

Detection of various parasitic protozoa from raw water and water supplies: A PCR study

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Abstract

Waterborne parasitic protozoa outbreaks are on an increase, although there are better surveillance and reporting systems in several countries. The most prevalent water borne parasitic infections producing diarrhea are cryptosporidiosis and giardiasis; the common waterborne parasitic protozoa that cause human infections are *Toxoplasma gondii*, *Cyclospora*, *Microspora*, *Naegleria* spp., etc. Pathogenic protozoa have a biologically different shape during their life cycle in the host. Although there are various methods available, detection of pathogenic protozoa is more difficult as compared to other methods. For monitoring of the protozoa in the water source system, we mainly conducted direct microscopic observations. In this study, 6 kinds of the waterborne parasitic protozoa were detected by the PCR method in samples collected from Nakdong River. The results of water quality in this investigation showed an average of total coliforms (TC) 40~4,900 MPN/100 mL and fecal coliforms 0~1,100 MPN/100 mL. We applied this method in 38 samples of 10 l of water taken from each of the water treatment steps and in 8 samples taken at home (only for *Toxoplasma* PCR) in Quindio region in Colombia.

There were 8 positive samples for *Cryptosporidium parvum* (21 %), 4 for *Cryptosporidium hominis* (10.5 %), 27 for *Toxoplasma gondii* (58.6 %), 2 for *Giardia duodenalis* assemblage A (5.2 %), and 5 for *G. duodenalis* assemblage B (13.1 %). By IFAT, 23 % were positive for *Giardia* and 21 % for *Cryptosporidium*.

The water quality during this survey showed an improvement when compared to results of the previous year (conducted during the same period), but the number of bacteria were temporarily increased due to turbidity caused by rainfall. Parasitic protozoa were not detected in any of the source water samples of the Busan metropolitan city. We confirmed the microbiological safety of drinking water produced by the treatment system. Thus, it is necessary to monitor the bacteriological load in water, so as to ensure the safety of water supplies. Further studies are required to compare the specificities and sensitivities of several methods to accurately detect parasitic protozoa.

This work is partly presented at 3rd World Congress and Expo on Applied Microbiology