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Improved detection and quantification of norovirus from water

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ABSTRACT

Norovirus is commonly associated with human sewage and is responsible for numerous cases of waterborne and foodborne gastroenteritis every year. Assays using reverse transcription-quantitative polymerase chain reaction (RT-qPCR) have been developed for norovirus, however, accurate detection and quantification remain problematic owing to a lack of suitable positive controls. To improve enumeration of norovirus genomes from water, a synthetic norovirus genogroup II quantification standard and competitive internal positive control were developed. The quantification standard demonstrates identical amplification efficiency as wildtype norovirus and can be used as a viral surrogate in labs with restricted access to norovirus. The internal control quantifies sample inhibition, allowing for accurate quantification of norovirus from complex environmental samples. Seawater samples spiked with sewage or bird guano were evaluated using the norovirus assay as part of a method comparison study. Inhibition was detected in 9 of 36 (25%) samples, two of which proved to be positive upon re-analysis. Results support the specificity of this assay for human-source (sewage) fecal contamination. Overall, use of this quantification standard and internal control signify a great advance over traditional positive controls, and suggest that molecular techniques for viral analysis could become standardized for routine water quality monitoring.

Full Text

ftp://ftp.sccwrp.org/pub/download/DOCUMENTS/AnnualReports/2010AnnualReport/ar10_139_152.pdf