Occurrence of Household Mold and Efficacy of Sodium Hypochlorite Disinfectant

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Abstract

The occurrence and distribution of mold on household surfaces and the efficacy of bleach-based (sodium hypochlorite, NaOCl) disinfectants on mold viability and allergenicity was documented. Household microenvironments prone to increased moisture were specifically targeted. Using the sticky tape method, 1330 samples were collected from non-porous indoor surfaces of 160 homes across the United States, and analyzed for mold. Homes were randomly selected and recruited via phone interviews. Culture and immunoassays were used to measure the viability and reduction of allergenic properties of Aspergillus fumigatus following 2.4% NaOCl treatment. All homes and 72.9% of surfaces tested positive for mold. Windowsills were the most frequently contaminated site (87.5%) and Cladosporium the most commonly identified mold (31.0%). Five-minute exposures to 2.4% NaOCl resulted in a >3 to >6-log$_{10}$ reduction of culturable mold counts in controlled laboratory studies. Organisms were nonculturable after 5- and 10-min contact times on non-porous and porous ceramic carriers, respectively, and A. fumigatus spore-eluted allergen levels were reduced by an average 95.8% in 30 sec, as indicated by immunoassay. All homes are contaminated with some level of mold, and regrowth is likely in moisture-prone microenvironments. The use of low concentrations (2.4%) of NaOCl for the reduction of culturable indoor mold and related allergens is effective and recommended.

Keywords: allergens, disinfectant, fungi, household hygiene
Disinfection alternatives for contact surfaces and toys at child care centers

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Abstract

Child care surfaces are vehicles for disease-causing organisms. Disinfectant procedures prevent microbial dispersion. This study reports the effectiveness of CITRUS Farm Edition® (CFE), Clorox® GreenWorks™ (CGW) and Clorox® Anywhere® (CA) against Salmonella Typhimurium and Staphylococcus aureus inoculated (1 ml of 9Log$_{10}$ CFU/ml) on a high chair and ball toy. Disinfectants were sprayed, and bacteria recovered from surfaces by sponge method. Exposing an inoculated high chair to CA resulted in the highest reduction of S. aureus (3.92 Log$_{10}$) and S. Typhimurium (3.22 Log$_{10}$). CGW reduced S. aureus and S. Typhimurium by 2.84 and 2.12 Log$_{10}$ from the inoculated high chair, while the inoculated ball toy showed a 2.50 and 1.80 Log$_{10}$ reduction, respectively. CFE showed the lowest reduction with 1.42 and 1.53 Log$_{10}$ of S. aureus and S. Typhimurium from the inoculated ball toy. CA was the best disinfectant no matter which bacteria or surface was analyzed. Emphasis on the effectiveness of disinfectant products is needed to be included in child care center infection control programs.

Keywords: child care centers, surface disinfection, Salmonella Typhimurium, Staphylococcus aureus