

**Project Title:** Microbial survival under hyperarid conditions in the Atacama Desert

**Supervisor:** Dr. Anna Hakobyan, Prof. Claudia Knief

**Institute/group:** INRES - Molecular Biology of the Rhizosphere

**Webpage:** <https://www.boden.uni-bonn.de/rhizosphare-1/de>; <https://sfb1211.uni-koeln.de/>

**Requirements:** Bachelor in Biology, basic knowledge of common molecular biology techniques (preparation of buffers, DNA extraction, PCR, agarose gel electrophoresis) and culturing are of an advantage, independent and team working skills, good communication skills in English.

**Skills to be learned:** The student will learn about microbial life in the Atacama Desert. Methodologically, she/he can do microbial DNA extraction from desert soils, PCR for next generation amplicon sequencing (16S rRNA gene, fungal ITS1 region) and possibly qPCR. Further, aerobic cultivation of desert isolates, H<sub>2</sub> and O<sub>2</sub> microsensor measurement methods can be done. The project may include sequence data analysis if of interest.

**Project Description (max. 150 words):** The Atacama Desert represents an extreme environment for microorganisms, caused by the strong limitation of water. Moreover, habitats such as soil are mostly strongly limited in organic carbon as substrate for growth. In our project, we study the distribution, activity and adaptation of microorganisms in the hyperarid Atacama Desert. Our work shows that microbial life exists quite ubiquitously in diverse habitats of the Atacama Desert, even at the driest locations. We study which microbes sustain these extreme conditions, especially in soils, and how they survive. In the next two years, we want to assess how selected isolated bacteria from the desert can overcome the extreme conditions via metabolic adaptations. We will also explore whether fog enables microbial activity at low rates.

**Support concept (max. 75 words):** The successful candidate will become part of our Atacama team. The student will be trained by members of this team to obtain microbiological background knowledge about the project and the methodological skills mentioned above. As part of the AG Knief group she/he is invited to attend group seminars, which provide broader insight into different research activities. We in turn expect a valuable contribution by the student to our Atacama Desert research project.

**Interested to recruit and finance a suitable student by own funds:** NO