

## Sorption of bovine serum albumin with hybrid organo-inorganic material based on silicon dioxide nanoparticles, functionalized with organosilicon derivative of thiacalix[4]arene

© Vladimir V. Gorbachuk, Ramilia V. Ziatdinova, and Ivan I. Stoikov\*<sup>+</sup>

Department of Organic Chemistry. A.M. Butlerov Chemical Institute. Kazan (Volga region) Federal University. Kremlevskaya St., 18, Kazan, 420008. Russia. Phone: +7 (843) 233-74-62.

E-mail: [ivan.stoikov@mail.ru](mailto:ivan.stoikov@mail.ru)

\*Supervising author; <sup>+</sup>Corresponding author

**Keywords:** thiacalixarenes, nanoparticles, proteins, sorption.

### Abstract

New sorbent, combining high specific surface area, formed by silicon dioxide nanoparticles and high effectivity of biopolymer binding, which is specific for derivatives of thiacalix[4]arene was proposed. Modification of silicon dioxide nanoparticles with organosilicon derivatives of thiacalixarene was carried out. Removal of water from colloidal suspension of superficially functionalized nanoparticles of silicon dioxide has allowed to obtain water-insoluble sorbent, for which high effectivity of bovine serum albumin was shown. Study of sorption kinetics and capacity of bovine serum albumin shows, that high sorption capacity is attained – up to 160 mg of protein per 1 g of sorbent, in correspondence with experiments on sorption kinetics – saturation of sorbent with protein is attained in the course of 60 minutes.