw materials; damaged surfaces; glass; rubber and plastic from the gaskets of equipment, etc ....

Preventive actions, such as monitoring the parameters of the technological process of production; heat treatment; use of a metal detector; treatment and disinfection of equipment, etc. are included in two programs: the preliminary activities program (APM) and the mandatory preliminary activities program (MRP).

Following the results of the risk analysis, the following evaluation criteria were applied.
AP ≥ 6 - Entry to MRP, MRP (o), or CCP.
AP <6 - Does not need special control measures.

Table 2: Provides a list of preventive actions

	Operation name	Hazard factor taken into account	Controlled signs	Preventive action
1	Gettingwater	Biological hazard	Water quality	Water control under production control program
		Chemical and radioactive hazard	Water quality	Water control under production control program
2	Receiving flour	Biological hazard	Flour quality	Control of raw materials for the production control program
		Chemical and radioactive hazard	Flour quality	Control of raw materials for the production control program
		Physical hazard	Foreign bodies	Input control of raw materials. Installation of sifters and magnetic speakers

RESULTS AND DISCUSSION

Determination of critical control points: with AR ≥ 6, control measures are managed as CCP or MRP (o). This division is based on the possibility of monitoring.

The stages at which the danger can be kept under control in monitoring and reducing it to acceptable levels were defined as CCP, and the stages at which the control is carried out, or an action is taken, or a procedure is used for the purposes of prevention or prevention, is defined as PPM(o).

Establishing critical limits for CCP: a critical limit is defined for each critical control point. The critical aisle should be measurable, while it should be set taking into account all errors, including measurements [4].

Critical limits are entered in the HACCP worksheets, (Table 4).

Establishment of a monitoring system for CCP: At this stage, a separate monitoring system has been developed for each critical point to conduct observations and measurements in a planned manner. These actions are necessary for the timely detection of violations of critical limits and the implementation of appropriate preventive or corrective actions (process adjustments). Monitoring procedures are also recorded in HACCP worksheets, (Table 4).

Establishing corrective actions: For each critical control point, corrective actions are taken and taken in case of violation of critical limits (Table 4).

After exceeding the critical limits of the CCP or MRP (o), it is necessary to specify and register corrective actions to control potentially dangerous products [5].

In case of dangerous products entering the implementation, a documented procedure for its withdrawal has been developed.

Table 3 shows the CCP for pasta production.

Table 3: Critical control points

Hazard	Getting water	Getting flour	Pressing	Drying	Getting packaging materials	Packing	Storage and shipment of finished products
Biological (microbiological) hazard							
CGB	PPM(o)	PPM(o)			PPM		
Mold		PPM(o)		PPM			PPM(o)
Toxins		PPM(o)			PPM		PPM(o)
Chemical and radioactive hazard							
Toxic elements	PPM(o)	PPM(o)			PPM		PPM(o)
Pesticides	PPM(o)	PPM(o)			PPM		PPM(o)
Radionuclides	PPM(o)	PPM(o)			PPM		PPM(o)
Physical danger							
Metal		PPM	PPM			CCP	
Not metal		PPM	PPM			PPM(o)	

Verification: confirmation of compliance with the established requirements by providing objective evidence [2].

The audit is carried out one per year or in an unscheduled order when new unaccounted hazards and risks are identified.

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Table 4: HACCP Worksheet (example)

Product Name: Finished Products (Pasta) Name of the technological process: packaging of products						
Operation name	Danger	Preventive action	Controlled parameter, critical limit	Monitoring	Corrective action	Documentation
Control of finished products during packing	Physical (the presence of metal magnetic impurities in pasta)	Installation of metal detectors	Metal magnetic impurity	Every 4 hours control of metal detectors.	Interlock and isolate products. Repair / replacement of the metal detector. Re-check batch products.	Log of control of metal detectors.

CONCLUSION

After passing through all the stages, we can say that the company has developed and implemented a food safety control system based on HACCP principles. For today in the Russian Federation, the system of voluntary certification "HASSP" is provided.

The HACCP certificate guarantees the advantage in obtaining orders from those network retailers that require a certified system from their suppliers. In addition, certification according to the HACCP standard and/or GOST R ISO 22000-2007 is the most effective, official way to show the consumer at the final realization of the goods that the goods Meet the requirements of the Technical Regulations of the Customs Union "On Food Safety" [3].

REFERENCES

[1] GOST R ISO 22000 - 2007 "Food safety management system. Requirements for the organization involved in the food chain. "
[2] Technical regulations of the Customs Union TP TC 021/2011 "On food safety", approved by the Decision of the Commission of the Customs Union of December 9, 2011 N880.
[3] Arshakuni V.L., Ustinov V.V. The procedure for the certification of HACCP systems: scientific and technical journal. Certification. Moscow: 2013. pp. 33-35.
[4] Vayskrobova ES, Kryuchko SA The development of the HACCP system in the framework of creating an integrated quality and safety management system. Young Scientist. 2015. 7. pp. 360-363.
[5] Mironov M.G.,Velbi T.C.Quality Management: Textbook. Allowance. M.:, publishing house Prospekt, 2016