

## In vitro Skin Model for Enhanced Testing of Antimicrobial Textiles

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**Abstract :** There are numerous standard test methods for antimicrobial textiles that measure activity against specific microorganisms. However, many times these results do not translate to the performance of treated textiles when worn by individuals. Standard test methods apply a single target organism grown under optimal conditions to a textile, then recover the organism to quantitate and determine activity; this does not reflect the actual performance environment that consists of polymicrobial communities in less than optimal conditions or interaction of the textile with the skin substrate. Here we propose the development of in vitro skin model method to bridge the gap between lab testing and wear studies. The model will consist of a defined polymicrobial community of 5-7 commensal microbes simulating the skin microbiome, seeded onto a solid tissue platform to represent the skin. The protocol would entail adding a non-commensal test organism of interest to the defined community and applying a textile sample to the solid substrate. Following incubation, the textile would be removed and the organisms recovered, which would then be quantitated to determine antimicrobial activity. Important parameters to consider include identification and assembly of the defined polymicrobial community, growth conditions to allow the establishment of a stable community, and choice of skin surrogate. This model could answer the following questions: 1) is the treated textile effective against the target organism? 2) How is the defined community affected? And 3) does the textile cause unwanted effects toward the skin simulant? The proposed model would determine activity under conditions comparable to the intended application and provide expanded knowledge relative to current test methods.

**Keywords :** antimicrobial textiles, defined polymicrobial community, in vitro skin model, skin microbiome

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