ANTIOXIDANT ACTIVITY IN *ARTHROSPIRA PLATENSIS* CELLS DURING THE VITAL CYCLE IN STANDARD AND STREES CONDITION

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The goal of this work was to determine the changes that occurred in the antioxidant status of cyanobacterium *Spirulina platensis* during its life cycle. For this *Arthrospira platensis* (*A. platensis*) *CNM-CB-11* strain from National Collection of Nonpathogenic Microorganisms (Institute of Microbiology and Biotechnology of the Academy of Science of Moldova) was used. The standard cultivation of *A. platensis* cells was carried out in an open-type tank with a volume of 60 L in the SP-1 nutritive medium (NaNO3-2,5 g/L; NaHCO3-8,0 g/L; NaCl-1,0 g/L; K2SO4-1,0 g/L; Na2HPO4-0,2 g/L; MgSO4•7H2O-0,2 g/L; CaCl2-0,024 g/L; H3BO3-2,86 mg/L; MnCl2•4H2O-1,81 mg/L, CuSO4•5H2O -0,08 mg/L; MoO3 –0,015 mg/L; FeEDTA-1ml/L) at 32-35°C, illumination 37-55 μmoles of photons/m2/s, pH 8-9 and constant mixing. Stress condition was induced by reducing the illumination period to 4 hours (from day 3 until day 7). Sampling was strictly performed every 24 hours, in order to exclude circadian variations involved in oxidative status of microalgae culture. Antiradical activity of extracts from *Arthrospira platensis* biomass during its life cycle was determined by applying ABTS assay (expressed in TEAC).

The antioxidant activity of ethanolic and water extracts reacted quickly to changing the lighting regime. On the first day of light stress, the antiradicalic activity against ABTS cation radical was reduced by 12,4-19,3% compared to the extracts from biomass grown under standard conditions. On the second day of light-induced stress, the antioxidant activity of the extracts was reduced by 20,2% -22,6%. The variations in the antioxidant activity of spirulina extracts in both experimental variants were identical during the first 6 days of cultivation, even under conditions of induced stress.

On day 7 of the cultivation cycle (which corresponds to the first day of returning to the normal light regimen), the antioxidant activity in the control variant decreased by 19% compared to the previous day and in the experimental variant with restored lighting regime increased by 23%. Thus, in spirulina biomass subjected for four days to light stress, the return to the normal illumination induces the accelerated synthesis of compounds with antioxidant properties. The next two days of cultivation, the antioxidant activity of ethanolic and water extracts from spirulina cultivated in standard and stress condition became leveled. Light stress reduces antioxidant activity in spirulina biomass, but in case of the return to the normal lighting regime this activity is restored.

The modification of the antioxidant activity correlates with caroten content in biomass. On the first day of light stress, carotene content was reduced by 15% compared to spirulina biomass grown under standard conditions. The return to the normal illumination induces the synthesis of carotene, which exceeds by 26% its content in spirulina biomass grown under optimal standard conditions. The next two days of cultivation, carotene content increased in both experimental variants, but remains higher in case of induced stress conditions. A strong negative correlation between carotene content and malonyl dialdehyde (MDA) values in spirulina biomass grown under light stress demonstrates the protective role of carotenoids. These results show carotene involvement in maintaining membrane integrity by protecting lipid against oxidative degradation. The carotenoids are some of the basic components that determine antioxidant activity of spirulina biomass under stress conditions.