**Abstract**

Current methods of sampling wastewater for viral SARS-CoV-2 detection require human presence in often hazardous environments. A design of an automated wastewater sample analyzer is described here. Wastewater is a colloidal suspension of particles that usually requires manual solid separation before process. An electric field of 1.8 Volts/cm was tested to replicate similar effects. Results were satisfactory, obtaining an appreciable reduction in turbidity after 2 hours.

**Objective**

It is proposed here an automated mechanism to sample and analyze wastewater and transmit results back to a center control for opportune monitoring.

**Background**

**Electrokinetic sedimentation**

Negatively charged particles move towards the anode driven by the electrophoretic force.

**Pulse electric field effect on cells**

The electroporation increases mass transfer of cell-bound molecules and ions, giving rise to promising applications.

**System Description**

- Sample process
- Volume extraction
- RNA extraction by electroporation
- LAMP Amplification
- Quantification

**Results**

- First stage of the sample process was tested with wastewater from a local source in Lima, Peru.
- A 100ml sample of wastewater was taken for a proof-of-concept test on electrokinetic sedimentation.
- After 2 hours an appreciable decrease in turbidity was observed.

**Discussion**

1. The results obtained, although promising, must be quantified and repeated with new sets of variables, like values of electric field (E) in the range of 2-5V/cm to see the effects in the sedimentation time.
2. Effects of low and high E in organic matter must be analyzed in terms of its impact in the integrity of RNA or DNA both inside the microfluidic chip as outside.

**Conclusions**

1. Any effort to reduce risk cost and reduce process time will be profitable in the future.
2. This system has the potential to enable “real time” viral monitoring on remote locations avoiding problems related to RNA decay.
3. Moreover, enabling communication technologies for biotechnology, allows scalable global implementations for epidemiology tracking in developing countries.

**References**

2. Pulse Electric Field Technology for Wastewater and Biomass Residues. https://doi.org/10.3390/pr9050736

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