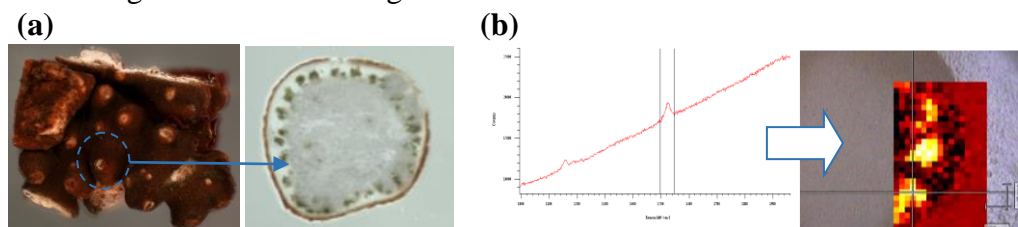


# Raman study of the stability of biomolecules on lichens after space- and Mars like conditions: Mission Ground Reference (MGR) samples

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The main objectives of BIOMEX [1,2] project are, on the one hand, to analyze the resistance of terrestrial extremophiles to survive in outer space and in Mars-like environment, and on the other hand, to deep into the stability under space and Mars-like conditions of biomolecules. For that reason, samples of the extremophile lichen *Circinaria gyrosa* (*C. gyrosa*) [3, 4] has been selected and included in the BIOMEX experiment. After the exposure on the EXPOSE-R2 facility at the ISS during 15 months, a correlative Mission Ground Experiment (MGR) reproducing EXPOSE R2 conditions was performed: selected samples of *C. gyrosa* were exposed to simulated Mars-like and Space-like environments reproduced at the space- and planetary chambers of DLR-Cologne in order to study Mars' habitability and resistance to real space conditions. These samples defined as Mission Ground Reference (MGR) samples, have been analyzed in order to search for biomarkers and pigments at the inner part, containing the medulla and algal clusters.



**Fig. 1** (a) Cross sections of MGR sample (M21t13); (b) Mapping of  $\beta$ -Carotene (at  $1524\text{ cm}^{-1}$ ) distribution in algal clusters.

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