

Antimicrobial Technology in the Building Industry

Introduction

The use of antimicrobial technology in construction materials, fabrics, and building products has become increasingly prevalent. This may be attributed to the rise in hospital-acquired infections (HAIs) and is evident in the marketing of antimicrobial face coverings used to confront the COVID-19 pandemic. The benefits of adding antimicrobial technology to products continues to be challenged today due to past research that shows it has little to no effectiveness in reducing infections.¹ However, research has also shown success with copper alloys used to reduce bacteria that is present on the surfaces of hospital furniture, fixtures, and hardware.² Therefore, a clear understanding of the impact and benefits of different antimicrobial technology should be understood when determining its applicability.

Antimicrobial Function and Benefits

Antimicrobials are used to prevent the growth of bacteria, mold, and mildew on products and surfaces. Antimicrobial additives are integrated during the manufacturing process in a liquid or powder form. They are commonly found in interior finishes and bathroom fixtures, and work to eliminate existing microorganisms and prevent new ones from populating. Additives remain active for the lifespan of a product; they are also often used in various products to prevent spoilage over time. Commonly advertised benefits of antimicrobial technology in building products and finishes include:

- Increases a product's lifespan.
- Reduces stain and odor-causing microbes.
- Prevents harmful microbes from residing on surfaces.

The COVID-19 pandemic has led to an increase in the number of face coverings made with graphene fabrics on the market. Although graphene has inherent antibacterial properties, it should be noted that antibacterials reduce the presence of microbes such as bacteria and mold, which are not viral. Careful consideration must therefore be given when advertising or implying its usefulness against viruses.

Impact to Human Health & The Environment

Building materials utilize silver ion coatings in products such as hardware and flooring. However, caution should be exercised when selecting materials with antimicrobial additives because there is evidence that some additives may be harmful to human health.³ Triclosan, an antimicrobial additive found in cementitious construction materials such as concrete, has been investigated by the FDA regarding its use in soaps and handwashes, and the full environmental and health impacts of triclosan additives are still being studied.⁴ The Centers for Disease Control stated that "the human health effects from exposure to low environmental levels of triclosan are unknown... More research is needed to assess the human health effects of exposure to triclosan".⁵ Additionally, studies have shown that some antimicrobial substances can migrate from products to other surfaces.⁶ The use of graphene based materials is also a subject of debate due to "a lack of universal acceptance criteria" related to the toxicity associated with them.⁷

Conclusion

Frequent handwashing and cleaning and safely sanitizing surfaces remain the established strategies in combating the spread of infectious diseases. Although antimicrobial technology has the potential to be beneficial, there are still many questions about its potential impact and efficacy. Some face coverings advertising antimicrobial properties are non-medical and have not yet been evaluated by the CDC or FDA or in rigorous scientific studies, and although copper has proven to be effective against some bacteria and viruses, "a low quality of evidence" was cited in response to the studies indicating reduced rates of infection.^{1,8} Antimicrobial additives are an emerging field, and our knowledge of their impact to human health as well as their effectiveness against viruses is rapidly evolving. Thus, more controlled research on the efficacy of antimicrobials incorporated into building materials, fabrics, and products is needed to ensure a positive impact on the health of buildings and their occupants.

Products, materials, and technologies referenced in this article are not cited as an endorsement by NIH. The intent of this article is to encourage more research and dialogue regarding the use of antimicrobials in the building industry.

References

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