THE EFFECT OF EXOGENOUS ORGANIC SUBSTANCES ON SPIRULINA GROWTH

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When exogenous organic substances are added in the light, the growth of blue-green algae greatly improves as a result of the transition from photoautotrophic to photoheterotrophic cultivation regime [1-3]. Accordingly, it can lead to a change in the pigment composition of microalgae. Therefore, it is advisable to carry out investigations to determine the effect of various concentrations of organic carbon sources on the increased productivity of the culture by biomass and pigments.

The influence of various concentrations of exogenous organic carbon sources on the productivity of the culture of cyanobacterium Spirulina platensis and its photosynthetic activity has been determined. The culture of cyanobacterium *Spirulina platensis (Gom.) Geitl*, culture LSU-603, taken from the collection of cultures of the M.G. Kholodny Institute of Botany, NAS of Ukraine, has been used for the research

The cultivation process was carried out in the nutritional medium Zaruka in a vertical tubular plant with diameter of 8 cm and volume of 2 dm^3, the culture medium was constantly stirred by air. The illumination of the culture on the surface of the plant was maintained at the level of 8 klx, the duration of the photoperiod was 12 hours per day. The temperature of the culture medium was maintained in the range from 30 to 32 ° C.

The growth of biomass was determined by photometric method by change in the optical density of the suspension at a wavelength of 750 nm. The conversion of units of optical density into dry biomass was carried out according to the calibration graph. The choice of samples for determination of culture was carried out every day when the light was switched off, after the dark phase of cultivation.

In the process of the research, absolutely dry biomass (ADB) and moisture content of the product were determined by the weight method, the mass fraction of protein in the biomass of spirulina - by the biuret reaction, the content of phycocyanin and chlorophyll - by spectrophotometric methods.

The dependency of the influence of exogenous organic substances on the growth of culture and the biosynthesis of phycocyanin, chlorophyll and carotenoids in the biomass of spirulina has been established. The optimum ratios of concentrations of sodium acetate, saccharose, succinate and glycine (when maximum accumulation of pigments in spirulina biomass and maximum culture productivity is observed) have been also determined.

It has been found out that the highest productivity of a culture by biomass, the yield of phycocyanin and chlorophyll can be obtained using succinate in a concentration of 0.03%. At the same time there is an increase in the productivity of the culture by biomass by 25%, the yield of phycocyanin - by 46%, and chlorophyll - by 34%, compared with the photoautotrophic cultivation regime without the addition of succinate.

It has been determined that the addition of sodium acetate to the culture medium at a concentration of 0.02% leads to an increase in the yield of carotenes by 54% compared with autotrophic cultivation regime without adding sodium acetate.

An increase in the concentration of saccharose by more than 0.02% leads to the rapid death of most of the spirulina culture, due to its inhibition by a foreign microflora and the occurrence of fermentation processes.

The study showed that the use of glycine at concentrations greater than 0.01% during the first five days of cultivation leads to inhibition of the culture growth due to the destruction of trichomes of microalgae. However, further cultivation leads to a significant increase in the productivity of culture (more than twice) compared with the control.

It has been determined that spirulina is able to use such exogenous sources of organic carbon as succinate, saccharose, sodium acetate, glycine for the intensification of biosynthesis processes and, thus, can switch from photoautotrophic to photoheterotrophic cultivation.

The obtained results can be used to increase the productivity of the culture by biomass and phycocyanin.

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