# Reunión de la
# Red Mexicana de Extremófilos

Popocatépti e
Iztaccihuatl

Extremófilo

Laguna Salada
Baja California

## Taller Internacional de Organismos Extremófilos

# International Workshop of Extremophile Organisms: Preserving the Biodiversity, Cosmovision and Cultural Heritage of the Extreme Ecosystems
# and
# 2d Meeting of the Mexican Association of Extremophiles

# October 27th to 31th, 2020, Oaxaca, Oax.

**Dirección del evento: Hotel Misión de los Angeles, Oaxaca, Oaxaca**
**(Calz. Porfirio Díaz 102, Reforma, 68050 Oaxaca de Juárez, Oax.)**

## S2: 32_Growth of *Bacillus subtilis* into chlorinated oxyanions seemingly Mars´ brines conditions

Marisela Aguirre Ramírez[1]*Sandra I. Ramírez Jiménez[2]

[1]Laboratorio del CAC Biología Celular y Molecular. Instituto de Ciencias Biomédicas, Universidad Autónoma de Ciudad Juárez, Anillo Envolvente del Pronaf y Estocolmo s/n, Ciudad Juárez, Chihuahua. [2]Laboratorio de Simulación de Ambientes Planetarios. Centro de Investigaciones Químicas, Universidad Autónoma del Estado de Morelos, Av. Universidad 1001, Chamilpa, Cuernavaca, Morelos.
*marisela.aguirre@uacj.mx.

Liquid water is one of the essential requirements for life as we know it together with a source of chemical elements (including carbon) to build biomolecules useful for structure and maintenance, as well as a source of energy that promotes a redox metabolism. If a planetary object fulfills at least one of these requirements, it is identified as a habitable place.

Nowadays, the astrobiological interest on Mars is rising as the number of robotic and future manned missions can testify. Mars is the fourth planet in the Solar System, smaller than Earth (15% of its mass) with a gravity of only 38% of the terrestrial value. Its reddish color is due to a soil rich in iron oxide ($Fe_2O_3$), but high concentrations of sodium ($Na^+$), calcium ($Ca^{2+}$), and magnesium ($Mg^{2+}$) have been reported (1). Additionally, Martian polar caps contain icy water, and small amounts of steam water have been observed in its atmosphere (2). Recent observations evidence the existence of sulfate ($SO_4^{2-}$), chlorates ($ClO_3^-$), and perchlorates ($ClO_4^-$) brines that could be responsible for partial surface hydration (3).

With such a an scenery, we are evaluating the growth of Bacillus subtilis, a mesophilic Gram-positive bacterium, in culture media modified with $KClO_3$, $NaClO_3$, $NaClO_4$ and $Mg(ClO_4)_2$ at concentrations similar to those reported for the surface of Mars. *B. subtilis* is a good astrobiological model because it has been demonstrated that its spores resist the outer space conditions (4), and can grow when exposed to different NaCl or $MgCl_2$ concentrations (5). We propose that this halotolerant bacteria can also grow in the presence of chlorinated oxyanions due to the expression of the HemHYQ complex, homologous to the chlorite dismutases described in other biological groups (6).