INCIDENCE OF THE SPREAD OF SALMONELLA SPP. SEROTYPES AT SOME SLAUGHTERHOUSE UNITS

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Abstract

The aim of that study was to analyze and establish the presence and diversity of pathogenic Salmonella spp. serotypes within poultry slaughtering houses from different regions (districts) of the republic. The research activity was carried out within a program in collaboration with National Agency for Food Safety and the National Agency for Public Health. In the title, 75 samples were taken from different districts of the republic. At the same time, 16 samples were taken from poultry products imported in the Republic of Moldova from Ukraine, Poland, Brazil and Romania. The detection of bacteria from the genus Salmonella spp. was carried out from the samples of 25 gr. from the carcass and analyzed by the method (SM EN ISO 6579-1:2017: Microbiology of the food chain for the detection, enumeration and serological typing of Salmonella bacteria). Serotyping of Salmonella spp. bacteria was performed in the microbiology laboratory of the National Agency for Public Health. From the total number of 75 samples, 6 samples were positive for salmonella, which constituted - 8% of the number of examined samples, including samples taken from imported products, with the predominance of serotypes: S. Lagos, S. Senftenberg and S. Isangi.

Key words: carcasses, samples, salmonella, birds, serotypes.

INTRODUCTION

Poultry farming is defined as raising different types of domestic birds commercially for the purpose of meat, eggs and feather production. People generally establish poultry farms for the purpose of producing eggs, meat and generating high revenue from these products. Around, billions of chickens are raised throughout the world as a good source of food from their eggs and meat. Globally, the production of primary poultry products (meat and eggs) has been rising rapidly in the last years. This reflects on consumer's preference for high quality products and the relatively low price due to efficiency in production (Hugas M., et. al., 2014; Rajan K., et al, 2017).

The interest in poultry and poultry related products have grown tremendously for the past 20 years. Almost every country has a poultry industry of some kind, as steadily increasing their domestic production of broilers and egg producing birds, or continuing to increase their output in order to meet demand. Other places are also increasing their production for poultry and poultry related products in order to meet demand (Crump J.A., et al, 2015; Hugas M., et al, 2014).

Poultry production is based on raising fast-growing chickens. Mass production of meat or eggs with high efficiency and low cost are important in the poultry industry. For maximum productivity, the poultry industry segregates chicken breeds into broiler and egg-laying chickens. Broiler chickens are bred for rapid growth to reach maximum meat production but egg-laying chickens are bred for high production of the egg with the highest efficiency (Kirsten Wessels, et al, 2021).

Some other factors such as disease and food intake efficiency are effective on the efficiency of poultry production. Improvement in feed efficiency is one of the main factors to reduce the costs of poultry production. Feed efficiency is possible to be improved by genetic selection on growth, feed intake (feed conversion ratio).

At the same time trans genesis technology is helpful to improve a rapid approach to accelerate performance of agriculture species such as rapid growth, food intake, and metabolic rates (Kumar, Y., et. al, 2019; Yang, B., et al, 2014).

Another factor that adversely influences the poultry industry is an avian disease. It has reported that the total economic costs of the disease that are mostly related to vaccines and

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condemnations, were about 20% of the gross value of production which is about three times the cost of losses from mortality. Bacterial disease causes significant food safety problems for human consumption of contaminated meat or eggs (Fitch, F.M., et al, 2015; Mezali L., et al, 2019).

Salmonella infections are a worldwide major public health concern. In industrialized countries, the main reservoir of non-typhoidal *Salmonella* is the intestinal tract of food-producing animals and birds. Food-borne salmonellosis is the most relevant source with a high global impact in human health. It was estimated that non-typhoidal *Salmonella* causes around 93.8 million illnesses and 155 000 deaths each year worldwide. In the USA, more than 1 million annual cases of food-borne salmonellosis were estimated by the CDC; they were associated with the largest number of hospitalizations and deaths compared with other food-borne microbial agents. In Europe, salmonellosis has been the second most common zoonosis (20.4 cases per 100 000 population in 2017) and the most frequent cause of food-borne outbreaks, in spite the reported decreasing trend that has resulted from *Salmonella* control programs (Rajan, K., et al; Yang, B.,2017; et al, 2014).

Taking into account the previously mentioned, the purpose of this study was to analyze and establish the presence and diversity of pathogenic Salmonella spp. serotypes within poultry slaughtering houses from different districts of the republic.

MATERIAL AND METHOD

Isolation and identification of serotypes of Salmonella spp. were performed in the microbiology laboratory of the National Agency for Public Health as well as at the Republican Veterinary Diagnostic Center.

The material for the research was the samples taken from the poultry carcasses from the poultry slaughtering enterprises from the districts such as: Anenii Noi, Orhei, Floresti, Calarasi, Ungheni, Chisinau, Donduseni, Falesti, Briceni, Criuleni and Ialoveni. A total of 75 samples were taken. At the same time, 16 samples were taken and examined from poultry carcasses imported in the Republic of Moldova from countries such as: Ukraine, Poland, Brazil and Romania.

The isolation and identification of bacteria from the genus Salmonella spp. was carried out according to the methods: SM EN ISO 6579-1:2017 - Microbiology of the food chain method. The horizontal method for the detection, counting and serological typing of bacteria of the genus Salmonella spp. The samples were subjected to classic microbiological tests using the working methods of the national standards in force.

For the isolation and identification of bacterial forms, nutrient media such as common, selective, special nutrient media (detonated and buffered water, XLD (Xylose Lysine Deoxycholate) and BSA (Brilliance Salmonella Aga), kits with monoreceptor serums for serotyping bacteria of the genus Salmonella spp.

RESULTS AND DISCUSSIONS

In table 1 shows the number of samples and the type of samples that were taken from the carcasses of slaughtered chickens from the specialized units. All 75 samples were taken randomly from the carcasses as well as from different parts of the carcasses such as:
chicken carcasses -17samp., chicken meat (thighs, calves, quarters, back - 12 samp.), chicken neck (with skin/without skin - 10 samp.), edible chicken organs (heart, gizzard, liver - 28 samp.), chicken cecum with contents – 4samp.), turkey meat (legs, breast – 4 samp.).

Out of the total number of examined samples bacteriologically, pathogenic serotypes of Salmonella spp. were isolated from 6 samples, which respectively constituted 8%. The most positive samples were isolated from the samples taken from the carcasses of the whole birds, and the other 3 samples were isolated from separate portions of the carcasses.

The results of subsequent serotyping of positive samples with Salmonella spp. are shown in table 2.

As a result of the serotyping investigations, the following serotypes of Salmonella spp. were identified, such as : S. Othmarschen (6,7,14:g,m,[t]:-), S. Lagos (1,4,[5],12: i:1,5), S. isangi (6,7,14:d:1,5), S. Senftenberg (1,3,19:g,[s],t:-), S. pasing (4,12:z35:1,5).

This fact proves that different non-typhoidal serotypes of salmonella spp. persist in poultry slaughtering units, having as a risk their spread with poultry products.

Table 1

The type of samples exposed to bacteriological investigations

Ord/ nr.	Type of samples	Nr. of examined samples	including salmonella positives
1	Chicken carcasses	17	3 (17.6%)
2	Chicken meat (thighs, calves, quarters, back)	12	1 (8.3%)
3	Chicken neck (with skin /without skin)	10	1 (10%)
4	Edible chicken organs (heart, gizzard, liver)	28	-
5	Chicken cecum with contents	4	1 (25%)
6	Turkey meat (legs, breast)	4	
	TOTAL	75	6 (8%)

Table 2

Serotypes of Salmonella spp. Isolated from the positive samples

Ord/ nr.	Type of sample	Number of positive sample	Serotype
1	Fresh chicken carcass	1	**S. Othmarschen** (6,7,14:g,m,[t]:-)
2	Fresh chicken carcass	1	**S. Lagos** (1,4,[5],12: i:1,5)
3	Frozen chicken carcass	1	**S. isangi** (6,7,14:d:1,5)
4	Fresh chicken legs	1	**S. Senftenberg** (1,3,19:g,[s],t:-)
5	Chicken neck skin	1	**S. Senftenberg** (1,3,19:g,[s],t:-)
6	Chicken cecum with contents	1	**S. pasing** (4,12:z35:1,5)
7	TOTAL	6	

CONCLUSIONS

1. Bacteriological investigations of poultry carcasses taken from poultry slaughtering units, demonstrated the presence of some serotypes of Salmonella spp. that are an epidemiological interest for poultry flocks.

2. From the total number of examined samples, pathogenic Salmonella spp. serotypes were isolated from 6 samples, which respectively constituted 8%, being mainly isolated from samples taken from intact carcasses, and serotyping investigations were identified, serotypes as S. Othmarschen, S. Lagos , S. isangi, S. Senftenberg , S. pasing .

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