BACTERIOLOGICAL ANALYSIS OF POTABLE WATER USED IN FOOD INDUSTRY

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Abstract

The public health importance of using potable water in food industry and the implications of the sanitary condition of the food units on the water quality are the major issues. Total coliform bacteria are commonly found in the environment (e.g., soil or vegetation) and are generally harmless. If only total coliform bacteria are detected in drinking water, the source is probably environmental. However, their presence in drinking water indicates that disease-causing organisms (pathogens) could be in the water system. Most pathogens that can contaminate water supplies come from the feces of humans or animals. Testing drinking water for all possible pathogens is comple but necessary. It is relatively easy and inexpensive to test for coliform bacteria. Taking repeat samples helps determine whether an actual problem exists in the system. If coliform bacteria are found in a water sample, water system operators work to find the source of contamination and restore safe drinking water. The results of microbiologycal analysis presented in text suggest a coliform contamination of drinking water derived from the tap water coming into the milk and meat processing plants.

Key words: water, quality, hygiene, microorganisms.

INTRODUCTION

The water used for cleaning procedures must meet drinking water standards and potable water is one that does not contain chemical substances or microorganisms in amounts that could cause hazards to health (Bara and Oneț 2008). Bacteriological examination of water is therefore a powerful and foremost tool in order to foreclose the presence of microorganisms that might constitute a health hazard. Microorganisms commonly used as indicators of water quality include: coliforms, faecal streptococci, *Clostridium perfringens*, and *Pseudomonas aeruginosa*.

MATERIAL AND METHODS

The research was done in 2009 and 2010. The potable water samples were collected from milk and a meat processing factories. The monitored food units are placed in Bihor County. To study the microbiological quality of potable water used in both food units' water samples were collected from the tap water coming into the milk and meat processing plants.

The method used was that of counting bacteria on specific culture media. All media used such as: nutrient agar for bacterial count, Macconkey agar for coliform count and brain-heart infusion for faecal streptococcus count were sterilized in an autoclave at 121^0C for 15 minutes. Samples were

cultured on the prepared medium in duplicate and incubated aerobically at 37^0C for 48 hours and the colonies formed were counted using colony counter and expressed as colony-forming units per milliliter (cfu/ml) of the sample. Various biochemical tests were carried out on the isolates for bacterial characterization. One-millimeter broth culture of each isolate was used for each test.

RESULTS AND DISCUSSION

In the following will be presented the results of microbiological analysis of potable water samples collected from the milk and meat factories. Numerical results of analysis are expressed in tables and are compared with the maximum limits set by into force legislation.

Table 1

Monitoring control of potable water collected from the tap water coming into the milk processing plants

Crt. nr.	Microbiologycal indicators	Results of analysis Mean Bacterial, Coliform and Faecal Streptococcus Counts (Cfu/Ml)					Acceptable value for potable water
		I 06.07.2009	II 05.10.2009	III 11.01.2010	I V 05.04.2010	V 05.07.2010	
1	bacteria count	0	0	0	0	0	20
3	coliform count	0	700	2300	3200	2100	none
4	faecal streptococcus count	0	0	0	0	0	none

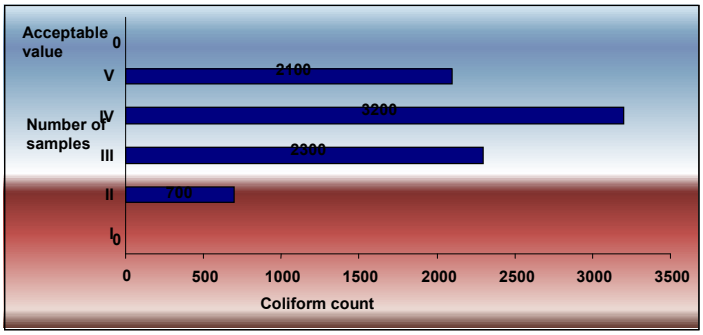

Fig.1. Total number of coliform determined in potable water samples collected from a milk processing factory

The results of microbiologycal analysis (table1, fig.1) suggest a faecal contamination of potable water with coliform bacteria derived from the input tap of milk processing factory because the number of coliforms is highly comparative with the acceptable value.

Table 2

Monitoring control of potable water collected from the tap water coming into the meat processing plant

Crt. nr.	Microbiologycal indicators	Results of analysis Mean Bacterial, Coliform and Faecal Streptococcus Counts (Cfu/Ml)					Acceptable value for potable water
		I 06.07.2009	II 05.10.2009	III 11.01.2010	I V 05.04.2010	V 05.07.2010	
1	bacteria count	0	0	10	18	15	20
3	coliform count	0	0	300	149	0	none
4	faecal streptococcus count	0	0	0	0	0	none

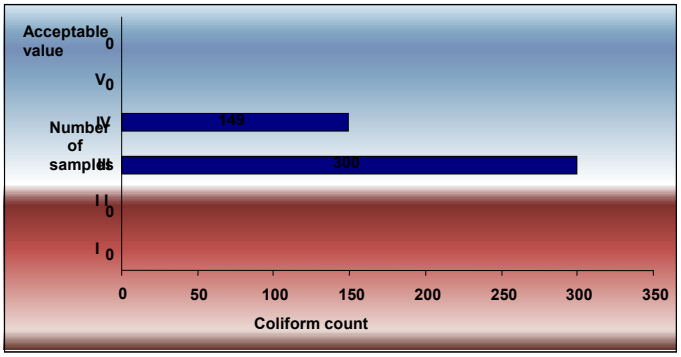

Fig. 2 Total number of coliform determined in potable water samples collected from a meat processing factory

Certain samples collected from meat processing factory were polluted with coliform and also bacteria count suggest a small impurification with microorganism although the number registered did not exceed acceptable limits. Potable water used for drinking or cleaning purposes should not contain any organism of faecal origin. Natural waters usually contain not only large numbers of microorganisms but also a wide variety and such waters may be perfectly good to drink. The sanitary quality of potable water is determined primarily by the kinds of microorganisms present rather than by the microbial count. The potential source of coliform bacteria in water supplies result from sub-optimal operation of water treatment processes or ingress of contamination from breaches in the integrity of the distribution system. These include for example, leaking hatches on service reservoirs, contamination via air-valves and stop valves, infiltration into mains and service reservoirs, cross connections and back-flow effects. Coliform bacteria can be present in domestic plumbing systems with kitchen taps and sinks being recognised sources of these organisms.The

water company and health authority and local authority will need to consider the issue of advice and guidance.

CONCLUSIONS

The result of this study shows that certain samples from the monitored milk and meat factory were microbial contaminated with coliforms while other potable water samples were included in the permissible limits. For the nonce more water samples will be taken to find and eliminate potential contamination sources, and chlorination of the system will most likely occur.

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