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The importance of biochemical tests for pathogens in sectors and products of Korca poultry

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Today, food safety is the main priority for the health of consumers. Recently, there is an increase in the consummation of poultry products on the world and European market. Groups of populations that consume products of poultry industry are interested in their safety and guarantee. The contamination of fresh and packaged poultry meat and other poultry products derives from the environment and from the operating procedures applied by the producing companies. The main objective of scientific research work is to reduce the degree of resistance of pathogens and their distribution in the area of poultry sectors. The methodology of this study is based on microbial analysis of air and poultry products in the area of Korça, isolation of pathogen microorganisms with the method of selection/coincidence and identification of microorganisms with biochemical tests and preparations. The biochemical tests and experimental results showed that *Pseudomonas* spp. but no *Salmonella* spp. were isolated in the outside sector. A large number of *Escherichia coli* was found in terrain DC.

Keywords: Food safety, pathogen microorganisms, isolation, poultry products, air microflora

INTRODUCTION

Being protein food, the poultry industry's products are very attractive to the action of microorganisms, including pathogenic bacteria. In current studies it has been found that the species *Micrococcuss* spp. are prevalent as bacterial genes in industrial processes of chicken production. A good part of them is evident on the skin of the neck. Chicken represent a very important source of *Salmonella* spp. This is judged not only in the product but also in the equipment of the industrial processes of the pulp, in the air of the poultry sectors, in the workers who make the removal from their hands or gloves. *Salmonella sandiego* and *Salmonella anatum* have been identified in these strainers. Where *Salmonella* spp. is found, researchers advance their studies [1,2].

Pathogens and all kinds of other microorganisms are generally followed in a progressive manner. They are also found on farms or poultry where a chicken poultry is made: chicken eggs or meat, and then a separation between the veterinary part and the production operations is carried out [3].

At the last stage of the process, the consumer is interested in a pure product separated from microbial contaminants, ready to be cooked at respective temperatures and consumed within the standards. If security concerns are examined in detail, the main mission of the USDA scientific research unit is to promote the development of new technologies, to prevent or reduce the presence of human enteropathogenic bacteria in the production of chicken meat and its products. In this overall context a major task is to reduce the presence of *Salmonella* spp. and *Campylobacter* spp. in order to reduce the exposure of the consumer to bacteria of pathogenic origin [1]. The main directions of the organization of scientific research are listed below:

- Factors that influence the growth of microbial load in a poultry product, to provide consumers with confidence;
- Finding ways to intervene in the colonization process of *Salmonella* spp. within the digestive tract apparatus and to minimize the distribution of colonized microorganisms to other edible parts using anti-microbial factors;
- Developing control procedures to prevent contamination with *Salmonella* spp. of bird eggs using chemical substrates together with antagonizing pathogenic microorganisms or both [4];
- Use of vaccines, antagonist microflora, diagnostic and epidemiological tools to identify and describe the linkages of pulp contamination with the final product contamination levels [5].

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The development of pathogenic resistant bacteria can be linked to many factors including the resistant intestinal flora and the animal digestive tract [2]. These factors can be destroyed by exposing the product to antimicrobial agents and by creating specific monitoring programs of pathogenic loads. The main objective of the current scientific research work is to reduce the degree of resistance of pathogenic bacteria in the air of the pulp sectors and in their products of their distribution. Only in this way can biosecurability of consumer products be increased [6]. The main points of the poultry sectors, such as chicken meat, eggs and by-products, are selected, and a microbiological assessment of their air is made.

This set could provide evidence of the efficacy of selected combinations to reduce pathogens.

MATERIALS AND METHODS

Microbiological analysis of air

The air microflora was determined in five poultry sectors during two years:

1- in the outside sector
2- in the egg sector
3- in the poultry sector for egg (battery)
4- in the bird grow sector
5- in the slaughter, packaging and labelling sector.

Colonies on terrain plates were counted after 24 h and 48 h (agar blood). Colonies counted were considered as a descendant of microorganism cell. The air quality can be determined based on the number of colonies that grow on a plate. For example, if the average number of colonies in two plates with a radius of 4.5-5 cm and with terrain, left in contact with air for 20 min it reaches up to 200, the air is considered clean, whereas, if it is over 200, the air is considered infected [7].

Isolation and identification of pathogenic microorganisms in the air of the poultry sectors of Korca by biochemical tests

For pathogenic microflora we used different terrains:

1- Terrain DC
2- Terrain Endo
3- Terrain Glucose - agar
4- Terrain Krystenzen
5- Terrain Hayn

The colonies suspicious for *Salmonella* spp. were passed on the terrains Hayn and Krystenzen [8].

Methodology. Isolation and identification of *Salmonella* spp. Sterile tampons in tubes were used to get material in cloaca of poultry and birds. We selected randomly 10 chicken and 10 birds. We got material in poultry and birds cloaca and marked numbers on the test tubes. After the recovery (revitalizing) of the sample in terrain Selenid, the material was passed to terrain DC and terrain Endo. After 24 and 48 h of incubation time in a thermostat, suspicious colonies were passed from terrain DC to terrain agar-glucose, terrain Hayn and terrain Krystenzen.

Glucose-agar is a solid terrain. We studied three characteristics: fermentation, gas production and mobility. *Salmonella spp*. in the terrain glucose-agar is fermenting glucose (changes the color from green to yellow), produces gas and flagel.

Terrain Hayn – indol *Salmonella* spp. is negative (-) (it does not color). Then, suspicious colonies for *Salmonella* spp. were passed to other terrains as lactose tube, mulberry tube, etc. Colonies of *E. coli* in terrain DC are colored in red.

Terrain Kristenzen – Further, we studied the pathogenic microorganisms (Enterobacters). When, the terrain Kristenzen displayed a color change (from beige to red color), no further study for enterobacters was performed.

Terrain Hayn – Part oblique is always acidic (yellow color), whereas the steep part is alkaline (red color). In terrain Hayn gas production and development of H_2S (black color) has to be checked which shows the presence of *E. coli* [9]

RESULTS AND DISCUSSION

The general microflora of air was defined in five sectors of Korça poultry for two years:

- Outside sector;
- Egg sector;
- Poultry sector;
- Bird grow sector;
- Packaging and labelling sector.

The results are presented below:

Table 1. The general air microflora in all sectors to Korca poultry

Sectors	Parallels	Terrain	
		Agar blood	
		Time of incubation	
		24 h CFU	48 h CFU
Outside sector	I	196	200
	II	190	198
	Average	193	199
Egg sector	I	290	300
	II	290	298
	Average	290	299
Poultry sector	I	340	350
	II	344	356
	Average	342	353
Bird growth sector	I	360	370
	II	376	380
	Average	368	375
Packaging and labelling sector	I	120	128
	II	126	130
	Average	123	129

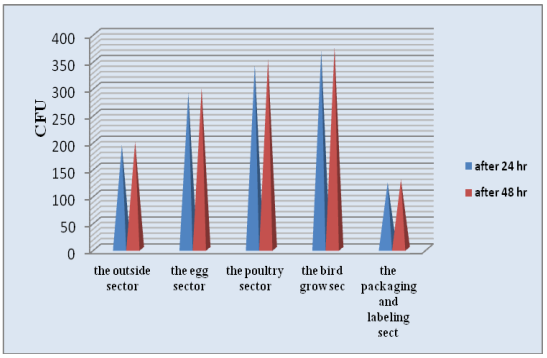

Figure 1. The air microflora in terrain Agar blood

Table 1 and figure 1 show that the sector of birds is with greater microbial load than other sectors. The sectors of eggs, birds and chicken have microbial loads above the allowed norms (over 200 colonies (CFU). The outside sector and the packaging and the labelling sector are considered not contaminated (pure), because the number of colonies is within the allowed norm.

Isolation and identification of pathogenic microorganisms in the air of the poultry sectors of Korca by biochemical tests

Table 2 and figure 2 show that analyzed chicken are clean of *Salmonella* spp. *E. coli* is a microorganism of fecal contamination. This fact explains its presence in chicken 1, 2 and 4, whereas, the other chicken are clean of *E. coli*.

Table 2. The number of microorganisms of *E. coli* and *Salmonella* spp. in live chicken

Chicken	*E. coli*	*Salmonella spp.*
1	2	0
2	36	0
3	0	0
4	1	0
5	0	0
6	0	0
7	0	0
8	0	0
9	0	0
10	0	0

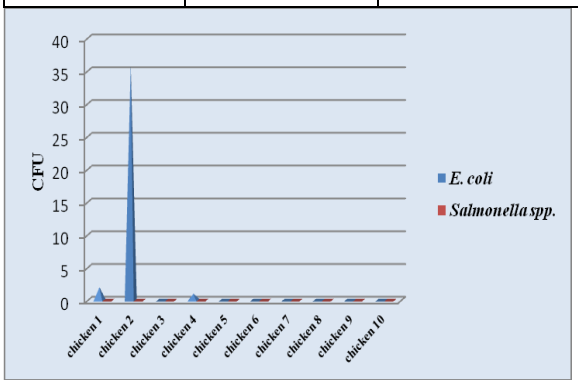

Figure 2. *E. coli* and *Salmonella spp*. isolated in the part of cloaca of chicken (method selection/coincidence)

Isolation of Salmonella spp. and E. coli in the abdominal part and the cloaca of the chicken and live birds (method of selection/coincidence)

Figure 3 and table 3 show that the number of *E. coli* in birds is bigger than in chicken of Korca poultry. *E. coli* is normal flora in part of cloaca as a microorganism of fecal contamination. The number of *Salmonella* spp. in these chicken and birds was zero. This is a very good indicator for the quality of poultry meat.

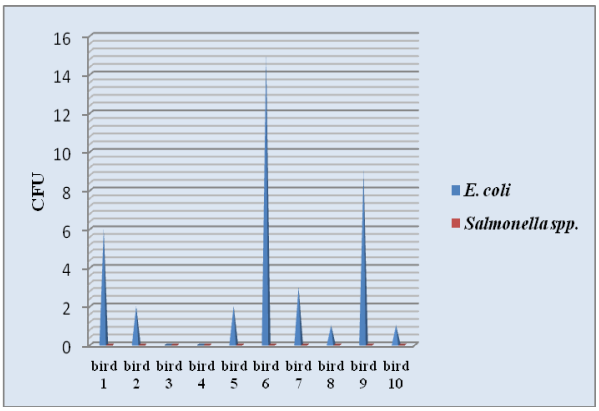

Figure 3. *E. coli* and *Salmonella spp*. isolated in part of cloaca in birds (method of selection/coincidence)

Table 3. The number of microorganisms of *E. coli* and *Salmonella* spp. in live birds.

Birds	*E. coli*	*Salmonella spp.*
1	6	0
2	2	0
3	0	0
4	0	0
5	2	0
6	15	0
7	3	0
8	1	0
9	9	0
10	1	0

CONCLUSIONS

Controlling the general air microflora in five sectors of Korca poultry revealed that in the bird growth and chicken sectors the microbial load was higher than in other sectors. However, microbial load was within the allowed norms. Sectors are called not-contaminated. This can affect in microbial load of final product.

On terrain agar blood, several colonies were observed that illuminated the terrain. After simple preparation, we observed them under microscope. They were *Staphyloccocus aureus.*

In air sectors of poultry, we identified *Streptococcus* spp. and *Diplococcus*.

Salmonella spp. and *E. coli* were isolated in the abdominal part and the cloaca of the chicken and live birds (method of selection/coincidence).

Microbiological analysis and biochemical tests for suspicious colonies showed that they were *E. coli*. No *Salmonella* spp. were isolated or identified. So, the poultry products are clean and there is no risk of contamination with *Salmonella* spp. during manipulation in other sectors.

The highest number of *E. coli* was in chicken number 2 and bird number 6. *E. coli* is characteristic flora in part of cloaca as a microorganism of fecal contamination.

Care should be taken during manipulation processes (slaughter, removal of organs and removal of feathers sectors) to chicken and birds, not to contaminate with *E. coli*.

Vaccine antagonist of *Salmonella enteritidis* was injected twice a year. This confirmed our experimental result, that no *Salmonella* spp. was found in 20 analyzed birds (chicken and birds) in Korca poultry.

We recommend poultry administrators to administer vaccine antagonist to *Salmonella* spp. to the poultry as little as possible.

We recommend setting up air systems in all sectors of Korca poultry, because the release of gases increases the temperature in the sector, which favors the development of microorganisms.

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