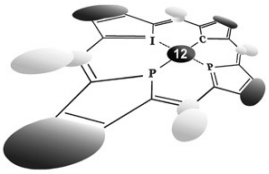

Replace Disinfection of wastewater in the mitigation of SARS-CoV-2 by photodynamic treatment

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Abstract The last few years have been marked by the SARS-CoV-2 pandemic. This virus is found in the intestinal tract reaching the wastewater system, and consequently the natural receiving water bodies. As such, inefficiently treated wastewater (WW) can be a means of contamination. The disinfection methods of WW currently used can lead to the formation of toxic compounds, be expensive, or inefficient. As such, new alternative approaches must be considered, namely microbial photodynamic inactivation (PDI). In this work, the phage ϕ6 was used as a model of the SARS-CoV-2. The phage viability was studied in WW under different environmental conditions of temperature, pH, salinity, solar and UV radiation. To assess the efficiency of virus inactivation, PDI assays were performed, both in phosphate-buffered saline (PBS) and in filtered WW, and toxicity tests of the resultant PDI-treated WW were performed on native marine microorganisms. Overall, the results showed that phage ϕ6 remains viable in different environments conditions for a considerable amount of time, with PDI being an efficient approach in the inactivation of the virus, and with the PDI-treated effluent showing no toxicity to native aquatic microorganisms under dilution realistic conditions, endorsing PDI as an efficient an safe WW tertiary disinfection method.

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