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MICROBIOLOGICAL CONTRIBUTIONS TO THE KNOWLEDGE OF THE MICROFLORA OF SOME VARIETY OF COMMERCIALIZED MEAT

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Abstract

The aim of this research was to investigate the microflora of some meat varieties from young animals sold in different halls in the central market of Chișinau. Classical microbiological research methods were used with preparation and staining according to the Gram method, visualization by immersion microscopy and passage on common and special culture media. At the same time, the microflora on the surfaces and in the air of the sales halls of rabbit, veal and lamb meats was determined. Data were obtained that fall within the category of indices admitted for the delivery of the investigated meats for consumption by insignificant differentiations of indices in veal of 15 microbial cocci cells, compared to indices of 10 and 9 cocci cells in lamb and rabbit meats.

Key words*: meat, young animals, microscopy, microbial colonies, bacteria.*

INTRODUCTION

Meat from young animals represents a significant source with substantial value for some countries, especially France, Italy, some regions of North America. At present, in the conditions of specialized marketing, some consumers increasingly prefer meat varieties of veal, rabbit, lamb, which are often appreciated for their delicate taste, more tender and paler appearance due to finer muscle fibers and a smaller amount of connective tissue (Golban, 2025; Karaman, 2021; Oprean, 2002).

The study of the microflora of meat is important, being essential for predicting shelf life, ensuring safety and developing new preservation methods (such as antimicrobial packaging) to control microbial growth and improve public health.

For these reasons, in some cases microorganisms can cause microbiological deterioration with the intervention of the microbial species *Pseudomonas, Acinetobacter, Salmonella, E. coli, Listeria* and beneficial cultures (lactic acid bacteria), originating from the animal, processing and environment, with a composition that varies depending on the type of meat (fresh, processed) and handling, affecting shelf life and safety (Răpuntean, 2005; Juran, 1986; Golban, 2024).

However, commercial meat is an important vehicle for microbial pathogens responsible for foodborne infections in humans, as its composition and physical characteristics are favorable for the growth of a wide range of microorganisms, including pathogens (Moldovan, 2013; Golban, 2015).

Contamination of meat with foodborne pathogens is a major public health problem. Among bacteria, Salmonella has been frequently associated with gastroenteritis worldwide. Different cooking techniques cannot guarantee the safety of meat if it initially has a high load of pathogenic microorganisms (Golban, 2020; Imre, 2019).

Given some problems related to the consumption of meat sold in markets and elsewhere under inappropriate conditions, it is necessary to control the microbiological quality of the meat sold (Golban, 2023; Tofan, 2004).

The objective of this study was to determine the bacterial load of meat sold in some halls, in order to know the bacterial microflora of some meat varieties from young animals.

MATERIALS AND METHODS

Microbiological research was carried out on meat samples from young animals: lamb, veal, rabbit. Meat samples from 2 halls within the central market of Chișinău were examined.

The following microbiological research methods were used: bacterioscopy, by making microbial preparations and staining according to the Gram method, visualization under a microscope with an immersion objective, and the bacteriological method by cultivation on common and special culture media: agarose, broth, Endo, in order to determine the microbial cultures characteristic of microorganisms isolated in these categories of meat sold within these halls.

RESULTS AND DISCUSSIONS

The indices of Table 1 indicate the number of colonies isolated in the lamb meat assortment in different halls. We note that the number of cocci colonies is higher in the number of 3 microbial colonies in the investigated lamb meat from hall number 1, compared to the number of colonies recorded in the lamb meat from hall number 2, where 1 microbial colony was recorded in the lamb meat samples as a result of the passages performed from the investigated samples.

Table 1. Number of microbial colonies isolated in the lamb meat assortment in the halls

Halls	Lamb meat samples (n/microbial colonies)		
	Agar/Saburo		Endo
	cocic	micettes	*Enterobacteriaceae*
N1	3	0	0
N2	1	0	0

At the same time, passages were performed on special culture media to determine the presence of enteropathogenic fungi and bacteria. As a result of passages on special Saburo culture media to identify the presence of fungi and Endo medium to identify pathogenic species in the bacterial microflora of meat from the genera *Staphylococcus, Salmonella, Escherichia,* etc., the results were negative. The lamb meat samples did not contain these species of microorganisms. Based on the above, it is interesting to read the opinion of some researchers regarding the microbial microflora of meats and the important aspects of the microbial action of microbial species on their quality from some bibliographic studies. Therefore, the most studied microbiological aspects from the point of view of the influence of saprophytic and pathogenic microflora are of interest both directly and indirectly (Carp-Cărare, 2014; Dobrea, 2014).

Table 2 shows the results of the research on the number of isolated colonies in the veal assortment in different halls. We note that the number of cocci colonies is higher in the number of 4 microbial colonies in the investigated veal from hall number 1, and the number of colonies determined in the veal from hall number 2 is 2 microbial colonies in the veal samples, after performing passages on the usual nutrient agar medium. At the same time, it is considered, according to some laboratory research studies, that the action of microorganisms from the meat microflora category has an influence on the immune system and contributes to the prevention of intestinal and respiratory infections (Golban, 2023; Taşbac, 2018).

Table 2. Number of aerobic colonies isolated in the veal assortment in different halls

Halls	Veal meat samples (n/microbial colonies)		
	Agar/Saburo		Endo
	cocic	micettes	*Enterobacteriaceae*
N1	4	0	0
N2	2	0	0

At the same time, cultures were performed on differential media to determine the presence of enteropathogenic fungi and bacteria. As a result of performing passages on special Saburo culture media to identify the presence of fungi and Endo medium to identify pathogenic species from the genera *Salmonella, Escherichia, Staphylococcus,* etc., the results were negative. The veal samples did not contain pathogenic bacterial species. It is worth noting that the mechanisms of action of some microorganisms according to some authors are diverse and complex, especially due to the chemical structure of different meat varieties. These act in most cases on the pathogenic microbial cell membrane by forming pores, or at the level of essential processes of living cells (transcription, translation, replication, biosynthesis of cell wall components) causing changes and contributing to the reduction of pathogenic infections (Dobrea, 2014; Juran, 2000).

As a result of the analyses carried out according to the indicators in Table 3, we observe the indicators of the number of isolated

colonies in the rabbit meat assortment in different halls.

Table 3. Number of aerobic colonies isolated in the rabbit meat assortment in different halls

Halls	Rabbit meat samples (n/microbial colonies)		
	Agar/Saburo		Endo
	cocic	micettes	*Enterobacteriaceae*
N1	3	0	0
N2	1	0	0

A number of cocci colonies in the number of 3 microbial colonies in the rabbit meat investigated in hall number 1 are shown, and the number of colonies revealed in the rabbit meat from hall number 2, constituted 1 microbial colony in the investigated rabbit meat samples, as a result of the inoculations carried out on the usual nutrient agar medium. In this context, based on the analyses presented, we mention the importance of the performance and functionality of the saprophytic bacterial microflora or individual non-pathogenic microorganisms, available in the foods we researched, which represents a normal bacterial microflora, resulting from investigation processes in meat halls for marketing (Fiț, 2015; Guguianu, 2002).

Thus, the need arose to perform passages on special media to determine the presence of fungi and enteropathogenic bacteria. After the analyses performed on the passages on special Saburo culture media to identify the presence of fungi and on Endo medium to identify pathogenic species, the presence of pathogenic bacteria *Salmonella, Escherichia* and *Staphylococcus* were not detected, confirming negative results. These researches in food microbiology are of public interest, an interest that allows us to deduce that the food products of different meat assortments sold in the network are qualitative and correspond to the marketing requirements. They are of importance by appreciable interest according to some authors by correlating the functionality and activity of the microflora and the functionality regarding the requirements of the human body (Josan, 2002; Golban, 2024).

The results of Table 4 confirm the microscopy indices of bacteria isolated from lamb meat samples, where it is observed that the number of cocci bacteria in lamb meat samples under microscopy was 10 cocci bacteria in hall 1, while in hall 2, the number of cocci bacteria was 14 cocci cells under microscopy in lamb meat samples.

Table 4. Microscopy indices of bacteria isolated from lamb meat samples

Halls	Lamb meat samples (microscopic field bacteria)		
	cocic	micettes	*Enterobacteriaceae*
N1	10	0	0
N2	14	0	0

Microorganisms from the category of fungi and pathogenic bacteria under microscopy were not detected.

Table 5 shows the microscopy indices of bacteria isolated from veal meat samples. It is observed that during the veal meat investigations, the number of cocci bacteria under microscopy of veal meat samples under microscopy constituted 15 cocci bacteria in hall 1, compared to hall 2, where the number of cocci bacteria was 11 cocci under microscopy in lamb meat samples.

The results of Table 4 confirm the microscopy indices of bacteria isolated from lamb meat samples, where it is observed that the number of cocci bacteria in lamb meat samples under microscopy was 10 cocci bacteria in hall 1, while in hall 2, the number of cocci bacteria was 14 cocci cells under microscopy in lamb meat samples. Microorganisms from the category of fungi and pathogenic bacteria under microscopy were not detected.

Table 5 shows the microscopy indices of bacteria isolated from veal meat samples. It is observed that during the veal meat investigations, the number of cocci bacteria under microscopy of veal meat samples under microscopy constituted 15 cocci bacteria in hall 1, compared to hall 2, where the number of cocci bacteria was 11 cocci under microscopy in lamb meat samples.

Table 5. Microscopy indices of bacteria isolated from veal meat samples

Halls	Veal meat samples (microscopic field bacteria)		
	cocic	micettes	*Enterobacteriaceae*
N1	15	0	0
N2	11	0	0

Pathogenic microorganisms from the group of

enterobacteria and fungi were not observed. At the same time, as a result of the analysis of Table 6, regarding the microscopy indices of bacteria isolated from rabbit meat samples, the presence of cocci bacteria in rabbit meat samples under microscopy is observed in the number of 9 cocci bacteria as a result of the research carried out in hall 1.

Table 6. Microscopy indices of bacteria isolated from rabbit meat samples

Halls	Rabbit meat samples (microscopic field bacteria)		
	cocic	micettes	*Enterobacteriaceae*
N1	9	0	0
N2	13	0	0

Investigations carried out in hall 2 demonstrated a count of 13 cocci bacteria under microscopy in rabbit meat samples. Microorganisms from the genera of fungi and enteropathogenic bacteria were not detected under microscopy.

CONCLUSIONS

The results of bacteriological analyses of meat samples taken from the investigated market halls revealed that the data obtained in the examined meat assortments fall within the category of indices admitted for delivery for consumption.

As a result of monitoring the data obtained from microscopy of bacteria isolated in samples of lamb, veal and rabbit meat, a number of cocci cells in veal of 15 cocci microbial cells was observed, compared to samples of lamb and rabbit meat where the indices were 10 and 9 cocci cells under microscopy.

In the lamb meat samples, a higher number of colonies was revealed in the investigations in hall 1, in the number of 3 microbial colonies, compared to the veal and rabbit meat assortments where the number of colonies determined in the veal samples a number of 4 colonies and in the rabbit meat a number of 3 colonies. In the veal and rabbit meat samples the number of microbial colonies was 1 colony and 2 microbial colonies.

It is recommended that veterinarians constantly monitor the types of meat sold.

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