

Evaluating Filtration Performance of Face Masks Following Repeated Cycles of Decontamination Treatments

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The emergence of the Covid-19 pandemic compromised the health of millions. Knowledge that SARS-CoV-2, the responsible virus, was primarily spread through droplets called for further aerosol research and caused many to turn to protective face masks as a means of filtering out potentially virulent air droplets. In an effort to act sustainably and preserve inventory in the case of a shortage, many investigated possible methods of decontaminating masks for reuse including detergents, water, light, and heat. The aim of this study is to evaluate the filtration performance of widely used face masks (cloth, surgical, and KN95) that have undergone 10, 30, and 100 cycles of selected decontamination methods: incubated at 58° (dry heat), placed in an incubator at 58° with constant water vapor from a humidifier (wet heat), placed in a rice cooker at 58° (rice cooker), and strung on a clothesline outside to receive solar irradiation (sunlight). Filtration performance was evaluated by placing a PM2.5 particle counter inside a sealed chamber. The chamber was fitted with tubing connected to a port inserted in each tested mask. Masks were then worn by a human inhaling continuous water vapor from an atomizer. The following results illustrate that masks that have been decontaminated in an effort to remove virions, may be compromised in terms of filtration effectiveness depending on mask type, treatment method, and number of decontamination cycles used.