Microbial Contaminants in Drinking Water Collected from Different Regions of Kuwait

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Abstract : Water plays a major role in maintaining life on earth, but it can also serve as a matrix for pathogenic organisms, posing substantial health threats to humans. Although, outbreaks of diseases attributable to drinking water may not be common in industrialized countries, they still occur and can lead to serious acute, chronic, or sometimes fatal health consequences. The analysis of drinking water samples from different regions of Kuwait was performed in this study for bacterial and viral contaminations. Drinking tap water samples were collected from 15 different locations of the six Kuwait governorates. All samples were analyzed by confocal microscopy for the presence of bacteria. The samples were cultured in vitro to detect cultivable organisms. DNA was isolated from the cultured organisms and the identity of the bacteria was determined by sequencing the bacterial 16S rRNA genes, followed by BLAST analysis in the database of NCBI, USA. RNA was extracted from water samples and analyzed by real-time PCR for the detection of viruses with potential health risks, i.e. Astrovirus, Enterovirus, Norovirus, Rotavirus, and Hepatitis A. Confocal microscopy showed the presence of bacteria in some water samples. The 16S rRNA gene sequencing of culture grown organisms, followed by BLAST analysis, identified the presence of several non-pathogenic bacterial species. However, one sample had Acinetobacter baumannii, which often causes opportunistic infections in immunocompromised people, but none of the studied viruses could be detected in the drinking water samples analyzed. The results indicate that drinking water samples analyzed from various locations in Kuwait are relatively safe for drinking and do not contain many harmful pathogens.