

Abstract Submitted
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Macroscopic vs Microscopic UV Fluorescence of DNA/RNA: a New Approach for Fast & Accurate Detection & Counting of Pathogens in Drops for a New Device InnovaBugTM RILEY RANE, TANVI SATHISH, KARISHMA SIVAKUMAR, SiO2 Innovates LLC, VISHESH AMIN, U. of Southern CA, VIRAJ AMIN, VISH SWAMINTHAN, VIDYA DESAI, LAUREN PUGLISI, ROBERT J. CULBERTSON, NICOLE HERBOTS, Arizona State U. Physics — Accurate and reliable detection, identification and counting of pathogens is critical in the COVID-19 pandemic. Standard Colony Forming Units (CFUs) counting requires 24-72 hrs lab incubation, takes days and yields 30% false positives. This work aims to detect and count quickly and accurately pathogens on surfaces before and after 254 nm UVC sterilization. First, benign pathogens are incubated, detected, identified and counted using UV Fluorescence microscopy via SYBR Safe fluorescent green stain for nucleic acids pairs. UV microscopy does not yield accurate pathogen counts because areas analyzed are <than 100x100 μm^2 . A new approach uses macroscopic imaging of 20x50 mm² via SmartPhone and macroscopic fluorescence of <1mL of dyed pathogen solutions on microscope slides. This new Small Fluid Volume Diagnostic (SFVD) device, InnovaBugTM, yields within min. the number of green 540 nm photons emitted by fluorescing DNA and RNA from pathogens. A simple color analysis App measures the number of green photons vs intensity of the UVA, making InnovaBugTM a convenient and practical device that can be deployed in many situations including, but not limited to, disaster sites and refugee camps

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