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Research Article

The Research of Listeria Monocytogenes in the Fresh Meat of the Broilers in Poultry Abattoir Konsoni in Kosova

Biotechnology and Food

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Abstract

This study is initiated to define the level of contamination and possible contaminant factors of broiler's fresh meat with Listeria monocytogenes in poultry's abattoir Konsoni and realized from November 2013 to march 2014,where 72 samples of the fresh meat were tested. These samples were taken from carcasses of the broilers in abattoir during the process of slaughter in different phases. The analytical procedure is realized by using the norm horizontal method ISO 11290.From 72 samples analyzed,18 samples resulted positive with Listeria spp.Biochemical test and CAMP-test confirmed 7 samples positive with Listeria monocytogenes.From all the samples analyzed, when expressing them in a percentage 25 % resulted positive with Listeria spp,whereas 9.72 % are positive with Listeria monocytogenes.The data taken tell that from 18 positive samples,16 of them were taken after the phase of eviscerate or as it is called "cold" part of the abattoir.The presence of the Listeria monocytogenes in the "cold" parts of the abattoir is related to the psychrophile nature of listeria.From the data gained we can conclude that the main origin of Llisteria monocytogenes are the broilers itself, which they carry this bacterium in their viscera and after the evisceration it contaminates the carcasses and the premises of the abattoir.

1. Introduction

Listeria are rod shaped bacteria, gram positive, facultative anaerobes, catalase-positive and oxidase-negative, which tolerate wide range of temperatures (0-45°C) and pH (4.4-9.4 pH) [1,4]. Of special interest is Listeria monocytogenes, which represents the main pathogen of Listeriosis in humans and animals. In the early 80s, after several outbreaks of Listeriosis from food origin in Canada and U.S., the World Health Organization decided to investigate this pathogen and to consider it important, cause it poses a threat to public health [2,5]. According to the assessments of Control Diseases Centre (2011), every year in the European Union, die 300 people due to Listeria infections. From a Listeriosis outbreak, in the state of Colorado, which occurred in August 2011, until December of that year, 146 people got infected, 33 of whom died and a pregnant woman had an abortion. This infection, which spread from the Colorado melon, is considered among the most severe outbreaks of food origin in the U.S. since 1924 [2,6,8].Listeria are often present in the fresh meat of poultry [7,10].This research evaluates the presence of *Listeria monocytogenes* and the possible factors which contaminate fresh meat in broiler in Konsoni poultry abattoir,Kosovo.Recognizing the contaminating factors it can be easy to take the appropriate steps to eliminate *Listeria monocytogenes* from fresh broilers meat and in this way it can be obtained a safe and quality product for the customers

2. Material and Methods

To conduct the study,were used samples of bird carcasses in different stages during the slaughter process in Konsoni poultry abattoir,Kosovo The study was realized during the period of November 2013 until March 2014. The total number of 72 fresh meat samples were analyzed from carcasses in 5 different points during the slaughter process,including the carcasses of opening point (point A) , evisceration (point B) , the cooling room (point C) ,the fragmentation and packaging room (point D) The samples analysis were done in accordance to the ISO 11290 standard [10,11 From carcasses was taken 25 grams of fresh meat, which was joined to 225 ml of Demi Fraser Broth (DFB), homogenized in stomacher and further was incubated at temperature 30 ° C for 24 ± 2

hours From this compound was taken an amount of 0.1 ml and was joined by a selective liquid enrichment field, with full concentration of the selective factor (Listeria Fraser Broth - LFB).This field was incubated in the temperature of 35-37 ° C for 48 hours .After second enrichment, the samples were inoculated in the surface of the selective media, Oxford agar and PALCAM agar, and incubated at the temperature of 37 ° C for 24 ± 2 hours.After incubation, it was conducted the plates examination for the presence of suspicious colonies of *Listeria spp*. Typical colonies of *Listeria spp*., in Oxford agar are small and surrounded by a black halo, while colonies that grow on PALCAM agar have a diameter of 1.5-2 mm, green to yellow in colour and with a shiny black centre. For confirmation, from each plate of each selective medium were taken five suspicious colonies for *Listeria spp.*

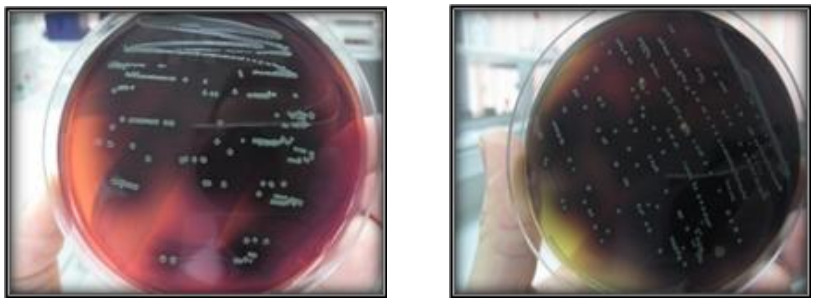

Figure. 1. Typical colonies of Listeria spp. in Oxford and Palcam agar

If there were less than five colonies, all of them went through the process of confirmation. The selected colonies were inoculated on the surface of TSYEA agar and incubated in an incubator set at 35°C or 37°C for 18-24 hours or till the growth of colonies were satisfactory. Confirmatory tests were conducted for Listeria spp. such as catalase reaction, Gram stain and motility test [8]. When morphological, physiological characteristics and catalase reaction resulted positive for Listeria spp., the samples were confirmed through carbohydrate fermentation tests (Rahmnoz dhe Ksilose) and also CAMP-test with Staphylococcus aureus and Rhodococcus equi.

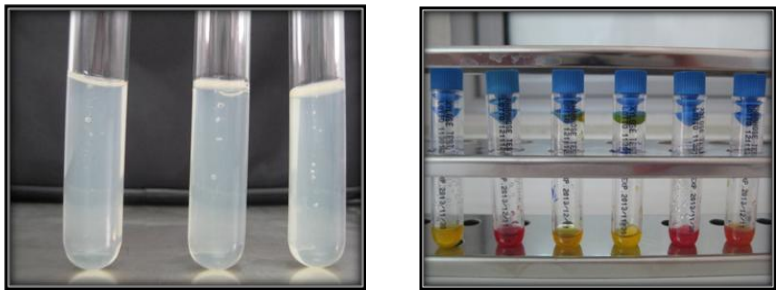

Figure. 2. Motility test and carbohydrate fermentation tests (Rahmnose & Ksilose)

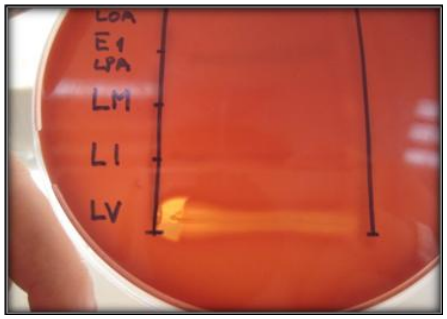

Figure. 3. CAMP-test with *Staphylococcus aureus* and *Rhodococcus equi.*

3. Result and Discussions

The results obtained from this study are presented in Table No. 1. This study lasted a total of 5 months, which started in November 2013 and was completed in March 2014. During this period, 72 samples of fresh meat broilers were analyzed which were taken in Konsoni poultry abattoir,Kosove.The number of samples through the months is approximately the same, the average of 15 samples ranges per month. From the analysis of these samples we received these results:

- The point A (the opening of carcasses) were analyzed a total of 14 samples and all gave negative results.
- The point B (evisceration) were analyzed 15 samples and two samples from this resulted with *Listeria spp*.,whereas negative for *Listeria monocytogenes.*
- The point C (The cleaning of carcasses) were analyzed 15 samples, where 8 samples resulted positive for *Listeria spp* and out of these 8 samples,3 samples resulted positive with *Listeria monocytogenes.*
- The point D (The cooling room) were analyzed a total of 15 samples , 4 resulted to be positive with *Listeria spp,* and 3 out of 4 samples resulted to be positive with *Listeria monocytogenes* .
- The point E (the fragmentation room) were analyzed 13 samples of which 4 samples resulted positive for Listeria spp and from these four samples ,only one resulted positive with *Listeria monocytogenes.*

From 72 samples analyzed,18 samples resulted positive with *Listeria spp*.Biochemical test and CAMP-test confirmed 7 samples positive with *Listeria monocytogenes*.From all the samples analyzed, when expressing them in a percentage 25 % resulted positive with *Listeria spp*,whereas 9.72 % are positive with *Listeria monocytogenes*.The presence of *Listeria monocitogenes* in broiler´s meat has it main source from birds themselves who carry it in the internal organs and spread it after the process of evisceration.Water,equipment and staff are contaminating factors of meat poultry. Their disinfection during the slaughtering process is of great importance.

Table 1. Results *of Listeria spp. and Listeria monocytogenes* isolated from carcasses

Sampling from carcasses at different points	No. of samples	Positive samples	
		Listeria spp.	Listeria monocytogenes
The opening of carcasses (point A)	14	-	-
Evisceration (point B)	15	2	-
Cleaning of carcasses (point C)	15	8	3
Cooling Room (point D)	15	4	3
Fragmenting room (point E)	13	4	1
TOTAL	72	18	7

4. Conclusions

- Overall 72 samples analyzed 25 % of them resulted positive to *Listeria spp.* and 9.72 % with *Listeria monocitogenes*.
- The data taken tell that from 18 positive samples,16 of them were taken after evisceration of carcasses or as it is called "cold" part of the abattoir.

- All samples analyzed at point A (opening of carcasses) resulted negative. We consider that this is due to the fact that until reaching the evisceration phase, the slaughtered broilers go through several tubs of hot water at 63.5 °C. This temperature can eliminate *Listeria* found on the bodies of broilers.
- We may also conclude beforehand that the main source of *Listeria monocytogenes* is the broilers themselves, which transfer this bacteria to their internal organs and after evisceration the bacteria contaminates the carcasses and the slaughterhouse equipment and facilities.
- The presence of *Listeria monocytogenes* in the"cold"areas of the slaughterhouse relates to the psychrophile nature of *Listeria* which can grow at a temperature of 0-45°.
- The isolation of *Listeria spp* at a percentage of 25 % and of *Listeria monocytogenes* in 9.72 of 72 samples in total is not an alarming percentage; however, it should not be underestimated considering the pathogenesis of this bacteria and the vulnerable persons to this bacteria (pregnant women, children, elderly, people with a weak immunity, etc.)
- To prevent contamination of the fresh meat of broilers with *Listeria monocytogenes*, the Konsoni slaughterhouse should apply different control measures, focusing on implementing the HACCP system to identify and to asses different risks at all processing phases, from slaughtering to packaging.

References

1. Bean NH, Griffin P: Food borne disease outbreaks in the United States 1973-1987. Journal of food protection 1990, 53, 804-817.
2. Beumer RR, Giffel MC, Kok MTC, Rombouts FM: Confirmation and identification of *Listeria spp*. Letters in Applied Microbiology 1996, 22: 448–452.
3. Hudson WR & Mead GC: *Listeria* contamination at a poultry processing plant. Letters in Applied Microbiology, Oxford 1989, 9: 211–214.
4. Katarzyna KP, Jacek B, Jarosław B, Berzy M, Małgorzata C: Occurrence *of Listeria Spp*. in raw poultry meat and poultry meat products. Bull Vet Inst Pulawy 2005, 49: 219-222.
5. Knabel S J, Walker HW, Hartman PA, Mendonca AF: Effects of growth temperature and strictly anaerobic recovery on the survival of *Listeria monocytogenes* during pasteurization. Appl Environ Microbiol 1990, 56: 370-376.
6. Mackey BM, Bratchell N: The heat resistance of *Listeria monocytogenes*. Lett Appl Microbiol 1989, 198(99): 89-94.
7. Miettinen MK, Palmu L, Bjorkroth KJ, Korkeala H: Prevalence of *Listeria monocytogenes* in broilers at the abattoir, processing plant, retail level. Journal of Food Protection 2001, 64: 994–999.
8. Sakaridis I, Soultos N, Iossifidou E, Pap A, Ambrosiadis I, Koidis P: Prevalence and antimicrobial resistance of *Listeria monocytogenes* isolated in chicken slaughterhouses in Northern Greece. Journal of Food Protection 2011, 74: 1017 -1021.
9. Technical Committee ISO/TC 34: ISO 11290-2: Microbiology of food and animal feeding stuffs — Horizontal method for the detection and enumeration of *Listeria monocytogenes* Part 2. Enumeration; 2007.
10. The European Parliament and the Council of European Union: Regulation (CE) n. 2073/2005 of the Commission on microbiological criteria applicable in foodstuffs; 2005.
11. Wong HC, Chao WL, Lee SJ: Incidence and characterization of *Listeria monocytogenes* in foods available in Taiwan. Appl. Environ. Microbiol. October 1990, 56:10, 3101-3104.