

# **Cultivation of cyanobacterium *Synechococcus elongatus* PCC 7942 in wastewater substrate – A challenge to be addressed**

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## **Abstract**

Due to their nutrient content, various types of biologically treated industrial wastewater can be used for the cultivation of cyanobacteria and the production of added value products and/or green energy. An implementation of a cyanobacteria-based nutrient removal/recovery treatment stage in typical aerobic biological processes may reduce their environmental footprint on the basis of circular economy and carbon emission mitigation. *Synechococcus elongatus* PCC 7942 (hereafter *S7942*), a freshwater cyanobacterium that does not produce cyanotoxins, could be utilized in wastewater treatment giving the additional opportunity for direct biohydrogen production via a dark anaerobic fermentation. Nonetheless, maintaining a monoculture cultivation in wastewater-media constitutes a significant challenge to be addressed, as a plethora of antagonistic and predating microorganisms exist in such media. In this work, the disinfection efficiency of filtration and of different low-cost disinfectants were studied in order to insure *S7942* monoculture at industrial wastewater-medias. The growth rates and nutrients removal rates of *S7942* in wastewater media were compared to control cultures in BG-11 culture media and the disinfection efficiency was evaluated via microscopic and microbiological examination. The results highlight the problem of monoculture contamination by competitive and/or predating non-photosynthetic microorganisms that exist in biologically treated wastewaters. A combination of low-cost disinfection techniques is suggested towards the implementation of a cyanobacteria-based process in biological wastewater treatment.