SUMMARY OF THESIS

ADENOVIRUS MOLECULAR DETECTION AND SEASONAL MONITORING IN BODIES OF WATER IN THE MUNICIPALITY OF GOIÂNIA, GOIÁS-BRAZIL: CORRELATION WITH PHYSICAL-CHEMICAL AND BACTERIOLOGICAL PARAMETERS AND META-ANALYSIS TO EVALUATE METHODOLOGIES

Although water is of vital importance for living beings, due to anthropic action it becomes a way of dissemination of several microorganisms, which reach aquatic environments through the feces of man and other animals and can cause several illnesses, especially for immunocompromised individuals. During routine environmental monitoring, coliform bacteria are normally used as a microbiological parameter of water quality, which does not evidence its contamination by viruses. Several researchers have proposed the detection of adenovirus (AdV) by PCR as a molecular index to monitor other enteric viruses. AdVs are among the most persistent and ubiquitous enteric viruses present in water and associated with a variety of clinical manifestations. This study aimed to evaluate the quality of water collected from lakes and rivers in Goiânia as to the occurrence of AdVs. Water samples were collected monthly, from December 2007 to November 2008, at five different points in Goiânia (lakes of Bosque dos Buritis and Vaca Brava park, João Leite and Meia Ponte rivers downstream and upstream the municipal sewage treatment plant). The analyses were carried out at the Laboratório de Diagnóstico Genético e Molecular and Laboratório de Genética Molecular e Citogenética, Universidade Federal de Goiás. All the samples were filtered in a positively-charged nylon membrane followed by molecular detection using PCR and semi-nested PCR. Also, we performed physical-chemical and bacteriological tests to correlate these results with the occurrence of AdV. Simultaneously, the Núcleo de Pesquisas em Agentes Emergentes e Re-emergentes carried out a meta-analysis to evaluate three methods of concentration of AdV coupled to molecular detection in samples of untreated water. Since 29 out of the 54 water samples collected were positive for AdV (39.2%), our results suggest the use of the methodology proposed in the present study for the detection of these pathogens in water. We observed statistically significant difference between nitrites, phosphates, fixed residues, total residues and the occurrence of AdV, whereas no correlation was observed between fecal coliforms and AdV. Furthermore, the occurrence of AdVs in the state of Goiás shows a seasonal trend. Based on the 33 studies selected for the meta-analysis, it was possible to get to the following interpretations: the most effective method to detect AdV in samples from rivers or lakes was ultracentrifugation combined with nested-PCR; it is advisable to use a combination of microfiltration membrane and ultrafugation with the subsequent diagnosis using qPCR to detect AdV in samples of treated and untreated sewage. This has been the first study carried out for the detection and monitoring of AdV in water bodies in the Midwestern Region of Brazil and the present results may be useful to propose the eco-epidemiological profile of AdVs or even the routes of some neglected diseases, which points out the need to define a virus indicator.

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