MITIGATION - SCIENCE AND TECHNOLOGY ADVANCES FOR CHEMICAL AND BIOLOGICAL CONTAMINATION MITIGATION

Disinfection Of Surfaces Contaminated With Sars-cov-2 Surrogate, Hucov229e

Vipin Rastogi U.S. Army DEVCOM Chemical Biological Center **Brianna Leija** Excet Inc. support to U.S. Army DEVCOM Chemical Biological Center **Sarah Katoski** U.S. Army DEVCOM Chemical Biological Center **Orshuntis Cross** ORISE support to U.S. Army DEVCOM Chemical Biological Center

People are primarily infected with SARS-CoV-2 through exposure to respiratory droplets containing infectious virus particles. In addition, the spread of infection has also been observed via contact with contaminated surfaces and objects. Decontamination of infectious particles on surfaces requires the use of effective virucidal chemicals. Here we report the virucidal efficacy of List N and experimental chemicals against bacteriophage, Phi6 (BSL-1), and human coronavirus strain 229E, HuCoV229E (BSL-2), on three surfaces. The study was completed in two phases: a lab-scale phase with small coupons and a sub-scale phase using components recovered from a C-17 aircraft. Prior to experimentation, a literature review was conducted on possible surrogates for SARS-CoV-2, the causative virus of COVID19, disinfection approaches, and virucidal chemicals. Three chemicals were selected from the EPA's list N: Calla1452, Lysol, and bleach. Three experimental chemicals, DiChlor, OxiClean, and Bioxy, were also evaluated. The OECD test method was used for the lab-scale phase to evaluate the successful decontamination of three surfaces: keyboard plastic, aluminum and nylon webbing. A surface sampling approach was used for the sub-scale phase to recover the virus from the three C-17 aircraft components, control panel, seat cushion and seatbelt.

The results indicate a high variability in virus recovery and inactivation at the sub-scale level. These experiments were conducted in a closed environment using an electrostatic sprayer to deliver the test chemicals. The three test chemicals, DiChlor, OxiClean, and Calla1452, partially inactivated the human coronavirus. Additional studies are needed to optimize and achieve complete inactivation of this human coronavirus. A continued search for innovative technologies to rapidly and effectively combat novel viral and bacterial threats will better prepare our war-fighter and first responders in the future.