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

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Abstract


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 (hazards) 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 pro-
gram approach to the identification, formulation and
analysis of hazard factors, CCP and correction acts
on a poultry farm (Table 1). The separate programs
ecompass different sectors of the whole technologi-
cal and production process and their number is a func-
tion 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 pro-
gams, while on low tech and small farms a combina-
tion of a minimum of 3-4 programs would suffice for
hazard management and economic effectiveness esti-
mation, even though with some compromises. The
introduction of more than 14 programs would not be
efficient and might lead to an unnecessary complica-
tion of the technology for MHACCP application.

Information record-keeping in an alleviated
variant for the purpose of analyses, increase of op-
erational efficiency and development of system ele-
ments and the system as a whole should not be un-
derestimated. In information records, contents is spe-
cific 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 alle-
viate record-keeping procedures, especially for the
second and third sub-objectives of MHACCP, in or-
der to make the system attractive for the consumers
and useful with minimum additional effort and compli-
cation of the technological and operational processes
as well as maximum utilization of management sys-
tems 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

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

References


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