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Toxicity assessment of residual biomass of microalgae Chlorella sorokiniana

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Abstract

In this paper, the determination of the toxicity of residual biomass of microalgae *Chlorella sorokiniana* by the method of biotesting with use of the test – object *Daphnia magna Straus* and algae *Chlorella vulgaris Beijer*. Determination of the toxic effect is necessary for planning the possibility of further use of waste, as a sorption material for wastewater treatment, as a co-substrate for fermentation of organic waste and in the production of biogas.

The residual biomass of *Chlorella sorokiniana* microalgae is formed after the extraction of valuable components (lipid complex, pigments, proteins, etc.).

The extraction of the lipid complex uses organic solvents (hexane, ethyl alcohol), the remains of which can remain in the residual biomass. Determined the acute toxicity of residual biomass of microalgae by water extraction with the help of test-object *Daphnia magna Straus* and the test object microalgae *Chlorella vulgaris Beijer* according to standard methods. According to the study waste source of residual biomass to treat the IV class of hazard, $LDR_{50\text{-}48}$ (lethal dilution ratio) = 11.7; $SDR_{10\text{-}48}$ (safe dilution ratio) = 35.48. To reduce the toxic effect is proposed to conduct heat treatment. Heat treatment was carried out in a muffle furnace at a temperature of 105 ^{o}C for 1 hour.

Experimental studies using Daphnia magna Straus crustaceans showed that the value of A is 3%, which indicates the absence of toxicity of residual biomass. When using microalgae toxicity criterion was also not exceeded in any dilution of water, including its original undiluted version.

It is established that after heat treatment the residual biomass of microalgae becomes non-toxic and has a V hazard class. The results indicate the possibility of re-use of residual biomass.

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