

and biocorrosion inside space modules. This issue is not only important for the International Space Station (ISS) but will be one of the main issues for the biosafety of manned modules and space greenhouses. Moreover, significant studies on the survival of microorganisms during exposure to space conditions, and on the microbial communities inside MIR and ISS modules were performed.

We have carried out research activities concerning biofilm metabolic activities of some reference bacteria on materials commonly used for aerospace industry and currently examined for space greenhouses. It was evaluated the effect on these materials of a mixture of emulsifiers produced by *Pseudomonas* strain AD1 and recently characterized by chemical methods. The following materials were investigated: Kevlar, Nomex, Beta cloth, aluminized Kapton, conventional Kapton, Combitherm, Mylar, copper foil, Teflon, aluminum, carbon fiber composite, aluminum thermo-dissipating textile, aluminum tape, Zylon, Ergoflex, Vectran.

Results showed a diverse affinity of materials for bacterial biofilm formation and occasionally sessile colonization was rejected. Pre-conditioning with the emulsifying extract led in some cases to a diminishment of biofilm dehydrogenase activity and development compared to untreated materials, taking into account both concentrations and experimental conditions. This also concerned the relationship between the physical traits of materials and the level of bacterial biofilm developed under the experimental conditions. Data may be useful to select appropriate material to be used for life support hardware to decrease the risk of surface biocontamination and health problems inside space modules, a great challenge for both biological and medical research.

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ULISSE: A Knowledge Management Project for Life and Physical Sciences from the International Space Station

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ULISSE (USOCs KnowLedge Integration and dissemination for Space Science and Exploration) is an FP7 project proposed by the USOC (User Support and Operation Centre) network in charge of the European operations on the International Space Station. The partners are led by TELESPAZIO in Italy and include as well knowledge scientists as data providers in all the related disciplines, life sciences have an important weight through the involvement of the MEDES consortium, a space medicine group organised by CNES and university hospitals in Toulouse. ULISSE concerns primarily all the European data obtained in the ISS in life sciences, physical sciences, earth and space sciences. It is designed also for other scientific data bases relating to space environment and space conditions as the data obtained in related studies like bed rest tests. The objective of the project is to lead to a better dissemination of the results obtained in space and to a knowledge increase through the simultaneous use of several data sets. The methodology preserved the original data sets with their full content, it differs in this respect from the data bases built since the International Geophysical Year (1957–1958) and the beginning from the space age. To resume, ULISSE intend to supersede the data sets with a header set in a mark-up language, the user manages the data through this header

and can treat simultaneously data sets of different origins. ULISSE meets astrobiology concerns in several ways as it can be used for example to make the relation between space environment data and physiological data of the crew, it can be used also to compare environmental effects on subjects in hospital conditions with simultaneous conditions in space flight. This communication describes the present status of the project and its implication for the future human exploration of space.

'\Brothers,\ I said, '\o you, who having crossed a hundred thousand dangers, reach the west, to this brief waking-time that still is left unto your senses, you must not deny experience of that which lies beyond the sun, and of the world that is not peopled. Consider well the seed that gave you birth: you were not made to live your lives as brutes, but to be followers of worth and knowledge. *Dante Alighieri, Inferno XXVI*

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Education and Networking in Astrobiology

The Results of a Recent Survey on Research and Teaching in Astrobiology in the UK

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Over the past 2 years, an extensive survey has been carried out (by Lewis Dartnell) of the astrobiology related activities in Universities in the United Kingdom. This has been combined with an analysis of conference abstracts (by Mark Burchell) and the results have been accepted for publication (Dartnell and Burchell 2009).

The survey provides a snap-shot of astrobiology in the UK. Fifteen Universities were found to offer courses (or modules) in their degree programmes and 34 active research groups identified. We have broken the researchers down by type (physicist/astronomer, microbiologist, etc.) and stage of career (research student, post-doctoral researcher, faculty member etc). Similarly, the numbers of undergraduate students taking astrobiology courses has been found and they have again been split by subject. In the case of students, physics/astronomy dominates, but Earth Sciences is the largest single departmental identifier for researchers.

The complete data will be summarised at EANA2009 and observations made as to the extent and nature of both teaching and research in the field of astrobiology in the UK.

Reference

Dartnell LR, Burchell MJ (2009) *Astrobiology* 9:717–730

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