included the river and a group of subsidence ponds. Some water contamination occurred during the period of metal mining, and some appeared after cessation of mining. Currently the river is recovering to its natural conditions, but many channel and floodplain locations still preserve the sediments that accumulated before, during, and after the mining period. The aim of our investigations was to model the response of the A.S. to the reduction of mine water discharge into the river. The model predictions are based on reconstructed changes of diatom assemblages and on physical characteristics and chemistry of sediment stored in subsidence ponds. The diatom materials consist of present planktonic samples and eighteen subfossil cores. The CCA analysis and Monte Carlo permutation test were performed using multivariate statistics in CANOCO software. In the CCA analysis of the species-locality relationship, the first two principal components accounted for 44.5 % (axis 1) and 16.4 % (axis 2). The most important diatoms in the samples most polluted by copper were *Fragilaria* cf. *rumpens*, *Planothidium lanceolatum*, and *P. frequentissimum.* The sediments heavily polluted by zinc and cadmium were rich in *Aulacoseira ambigua, Craticula buderii*, and *Pinnularia frequentis* valves. The material collected from the deepest part of the cores (representing the pre-mining period) show many taxa which were lost during the time of mining, when diatoms resistant to heavy metals appeared. In the pre-mining time the waters were inhabited by oligosaprophilous and oligotraphentic diatoms – *Brachysira brebissoni*, *Chamaepinnularia mediocris*, *Encyonema neogracile*, *Eunotia incisa*, *E. tenella, E. tetraodon* or *Frustulia saxonica*. Currently the majority of diatoms are recognised as eurytraphentic and the most abundant species indicate in the uppermost sample the water of α-meso-polysaprobous or ß-mesosaprobous status.

The Research was supported by grant No. 2014/15/B/ST10/03862 from the National Centre for Science.

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PHYCOCYANIN CONTENT ASSESSMENT BY THE SPECTRAL RESPONSE OF *ARTHROSPIRA PLATENSIS* GOMONT BIOMASS

Arthrospira platensis Gomont is one of the most widely used microalgae culture which has a gainful potential as a source of valuable substances, such as murein, phycocyanin, β-carotene, chlorophyll, carbohydrates, proteins, fats, vitamins, fatty acids, essential amino acids and bioavailable mineral forms (Khan et al., 2005). High biomass growth rates and relatively simple cultivation technologies provide the promising background to use this cyanobacteria as a source for a broad variety of industries and applications, such as pharmaceutics, food, polymers and fuel production. In case of some applications it is vitally important to get predictable and stabilized amounts of targeted substances in a net biomass. Since *A. platensis* is a cyanobacteria, this culture could adapt quickly for cultivation environment changes (such as microelements balance, temperature, pH, light spectrum, nutrition components, etc.). This adaptation bears the changes in a net biomass content, growth rate and other strain features. For such stabilization it is obvious to use a permanently stabilized growth environment, however the real-life cultivation facility conditions could fluctuate widely as a result of human factor and system of external conditions changes. For this reason it is important to use control systems with feedback option based on real-time biomass features monitoring.

The main objective of the described research is to determine the sets of typical reflective spectral responses which appear as an *A. platensis* reaction for different impact-factors, in particular medium vitally important or vitally stressful additives. Another objective is to build the response-content correlations and to estimate how these spectral responses could be used to predict the content of valuable substances in a net biomass.

Typical experiment had following framework. The 48 samples (plastic cups, 6*8 matrix) were used for a data collection. Each inoculated sample contained 100 ml of Zarrouck medium with a different additives concentration in each. 5 samples were used as a control (no additives). As an additives the different concentrations and proportions of Cobalt nitrate, Potassium iodide (Kotinsky et al., 2004), dextrose (Chojnacka, Saeid, World, 2012) and some other substances were used.

The data collection was performed with state-of-the-art computer vision module which collects data in RGB and IR bands for each separate sample simultaneously. After data collection the computer vision module uploads the calculated spectral stats, biomass density values and images into a cloud database. Information about phycocyanin content was calculated after biomass samples extraction and final dry weight measurement.

The working model for predictive analysis of phycocyanin content in a net biomass of *A. platensis* is proposed and discussed. Model was applied for feedback control to correct the medium additives and conditions to fit the required biomass parameters.

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THE INFLUENCE OF NITROGEN TO PHOSPHOROUS RATIO ON INTER-ANNUAL VARIABILITY OF PHYTOPLANKTON STRUCTURE OF THE ODESSA REGION (THE BLACK SEA, UKRAINE)

Studies of the variability of specific surface (*S/W*; $m^2 \bullet kg^{-1}$) and relative abundance (density *N*, biomass *B*, surface area *S*; %) of unicellular algae taxonomic groups revealed the relationship between the reorganization of the morphological and taxonomic structure of phytoplankton (Zotov, 2018). The deviations of the distribution of taxonomic groups *S/W* values in the phytoplankton community from the distribution that characterizes the overall variability of *S/W* of these taxa were accompanied by the redistribution of the relative abundance of taxonomic groups. Groups that dominated during the year lost their dominant status. And the maximum contribution to abundance of phytoplankton was formed by one of the accompanying groups. The revealed relationship demonstrates the mechanism of structural self-organization of phytoplankton in accordance with changes in environmental conditions. Therefore, the task of searching for environmental factors that determine the interrelated morphostructural rearrangements of phytoplankton is relevant.

In accordance with the "resource ratio" theory, which considers nutritional needs as a species-specific characteristic, the main factor regulating the taxonomic rearrangement of phytoplankton is the nutrient concentrations ratio, primarily nitrogen to phosphorus ratio (N/P) (Levich, 2000). However, to identify this relationship in natural communities is problematic. Uneven consumption of nitrogen and phosphorus leads to a change in the value of N/P during the implementation of the community structural adjustment. An additional process