

Nanochemistry and biotechnology

Using cyclodextrins for improvement of performance of analytical biosensor for urea determination

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A new promising trend in biosensorics is application of cyclodextrins [1]. It is aimed at ensuring favourable conditions of operation and storage of enzymes in bioselective membranes due to cyclodextrins unique structure (hydrophilic surface and hydrophobic intramolecular cavity). The main advantage of cyclodextrins is their ability to incorporate other molecules or their fragments in the cavity, which results in the changes of physical and chemical properties of the "guest molecule" [2].

Various types of cyclodextrins - α , β , γ , HP- β -CD - were studied. For the formation of bioselective membranes, the cyclodextrin aqueous solutions were mixed with the enzyme solution at the 1:1 ratio and deposited onto the surfaces of pH-sensitive field-effect transistors (pH-FET). For the enzyme immobilization, the transducers with deposited mixture were kept in saturated glutaraldehyde vapor. The main analytical characteristics of biosensors based on urease coimmobilized with different cyclodextrins were determined. For comparison, we used the urease biosensor based on urease immobilized without cyclodextrins.

It is shown that using cyclodextrins at the urease immobilization on the pH-FET resulted in a decrease of the minimum limit of urea determination and a lower response time of the biosensor.

1. *Cristiano P. da Silva a, Ana C. Franzoib* Development of biosensor for phenolic compounds containing PPO in β -cyclodextrin modified support and iridium nanoparticles // *Enzyme Microb. Technol.*-2013.-**52**.-P. 296-301.
2. *Lofsson T., Duchêne D.* Cyclodextrins and their pharmaceutical applications: historical perspectives // *Int. J. Pharm.*-2007.-**329**.-P. 1-11