

The potential for coronavirus transmission in waters: what do we know?

Annalaura Carducci

A Carducci¹, I Federigi¹, M Verani¹, D Liu², JR Thompson³

¹Department of Biology, University of Pisa, Pisa, Italy

²Ecological Society of Shandong, Zhijijinshi Jie - Jinan, China

³UCL Department of Geography, University College London, London, UK

Contact: annalaura.carducci@unipi.it

Background:

Although the main route of transmission of SARS-CoV2 is via droplets and close contact, concerns about the possible secondary transmission via waters is growing given evidence for SARS-CoV2 faecal elimination. Here we review studies on coronavirus in water environments.

Methods:

A review was carried out of papers written in English on PubMed, Scopus and Web of Science. Papers were identified using the keywords: coronavirus, SARS, MERS, Covid-19 associated with water, surface water, drinking water, waste-water, sewage, slurry, sludge, biosolid. Papers were screened using their title and abstract to confirm their relevance. They were then reviewed to identify: coronavirus type and strain, type of water sample, type of study, detection methods, monitoring data, survival data, effect of disinfection and treatments.

Results:

Since 1978, only 18 papers met the selection criteria. Of these, 11 reported experimental studies, 6 field studies, and one included both field and experimental work. Experimental studies were carried out using samples spiked with SARS-CoV or surrogates: 4 addressed the recovery efficiency of detection methods; 3 reported studies on virus removal from waters by different treatments; 7 were focussed on survival in water samples with results ranging from 2 to > 100 days, depending on virus, type of water, temperature, and detection method. Field studies monitored the presence of coronavirus in waters, sewage, slurry or biosolid. The included in total no more than 200 samples and used different detection methods. Some samples tested positive in 5 studies.

Conclusions:

While knowledge of coronavirus in waters appears very scarce and fragmentary, the recent SARS-CoV2 emergency demands new attention be focussed on its survival in natural conditions and following treatment in order to assess the risk of waterborne and food borne transmission as well as developing monitoring within sewage treatment facilities.

Key messages:

- The potential spread of SARS-CoV2 through waters cannot be excluded without better knowledge.
- Urgent research on this topic is required.