

**BIOMARKERS AND LIFE DETECTION STRATEGIES IN THE FIRST STEPS FROM MASE PROJECT.**

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**Introduction:** Life is a physico-chemical process by which it leaves tell-tale signals on Earth. These signals are indicators of life and are known as biomarkers. Detecting them is a means of discovering whether life exists on any alien worlds.

In the project MASE (Mars Analogues for Space Exploration) we work to improve approaches and methods for biomarker detection and extraction in samples with low biomass from Mars analogue sites.

A developed antibody microarray competitive immunoassay (MACIA) for the simultaneous detection of compounds of a wide range of molecular sizes, from single aromatic ring derivatives or polycyclic aromatic hydrocarbons (PAHs) to small peptides, proteins, or whole spores and cells ([1]; [2]).

**Methods:** Samples from the three MASE campaigns in Iceland (Graenvatun Lake), United Kingdom (Boulby Mines) and Germany (Regensburg) were used in microarray immunoassays to determine the presence of biomarkers.

DNA extraction and subsequent cloning procedures could correlate antibody microarray findings.

Complementary assays using ATP as a biomarker of viable microorganisms will help in developing techniques for identification of biosignatures.

**Results:** By sandwich assay we have detected signals of the presence of some microorganisms groups specially psychrophiles, iron and sulfur oxidizers (Iceland and Boulby), perchlorate reducers (Regensburg) some from cyanobacter group and others alike to those which frequently appear in rock and sedimentary environments.

**References:** [1] Fernández-Calvo, P., Näge, C., Rivas, L. A., García-Villadangos, M., Gómez-Elvira, J., & Parro, V. (2006). *Planetary and Space Science*, 54, 1612-1621. [2] Parro V, Fernández-Calvo P, Rodríguez Manfredi JA, Moreno-Paz M, Rivas LA, García-Villadangos M, Bonaccorsi R, González-Pastor JE, Prieto-Ballesteros O, Schuerger AC, Davidson M, Gómez-Elvira J, Stoker CR. (2008). *Astrobiology*. 8(5):987-99

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