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EFFECT OF AN IODOPHOR IN CHILLING WATER ON THE BACTERIAL COUNTS OF PROCESSED POULTRY

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PANETTA, J. C. & COELHO, W. P. *Effect of an iodophor in chilling water on the bacterial counts of processed poultry.* **Rev. Fac. Med. vet. Zootec. Univ. S. Paulo, 13**(1):249-52, 1976.

SUMMARY: *The experiment was conducted to determine whether or not the iodophor is effective in the decontamination of poultry carcases immersed in the treated chilling water. 45 carcases were used at weekly intervals, allocated in 9 groups of 5 each. 8 groups were treated by iodophor solutions in the chilling tank at the following dilutions*: 1:250; 1:500; 1.750; 1:1000; 1:1250; 1:1500; 1:1750; 1:2000.

One group remained as control. The samples for bacteriological examinations were collected by swabs. The use of iodophor in the water from the chilling tank resulted in the decontamination of the poultry carcases at dilutions from 1:250 *to* 1:250. *The experiments were repeated 10 times.*

UNITERMS: *Poultry, carcases*; Poultry, spoilate*; Water chilling, decontamination*.*

INTRODUCTION AND LITERATURE

A low bacteria count in the skin of processed carcases represent good hygienic procedures. This improves the poultry products for marketing as well as increasing shelf life and bettering appearance of the poultry [17, 18].

These improvements in poultry processing have arisen from technologists' constant preoccupation in examination of the contamination of the skin in processed poultry and consideration of its importance with regards to the health of the public [3].

Technological procedures have searched for minimising the incidence and development of the contaminants. Thus, with this objective in mind, the following methods were investigated: chlorination of the water [5]; the use of antibiotics [1]; the use of sodium chloride solutions [9]; the utilisation of phosphate and poly-phosphate solutions [6]; the use of acid solutions [15]; the application of carbon dioxide atmosphere [13]; the use of new package [12]; shift of the pre-chilling procedures [4]; in the processing line [14].

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As many authors [8, 19] have identified the chilling tank as an important factor in the contamination of processed poultry, the following experiment was conducted to determine whether or not the iodophor acts in the decontamination of poultry carcases when diluted in water for immersion chilling of poultry.

EXPERIMENTAL PROCEDURE

In this work the authors choose for bacteriogical examinations the total count of aerobics (at 35°C), the count of coliform group (which has *E. coli* as pattern) and the count of enterococcus group (which has *S. faecalis* as patern). This practice is recommended by several authors [16, 20] who consider coliforms and enterococcus as fecal indicator organisms which show the hygienic quality of the processed carcases.

Poultry carcases from a commercial processing plant in S. Paulo City were used in the experiment.

At weekly intervals 45 carcases were allocated, at random, in 9 groups of 5 each. 8 group were treated by idophor * diluted in the chilling water, plus ice rocks, at the following dilutions: 1:250; 1:500; 1:750; 1:1000; 1:1250; 1:1500; 1:1750; 1:2000.

One group chilled by convencional procedure, remained as the control.

The treated poultry carcases ere immersed in the solutions of iodophor contained in the stainless steel chilling tank for 15 minutes, under continuous agitation. The carcases were sent for packaging in plastic bags and transferred to the laboratory for bacteriological examinations.

The five carcases from the control group were randomised after the packaging in plastic bags during the conventional processing for immersion chilling, in which non-treated water, plus ice rocks, was used in a stainless steel tank.

In the laboratory the samples are obtained by swabbing of the carcase skin, according to the technique written by WALKER & AYRES [18], but with the changes proposed by KOTULA [10], that replaced the conventional metal instruments by sterilised cotton.

The samples were collected by swabs from the external areas of the carcase corresponding to 8 square centimeters (2 cm^2 under the left wing, 2 cm^2 under the right wing and 4 cm^2 in the breast).

For determination of the total numbers of coliforms, enterococcus and aerobics, the 3 swabs from each carcase were put in 250 ml, flasks with 100 ml, of Ringer's solution and 1 gram of peptone sterilised at 120åC, under 15 lbs pressure. After this, the samples ere sent to the microbiological laboratory of The Veterinary School, for examination (transportation taking 20 minutes).

The following culture media were used in these experiments: "plate count agar" (Oxoid 37) for aerobics; "brilliant green bile broth" (Difco B-7) for coliforms; the medium from LITSKY, MALMANN & FIFIELD [11], modified, for enterococcus.

The bacterial computation was made according to the method adopted by PANETTA [14] in previous work.

RESULTS AND DISCUSSION

The treatment of the chilling water by iodophor reduced the degree of bacterial contamination of the poultry carcases. There was complete decontamination of the processed poultry carcases by use of iodophor dilutions from 1:250 to 1:1250. The presence of bacteria in the surface of the poultry carcases was observed in the 1:1500 dilution.

The Table 1 shows the counts of total aerobics (at 35°C) coliforms and enterococcus. These results represent the averages from the tests carried out, i.e., one test per week over a period of 10 weeks, each test involving 9 groups of 5 carcases.

From the practical standpoint the 1:1250 dilution was chosen for the treatment of the water used for immersion chilling during the poultry processing.

* Biocid, Pfizer's trade name for an iodophor from Vanodine International Limited, England.

TABLE 1

Average counts (10 replications) of total aerobics (at 35ºC), coliforms and enterococcus obtained in processed poultry carcases treated and non-treated by iodophor.

Iodophor dilutions	N.º of bacteria per square centimeter ($\bar{x}$)		
	Aerobics	Coliforms	Enterococcus
1: 250	—	—	—
1: 500	—	—	—
1: 750	—	—	—
1:1000	—	—	—
1:1250	—	—	—
1:1500	35.0×10^2	7.0×10^2	21.0×10^2
1:1750	58.0×10^2	12.0×10^2	37.0×10^2
1:2000	11.2×10^3	34.0×10^2	66.0×10^2
Control	10.5×10^4	28.3×10^3	67.9×10^3

Special attention should be paid to the higher enterococcus levels over coliforms. This is an extremely important fact for the bacteriological quality of the water from the chilling tank was taken into consideration when selecting a representative bacterium [16]. On this subject, the enterococcus as contaminant of the chilling water will be studied in further work because from the experimental results it is evident that they appear to have more resistance to the temperature of the water used in the chilling tank. This point is endorsed by PANETTA [11] and WILKERSON [20].

RFMV-A/17

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RESUMO: *O trabalho foi conduzido com o propósito de testar a eficiência de um "iodophor" na descontaminação da água do tanque de pré-resfriamento utilizado na industrialização de carcaças de aves. Foram usadas 45 carcaças de frangos, a intervalos semanais, distribuídas em 9 grupos de carcaças cada. 8 grupos foram tratados pelo "iodophor" adicionado à água do tanque de pré-resfriamento nas seguintes diluições*: 1:250; 1:500; 1:750; 1:1000; 1:1250; 1:1500; 1:1750 e 1:2000. *Um grupo foi reservado como controle. As amostras para o exame bacteriológico foram colhidas por "swab" da pele das carcaças. A utilização do iodophor diluído na água do tanque resultou na descontaminação das carcaças, quando as diluições localizaram-se entre* 1:250 *e* 1:1250. *O experimento foi replicado dez vezes.*

UNITERMOS: *Aves, carcaças *; Carne, deterioração *; Frangos, industrialização **.

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