
The indices of microflora diversity of chickens saled in the poultry market from Chisinau

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Abstract

The investigations have as an aim to analyze the diversity of the microflora circulating in chickens sold in Chisinau poultry market and to identify the risk factors of contamination with pathogens. As research material were used the chicken flocks which were delivered for the sale from various poultry farms as well as from private and individual breeders from different districts of the country. Lavages of biological material for investigation were collected from the transport units which delivered chickens to the poultry market, from the cells where the chickens were held for transportation, from the floors, walls and equipment where chickens are sold. Insemination was performed on ordinary, special and differential nutrient media. After 48 hours of incubation in thermostat at + 37° C was established a trend of increasing number of colonies of the microorganisms and fungals on Petri dish where the inseminations were carried from the lavages sampling from the transport units as well from cells for birds transportation. As results on nutrient media were present isolated colonies of Streptococcus, Staphylococcus, E. coli, fungals. From the colonies of microorganisms have been prepared smears were stained by the Gram method and examined on the biological microscope (ob. 10x40), which confirmed the presence of microbial flora associated with various forms as mentioned above. The antibiograma test established the highest sensitivity of the isolated microflora was proved to florfinicol, trimethoprim and ciproflocacin. Investigations have shown that in the poultry market in Chisinau are present several types of conditioned pathogen microorganisms from different units of birds with intensive and extensive production. This represents a serious risk of spreading bacterial infections at commercial and individual units as well. It was found that the most important vectors of transmission through direct inevitable contact on the territory of the poultry market can be the transportation units that transport the birds.

Key words. *Birds, lavages, contamination, microorganisms, the culture medium*

Inrtoduction

The domestic chicken occupies a special place in science and society. It is the most common domesticated animal and the most important and distributed production of food animal in the world. Chickens are an important food animal but can also be responsible for public health problems such as Salmonella. Actually is important to maximize the growth of birds without compromising its ability to resist to the infectious diseases.

Poultry manure can contain a variety of pathogens. Some are host-adapted; therefore, do not represent a health risk for humans. Others can produce infection in humans. The more common zoonotic pathogens in manure include *Escherichia coli* 0157:H7, *Campylobacter*, *Salmonella*, *Cryptosporidium parvum*, and *Giardia lamblia*. The level of risk to humans depends upon a number of factors that dictate how readily the microorganisms are transported through the environment and how long they remain infectious, as well as the numbers of microbes and their infectious doses. It is estimated that most (60%-80%) poultry routinely receive antimicrobials. Antimicrobials may be administered to treat and prevent diseases and outbreaks, or at sub-therapeutic levels to promote animal growth and feed efficiency [2,4].

There are many poultry diseases transmissible to human, among them avian Colibacillosis and avian Salmonellosis are the prime concerns. But the detailed information about avian Colibacillosis and avian salmonellosis in connection to the public health concerns are not available yet in one place. Avian *Salmonella* infections are important as both a cause of clinical disease in poultry and as a source of food-borne transmission of disease to humans. Under the family of Enterobacteriaceae, the genus *Salmonella* is a facultative intracellular pathogen causing localized or systemic infections; as well as a chronic asymptomatic carrier state. The etiological agent of fowl typhoid and pullorum disease is *Salmonella enterica* subsp. *enterica* serovar *Gallinarum*, which is divided into two distinct biovars under the serogroup D1, *Gallinarum* and *Pullorum*, which are denoted as *S. gallinarum* and *S. pullorum*, respectively. Age wise prevalence of avian salmonellosis showed highest infection rate in adult layers (53.25%) in comparison to brooding (14.55%), growing (16.10%) and pullet (16.10%) chickens [1,3].

Chickens may be infected early by vertical transmission either from an infected ovary, oviduct or from the infected eggs during the passage through the cloacal faeces from infected or carrier hens. The birds survive from clinical disease. When infected in young stage they may show few signs of infection but become carriers. In adult carriers the reproductive organs are the predilection sites that often lead to the infection of ovarian follicles and as a result transovarian transmission of the disease occurs. The bacteria are passed out through the faeces and lateral spread takes place through the fecal contaminated feeds, transport units, water, litter, commercial pleases etc. [2].

Crowding, malnutrition, transportation, concentration of large number of birds in limited spaces, in specially poultry markets and other stressful conditions as well as unsanitary surroundings can increase the risk of appearance of infectious diseases with high rates of morbidity and mortality in poultry flocks. Taking into consideration the above aim, our scientific direction was to establish some microbial indices of the chickens sold in the poultry market in Chisinau.

Material and methods

The research was conducted at the Chisinau poultry market. As research material served chicken flocks which were delivered for sale from various poultry farms as well as from private and individual breeders from different districts of the country. Lavages of biological material for investigation was collected from transport units which deliver chickens to poultry market, from cells for transporting chickens, from the floors, walls and equipment from the hall where chickens are sold. Microbiological insemination were performed on ordinary, special and differential nutrient media as agar medium, bismuth sulfate agar, medium Endo, medium Saburo and Levin, SSA(*Salmonella Shigela* Agar). The samples was examined at Republican Veterinary Diagnostic Center, mun. Chisinau and in the laboratory of Microbiology, department Clinics II, Faculty of Veterinary Medicine and Animal Science, SAUM. An index of investigation was to establish the following microbiological criteria: morphological parameters of the colonies that have grown on nutrient media, microscopic variety of microorganisms and sensitivity of bacterial microflora to certain antibiotics.

Results and discussion

The research was conducted in the poultry market of mun. Chisinau where usually are sold chickens and birds of varied species and ages. The birds are being delivered from various poultry farms with intensive and extensive production situated in different districts of the country. Even

though the poultry market entrance has a sanitary filter and the vehicles entering into the market go through a sanitary disinfection barrier, the cells with birds have a specific microflora. Also the movement of microflora is made possible from a flock to another through the air, traders, buyers, and the baskets with birds remaining unsold at the end of the day which are delivered back to the poultry units.

On the figure 1 is shown the aspect of poultry market from mun. Chisinau with the basic construction elements (metal pillars, roof, the sides are covered with wetal mesh and partially transparent glass. Inside of the poultry market (access and the cars which delivering birds of different species and ages from different regions of the country.



Fig. 1 Interior aspect of poultry market

To monitor microbial circulation and its diversity on poultry market the lavages were taken from the cars which delivering poultry for sale on the market (fig. 2), from the cells which are maintained poultry stock in the market (fig. 3), from the market interior walls, floor and other equipment (fig. 4). From the lavages were made insemination on nutrient media and with subsequent study of microbial colonies. The results of this study are shown in figures 5-9. In case when the insemination was performed from the lavages which were collected from interior parts of the market hall (floor, walls, etc.) on medium bismuth sulfite agar have developed colonies of *Salmonella* placed on Petri plate placed unevenly, with dark-gray color and with spherical or oval forms and various sizes (fig. 5). In case when the insemination was performed from the lavages collected from the interior space and equipment of the vehicle for poultry delivery, the colonies have developed very intensive, in a big number, with light-brown color, small and medium sizes, placed over the all surface of Petri dishes, from both types of the lavages which was collected from the interior of transport units and from equipment for birds transportation (fig.6).



Fig. 2 Sample collection from the transport units



Fig. 3 Sample collection from the poultry equipment



Fig. 4 Sample collection from the walls

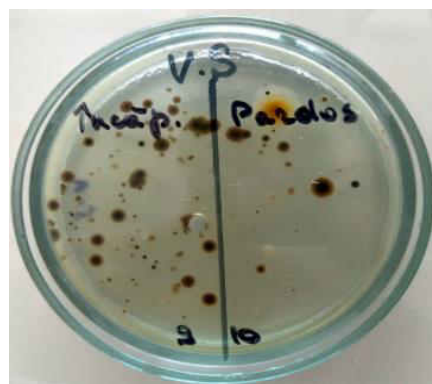


Fig. 5 Microbial colonies on bismuth sulfite agar (Lavages from the hall supports)

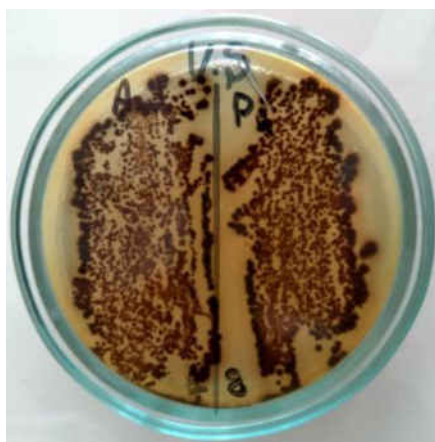


Fig.6 Microbial colonies on bismuth sulfite agar (Lavages from the transport units)



Fig. 7 Colonies of *Salmonella*; Salmonella Shigela Agar (Lavages from the transport units)

In case when the insemination was performed from the lavages which were collected from interior parts of the market hall (floor, walls, etc.) on medium Salmonella Shigela Agar (fig. 7), the

colonies of microorganisms have been developed quite intensive, occupying all of the surface of the plate Petri, predominantly with small-size round form colonies and ping-red color.

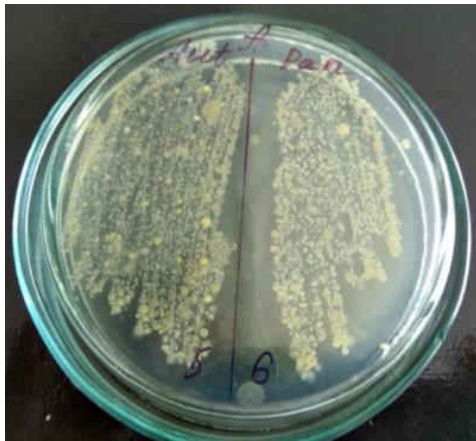


Fig. 8 Colonies of *Streptococcus* on Agar medium (Lavages from the transport units)



Fig.9 Colonies of *fungals* on Saburo medium (Lavages from the hall supports)

An intensive growth of *Staphylococcus* and *Streptococcus* colonies was established in case of insemination on agar medium when the lavages were performed from hall equipment and transport units. Colonies were a green color with round and shape forms and with massive number (fig.8). Simultaneously were made insemination on Saburo medium (fig. 9). On this imagines there are a intensive growth of different types of fungi, with regular shape, oval or diffuse forms and with brown, green and gray colors.

Antibiograma was conducted using microbial colonies isolated from hall supports and transport units. As a result was established that the highest sensitivity of microflora was to florfinecol and trimethoprim with zone of growth inhibition of microbial flora at 22 mm to 17 mm respectively (fig.10 and 11).



Fig.10 Antibiograma (hall microflora)



Fig. 11 Antibiograma (transport units microflora)

From microbial colonies were prepared smears by Gram method. On the fig. 12 are presented the *Salmonella* and *E. coli* microorganisms. Its appears in rods form with oval ends, blue

color, placed in separate piles. In fig. 13 are represented *Staphylococcus* and *Streptococcus* which are colored blue, are placed in the field of the microscope in the form of a chain or in heaps.

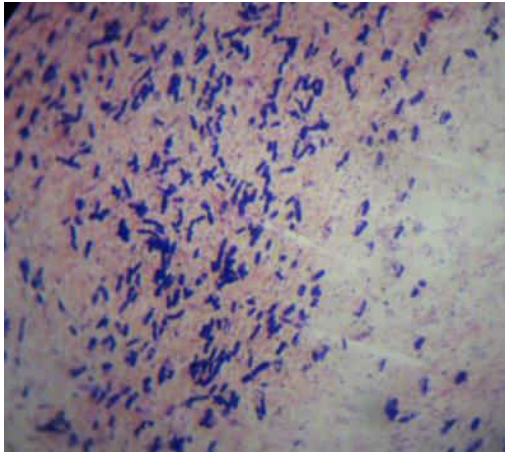


Fig. 12 *Salmonella* and *E. coli*
(Lavages from the transport units)

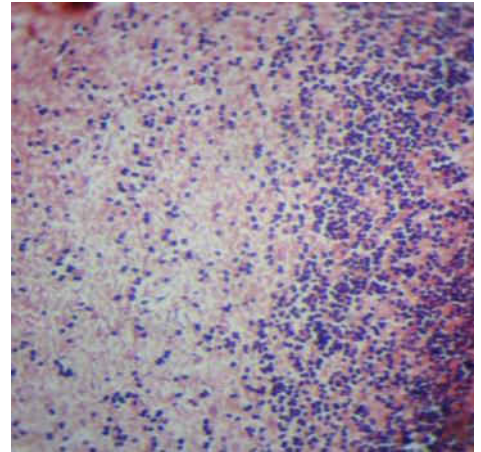


Fig. 13 Colonies of *Streptococcus* and *Staphylococcus*
(Lavages from the hall supports)

Conclusions

1. As a result of microbiological monitoring was established that the poultry market remains a diverse background of microorganisms which are represented mainly with *Streptococcus*, *Staphylococcus*, *E. coli*, *Salmonella* and *fungals* which persist inside of the market hall as well as in the transport units.
2. Poultry market can be an important vector of accumulation and spread of pathogenic microorganisms through transport units, poultry inventory or through direct contact between poultry flocks.

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