

عنوان مقاله:

Study of Stress-Responsive Genes Effective on Lipid Profiling in Some Newly Isolated Cyanobacteria

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خلاصه مقاله:

In this study, 17 heterocystous cyanobacterial strains were investigated for biomass density, lipid content, lipid productivity, and fatty acid composition. A superior strain for biofuel production was selected for a further study evaluating the lipid enhancement under some environmental stress including different concentrations of NaCl, H₂O₂, and CuSO₄. Moreover, Real-time PCR analysis determined the dependency of cyanobacterial cell age and also stressed conditions on the expression variations of some essential genes in lipid biosynthesis pathways, and photosynthesis. Among the studies strains, *Aliinostoc* sp. produced the highest chlorophyll (19.79 µg/mg DW) and lipid (12.64% DW) content, therefore it was selected to optimize experimental conditions for lipid biosynthesis; The optimal conditions for lipid production (CuSO₄: 3 µM, NaCl: 10 mM, H₂O₂: 0) resulted in an increase in lipid (12.82%) and a decrease in chlorophyll (10.32%) content, compared to the control condition. These results were confirmed by up-regulation of the *accD* gene (73%) as the first gene involved in the lipid production pathway, and down-regulation of the *rbcL* gene (54%), which is an indicator of photosynthetic rate. Since the ability of growth and lipid production of *Aliinostoc* sp. has been optimized under salinity and heavy metal stress conditions, lipid production could simultaneously perform by biorefining of contaminated water resources.

کلمات کلیدی:

Pollution, Wastewater treatment, Lipid, Cyanobacteria, Stress

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