

DBT-NCCS scientists study microbial ecology of world's highest saltwater lake

New Delhi, Nov 20: The Pangong Lake is the world's highest saltwater lake, situated on the Himalayan Plateau, traversing the India/China border. This aquatic environment is relatively poor in nutrients (oligotrophic), and exposed to extremes of temperatures and other harsh conditions like UV radiation. The water of this pristine lake is usually very clear, and the sediments and surfaces of pebbles are often devoid of any visible films of microorganisms (biofilms or microbial mats). The noticeable increase in human activities near this lake over the past decade or so has the potential to have influenced the ecosystem of this lake, including the microbial ecosystem.

The presence of biofilms was recently observed near the shore of the Pangong Tso, next to the Maan village. Biofilms on rock surfaces in such oligotrophic lakes are important components, since they can often dominate the primary food production process in these ecosystems, through the activity of photosynthetic microorganisms present in them.

The biofilms in the Pangong Tso piqued the interest of researchers at the National Centre for Cell Science (DBT-NCCS) in Pune. Microbiologists at the DBT-NCCS's Centre of Excellence, the National Centre for Microbial Resources (DBT-NCCS-NCMR), set out to learn more about the bacterial communities associated with the lake water, sediments and biofilms in the Pangong Tso. They conducted studies on different components of this lake to learn if the microbial communities in the biofilms are different from the bulk water and sediments without biofilms. They studied what metabolic capabilities these microorganisms could have. They also analyzed the physicochemical characteristics of the lake water, to get a complete understanding of this ecosystem.

The researchers have observed that overall, the bacterial phyla, Proteobacteria, Bacteroidetes, Acidobacteria, Planctomycetes, Actinobacteria, and Firmicutes, were dominant across all types of samples studied. However, maximum bacterial diversity was observed in the sediments, followed by biofilm communities and in the water samples in that order. Further, the bacterial communities from the water, sediment and biofilm samples were significantly different from each other.

They found that the biofilm samples had a higher abundance of bacteria that carry out photosynthesis, called cyanobacteria, than sediment and water samples, supporting these researchers' hypothesis on the establishment of primary producers in biofilms. These studies have provided interesting insights into the microbial ecology of the Pangong lake, with a bird's-eye view of how the bacterial communities of this lake are compared to other saline and low-temperature lakes in the Tibetan Plateau.

Contact Person & Contact Details:

Scientist who led the study: Dr. Praveen Rahi (praveen@nccs.res.in),

Communication: Jyoti Rao (jyoti@nccs.res.in)

Institute website: <https://www.nccs.res.in/>