SPACE LIFE SCIENCES SYMPOSIUM (A1)
Medical Care for Humans in Space (3)

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DEVELOPMENT OF MITOSPORIC FUNGI IN HERMETICALLY CLOSED CHAMBERS BY THE EXAMPLE OF MARS-105 EXPERIMENT

Abstract

Long-term staying of human in closed chambers with artificial environment is inevitably followed by microbial contamination of air, and also of interior and equipment surfaces. Developing in air and on surfaces, microorganisms pose potential hazard to humans' health. That is why one of the main tasks of future interplanetary flights including Mars missions is microbiological monitoring and control of the quality of cosmonauts' habitat in order to decrease the risk of their sicknesses. One of the main components of microbial society is the complex of mitosporic fungi. It is known that many species of mitosporic fungi have pathogenic, toxic and allergenic characteristics. Besides, they are able to remain in the environment for a long time and to infect crewmembers under corresponding terms. In this connection the study of the peculiarities of the forming of fungi society was conducted in ground experimental facility (NEK) within the simulate MARS-105 experiment when 5 persons were isolated for 105 days in closed chamber (NEK) with artificial habitat. The sampling and analysis of samples from the interior and equipment surfaces were conducted as a part of monitoring of the NEK habitat. During isolation of the subjects, 35 species of mitosporic fungi and 2 species of yeast were revealed on the internal surfaces of NEK. It should be noted that the most of the 35 species of fungi were the potentially pathogenic fungi. The following fungi dominated: Aspergillus (A. versicolor, A. ustus), Penicillium (P. brevicompactum, P. citrinum, P. chrysogenum), Alternaria alternata, Fusarium oxysporum – these are well-known opportunistic species forming such toxins as patulin, citrinin, alternariol, and others. The amount of these fungi was fluctuating. The obtained results are evidence of importance of sanitary-hygienic arrangements to normalize microbiological state of closed habitats.