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Biologically Active Fibers with the Sorption Tramadol

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Biologically active fibers as drug carriers have improved characteristics in comparison with conventional medical therapies. Cellulose as a hydrophilic and biocompatible, nontoxic and eco-friendly material, makes a good polymer matrix for obtaining biologically active fibers.

The aim of this study was to investigate the possibility of obtaining biologically active materials by sorption of tramadol on oxidized cellulose fibers. For this purpose, samples of oxidized cellulose (OC) with 0.547 and 1.163 mmol/g of COOH groups and a sample of OC with 0.547 mmol/g activated Na+ ion were used

The bonding was performed in analgesic water solution concentration of c=1,7·10-3 2,5·10-3 3,4·10-3 4,3·10-3 5,1·10-3 mol/L at temperature 26±1 °C, while desorption was performed in physiological solution. The amounts of bonded and released antibiotic were determined spectrophotometrically in UV range. Maximum amount of the bound drug (0,2232 mmol/g) was obtained during the sorption on the oxidized bandage with 1,163 mmol/g COOH from a tramadol solution with a concentration of c=5.1·10-3 mol/L after 24 hours. The amount of tramadol bound to the activated OC fiber was significantly higher and amounted to 0.5297 mmol/g from a tramadol solution with a concentration of c=5.1·10-3 mol/L after 24 hours. The maximum amount of the released drug was 0.0524 mmol/g.

The paper studies the influence of tramadol's chemical structure and the duration of sorption on the amount of the bound drug. It was determined that the drug bonding was achieved through ionic hydrogen bonds and π-π interactions of the drug functional groups with the oxidized cellulose bandage.

Keywords: oxidized cellulose, tramadol, biologically active cellulosic fibers.