

EFFECT OF STORAGE CONDITIONS ON POULTRY MEAT FROM SALES UNITS

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Abstract

The study performed on poultry products proved that they represent an important source of germs, that can appear by various sources in the chain of food from, through the transmitters from critical points of control, which represents the main cause in the production food poisoning. The main source of contaminating the poultry meat with microorganisms, is by vertical transmission from breeding farm of the biological material to the trading unit. Also, one of the important factors was the slaughtering and meat storage conditions

Key words: poultry, pathogens, *Salmonella*, *Staphylococcus*, *Campylobacter*

INTRODUCTION

Although in the recent years, hygiene in poultry breeding has considerably improved and also in those of slaughtering, however, the incidence of infections and food poisoning have increased worldwide. The reason for these increases can be seen in the large cargo microbial contamination in raw materials or secondary flow line technology (Notermans et al., 1981; Șindilar et al., 1993).

The introduction of these contaminants in/or on living birds, is being possible and facilitated by the existence of living or inert transmitters, i.e. points (places) by which pathogens can enter the system of poultry production.

Pathogenic microorganisms capable of producing food poisoning in humans, can be also found on / in poultry meat. Of these the most important are: *Salmonella sp.*, *Campylobacter sp.*, *Perfringens*, *Clostridium*, *Listeria monocytogenes* and enterohaemorrhagic or enteropathogenic strains of *Escherichia coli*. Other bacterial species such as: *Aeromonas spp.*, *Yersinia enterocolitis*, *Staphylococcus aureus*, *Clostridium botulinum*, *Bacillus cereus*, known for their pathogenicity, although they have been identified in poultry meat, there haven't been reported food poisoning, caused by these bacteria as a result of poultry consumption (Man, 2002; Cunningham et al., 1987, Davies et al., 1998; Fernandes, 2009, Jay et al., 2005).

If the hazard analysis is not carried out correctly and if within HACCP system there are not being established measures to ensure the control of hazards, the plan will not be effective for consumer s' protection, no matter how well the plan would be followed. Besides, a review of operations

during the analysis of hazard, can often lead to the identification of elements of the process or product that needs to be modified (ROTARU, 2002).

Monitoring the distribution process must be carefully made, with emphasis on the ultimate control of distributed and sold product. During distribution, until the product reaches the consumer, there may appear changes of optical qualities, or even nutrition qualities, because of the following reasons: inadequate packaging; temperature during distribution and sale outside the boundaries of technology, the principle "first in - first out" should be displayed and respected both in the warehouse and sales, which together with the strict control of meat stock allows not only declaring the warranty period, but also ensuring that term, excess of validity, etc. (Van, 2009).

Distributors and dealers are in constant contact with consumers and they should provide general information about the product. They must receive information about all stages of production, but especially on genetics, nutrition and eventually slaughter. Loss of confidence in product quality is primarily due to lack of information, which can lead to conjecture and speculation. The buyer must be sure that there is no risk consuming a particular food product.

In plants, depending on the thermal state, poultry must be stored at: maximum temperature of 4°C, in depth for chilled poultry meat, a minimum temperature of -12°C, in depth for frozen poultry meat. In this context is also written this paper, which takes part of a more complex study, on branch of poultry meat.

MATERIAL AND METHODS

Pentru a atinge obiectivul propus a fost urmărită o filieră a cărnii de pasăre. There was pursued a branch of poultry meat in order to achieve the proposed objective and there were chosen three production lots that were the starting point and seeking to trace the product made from poultry farm to fork. To examine this link from the chain poultry, there were chosen five marketing units for meat and poultry products, which was selling meat and meat products that were produced and processed in the unit of study. The 25 samples for each determination, from each unit that sells chicken meat, were whole carcasses, legs, chicken wings, boneless breast and gizzard. All samples were collected and processed during the period of validity of the products, using common analytical methods in microbiology.

RESULT AND DISCUSSION

The poultry meat products from the commercial network, regarding batch I, shows that from the total of analyzed samples, the most microbial load is found in chicken wings and legs followed by gizzard, carcass and breast (Table 1, Fig. 1).

Table 1
Quality of poultry in the commercial network from batch I studied

Specification	No. of samples	Categories of samples				
		Carcases	Legs	Wings	Breast	Gizzards
NTG (UFC/cm ²)	25	4,75	5,32	5,42	5,11	5,86
Coliforms (UFC/cm ²)	25	2,57	3,91	3,89	2,93	3,52
Enterobacteria (UFC/cm ²)	25	3,98	4,43	6,30	3,74	3,84
Positive samples						
Salmonella/25g	25	2	1	-	2	3
Sulphite-reducing clostridia	25	-	-	-	-	2
Staphylococcus spp.	25	5	5	4	11	3
Campylobacter spp.	25	-	-	-	-	-

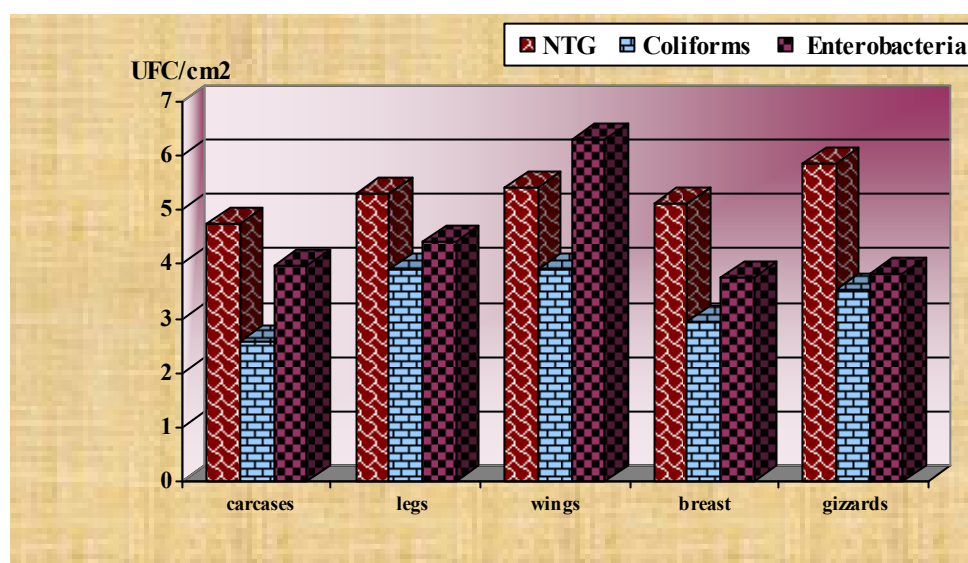


Fig. 1. Variation of number of micro-organisms in batch I poultry

Regarding batch II that was also studied, the results of microbial load of carcasses and portions cut shows that the microbial load (Table 2) is similar to batch I studied with small differences between the cut portions.

Table 2

Quality of poultry in the commercial network from batch II studied

Specification	No. of samples	Categories of samples				
		Carcases	Legs	Wings	Breast	Gizzards
NTG (UFC/g)	25	4,82	5,25	5,21	5,12	5,61
Coliforms (UFC/cm ²)	25	3,78	4,12	3,97	3,68	3,85
Enterobacteria (UFC/cm ²)	25	2,63	4,02	6,10	2,93	3,58
Positive samples						
Salmonella/25g	25	1	1	-	2	3
Sulphite-reducing clostridia	25	-	-	-	-	3
Staphylococcus spp.	25	4	5	3	9	4
Campylobacter spp.	25	-	-	-	-	-

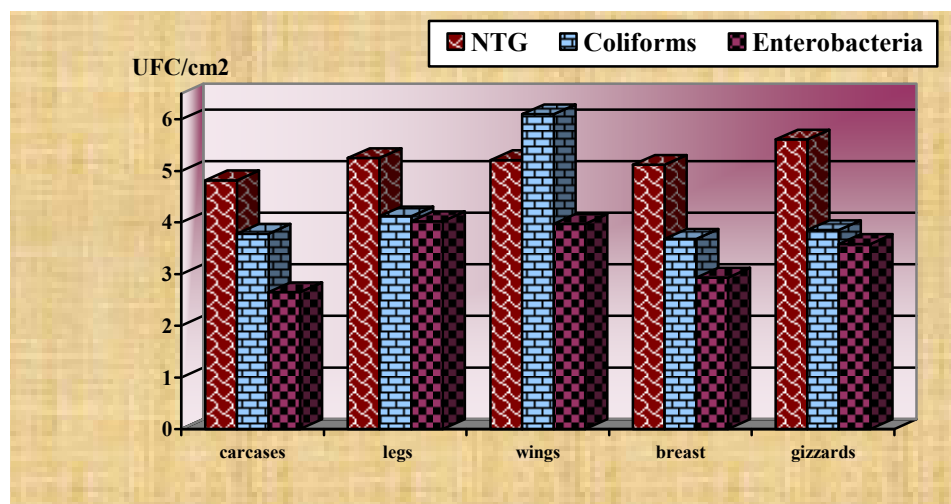


Fig. 2. Variation of number of micro-organisms in batch II poultry

Batch III which was examined because of the microbial load of meat from the commercial network (Table 3), shows that the highest concentration of microorganisms was found in the gizzard, followed by the wings, legs, breast and carcasses (Fig. 3).

Table 3

Quality of poultry in the commercial network from batch III studied

Specification	No. of samples	Categories of samples				
		Carcases	Legs	Wings	Breast	Gizzards
NTG (UFC/g)	25	4,81	5,34	5,46	5,16	6,00
Coliforms(UFC/cm ²)	25	4,01	4,43	3,95	3,76	3,87
Enterobacteria(UFC/cm ²)	25	2,65	4,10	5,99	2,92	3,56
Positive samples						
Salmonella/25g	25	3	2	-	2	3
Sulphite-reducing clostridia	25	-	-	-	-	3

Staphylococcus spp.	25	6	5	4	8	4
Campylobacter spp.	25	-	-	-	-	-

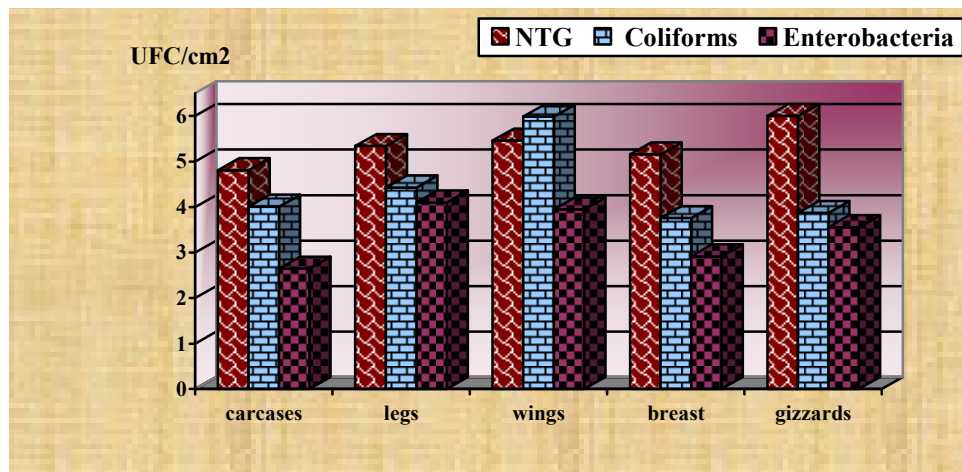


Fig. 3. Variation of number of micro-organisms in batch III poultry

Among the indicators of pathogenicity of meat resulted from commercial network, from the total of analyzed samples, the pathogenic germ like *Staphylococcus* was found positive in 80 cases, *Salmonella* in 25 cases, sulphite-reducing bacteria in 8 cases and the pathogenic germ like *Campylobacter* was absent (fig.4).

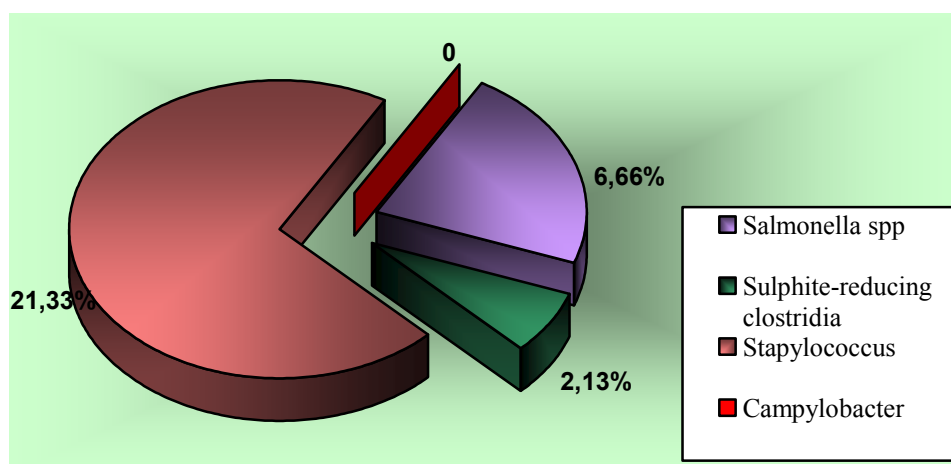


Fig. 4. Variation of pathogenic micro-organisms in poultry (%)

CONCLUSIONS

The total number of aerobic microorganisms in the samples examined varied from batch to batch and from one category of sample to another, ranging from 4.75 to 6 UFC/g/examined. The largest number was determined in the gizzard, with an average of 5.82 UFC/g/batch of meat.

The enterobacteriaceae were also found in a large number in chicken legs and wings, having values between 2.65 to 6.30 UFC/g. The highest value was recorded by batch I was in samples taken from the wings. Regarding the coliform bacteria, the number determined in samples varied, depending on the category of examined sample taking values between 2.57 to 6.10 UFC/g. The highest value was recorded by group II (6.10 UFC/g) in the wings.

Salmonella was identified in 8 cases in group I, 7 in batch II and 10 in batch III, from a total of 375 analyzed samples. Most positive samples were registered in chicken gizzard.

Bacteria from *Clostridium* have been isolated only in the gizzard, in all three groups studied. *Staphylococcus sp.* was isolated in the chest in large numbers, carcasses and legs, reaching the highest value of all determinations performed, representing 80 positive samples of all samples examined. *Campylobacter sp.* was not identified in any of the samples.

After the study made in this link, it is required the using of corrective measures regarding transport, storage and recovery of poultry meat.

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