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Use of *Chlorella sorokiniana* biomass as an oral sorbent

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Abstract

This article presents an assessment of the biosorption capacity of *Chlorella sorokiniana* microalgae in relation to heavy metal ions (Zn^{2+}, Cd^{2+}, Pb^{2+}, Cu^{2+}) at various pH values. With the development of industry, several environmental threats have emerged, including heavy metal pollution. This form of pollution has negative effects in the short and long term on the health of animals and humans. To prevent the accumulation of harmful substances in the human body, it is advised to use oral sorbents in prophylactic and therapeutic purposes. Oral sorbents have the ability to adsorb and neutralize certain toxins in the stomach and the intestines and remove them from the human body.

The present article investigated the possibility of using microalgae *Chlorella sorokiniana* as an oral sorbent.

The sorption capacity of *Chlorella sorokiniana* microalgal biomass was determined by voltammetry of standard solutions with an initial concentration of heavy metal ions of 10 mg/L. The removal efficiency ranged from 88 to 99%. The studies were carried out at pH values from 2 to 6. The sorption capacity was high at all considered acidity values. Sorption properties were confirmed by the study of the IR spectrum and microscopy of the freeze-dried biomass samples.

The surface of the sorption material was studied by electron microscopy depicting the presence of multiple pores and depressions. It could be assumed that the sorption properties of microalgae are partly due to physical processes. Freeze drying can significantly increase the active surface area of the sample. The presence of hydroxyl groups in the biomass was confirmed by IR-spectroscopy indicating the chemical nature of the sorption process.

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