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TECHNOLOGICAL STRESS AND THE QUALITY OF SPIRULINA BIOMASS

Liliana CEPOI
Institute of Microbiology and Biotechnology, Republic of Moldova

E-mail: *cepoililiana67@gmail.com*

Arthrospira platensis is an industrially grown cyanobacterium in several countries, and its production is constantly increasing. Technological factors can be a useful tool for the quality of cyanobacterial biomass, but may present a risk of free radical accumulation. Taking into account that one of the requirements for technologies of cyanobacterial biomass production is to ensure the high quality of the final product, the purpose of this research was to investigate *the influence of thermal, salt, illumination and chemical stresses on biomass quality of cyanobacterium Arthrospira platensis CNMN-CB-11 (spirulina).*

Stress conditions were created by deviating from the optimal ones (temperature 30±1 ºC, pH 8-10 and continuous illumination 37-55 μM photons/m^2·s) or by adding xenobiotics. Evaluated quantitative parameters were: biomass quantity, content of proteins, phycobiliproteins, carbohydrates, β-carotene and chlorophyll *a*, lipids and malondialdehyde (MDA), antioxidant enzymes activity (SOD, CAT, POD).

All types of stress are associated with an increase in the amount of MDA into biomass and a modification of the antioxidant activity of aqueous extracts, and the activity of the antioxidant enzymes SOD, CAT, and POD. Depending on the type of stress and its intensity, the values of these parameters may increase or decrease.

Under moderate stress conditions (e.g. in the case of periodic illumination), certain technological advantages can be achieved, such as increased biomass production and high levels of phycobiliproteins and carbohydrates in biomass.

When the purpose of production is not to use the entire biomass, but to extract certain bioactive components (e.g. phycobiliproteins, polysaccharides), the advantages of moderate stress can be successfully applied as simple, low cost, and efficient technological solutions.

The wide range of spirulina responses to technological stress provoked by illumination, temperature, salinity, xenobiotics, etc. can be used in biotechnology to obtain predicted cellular composition.