

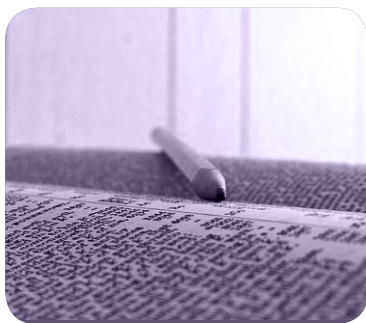
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**Characterization
of cyanobacteria
isolated from
biocrusts and
rivers, and their
physiological
response to
temperature
changes**

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Characterization of cyanobacteria isolated from biocrusts and rivers, and their physiological response to temperature changes

Abstract

Cyanobacteria are a group of very diverse and widely distributed group of photosynthetic prokaryotes. They are the first colonizers and primary producers in habitats such as rivers and biocrust and therefore have an important ecological role in ecosystems and in biogeochemical cycles on earth. Studies of cyanobacteria in these environments in the Mediterranean basin, in Spain are few and many of the metagenomics environmental studies underway have generated many unidentified sequences that need to be assigned to known taxa. Therefore, in this study a poliphasic approach to cyanobacterial characterization of isolates from environmental samples was performed along with experiments on strains' response to different temperatures. A total of 15 strains were identified by microscopic evaluation and the molecular characterization allowed the successful isolation and sequencing of 11 cyanobacterial strains. The morphologically identified strains belonged to the genera: (*Chroococcus*, *Cyanothece*, *Gloeocapsa*, *Aphanothece* and *Synechococcus*, *Phormidesmis*, *Trichocoleus/Leptolyngbya* and two heterocyst-forming filamentous (*Scytonema*, *Tolypothrix*) from biocrusts, and *Sytonemaptopsis*, *Tolypothrix*, *Calothrix* from river benthos. Most morphologic and genetic identifications were in agreement, while others need further studies. The ones that aligned with non-cultivated sequences might represent new cyanobacterial species for these environments. Physiological experiments showed greater growth and photosynthetic activity and nitrogen activity (in the case of one heterocystous cyanobacteria studied) within the range of 12-30°C. Growth and photosynthetic behavior in mixed cultures of cyanobacteria isolates was more varied and related to distinct microscopic observations. Nitrogen fixation was observed under all studied temperatures for isolated classified under the genera *Tolypothrix* strain BARR.