



THE IMPACT OF IDENTIFICATION OF SALMONELLA SPP. BACTERIA IN POULTRY MEAT AND EGGS

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INTRODUCTION

In recent years, poultry production as a branch of the livestock sector in the Republic of Moldova remains one of the most developed branch with a high priority share in the consumption of animal products at the national level.

- The protection of poultry flocks against contamination with contagious micro-organisms requires constant monitoring by the veterinary health service, as well as the maintenance of high-level biosecurity measures for bird populations.**
- The application of daily biosecurity procedures can contribute to reduce the possibility of contacting zoonotic microbial infections with an important impact on public health such as: Salmonellosis, Campylobacteriosis, Listeriosis, etc.**
- Compared to other bacteria, the genus Salmonella spp. bacteria has been determined as a frequent cause of food poisoning.**
- Currently, at European level, approximately 200 Salmonella serotypes are associated with foodborne infections in humans, of which two serotypes are considered more dangerous for public health: Salmonella Enteritidis and Salmonella Typhimurium.**



INTRODUCTION

- ❑ Important route of contamination with the bacteria of the genus *Salmonella* spp, *Listeria* spp. etc. remains the elements of the poultry product marketing chain.**
- ❑ Good management of production processes and biosafety of technological processes, as well as systematized control within different segments of the production chain are critical aspects that can minimize the risk of contact and persistence of infections.**
- ❑ The goal of our research was to establish the degree of presence and the diversity of the genera *Salmonella* spp. in poultry meat and eggs for common consumption, given the highly negative health impact that these bacteria can have over humans and poultry flocks.**



MATERIALS AND METHODS

□ The researches were conducted at the Department Food Safety and Public Health of the Faculty of Veterinary Medicine of State Agrarian University of Moldova. Serotyping of isolated bacteria *Salmonella* spp. were performed at the Republican Center for Veterinary Diagnostic.

□ As research materials served the samples from the poultry carcasses and eggs of current consumption from some units for the production of poultry meat and eggs such as:

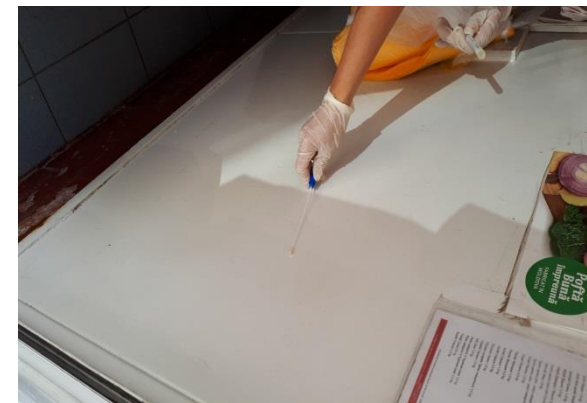
- ✓ SRL "Silver Bird", v. Ciorescu, mun. Chisinau,**
- ✓ SRL "Codim Com", v. Sadaclia, district Basarabeasca,**
- ✓ „IM PB Nord ” SRL, district Edinet, v. Blesteni,**
- ✓ SRL “Intervetcom”, district Cimislia,**
- ✓ SRL „Redi Agro”, district Dondușeni, v. Tirnova,**
- ✓ SRL „Dant Agro”, district Ungheni, v. Pirlîța,**
- ✓ SRL “Solar Nord” district Edinet, v. Gordinesti,**
- ✓ Avicola „ Riscani”, district Riscani, v. Corlateni.**



MATERIALS AND METHODS

- ☐ The isolation and identification of bacteria of the genera *Salmonella* spp. was performed according to the methodology SM EN ISO 6579-1: 2017 - Microbiology of the food chain, horizontal method (*for the detection and enumeration of Salmonella spp.*).
- ☐ The samples were subjected to classical microbiological tests using the national standards methods and the confirmation was made using "Microbact" tests according to the manufacturer's instruction for *Salmonella* spp. (ATCC 14028 *Salmonella* spp.).
- ☐ For the isolation and identification of the bacterial forms were used ordinary, selective and special culture media, (peptone water buffered, XLD agar (Xyloze Lysine Deoxycholate), BSA (Brilliance *Salmonella* Agar), monoreceptor sera for serotyping.
- ☐ Totally for examinations were taken 60 samples of eggs and 60 poultry carcasses samples (40 samples from refrigerated carcasses and 20 samples from frozen carcasses).

Sampling for microbiological investigations

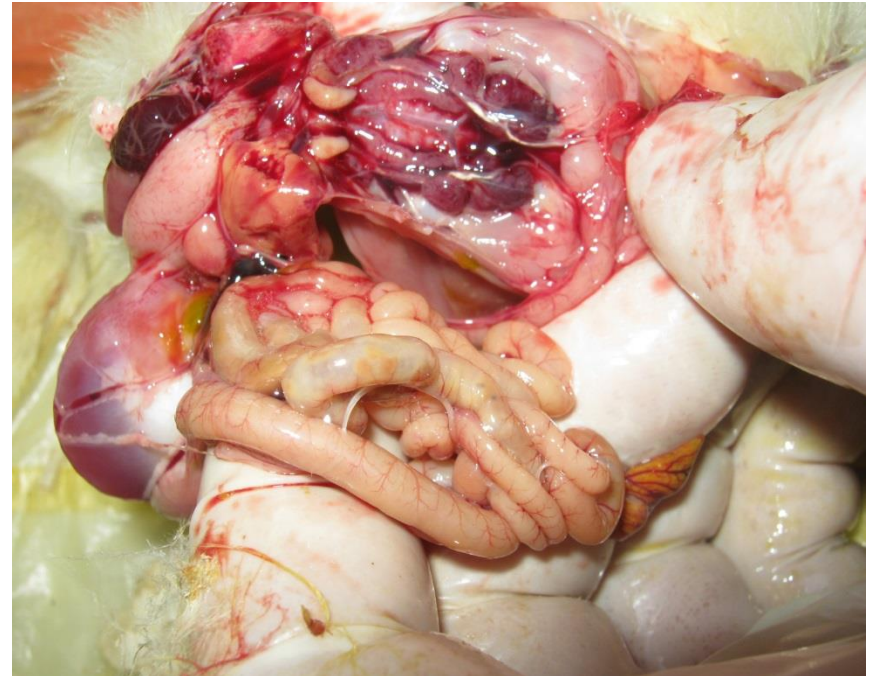




RESULTS AND DISCUSSIONS

- ❑ Some investigations of the incidence of salmonellosis in laying birds have been performed based on pathomorphological observations specific for avian salmonellosis.**
- ❑ Attention was drawn to the presence of enterocolitis, vetellin peritonitis, salpingitis, and ovarites. The incidence of mortality caused by this changes ranged from 2 to 4%.**
- ❑ In broiler chickens, symptoms and pathomorphological changes specific for salmonellosis (diarrhea, enterocolitis and liver miliar necrosis) ranged from 3 to 5% of growing chickens.**

**Pathomorphological changes
(liver and heart miliar infarction, urate accumulation in the ureters)**



The results of bacteriological investigations showed an increased number of *Salmonella* spp. colonies in over 75% of the samples taken from bird carcasses, which demonstrates the presence of *Salmonella* serotypes on objects that come in contact with poultry products.

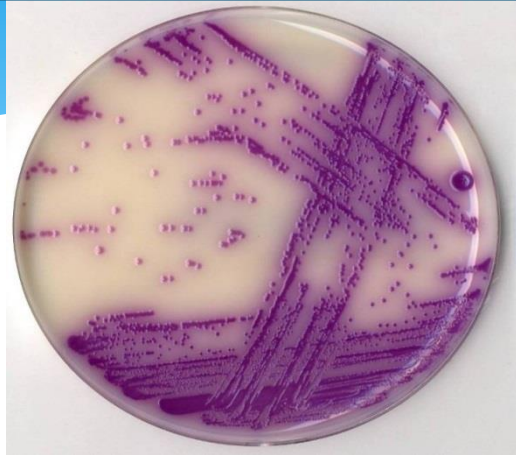


Figure 1. Brilliance Salmonella Agar, (purpury colonies of Salmonella).



Figure 2. Typical Salmonella colonies on XLD medium with black center and transparent area and red color.

Colonies with a typical morphological structure of *Salmonella* grown on the XLD medium have a black center and a bright transparent area of red color (fig.2), and on the Brilliance Salmonella Agar medium, the *Salmonella* spp. colonies are purple (fig.1).

***Salmonella* H₂S serotypes negative on XLD medium are dark pink with a dark center. Lactose-positive *Salmonella* on XLD are yellow with or without a black center.**



RESULTS AND DISCUSSIONS

- ❑ Inoculations performed on Brilliance Salmonella Agar medium from samples taken from frozen meat carcasses ranged from 54 to 127 colonies. In the case of inoculations from refrigerated carcass samples, the number of Salmonella colonies ranged from 89 to 187.**
- ❑ In the case of inoculations from lavages taken from the surface of egg samples, the number of Salmonella colonies varied from 69 to 114 colonies, but in the case of inoculations performed from egg contents, the number of colonies varied from 6 to 17.**
- ❑ In the case of inoculations performed on XLD (Xyloze Lysine Deoxycholate), agar from samples taken from frozen carcasses, the number of Salmonella colonies ranged from 31 to 135, and from refrigerated carcasses the number of colonies ranged from 77 to 205.**
- ❑ Inoculations from egg surface washings confirmed the presence of Salmonella colonies with variations from 43 to 127 colonies, and in the case of inoculations from egg contents the number of colonies ranged from 8 to 25.**

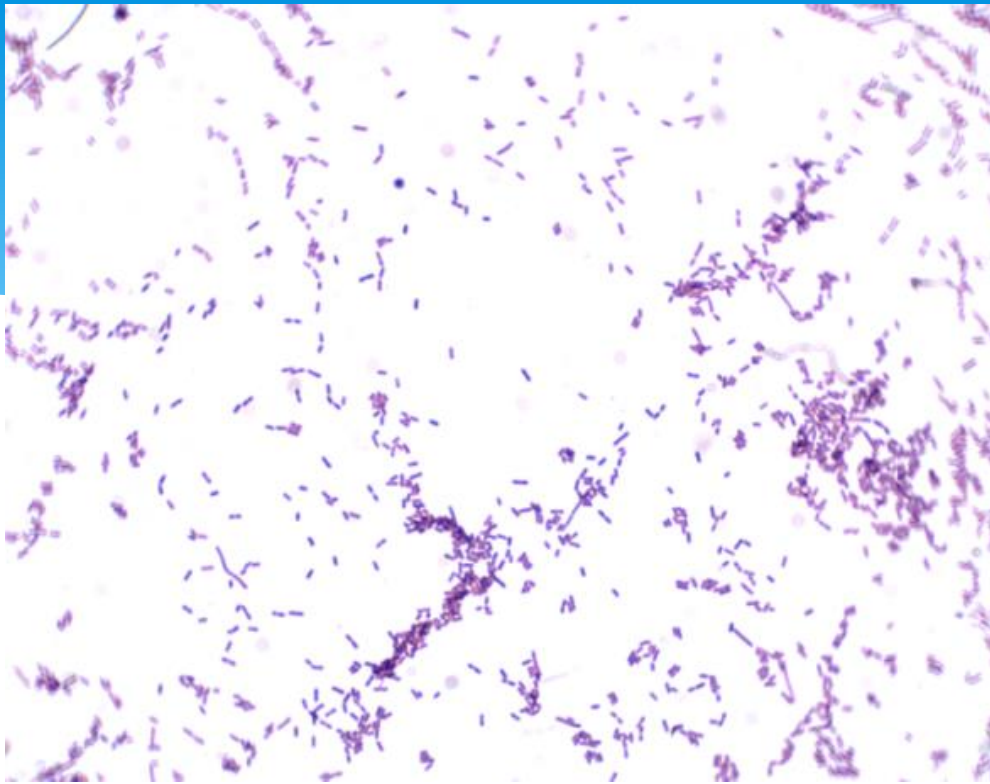


Figure 5. Salmonella spp. separate sticks or piles, gr -)

- ☐ Subsequently, smears were prepared from colony cultures and examined under a microscope (ob.10x100).
- ☐ Fig. 5 shows the morphological structure of bacteria of the genus *Salmonella* spp. which is placed in the field of the microscope in separate rods or in piles with oval heads.

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- * Colonies were serotyped using monoreceptor sera (fig.6), biochemical investigations, commercial putties (Micobact test, fig.7) with the use of positive controls.



Results of serotyping of bacteria of the genera *Salmonella* spp. (Tab.1)

Nr. d/o	Product name	Number of examined samples	Bacterial genera		Nr. of positive samples	% of contamination
			S. Enteritidis	S. Typhimurium		
1	Eggs for current consumption	60	-	4	4	6,6
2	Frozen poultry carcasses	20	1	-	1	5
3	Refrigerated poultry carcasses	40	3	2	5	12,5
Total		120	4	6	10	8,3

- Samples with bacteria of the genus *Salmonella* pathogenic to humans and birds (*S. Enteritidis* and *S. Typhimurium*) were isolated from 10 samples, which constituting 8.3% of the total number of examined samples of which 4 samples were isolated from eggs for current consumption, and 6 samples from meat carcasses.



CONCLUSIONS

- 1. The research on the circulation of pathogenic serotypes of bacteria of the genera *Salmonella* spp. showed that the veterinary measures currently taken are not sufficient to prevent the incidence of contamination of poultry products with these bacteria; therefore, a perspective program that will have as priority to monitor and analyze the risks of contamination for poultry units and for humans has to be implemented.**
- 2. Bacteriological investigations of poultry carcasses showed that from the total number of examined samples, the incidence of positive samples with the presence of pathogenic serotypes of *Salmonella* spp. was detected at 8.3% of examined samples of eggs and carcasses with the predominance of serotypes *S. Enteritidis* and *S. Typhimurium* which implies a risk for contamination of consumers of poultry products with these pathogenic bacteria.**



THANKS FOR YOUR
ATTENTION !