CONCURRENT SESSION 6 – BIOLOGICAL AGENT DECONTAMINATION

Efficacy of Household Disinfectants and Detergent-Based Cleaning Methods Against Coronaviruses

Rachel Hardison | *Battelle Memorial Institute*

Transmission of SARS-CoV-2 primarily occurs via close contact with respiratory aerosols from an infectious individual, though transmission through contaminated surfaces cannot be ruled out. The 2021 CDC guidelines for surface cleaning and disinfection of SARS-CoV-2 state that routine detergent-based cleaning of high-touch surfaces is sufficient in most cases; however, chemical disinfectants are recommended when individuals in household or community locations were infected with SARS-CoV-2. This study evaluated the efficacy of commercially available household disinfectants and detergent-based cleaning methods against Murine Hepatitis Virus A59 (MHV, 5% soil load in culture medium or simulated saliva) as a surrogate coronavirus for SARS-CoV-2 on coupons of high-touch surfaces [stainless steel (SS), ABS plastic (ABS), Formica, bus seat fabric (SF), Styrene Butadiene Rubber (SBR) or Latex-painted drywall tape (Paint)] at T0 or T2 hours post-inoculation. Four disinfectants (Bleach solution, Clorox Total 360, Vital Oxide, and Peroxide Multi-Surface Cleaner (Peroxide)) and two detergents (Tide Plus Bleach Alternative and Dawn Ultra Dishwashing Liquid) were evaluated against MHV. Disinfectants were applied by trigger-pull or electrostatic sprayer (ESS) and either held for recommended contact times or immediately wiped with a Kimwipe. To evaluate detergents, inoculated coupons were cleaned (damp wipe wiping) with and without pre-treatment with detergent solution or 375 ppm OECD hard water alone. Recovered infectious MHV was quantified by TCID50 assay. Cleaning methods were less consistent than chemical-based disinfection at eradicating MHV from high touch surfaces. Physical removal (wiping only, no pre-treatment) removed >2.3 log10 MHV on ABS, SS, and Formica when virus was cleaned immediately. Pre-treatment with detergent significantly increased ($p \leq 0.05$) removal of MHV in simulated saliva (but not in culture media) over hard water pre-treatment (Formica and ABS). Bleach solution, Clorox Total 360, and Vital Oxide were all effective (>3-log10 reduction) on SS, SBR and paint when used at recommended contact times, while Peroxide showed limited inactivation against MHV on SS within the recommended contact time. As expected, removal of MHV from SF was challenging. Cleaning was ineffective on SF under all conditions, while chemical disinfection was partially effective. The only products to achieve a 3-log10 reduction on SF were Vital Oxide and Clorox Total 360; however, efficacy of Vital Oxide against MHV on SF was reduced below 3-log when applied by ESS. This study highlights the importance of considering material, product, and application method when developing a SARS-CoV-2 cleaning and disinfection strategy.