

VOLTAMMETRIC IDENTIFICATION OF INSULIN AND ITS ANALOGUES USING ELECTRODES MODIFIED WITH POLYARYLENEPHTHALIDES

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Insulin is a peptide hormone of nature, formed in the beta cells of the islets of Langerhans of the pancreas. Has a multifaceted effect on metabolism in human body. The main action of insulin is to reduce glucose concentration in the blood. Violation of insulin secretion or its action is a key element in the development of various forms of diabetes, hypoglycemic conditions, and obesity. Currently, human insulin and its analogues, get genetically engineered using recombinant DNA technology. The insulin analogs differ amino acid position, and other substituents in the polypeptide chain. And they have such differences as: biological properties duration, dissolution, etc.

Using chemometrics, we developed a voltammetric method for the identification and discrimination of pharmaceuticals containing insulin and its analogues from various manufacturers, using glassy carbon electrodes modified with polyaryleneophthalides. To test the voltammetric method of identification and recognition of preparations of insulin have been investigated: Lantus, Apidra, Biosulin R, Levemir, NovoRapid FlexPen, NovoRapid Penfill.

The voltammograms obtained on the glassy carbon electrodes modified with polyaryleneophthalides was converted by principal component analysis (PCA). Due to the modification of polyaryleneophthalide films, multisensor system is sensitive to the formulation adjuvants in pharmaceutical preparations containing insulin that allows to identify them reliably.

In this way using voltammetric system such as electronic tongue based on glassy carbon electrodes modified with polyaryleneophthalides with various quantity diphenylenethio and diphenyleneoxide fragments in monomer units in the polymer chain and chemometrics, the possibility of an express identification and recognition of drugs containing insulin and its analogues, obtained by recombinant DNA technology and different amino acid position, and other substituents in the polypeptide chain was shown.

It should be noted that the proposed approach may be used for rapid assessment of the quality of pharmaceutical preparations of insulin.

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