Biotechnological approach in wastewater algolization for reducing phosphate pollution of surface bodies

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BACKGROUND

At the terms of excessive inflow of nitrogen and phosphorus compounds into water bodies, they cause their eutrophication, and, as a result, the accumulation of biotoxins, deterioration of water quality, death of aquatic organisms. Adding of *Ch.vulgaris* to wastewater treatment is one of the approaches for reducing the concentration of these compounds.

RESEARCH GOALS

- Analyze the effects of different phosphate concentrations on viability of *Chlorella vulgaris*.
- Substantiate biotechnological methods for reducing phosphate pollution of surface bodies.

CH.VULGARIS

- Unicellular green microalgae;
- Unpretentious to living conditions;
- High efficiency of photosynthesis;
- Rapid accumulation of biomass;
- Chlorophyll has antiseptic and regenerating properties;
- Competes with blue-green algae for resource base.

THE EFFECT OF EXCESS CONCENTRATIONS OF P_2O_5

For the experiment with the phosphate load on the chlorella culture, a fertilizer "double granular superphosphate" was selected. This fertilizer contains: Nitrogen - 10%; Phosphorus (P_2O_5) - 40%; Sulfur (SO3) - 5%.

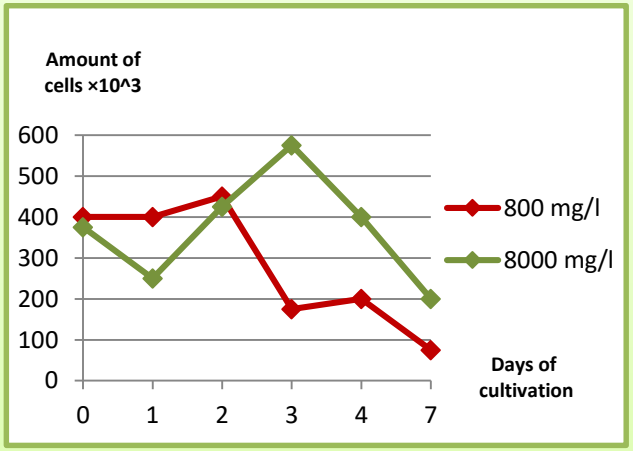

Figure 1 – Growth of *Ch.vulgaris* on a phosphatic environment

TECHNOLOGICAL SOLUTION

At the stage of wastewater treatment (post-treatment block), after the stage of biological treatment recommended to add *Ch.vulgaris* at amount of 400 thousand cells/ml for 1-2 days.

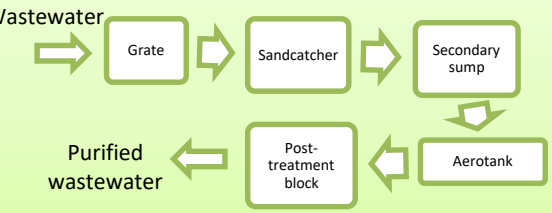

Figure 2 - Modular-type wastewater treatment scheme

RESULTS

The results of this research indicate the possibility of using microalgae to purify wastewater from excess concentrations of phosphates. Recommended technological solution will increase the efficiency of treatment plants not only in relation to phosphates, but also nitrates, which are also the most important nutrients that are intensively used to increase crop yields.

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