ENUMERATION OF BACTERIA IN WATER USED IN MILK INDUSTRY

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Abstract

The most common and widespread health risk associated with drinking water is contamination; wither directly or indirectly, by human or animal excreta, particularly faeces. If such contamination is recent, and if those responsible for it include carriers of communicable enteric disease, some of the pathogenic microorganisms that cause these diseases may be present in the water(13). Drinking the water, or using it in food preparation, may then result in new cases of infection. The goal of the paper is increasing food safety through the improvement of the drinking water quality used in processing and distribution of food products. Provide water that is safe and adequate from the perspectives of technological requirements in every stage of food processing/distribution. The results of microbiologycal analysis suggest a faecal contamination of water derived from hall of cheese processing tap, packing hall tap and laboratory tap.

Key words: water, quality, hygiene, microorganism.

INTRODUCTION

The pathogenic agents involved in the contamination of water include bacteria, viruses, and protozoa, which may cause diseases that vary in severity from mild gastroenteritis to severe and sometimes fatal diarrhea, dysentery, hepatitis, or typhoid fever, most of them are widely distributed throughout the world. Faecal contamination of drinking water is only one of several faeco-oral mechanisms by which they can be transmitted from one person to another or, in some cases, from animals to people (13).

Ideally, all samples taken from the distribution system including consumers' premises should be free from Coliforms organisms. In practice, this is not always attainable. To control purity of water the following microbiological parameters for water collected in the distribution system is therefore recommended (13).

The use of indicator bacteria, in particular *Escherichia coli* (*E. coli*) and the coliform bacteria, as a means of assessing the potential presence of water-borne pathogens has been paramount to protecting public health. The analysis of large volumes of sample for faecal indicator bacteria using membrane filtration procedures can be very useful in assessing water treatment efficiency at various points in the treatment process (Edberg, 2000).

Numbers of enterococci in humans are greatly outnumbered by *E. coli* bacteria. When coliform bacteria are present in the absence of *E. coli*, but in the presence of enterococci, this can be indicative of the faecal origin of the coliform bacteria (Hijnen, 2000).

It has been suggested that testing for enterococci can be a useful additional indicator of water treatment efficiency. As these bacteria are resistant to drying, they can be of value for routine assessment after new mains have been laid or when repairs in distribution systems have been carried out, or for assessing pollution by surface run-off to ground or surface waters (Hijnen, 2000).

MATERIAL AND METHODS

The water samples were collected in March 2011 from a milk processing factory placed in Bihor County. Water samples were collected from the following places: hall of cheese processing tap, packing hall tap and laboratory tap.

Plate count method was used to estimate the total number of microorganisms on a solid nutrient medium containing meat extract (Atlas, 2004). After incubation the counts obtained were multiplied by the dilution factor to obtain the number of colony forming unit per ml water. The method used for testing total coliforms was multitube fermentation technique/MPN method (Macconky broth and BBLV medium were used). Presence of gas production confirm the presence of bacteria (WHO, 1993). After incubation the most probable number of nitrifying bacteria was calculated according to the statistical table of Alexander (1965).

RESULTS AND DISCUSSION

The protection of public health is of paramount importance. Access to safe water and adequate water is recognised as one of the most fundamental of human needs.

The development of sustainable capacities to meet these needs in developing countries is one of the key challenges for the water sector as a whole.

Maintaining a high standard of hygiene is one of today's most important milk production objectives. The hygiene level directly influences the production's economical result and dairies are enforcing this by steadily raising their quality requirements for raw milk.

More importantly though, consumers are concerned about the safety of dairy products and the conditions under which these are produced.

It is therefore critically important to ensure high quality raw milk can be produced from healthy animals under good hygienic conditions and that control measures are applied to protect human health (WHO, 1993).

Table 1

The results of microbiologycal analysis of drinking water

Microbiologycal determination	Cold water Hall of cheese processing tap I	Warm water Hall of cheese processing tap II	Cold water Packing hall tap III	Cold water Laboratory tap IV	Normal values
colony count bacteria growing at 37 °C	-	-	-	-	-
Total number of coliforms/100 cm^3	0	300	200	1500	0
Probable number of faecal streptococci/100 cm^3	0	-	-	-	0

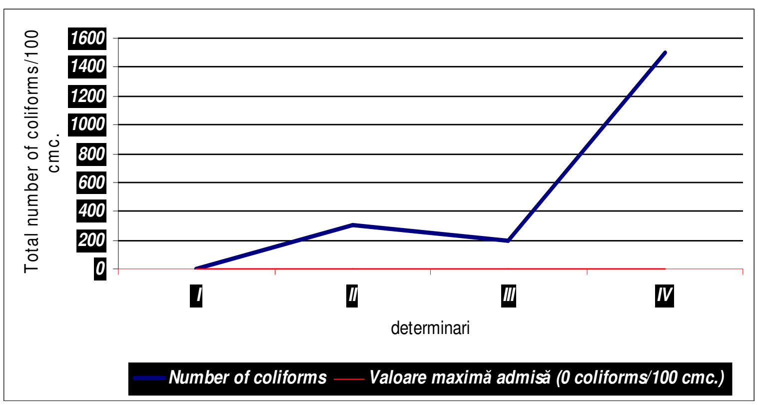

Fig. 1. Determination of total number of coliforms/100cm^3

The results of microbiologycal analysis showed in this graphic suggest a faecal contamination of water derived from hall of cheese processing tap, packing hall tap and laboratory tap because the number of coliforms is highly comparative with the number specified in the romanian normative standard. The term “coliform organisms (total coliforms)” refers to gram negative, rod shaped bacteria capable of growth in the presence of bile salts or other surface-active agents with similar growth-inhibiting properties, and able to ferment lactose at 35 – 37^0C with the production of acid, gas, and aldehyde within 24 – 48 hours. They are also oxidase-negative and non-spore-forming. These definitions have recently been extended by the development of rapid and direct enzymatic methods for enumerating and confirming members of the coliform group. The existence both of non-faecal bacteria that fit the definitions of coliform bacteria and of lactose-negative coliform bacteria limits the applicability of this group as an indicator of faecal pollution (13). The coliform test can therefore be used as an indicator both of treatment efficiency and of the integrity of the integrity of the distribution system.

CONCLUSIONS

The results of microbiologycal analysis suggest a faecal contamination of water, the number of coliforms was highly comparative with the number from romanian normative standard which specified the absence of such bacteria .

If drinking water supplies become contaminated with microbial pathogens, or there is a risk of microbiological contamination, immediate action should be taken to protect public health. The microbiological examination is still remaining important way to control purity of the water and it suitably for drinking purpose (13).

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