

Study of PHA producing cyanobacteria by cryo-SEM

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Polyhydroxyalkanoates (PHA), polyesters of hydroxyalkanoic acids are biodegradable plastics, that many prokaryotic cells accumulate in granules as storage material. Recent studies showed, that cells containing PHA are also more resistant to stress environment such as osmotic imbalances, UV irradiance or temperature changes. Besides microbial cell storage material, PHA are also considered as a promising bioplastic material, due to its biodegradability and mechanical properties similar to petrochemical plastics, such as polypropylene [1,2].

Synechocystis sp. is a strain of unicellular cyanobacteria commonly occurring in fresh and saltwater that are also able to produce PHA in the cell. This study deals with morphological study of cyanobacterial strains *Synechocystis* sp. PCC 6803 focused on the PHA content.

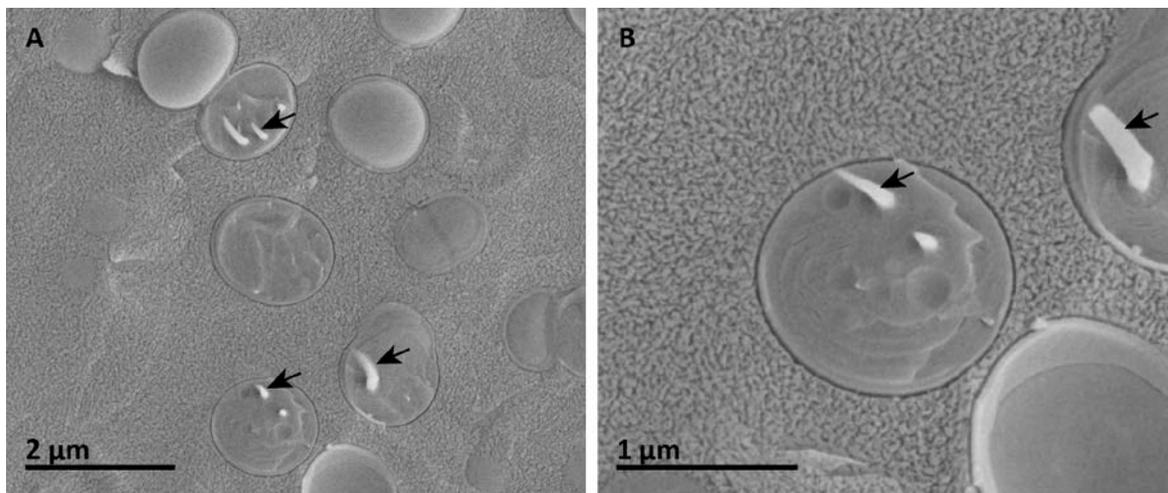


Figure 1 (A-B): Cryo-SEM micrographs show cyanobacterial cells of *Synechocystis* sp. PCC 6803 that were fixed using high-pressure freezing method, freeze-fractured, coated with Pt and imaged in cryo-SEM [3,4] that enabled observation of intracellular PHA granules which are elastic even at temperatures of -130 °C (black arrows).

References:

- [1] S. Obruca et al, Involvement of polyhydroxyalkanoates in stress resistance of microbial cells: Biotechnological consequences and applications. *Biotechnology Advances* 36 (2018) p. 856-870.
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- [3] K. Hrubanova et al, Monitoring *Candida parapsilosis* and *Staphylococcus epidermidis* Biofilms by a Combination of Scanning Electron Microscopy and Raman Spectroscopy. *Sensors* 18(12), (2018), 4089.
- [4] K. Hrubanova et al, The innovation of cryo-SEM freeze-fracturing methodology demonstrated on high pressure frozen biofilm, *Micron* 110 (2018) p. 28-35.

The research was supported by the Czech Science Foundation (project GF19-29651L) and the infrastructure by the Czech Academy of Sciences (project RVO:68081731).