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EXTREMOPHILES FROM SAUDI ARABIA FOR SPACE APPLICATIONS

Abstract

Saudi Arabia is characterized by unique diverse environments, starting from marine, salt marches, saline soils, hot springs and ending with desert ecosystems. Recently, the Saudi National Vision 2030 focused on sustainability by using alternative renewable natural resources, which can be served by the launching of the “National Biotechnology Strategy” to take further steps toward space technology and science. Many native microbial extremophiles might be suitable for space scientific investigations, as a start, we introduce our newly isolated thermophilic bacilli to be used in space microbiology experiments. Earth near space has extreme atmosphere conditions including radiation, low atmospheric pressure and unstable temperature which resembles Mars conditions and would be suitable for studying the evolution and survival of life. Bacillus strains are spore forming bacteria with the ability to produce high levels of enzymes and other metabolites that may serve in many biotechnological applications. Recent studies showed that some of bacterial strains found in the stratosphere are spore forming Bacillus, and with the development of OMICS technologies and modern molecular biology we can study the survival of these bacteria strains in extreme conditions of space. Recently, we isolated eight different thermophilic bacillus strains from Al-Lith hot spring and were identified by 16s rRNA sequencing, then submitted to NCBI GenBank as shown in table 1. These strains were collected from different parts of the spring water, sediment and wet shore where the temperature ranges from 37 OC.to 65 OC. Our pilot experiments reported unique properties for these bacilli such as plant growth promoting, biobased thermoplastic production and bacteriophage isolation. Therefore, we propose the use of our newly isolated bacilli as a thermophile for space experiments.

References:

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