

# Biomarkers Below Planetary Surfaces

Scientists have drilled to over 166 meters (545 ft.) below ground in the Rio Tinto region of Spain to study subsurface microbial communities.

Rio Tinto is currently used to study life's limits on Earth, it is a highly acidic river with sulfuric acid and high ferric iron content. In this environment extremophile microbes survive using energy from chemical reactions.

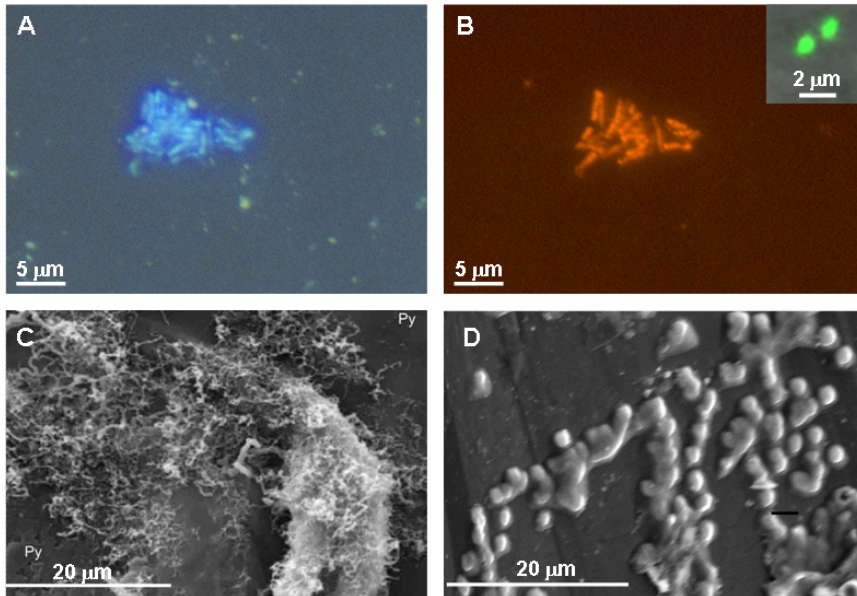


Waters of the Rio Tinto in Spain run red.

For this new study, 200 samples were collected below ground to model the subsurface ecosystem. Scientists used many tools to find biomarkers of life, which will help determine how to best search for life on other planets.

The subsurface is the best place to look for life on rocky planets like Mars, where the environments would be protected from harsh surface extremes of temperatures, radiation, pressure, and desiccation. To this end, the Mars Analog Research and Technology Experiment (MARTE) in Rio Tinto tests equipment for future Mars missions.

Puente-Sánchez et al. (2014) *Geobiology*.



SEM-FISH images of bacteria bound to the minerals in drill cores.