WASTEWATER TREATMENT WITH MICROALGAE AND CHARACTERIZATION OF THE OBTAINED BIOMASS

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Abstract
Wastewater treatment using microalgae possesses numerous benefits when compared to the conventional treatment. Apart from a significant reduction in expenses of purification of wastewater, it also decreases costs of microalgae production. In addition, there are additional benefits of using microalgae in wastewater treatment such as: reduction in toxic solid sludge formation; reduction of greenhouse gases; reduction of necessity for forced aeration because the oxygen required for aerobic bacteria is provided by the microalgae photosynthesis; production of microalgae biomass, which is a great source of energy due to the process of absorbing nutrients present in the wastewater [1-3].
Microalgae represent a source of significant components such as proteins, sugars, lipids, pigments (carotenoids and chlorophylls), and antioxidant components. Therefore, the obtained biomass, depending on its chemical composition and quality, can be used in different fields.

Introduction
The main goal of this work was to evaluate the potential of *Scenedesmus obliquus* microalga for treating wastewater from poultry industry. Moreover, the goal was to determine the composition of the obtained biomass in terms of content of proteins, lipids, carbohydrates, chlorophylls, and bioactive compounds. Based on the composition, the potential application(s) of the obtained biomass can be determined.

Experimental
The effluent was characterized in terms of pH, COD, and nitrogen (ammonia and Kjeldahl nitrogen) and phosphorus concentrations, before cultivation. In order to assess the efficiency of the wastewater treatment by microalgae, the same analyses were performed at the end of the cultivation, after biomass settling and filtration. The obtained biomass was characterized in terms of its crude protein, total sugars, and chlorophylls (a and b). In addition, biomass productivity was determined.

Results and discussion
The efficiency of removing of Kjedahl nitrogen was approximately 45% in poultry wastewater, while regarding COD removal, high efficiency of 97.68% was achieved. The results of biochemical characterization of microalgae biomass after the effluent treatment indicate that the process resulted in production of valuable biomass. The content of proteins of the *S. obliquus* biomass after treatment of poultry wastewater was 35.8%. The content of sugars was approximately 6%. Additionally, the content of chlorophyll in biomass obtained after poultry wastewater treatment was 4.2 μg/mg.

Conclusion

The obtained results indicate that microalgae *S. obliquus* possess the potential in wastewater poultry treatment and the obtained biomass can be used as potential feedstock for biofuel and biofertilizer production or as a source of animal feed.

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References

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