

Food safety and biochemical tests for pathogens in the air of sectors and products to Korca Poultry, Albania

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ABSTRACT— Today, food safety is the main priority for health of consumers. Recently, there is increasing in the consume of the poultry product in the World and European market. Groups of populations that consume poultry products industry searching them 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 companies of the production. The main objective of scientific research work is to reduce in the area of poultry sectors the degree of resistance of pathogens and their distribution. Methodology of this study is based on microbial analysis of air and their products in the poultry of Korça, isolation of pathogens microorganisms with method selection/incidence and identification of microorganisms with biochemical tests and preparations. The biochemical tests and experimental results showed that was isolated *Pseudomonas spp.* in outside sector and no *Salmonella spp.* was isolated. Measurement experimental show a large number of *Escherichia coli* in terrain DC. The number with *E. coli* in birds is bigger than in chickens to Korca poultry. *E. coli* is normal flora in part of cloaca as a microorganism of fecal contamination. The number of *Salmonella spp.* in these chickens and birds was zero. This is a very good indicator in the quality of poultry meat.

KEYWORDS: abdominal part, cloaca part, poultry products, safety food, *Salmonella spp.*

1. INTRODUCTION

Being protein food makes the poultry industry's products very attractive to the action of microorganisms, including pathogenic bacteria. In current studies, it has been found that species *Micrococcuss spp.* are more prevalent as bacterial genes in industrial processes of chicken production. A good part of them is evident on the skin of the neck. Chickens represent a very important source of *Salmonella spp.* It 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 remover 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. 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: egg chickens or meat, and then a separation between the veterinary part and the production operations is carried out [12]. At the last stage of the process, the consumer is interested in 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 [8]. The main directions of the organization of scientific research are listed below:

In factors that influence the growth of microbial load in a poultry product, to provide consumers with confidence. In 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 antimicrobial factors

In developing control procedures to prevent contamination with *Salmonella* spp. of bird eggs using chemical substrates for this purpose together with antagonizing pathogenic microorganisms or both. In the use of vaccines, antagonist microflora, diagnostic and epidemiological tools to identify and describe the linkages between pulp contamination with the final product contamination levels [5], [6]. The development of pathogenic resistant bacteria can be linked to many factors including the resistant intestinal flora and the solvent and animal digestive tract. These factors can be destroyed by exposing the product to antimicrobial agents and by creating specific monitoring programs of pathogenic loads [7]. The main objective of the current scientific research work is to reduce in the air of the pulp sector sectors and in their products the degree of resistance of pathogenic bacteria to their distribution. Only, in this way can biosigurability of consumer products be increased [1], [2].

The main points of the poultry sectors, such as chicken meat, eggs and by-products, are selected, and the microbiological assessment of their air is made.

This set of evidence is evidence of the efficacy of selected combinations to reduce pathogens

2. MATERIAL AND METHODS

We performed these analysis:

Microbiological analysis of air

Isolation and identification of pathogenic microorganisms in the air of the poultry sectors of Korca by biochemical tests [11]

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

For the analysis of microflora of the air in the poultry sectors was used the sedimentation method. This method is based on the phenomenon of microbial precipitation on the plate. These terrains were used:

1- Terrain Agar-blood,

Microbiological analysis of air

Prepare the preparations coloring by gram and simple preparations

The form of colonies in the microscope (zoom 100)

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 we numbered them after 24 hours and 48 hours (Agar blood). Colonies counted considered as a descendant of microorganisms cell. The air quality can be determined based on the number of colonies that grows on plate. Example, if the average number of colonies increased in two plates with a radius 4.5-5 cm and with terrain, left in contact with air for 20 minutes reaches up to 200, the air considered clean, whereas, if it si over 200, it considered infected [3], [4].

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

Isolation and identification of colony by biochemical tests. Prepare the preparations coloring by gram and simple preparations

The form of colonies in the microscope (zoom 100)

For pathogenic microflora we used selective terrain:

- 1- Terrain DC
- 2- Terrain Endo
- 3- Terrain glucose - agar
- 4- Terrain Krystenzen
- 5- Terrain Hayn
- 6- Terrain Selenid

The colonies suspicious for *Salmonella* spp., we passed on the terrain Hayn and Krystenzen.

Methodology. Isolation and identification of *Salmonella* spp. Tampons steril in tubes, we used to get material in cloaca of poultry and birds. We selected 10 chickens and 10 birds at random way, with method (selection/incidence). With one hand we got material in poultry and birds cloaca. The other hand marked numbers in test tubes. After the recovery (revitalize) of the sample in Selenid, passed the material in terrain DC and terrain Endo. After 24 and 48 hours incubation time in thermostat, suspicious colonies passed from terrain DC in terrain Agar-Glucose, terrain Hayn and terrain Krystenzen.

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

Terrain Hayn-indol *Salmonella* spp. has negative (-) (it does not color). Then, suspicious colonies for *Salmonella* spp. passed in other terrain as lactose tube, mulberry tube etc...

Colonies *E. coli* in terrain DC are red color.

Terrain Kristenzen – Further, we study the pathogenic microorganisms (Enterobacters). When, the terrain Kristenzen has a color change, not performed further study for enterobacters (from beige to red color).

Terrain Hayn – Part oblique is always acidic (yellow color), whereas the steep part is alkaline (red color). In terrain Hayn see if there is gas production and development of H₂S (black color). This shows the presence of *E. coli*. [4]

3. RESULTS

The general microflora of air we defined in five sectors to Korça poultry for two years of study in five sectors to poultry of Korça:

- The outside sector
- the egg sector
- the poultry sector
- the bird grow sector
- the packaging and labeling sector

The results were presented in the graphs below:

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

Sectors	Parallels	Terrain	
		Agar blood	
		Time of incubation	
		24 hr CFU	48 hr CFU
The outside sector	I	196	200
	II	190	198
	Aver.	193	199
The egg sector	I	290	300
	II	290	298
	Aver.	290	299
The poultry sector	I	340	350
	II	344	356
	Aver.	342	353
The birds grow sector	I	360	370
	II	376	380
	Aver.	368	375
The packaging and labeling sector	I	120	128
	II	126	130
	Aver.	123	129

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

Table 2. Indole testing in Hayn-Indol terrains and pepton water in the air of poultry sectors Korça for pathogen microflora

Number of the samples		Hayn terrain	Add Indole with drops	Water pepton
1	The outside sector	+	Red color	+
2		+	Red color	+
3	The eggs sector	+	Red color	+
4		+	Red color	+
5	The poultry sector	+	Red color	+
6		+	Red color	+
7	The birds grow sector	+	Red color	+
8		+	Red color	+
9	The packaging and labeling sector	+	Red color	+
10		+	Red color	+

In table 2: Hayn indole and peptone water after 24 hours of incubation in thermostat, when we added indole drops, all samples analyzed turned red. This indicates the presence of E.coli. Escherichia coli is a sanitary index. E. coli indicates the level of hygiene of personnel and materials used for manipulating chickens (knives, work tables).

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

biochemical tests. Isolation and identification of colony by biochemical tests

Prepare the preparations coloring by gram and simple preparations

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

Table 3. The number of microorganisms of *E. coli* and *Salmonella* spp. to live chickens (part of cloaca)

Chickens	<i>E. coli</i>	<i>Salmonella</i> 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

Table 4. The number of microorganisms of *E. coli* and *Salmonella* spp. to live birds (part of cloaca)

Birds	<i>E. coli</i>	<i>Salmonella</i> 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

The tables 3 and 4 shows that analyzed chickens are clean with *Salmonella* spp. *E. coli* is microorganism of fecal contamination. This fact explain its presence in chickens 1,2 and 4. Whereas, the other chickens are clean with *E. coli*. The number with *E. coli* in birds is bigger than in chickens to Korca poultry.

E. coli is normal flora in part of cloaca as a microorganism of fecal contamination. The number of *Salmonella* spp. in these chickens and birds was zero. This is a very good indicator in the quality of poultry meat.

4. DISCUSSIONS

At the end of this study by controlling the general air microflora in five sectors to Korca poultry resulted that in the bird growth and chickens sector 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, were observed several colonies that illuminated the terrain. After preparing the simple preparation, we saw them in microscope. They were *Saphylococcus aureus*. In air sectors of poultry, we identified *Streptococcus* spp. and diplococcus. Isolation of *Salmonella* spp. and *E. coli* in the abdominal part and the cloaca of the chickens and live birds (method selection/incidence).

Microbiological analysis and biochemical tests shows: The analysis and biochemical tests that were conducted for suspicious colonies shows: They are *E. coli*. They were not isolated and not identified *Salmonella* spp. 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.

Should be careful during manipulation processes (the slaughter, the removal of organs and the removal of feathers sectors) to chickens and birds, not to penetrate *E. coli*.

We learned that was injected vaccine antagonist *Salmonella enteritidis* twice a year. This confirms our experimental result, that wasn't isolated any *Salmonella* spp. in 20 analyzed birds (chickens and birds) to Korca poultry.

5. ACKNOWLEDGEMENT

This research study on microbiological safety in air sectors and its products to Korca poultry in Albania country, was performed in poultry premises. The microbiological analyzes of this study were determined in the microbiology laboratory of the sanitary center and veterinary services laboratory in the city of Korca. The experimental work presented in this study research is only a small part of the scientific research and evidence that can be done, on the results of which depends the successful continuation of research in the same field.

6. CONCLUSIONS

At the end of this study we are giving some (modest) valid recommendations: Relevant institutions which are responsible for the safety of food products, as well as poultry products, found in the market should carry out more frequent checks of the safety elements that must meet these products. All those who produce and sell chickens meat in the market must be inspected and ensure a safe product without microbial contamination. We recommend poultry administrators that the injection of vaccine antagonist *Salmonella* spp. to the poultry should be injected as little as possible.

We recommend to set up air systems in all sectors of Korca poultry, after the release of gases increases temperature in sector, favors development of microorganisms.

7. REFERENCES

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