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A NEW PREVENTIVE ACTING BIOINSPIRED ANTIMICROBIAL SURFACE – ACTUAL STATUS
AND FIRST RESULTS

Abstract

Antimicrobial surfaces are a highly promising approach in preventing/ reducing microbial loads in sensitive areas. There, high humidity and temperature levels are causing microbial contamination - endangering human health, health of organisms e.g. in bioregenerative life-support systems as well as technical equipment. Antimicrobial surfaces are beneficial • in spaceflight - w.r.t. activities in confined environments in LEO and during exploration activities - to support breeding activities of e.g. algae in bioreactors, biological experiments and to meet the COSPAR planetary protection policy • as well as on Earth - in hygiene areas during medical activities and food handling, in swimming baths, bathrooms etc..

For confined environments in space as well as on Earth, antimicrobial surfaces must be free of any toxic substance, otherwise higher non-target organisms would be affected. Thus, synthetic chemicals, silver, copper etc., as used until now, are not a suited solution, which in addition might lead to resistances of the bacteria to these toxic substances and are acting rather unspecific. Bioinspired technologies as using antimicrobial peptides from nature (e.g. from frog skin etc.), immobilised on surfaces, are a suited alternative. High flexibility concerning the microbial target, low toxicity and an absence of resistances are the main advantages.

As a consequence, the goal of the ESA-funded project BALS (Bio-inspired antimicrobial lacquer for space) was the development of a new innovative antimicrobial acting lacquer based on peptides. Project partners were OHB System, Fraunhofer Institute for Manufacturing Technology and Advanced Materials (IFAM) (both Bremen, Germany) as well as the German Aerospace Center, Institute of Aerospace Medicine (Cologne, Germany).

An overview about goals, technology and test results (w.r.t. antimicrobial activity, adhesion on substrates as well as absence of effects on higher organisms) of the BALS activity will be given at the symposium. Furthermore, an outlook about the next development and qualification steps until routine application in space and on Earth will be part of the presentation.