

Microbial contamination of water in industrial poultry abattoirs in Mazandaran province, Iran.

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Abstract— Industrial poultry meat production has increased in Iran, therefore hygienic production and processing of poultry meat becomes important. In poultry slaughter chain, contamination is probable from different sources. One of the contamination sources is water that used in slaughter chain. Therefore in this survey water in slaughter chain include input water, washing water and chilling water was evaluated in industrial poultry abattoir in Mazandaran province that is one of the important provinces of poultry production in the north of Iran.

Samples include input water; washing water and chilling water were collected from 10 industrial poultry abattoir of the province and transfer to the water and food laboratory. All samples were evaluated about total microbial count by surface plating method, *Coliforms* and *E.coli* count by Most Probable Number (MPN) method.

According to the results; in input water, total microbial count, *Coliforms* and *E.coli* count was: 704 \pm 416 SE, 13 \pm 5.5 SE and 6.7 \pm 3.4 SE. The count in washing water was: 700 \pm 409 SE, 15 \pm 5.4 SE and 9 \pm 3.6 SE, and in chilling water was: 39205 \pm 12960 SE, 832 \pm 112 SE and 448 \pm 177 SE. Results showed no significant difference between contamination in input water and washing water but it was significant among input and washing water with chilling water ($p < 0.05$). There was no significant difference in microbial contamination among different abattoirs. Therefore regarding to water microbial contamination, especially in chillers, hygienic controls and use of better chilling methods is necessary.

Keywords—Microbial contamination, water, poultry abattoirs

I. INTRODUCTION

In Iran as all over the world, industrial poultry production has been increasing over the last two decades. At present, annual poultry meat production is more than one million tons in the country [1]. Among the provinces of Iran, Mazandaran province in northern part of Iran has been rated one of the largest producer of poultry meat in the country.

By increasing poultry meat production, hygienic production and processing of poultry meat becomes important. Zoonotic pathogens in foods including meats have to be controlled through a complete, continuous farm-to-fork system [2].

Although various foods can serve as sources of foodborne illness, meat and meat products are important sources of human infections. Poultry meat contaminating bacteria may be the direct cause of foodborne diseases [1, 3].

Although it is clear that meat or meat products can be implicated in all of the above zoonotic infections in humans, understanding in quantitative terms of the importance of meat and meat products compared with other types of food, drinking water and environmental exposure is quite limited. Efforts to quantify the importance of specific food sources and animal reservoirs for human cases of foodborne illness have been named ‘‘human illness attribution’’. Several human illness attribution approaches, and related data, are currently used worldwide [4].

In poultry slaughter chain, contamination is probable from different sources. One of the contamination sources is water that used in slaughter chain. Water can contaminated in different stage and

may transfer the contamination to the poultry carcasses. Therefore in this survey water in slaughter chain include input water, washing water and chilling water was evaluated in industrial poultry abattoir in Mazandaran province.

II. MATERIAL AND METHODS:

10 industrial poultry abattoir of different parts of Mazandran province were selected for the sampling. Samples from various stages include input water; washing water and chilling water were collected from the abattoirs and transfer by sterile sampling tube in 4°C to food and water laboratory. All abattoirs were sampled three times.

In the laboratory, all samples were evaluated about total microbial count by plating method. 1 ml of physiological saline dilutions of samples were inoculated in PCA (Plate Count Agar, Merck, Germany) and mixed by swirling or tilting plates to disperse the inoculum throughout the medium. The plates were aerobically incubated for 24 h at 32°C [4].

Coliforms and *E.coli* were counted by Most Probable Number (MPN) method in Lactose broth (LB) and Brilliant Green broth (BGB) media.

More information about the abattoirs and sources of water were collected in the questioner. The main questions are about source of providing water and methods of exclusion of sewage.

Results were analyzed statistically, using the statistics program SPSS 16.

III. RESULT AND DISCUSSION

According to the results; in input water, Total microbial count, *Coliforms* and *E.coli* count was: 704 ±416 SE, 13 ±5.5 SE and 6.7 ±3.4 SE. The count in washing water was: 700 ±409 SE, 15 ±5.4 SE and 9 ±3.6 SE, and in chilling water was: 39205 ±12960 SE, 832 ±112 SE and 448 ±177 SE.

Results showed no significant difference between contamination in input water and washing water but it was significant among input and washing water with chilling water ($p < 0.05$). It means high contamination in chillers may be a cause of carcasses contamination.

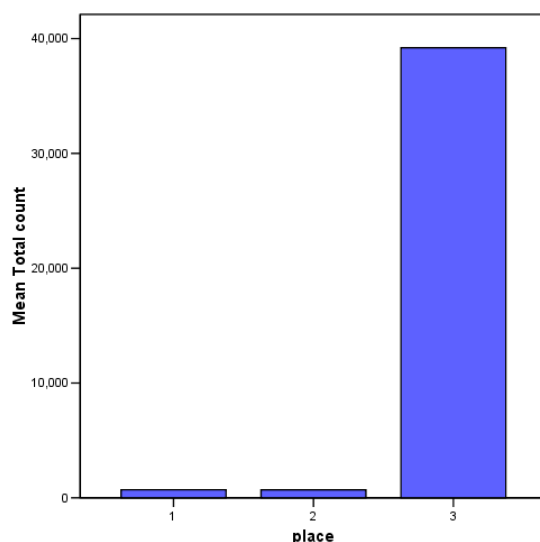


Fig. 1 Total microbial count of water in different places of sampling (1= input water, 2= washing water, 3= chilling water).

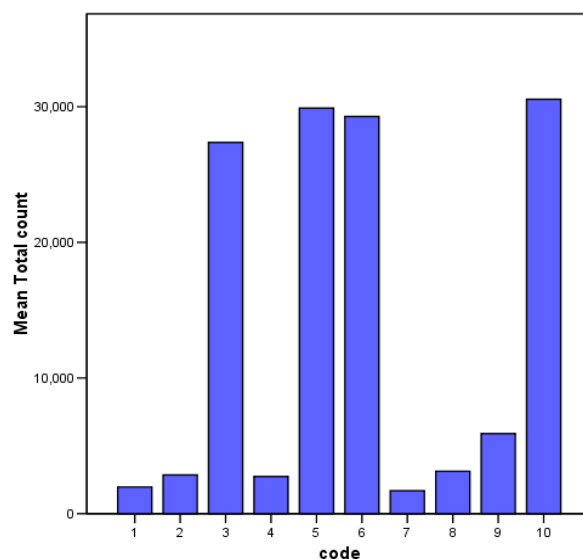


Fig. 2 Total microbial count of water in different abattoirs

There was no significant difference in microbial contamination among different abattoirs ($p < 0.05$). This is should be a result of same chilling method in all abattoirs.

There was a significant correlation between source of providing water and methods of exclusion of sewage with microbial contamination of water.

IV. CONCLUSIONS

It seems in most of the abattoirs input and washing water was acceptable. But in chilling water the contaminations were not acceptable. In some of the abattoirs the sewage exclude without cleaning and it may be a cause of environmental pollution [5].

Therefore regarding to water microbial contamination, especially in chillers, hygienic controls and use of better chilling methods seems necessary.

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