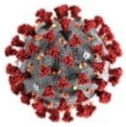
Biomonitoring Tools for SARS-CoV-2 and other disease threats in Air, Surfaces, and Liquids



Introduction

It is understood that SARS-CoV-2 (as well as influenza and SARS-CoV-1) transmission is primarily through droplet and contaminated surface contact. However, there is also significant direct and indirect evidence that aerosol and surface transmission of SARS-CoV-2 and other pathogens are likely means of transmission.[1-9] In the current reality of the COVID-19 pandemic, the following situations may be operating blindly when it comes to surface, fomite, and aerosol contamination.

- Hospitals and clinics
- Close-quarter living facilities such as
    - Military barracks
    - Cruise ships or other vessels
    - Senior living centers
    - Prisons
    - Schools
- Public transportation, event spaces, and industry

Programs like the Vessel Sanitation Program (VSP) at the Centers for Disease Control and Prevention (CDC) have been enacted to prevent and control the introduction, transmission, and spread of illnesses on cruise ships through such steps as monitoring and investigation. The food industry has adopted Hazard Analysis and Critical Control Points (HACCP) as a systematic preventive approach to hazards such as bacterial and viral pathogens in a manner to avoid the hazards before they become a reality. Similar approaches should be implemented to provide knowledge to management during the current COVID-19 pandemic.

However, traditional methods for aerosol and surface monitoring for bacteria and viruses are negatively affected by limited collection volumes, poor sample recovery, and complex and difficult to perform recovery processes. InnovaPrep offers novel systems that provide simple and straightforward methods for collection and detection of SARS-CoV-2 and other pathogens at previously undetectable levels.

Proactive monitoring provides an increased understanding of:

1. Current state of contamination in the facility
2. Effectiveness, limits or gaps of environmental controls
3. Effectiveness, limits or gaps of cleaning and disinfection procedures
4. Infection risk associated with staffing locations, functions, and available PPE

Enabling the introduction of improved control measures, cleaning and disinfection procedures, and corrective actions and enables PPE use optimization during the current shortage.

Biomonitoring Tools for SARS-CoV-2 in Air, Surfaces, and Liquids

Rapid, easy, portable & battery operable

Air Sampling – The ADC-200 Bobcat™ is a small lightweight and portable dry filter air sampler with a built-in tripod that actively collects viruses, bacteria and fungal spores from 100 LPM to 200 LPM. Sample recovery from the filter takes just seconds and results in a concentrated liquid sample of 6 mL that is ready for analysis using PCR or other molecular methods.

> **Longitudinal Metagenomic Analysis of Hospital Air Identifies Clinically Relevant Microbes** An article published by the Public Library of Science (PLOS ONE 2016). by *Paula King, et al.*

Liquid Concentration for exponentially increasing the limit of detection – the Concentrating Pipette™ will concentrate viruses, bacteria, and fungal spores into a final concentrate of ~200 µL in minutes with the press of a button. The Concentrating Pipette pairs perfectly with PCR and other molecular methods.

[**NOTE**: users report efficient concentration of COVID-19 (SARS-CoV-2) using the 0.05 um tips (item CC08020) for most sample types. The Ultrafilter tips (item CC08003) are recommended for samples that contain detergents or disinfectants or air samples collected from the ADC-200 Bobcat.]

> **Detection of an Avian Lineage Influenza A(H7N2) Virus in Air and Surface Samples at a New York City Feline Quarantine Facility** *Francoise M. Blachere, CDC NIOS, et al.*

A surface sampling method published by NASA JPL showed the effectiveness of how simple felt squares or dry Swiffer-type wipes can be wetted and used to collect samples from large area surfaces. The resulting sample can be concentrated, without enrichment, on the Concentrating Pipette into a PCR-ready sample of about 200 µL.

> **A Meta Mini Study: Improved Pathogen Detection of Air, Surface and Liquid Samples Through Rapid Concentration** *a poster presentation given by Dave Alburty, InnovaPrep CEO, at the American Society of Microbiology Biothreats meeting in January 2019. The poster outlines three studies where pathogen detection of air, surface and liquid samples were improved by using the Concentrating Pipette for rapid concentration. The studies were performed by independent labs including CDC NIOSH, NASA JPL, and the USDA.*

Detection – InnovaPrep elution fluids are compatible with most molecular assays used in microbiology laboratories and will provide complete analysis within hours. For those facilities without these capabilities, please contact us for recommendations or consult with your local microbiology services laboratories.

About InnovaPrep

InnovaPrep® is a developer of preanalytical tools for modern microbiology. InnovaPrep products provide the critical macro-to-micro interface between real-world samples and the input volumes of modern molecular methods for analysis. These tools increase sensitivity and enable a faster, easier, and more efficient means of delivering the most highly concentrated sample possible for subsequent analysis.

InnovaPrep's 35 pending and awarded patents apply to highly efficient collection and concentration of biological particles from air, surfaces, and liquids. InnovaPrep's Wet Foam Elution™ process enables instant recovery of particles from filters, membranes, surfaces, and objects. The primary utility for these technologies is to greatly improve the way biological samples, especially dilute samples, are collected and prepared for analysis, allowing the most advanced biological detection systems to contribute their full potential.

Innovaprep is a registered prime contract holder with Joint Enterprise- Research, Development, Acquisition, Production/Procurement (JE-RDAP) a Multiple Award, enterprise-wide omnibus Indefinite Delivery Indefinite Quantity (IDIQ) contract vehicle that enables us to compete for future research, development, production, procurement, and fielding of CBRN defense systems, equipment, and material task/delivery orders for the Warfighter.

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