

# Analysis of Samples Collected from Silica-depositing Hot Spring by the Mars Organic Molecule Analyzer (MOMA) on ExoMars

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The Mars Organic Molecule Analyzer (MOMA) investigation is a joint venture between the European Space Agency and NASA, and a key analytical instrument on the ExoMars rover (launch July 2020). A top-priority objective of MOMA is to characterize any nonvolatile organic molecules encountered within two meters of the Mars surface. We present here the MOMA characterization of Mars analog samples collected from the main outflow channel of an alkaline silica-depositing hot spring known as Queen's Laundry in Yellowstone National Park, WY, USA. These samples contain microbial streamer communities composed of oxygenic and anoxygenic phototrophs. Both freeze-dried microbial streamers sample and their total lipid extracts (TLEs) have been measured on a prototype MOMA instrument in the laser desorption mass spectrometry (LDMS) mode. Analyses have been duplicated on commercial LDMS instruments for comparison. As these samples are relatively well characterized previously by other microscopic and spectroscopic techniques including SEM, and ToF-SIMS (time-of-flight secondary ion mass spectrometry), the experiment here not only added the LDMS results to the sample characterization database, but also demonstrated the potential of MOMA instrument to reveal the presence of key biomarkers preserved in a natural sample, providing guidance for *in situ* surface operations and interpretation on ExoMars.