Comparative Pre-treatment Analysis of RNA-Extraction Methods and Efficient Detection of SARS-COV-2 and PMMoV in Influents and 1st Sedimentation from a Wastewater Treatment Plan

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Abstract : This study aimed to compare two pre-treatment and two RNA extraction methods, namely PEG, and Nano bubble, Viral RNA Soil, and Mini Kit, in terms of their efficiency in detecting SARS-CoV-2 and PMMoV in influent and 1st sedimentation samples from a wastewater treatment plant. The extracted RNA samples were quantified and evaluated for purity, yield, and integrity. The results indicated that the nanobubble PEG method provided the highest yield of RNA, while the QIAamp Viral RNA Mini Kit produced the purest RNA samples. In terms of sensitivity and specificity, all these methods were able to detect SARS-CoV-2 and PMMoV in both influent and 1st sedimentation samples. However, the nanobubble PEG method showed slightly higher sensitivity compared to the other methods. These findings suggest that the choice of RNA extraction method should depend on the downstream application and the quality of the RNA required. The study also highlights the potential of wastewater-based epidemiology as an effective and non-invasive method for monitoring the spread of infectious diseases in a community.

Keywords : influent, PMMoV, SARS-CoV-2, wastewater based epidemiology
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