The Role of Materials and Surfaces in the Transmission of Bacteria in Public Places

Hurst, Camilla

This research project is a study into measures to reduce the transmission of bacteria from person-to-person. This has become an important policy goal due to the rise in bacteria that are resistant to anti-microbial treatment and the health risks these pose for society. Earlier research using DNA sequencing has shown the contamination of the school with potentially pathogenic bacteria. Subsequent tests on the survival of bacteria on a range of surfaces found a very quick death rate for bacteria on pine. The goal of this study is to identify the compounds in wood that might contribute to its antibacterial properties. Solutions of pine extracts were prepared with physiological serum and ethanol. The water-based solutions had little effect, while the ethanol-based solutions did reduce bacterial presence. The chemical composition of these extracts was analysed with High Performance Liquid Chromatography. This showed that there were more compounds present in the ethanol extractions, of which a phenolic compound was the most predominant. The antibacterial properties of pine are due to chemicals in resins that serve as the natural defensive mechanisms of the tree. Materials can be used to reduce transmission risks, for example by using untreated pine for work surfaces. However, door handles pose a particular problem due to the frequency with which they are touched. The only way to quickly remove bacteria from a door handle is through repeated cleaning. To address this particular risk factor, a prototype door handle was built that dispenses a small quantity of disinfectant each time it is used. This was well received by a sample of users. It remains important to understand the role of materials in disease transmission in public spaces to help improve global hygiene.

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Fourth Award of $500