BIOSORPTIVE POTENTIAL OF NEW TYPES OF BIOSORBENTS BASED ON MICROORGANISM AND RESIDUAL BIOMASS

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Nowadays, due to the rapid industrialization and increasing of the world population, the ecosystems are affected by the presence of persistent organic pollutants (pesticides, pharmaceuticals, dyes, personal care products etc.). The removal of these types of water contaminants can be carried out by physicochemical and biological processes such as adsorption, biosorption, coagulation, sedimentation, filtration, ion exchange, membrane technologies and biological treatments.

This study aimed to develop biosorbents by immobilizing *Saccharomyces pastorianus* and *Saccharomyces pastorianus* residual biomass on alginate. Synthesized biosorbents were characterized by scanning electron microscopy (SEM) and Fourier transform infrared spectroscopy (FTIR) their biosorptive potential for removal of pharmaceuticals and dyes from water was evaluated. Biosorption studies were carried out in batch system. The operational parameters were chosen considering the chemical characteristics of targeted molecules (drugs: cephalexin, rifampicin, ethacridine lactate; dyes: orange II and indigo carmine).

The experimental setup reveals that the biosorption process is influenced by the type of biosorbent and the pollutants concentration. The removal efficiency is between 40.05% and 87.62% for drugs and between 27.83% and 53.17% for dyes. The biosorption capacities obtained in the tested conditions ranged from 4.79 mg/g to 43.29 mg/g for drugs and from 4.10 mg/g to 12.38 mg/g for dyes. The recorded data show that the immobilization technique on natural polymer eliminates the main disadvantage of using free cells of microorganisms and that the eco-friendly synthesized biosorbents can be successfully used for the removal of pharmaceuticals and dyes from aqueous solutions.

Keywords: *alginate beads, biosorption, drugs, dyes, immobilization technique, Saccharomyces pastorianus*

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