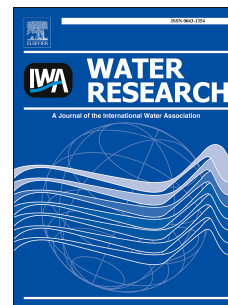


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# The application of bacteriophages as novel indicators of viral pathogens in wastewater treatment systems

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## Abstract

Many wastewater treatment technologies have been shown to remove bacterial pathogens more effectively than viral pathogens and, in aquatic environments, levels of traditional faecal indicator bacteria (FIB) do not appear to correlate consistently with levels of human viral pathogens. There is, therefore, a need for novel viral indicators of faecal pollution and surrogates of viral pathogens, especially given the increasing importance of indirect and direct wastewater reuse. Potential candidates include bacteriophages (phages) and the study described here sought to elucidate the relationship between three groups of phages (somatic coliphages (SOMPH), F RNA coliphages (F RNAPH) and human-specific phages infecting *B. fragilis* (Bf124PH) – enumeration using double layer agar technique) and viral pathogens (human adenovirus (HuAdV) and norovirus (NoV) – enumeration using molecular methods) through full-scale municipal wastewater treatment processes. FIB (faecal coliforms (FC) and intestinal enterococci (ENT) – enumeration using membrane filtration) were also monitored. Samples were collected every fortnight, during a twelve-month period, at each stage of four full-scale wastewater treatment plants (WWTP) in southern England (two activated sludge

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