WASTEWATER PURIFICATION BY ADSORPTION WITH COMPOSITE MATERIALS

Ljiljana Tanasić[1], Milan Gličić[1], Jelena Tanasić[2], Bojan Damnjanović[3]

[1]*Unite for Agricultural and Business Studies and Tourism, Academy of Applied Studies Šabac, Vojvode Putnika 56, 15000 Šabac, Serbia*
[2]*University of Novi Sad, Faculty of Technology Novi Sad*
[3]*Unit for Medical and Business-Technological Studies, Academy of Applied Studies Šabac, Hajduk Veljkova 10, 15000 Šabac, Serbia*
e-mail: ljiljana3101@gmail.com

Abstract

The dyes to finding in wastewater-containing are very difficult to treat because dyes are recalcitrant molecules and resistant to aerobic digestion. There are more than 100 000 commercially available colors. Many industrial dyes are toxic, mutagenic, teratogenic, and carcinogenic. The synthetic dye cannot be effectively decolorized by traditional methods.

The physical method of adsorption does not lead to the creation of harmful substances and is superior to other methods. Synthetic dyes are considered the most difficult to treat because they contain complex aromatic structures, which make them more stable and harder to biodegrade. Decolorization is the result of adsorption and ion exchange mechanisms and depends on dye/sorbent interactions, sorbent surfaces, particle size, temperature, pH, and contact time. The most important step in wastewater treatment is to provide high-selectivity adsorbents that have a low cost and a long service life. The goal of our work was to prepare effective composite materials based on deacetylated chitin, i.e. poly(D-glucosamine) of medium molecular weight and bio-degradable non-toxic polysaccharide sodium alginate with magnetite nanoparticles for the removal of dyes from aqueous solutions. Composite alginate granules were coated with poly(D-glucosamine) using the layer-by-layer (LbL) application method. During the adsorption process, the dye concentration was monitored using a general spectrophotometric method.

Keywords: wastewater, dyes, adsorption, sodium alginate, magnetite nanoparticles