

Bioprocess Engineering

New strategies for surface modification of cotton and silk textiles with antimicrobial properties



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Throughout the past decades hospitals have been facing a major challenge concerning the growing multi-drug microbial resistance, especially in immunodepressed patients. The development of antimicrobial textiles offers a promising solution in the prevention of infections in clinical settings since microbial shedding from our body contributes to microorganism spreading into a textile material, either directly in clothes or on surrounding textiles.

The use of some chemical antimicrobial agents in textiles has already been tested, as for example quaternary-ammonium-compounds (QACs), biguanidines, silver, triclosan, and N-halamines. However, these have proved to be of limited clinical applicability. They exhibit some cytotoxicity causing some irritation of the skin, toxicity to the environment and, except for silver and N-halamines, exhibit a reduced spectrum of microbial inhibition thus bringing about microbial resistance. Besides, with the exception of QACs, which establish durable bonds with textiles, they gradually lose their bioactivity with use and laundering.

Therefore a new strategy to develop non-toxic antimicrobial textiles without microbial resistance side-effects are hereby described. Our results demonstrate the potential of the cotton and silk covalent and non-covalent modification with aminoacids and antimicrobial peptides (AMPs) and opening new avenues to a world of applications in the area of increased risk microbial infections.