



Is a wipe a wipe? Implications of various wipe substrate materials on proper disinfection of surfaces using commonly used disinfectant chemistries



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Abstract

Cleaning and disinfection is an integral part of the infection prevention program for healthcare facilities. As such, a variety of wipe substrates are commonly used for decontamination of surfaces. Common practice is to wet the wipe with a disinfectant at the time of use as it is more economical. The objective of this study was to evaluate the interaction between wipe substrates and commonly used disinfectant chemistries and the subsequent impact on saturation load and drying contact time.

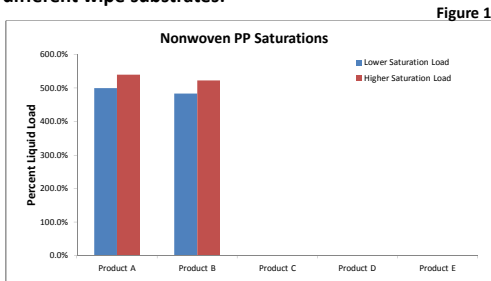
Materials and Methods

Materials: Three wipe substrates (melt blown polypropylene, microfiber, and reusable cotton) and five disinfectant products (Product A, 0.5% hydrogen peroxide, Product B, 0.8% quat/20% alcohol, Product C, 0.08% phenol mix, Product D, 0.07% quat mixture, and Product E, 0.2% sodium hypochlorite) were used in this study.

Procedures: Each wipe was tested for the minimum and maximum load required to wet the entire wipe surface of each disinfectant (absorbed liquid/dry wipe weight, in percentage). Drying time was measured as the duration in which 50% of the surface appeared dry after wiping. The wipes at both full saturation level and minimum load level were then applied to a 12" x 36" surface. The drying time and the level of liquid released from each wipe were measured.

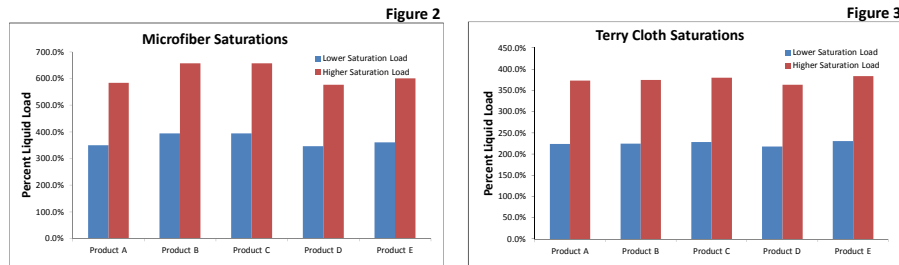
Results

➤ Difference of upper and lower saturation loads across different wipe substrates:

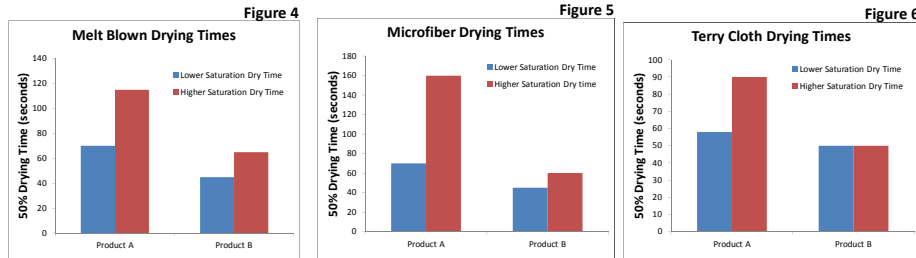


(Products C, D and E did not absorb into the nonwoven wipes even after 24 hours of incubation.)

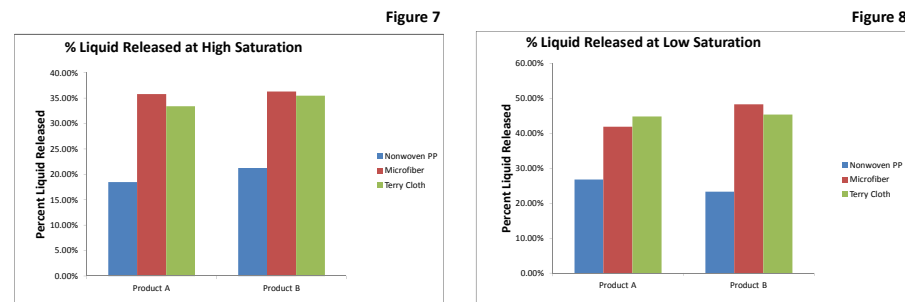
➤ Upper and Lower Liquid Saturation Loads in Percent Weight of Dry Wipes:



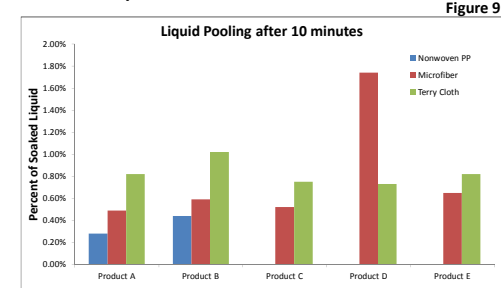
➤ 50% Drying Time When Higher and Lower Saturation Wipes Were Used to Wipe a 3 Square Foot Counter Top:



➤ Percent Liquid Released During Wiping, When Different Saturations of Wipes Were Used:



➤ Liquid Pooling When High Saturated Wipes Left on Counter Top for 10 Minutes:



Discussions and Concluding Remarks

1) Changing the substrate can make a more significant difference in the absorption level than that for the disinfectant. For the same chemistry, the saturation level varied about 43% from one substrate to another. 2) Drying time is positively correlated to the liquid load and liquid release. 3) The drying time for the same chemistry can differ significantly between the different type of substrates. 4) Different wipe substrates will release different amounts of liquid when left on a counter top, which would also directly correlate to how even the disinfectant is released during an actual wiping application. 5) Disinfectants with poor detergency cannot properly wet hydrophobic substrates. 6) Combined properties of wipe substrates and disinfectant chemistries play a major role in the mode of liquid release during surface disinfection.

In summary, the wipe substrate type has a significantly greater impact on the saturation level than the chemistry itself. Therefore, to ensure that adequate cleaning and disinfection will occur one cannot simply change the wipe substrate without first testing for its saturation level as well as the drying time with the disinfectant to be used to.