

**VIABILITY OF FUNGAL SPORES UNDER MARS SOIL CONDITIONS.** D. E. Green-Tripp<sup>1</sup>, P. G. Núñez<sup>2</sup> and R. Vázquez<sup>1</sup>, <sup>1</sup>Instituto de Astronomía, Universidad Nacional Autónoma de México (22860 Ensenada, B.C., México; greendavid@astro.unam.mx), <sup>2</sup>Instituto de Estudios Avanzados de Baja California, A. C.(22800 Ensenada, B.C., México).

**Introduction:** Panspermia is the transport of microorganisms in a viable way, from an astronomical location to another, so life can be spread between planets or planetary systems [1, 2], and is widely cited as a hypothesis of how life could reached Earth. Studies have been conducted on the possibility that organisms can be transported by reverse panspermia (litho-panspermia) from Earth to other bodies in the Solar System [3], showing that material ejected can collide with Mars only if the ejecta velocity is at least 105% of Earth escape velocity. In this expelled materials, are added to clays, pollen grains, and spores [4].

**Martian Environment.** Assuming that fungus spores reach Mars, the red planet still has a very hostile environment for life. However, some extremophiles are good candidates to survive such harsh conditions. The approximate average temperature on Mars is -65 °C and its average surface pressure is 560 Pa [5], not allowing the presence of liquid water over long periods. Another factor that difficult the viability on Mars is UV radiation. The UV-C ( $\lambda < 280$  nm) and UV-B ( $280 < \lambda < 320$ ) radiations are extremely damaging to organisms, and are present in the Martian atmosphere with significant flow rates [6, 7]. With respect to the soil analysis of the Viking and Phoenix landers, it was detected alkaline pH on the Martian soil, about 8 and  $7.7 \pm 5$ , respectively [8].

**Fungi as a form of extremophile life.** Even though many analyzes performed for viability and germination of fungi are focused at high temperatures and acidic pH [9, 10], is remarkable the fungi tolerance to drastic changes in those parameters. Another important characteristic of fungi is its resistance to UV radiation. It have been observed species of fungi that are able to create mechanisms that allow it to survive in desert environment where sudden changes in temperature, desiccation and intense and persistent UV radiation occur [11].

**Analyzing the Viability of Fungal Spores:** Despite adverse Martian conditions, fungi have proven to be one of the toughest life forms. A similar and recent study [4] was performed with pollen grains. Some of the pollen samples were contaminated with fungus spores (*Alternaria sp.*, *Aspergillus sp.* and *Penicillium sp.*). These fungi are present in the outer layer of pollen grains and insides their apertures were they can be protected through the journey to Mars. In this project we propose to analyze the survival of fungi under condi-

tions of temperature, pH and UV radiation similar to those present on Mars.

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