

Biomimetic Strategies to Design Non-Toxic Antimicrobial Textiles

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Abstract : Antimicrobial textile materials may significantly reduce the risk of infections and because they are able to absorb substances from the skin and release therapeutic compounds to the skin, they can also find applications as complementary therapy of skin-diseases as part of standard management. Although functional textiles may be a promising area in skin disease/injury management, as part of standard management, few offer complementary treatment even though they are well known to reduce scratching and aiding emollient absorption, reducing infection, and alleviating pruritus. The reason for this may rely on the low quality of supporting evidence and negative effect that antimicrobial agents may exert on skin microbiome, as for example additional irritation of the vulnerable skin, and by causing resistant bacteria. Several antimicrobial agents have been tested in textiles: quaternary ammonium compounds, silver, polyhexamethylene-biguanides and triclosan have been used, with success. They have powerful bactericidal activity but the majority have a reduce spectrum of microbial inhibition and may cause skin irritation, ecotoxicity and bacteria resistance. Furthermore, the rising flow of strains resistant to last-resort antibiotics rekindles interest in alternative strategies. In this regard, new functional textiles incorporating highly specific antimicrobial agents towards pathogenic bacteria, are required. Recent research has been conducted on naturally occurring antimicrobials as novel alternatives to antibiotics. Conscious of this need our team firstly reported new approaches using L-cysteine and antimicrobial peptides (AMP). Briefly, we were able to develop different immobilization processes towards 6 Log Reduction against bacteria such as *S. aureus* and *K. pneumoniae*. Therefore, here we present several innovative antimicrobial textiles incorporating AMP and L-Cysteine which may open new avenues for the medical textiles market and biomaterials in general. Team references will be discussed as an overview and for comparison purposes in terms of potential therapeutic applications.

Keywords : Antimicrobials, Antimicrobial Textiles, Biomedical Textiles, Biomimetic surface functionalization

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