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Prolongation of the biological durability of paper-based materials

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Abstract

Cellulose is an ubiquitously available and renewable resource. Not least for these reasons, the use of paper and board products as building materials is increasingly in the focus of materials scientists and engineers. Although cellulose is known to be susceptible to biodegradation, not much effort has been invested yet to study the microbial colonization of paper materials under environmental conditions. To overcome these drawbacks 1. We tested honeycomb boards in field studies at three climatically different locations within Germany and – for the very first time - paper microbiome analysis were performed using Next Generation Sequencing techniques (NGS) and quantitative PCR (qPCR). 2. we newly developed aminoethyl-chitosan-dithiocarbamate (AECS-DTC) with different molecular weights and characterized the substitution patterns by FTIR, elemental analysis (EA) and 1H-NMR. 3. We tested the antimicrobial activity of AECS-DTC paper and honeycomb board coatings against environmental isolates in the laboratory and in field studies using NGS, qPCR and ergosterol analysis.
KEYWORDS:

paper microbiome
paper microbial colonization
next generation sequencing
antimicrobial paper coatings
aminoethyl-chitosan
dithiocarbamates

Biography

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Education
2017 M.Sc. Biochemistry, University of Leipzig
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Research interests
- interaction of paper and environment
- paper microbiome
- antimicrobial and biodegradable paper coatings