

MODIFIED HAZARD ANALYSIS. BASIC PROGRAMS OF THE MODIFIED HACCP FOR POULTRY INDUSTRY

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Abstract

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We propose a modified HACCP model (MHACCP) of improved quality and economic effectiveness. In addition to the traditional and socially important HACCP mission of food safety, it targets farm competitiveness as a key issue of economic development. MHACCP is an attempt to incorporate the interests of food producers and consumers in Bulgaria for better human healthcare and economic prosperity.

In the present study, the hazard analysis, Critical Control Points (CCP) and correction acts for the third sub-objective of MHACCP are systematized in 14 programs in view of their more convenient, easy and accurate way to apply in primary poultry and egg production. Each program encompasses different sectors of the entire technological process. Introducing all 14 programs is the correct decision in high tech farms. On the other hand, for low tech farms it is recommended to introduce 3 to 4 or more programs with some compromises in terms of hazard assessment and evaluation of economic efficiency.

Key words: modified HACCP model, hazard analysis, CCP, programs

Abbreviations: HACCP – Hazard Analysis and Critical Control Points; MHACCP – Modified Hazard Analysis and Critical Control Points; CCT – Critical Control Point

Introduction

Poultry meat and egg production in Bulgaria has its traditions and is constantly developing and improving in accordance with the changing market conditions and requirements. The consumption of poultry meat and poultry products is growing worldwide and this reflects on our domestic market as well (Anonymous, 2006a). A number of EU requirements imposed changes in poultry and egg production and processing along the chain “from gate to plate” (Anonymous, 2002; Anonymous, 2004). The changes concern

mainly hygiene of production and guarantee safe consumer products by means of self-control systems such as HACCP and Good Hygiene and Production Practices. (ISO 9001:2000; ISO/FDIS 22000:2005; Anonymous, 2006b). The poultry farm can be defined as an industrial enterprise, where fattened broilers or eggs are the intermediate or finished product intended for the market. It has its own characteristics in terms of safety, quality and economic parameters. There is a complex of interacting factors with effect on economic efficiency, economic stability and sustainable poultry farm development. Typical factors are

related to day old chickens, feed, facilities and equipment and microclimate parameters, etc., that reflect directly on the production process (Bozakova, 2003; Oblakova et al., 2004). Some factors with effect on economic efficiency of the poultry farm are often hidden or difficult to assess. They are related to management, administrative services, consultancy, providing of services and market research, etc. Regardless of the type of factors and the rate of their hazard effect, they have to be carefully analyzed for the purpose of planning and forecast related to production, economic effectiveness and competitiveness of the poultry farm. A competitive economy is a priority of EU policy (Anonymous, 2000).

The objective of the present article is to present a modified HACCP with hazard, critical control points and correction acts for the third sub-objective, i.e. economic efficiency, encompassed in 14 programs.

Competitiveness is the major objective of producers and is subject to discussion and analysis in the accomplishment of the sub-objectives of the modified HACCP (MHACCP). The functioning of MHACCP as an active system for the increase of poultry farm competitiveness is based on the complex effect of sub-objectives such as Safety, Quality and Economic efficiency. (Kaitazov and Stoyanchev, 2007). MHACCP is based on the principles, philosophy, approach and general procedures of HACCP (Anonymous, 2006c) but at the same time it is intended to further develop, adjust and specify them for the needs of efficiency and quality issues in addition to the brilliantly developed traditional issue of food safety.

The key moments of MHACCP development are as follows: identification of hazards, critical control points and correction acts.

Some basic definitions need to be expanded in MHACCP for the better understanding of the issues of competitiveness and the related issues of Quality and Effectiveness as follows:

- **Hazard** – acquires an additional meaning as hazard resulting in lower quality and effectiveness as well as a major factor for the formation of quality and production efficiency. The total complex of factors (haz-

ards) should be accounted for in the formation of efficiency.

- **Critical control point** – in terms of efficiency, it has the meaning of a control point, i.e. not only the major, but also insignificant hazards, or, in other words, all efficiency related factors, are monitored and encompassed in the estimation of efficiency as long as they affect it adversely.

Monitoring is the source of information as it serves as a basis for analyses, decisions, critical limits, correction acts and improvements. In classic HACCP, it is solely a real time process, followed by consecutive analyses, correction acts and general conclusions. The same procedure is used in MHACCP but there is an important development – it operates with forecast information, most often of short-term nature. This approach allows the calculation of effectiveness not only as a real time fact but also the estimated efficiency for the current bird batch in the immediate future, i.e. next several days, or weeks and months. Forecasts can be realistic in case they account for, extrapolate and analyze the following real life factors and information:

- the facts established by farm monitoring, including an earlier period, concerning productivity, prices, economic results, technological, microclimate, biological and the whole complex of other parameters and factors that account for the formation of production competitiveness;

- equivalent information on other poultry farms in this area and in the country;

- legal and recommended information in Bulgaria and the EU;

- corporate technological programs, technologies, laws and rules, recommendations and projects, etc.;

- other reference sources, related to the specific issue.

The collection, classification and processing of the information from a certain poultry farm requires taking into consideration its general and specific (Bozakova, 2003; 2008) peculiarities. These peculiarities are the basis for identifying the factors that should be subjected to profound hazard analysis. In

order to develop and apply the third sub-objective of MHACCP, namely, economic efficiency, in a more convenient, easy and flawless way, we propose a program approach to the identification, formulation and analysis of hazard factors, CCP and correction acts on a poultry farm (Table 1). The separate programs encompass different sectors of the whole technological and production process and their number is a function of the concentration rate and technological level of the poultry farm. In high tech structures, the right decision is to introduce 14 or a similar number of programs, while on low tech and small farms a combination of a minimum of 3-4 programs would suffice for hazard management and economic effectiveness estimation, even though with some compromises. The introduction of more than 14 programs would not be efficient and might lead to an unnecessary complication of the technology for MHACCP application.

Information record-keeping in an alleviated variant for the purpose of analyses, increase of operational efficiency and development of system elements and the system as a whole should not be underestimated. In information records, contents is specific while the well known classic HACCP principle

approach is repeated in separate programs, hazards and CCP, enabling principle reviewing and traditional solution. An important difference is the effort to alleviate record-keeping procedures, especially for the second and third sub-objectives of MHACCP, in order to make the system attractive for the consumers and useful with minimum additional effort and complication of the technological and operational processes as well as maximum utilization of management systems and computer technologies.

The management of technological processes, both before and regardless of HACCP and MHACCP, is done on the basis of the respective documentation control and record-keeping. Record-keeping in high tech structures is done by means of sensors and electronic devices (Pan and Yang, 2007) and in low tech – with the aid of traditional control and measuring equipment on paper. A combination of both approaches in different proportions, depending on the technical level, is even more frequent. The above is sufficient without having to repeatedly review the same issue for each program and hazard or CCP. The specifics of each separate program refer to specific controlled and documented indices, characteristics,

Table 1
MHACCP programs in hazard analysis and risk assessment in poultry industry
with reference to economic effectiveness

Program № 1	Day old chickens, potential productivity and expenses
Program № 2	Feed, conversion and expenses
Program № 3	Water and expenses
Program № 4	Premises, equipment and depreciation
Program № 5	Temperature factor, HVAC and expenses
Program № 6	Ventilation, humidity, atmosphere measurement and expenses
Program № 7	Day light program and expenses
Program № 8	Floor covering and cost expenses
Program № 9	Transport and cost expenses
Program № 10	Prophylactics, treatment and expenses
Program № 11	Cleaning, disinfection and expenses
Program № 12	Staff, education and expenses
Program № 13	Material expenses
Program № 14	Management and labor expenses

parameters and limits, etc. They are reviewed and defined within the limits of the programs, hazards and control points.

The issue of *information verification* is even easier. HACCP is about information of major significance to the lives and health of third persons, i.e. consumers (Panisello et al., 2000), which is very important. As a rule, the operator is not immediately affected, this is not about his destiny and therefore, verification is necessary and obligatory in order to guarantee information reliability, independently from the operator and by double-checking him. This is similar to the situation with the first sub-objective of MHACCP but there is a principle difference in the second and third sub-objectives. Information reliability is of value only to the respective company, a poultry company in our case. In case a mistake is made, society or third persons do not lose anything. The operator is employed by the company or is the head of the family that owns the poultry farm – in other words, he is the company. Therefore, the interest in reliable information is so big that there is no need for operator-independent and double-checking verification to guarantee information reliability. This approach simplifies work, saves on labor and makes MHACCP system more attractive.

In this specific case, MHACCP was developed for the needs of poultry breeding economic structures. At the same time, it has a much broader application potential:

- in other animal farming industries;
- in plant breeding;
- anywhere, where classic HACCP is applied, of course, accounting for the specific peculiarities of the respective industry.

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