NANO-STRUCTURED SILICON AS EFFECTIVE TRANSDUCER FOR IMMUNE BIOSENSORS

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It will be presented the experimental results about the investigations of the efficiency of the structured nanopouroussilicon (sNPS) application astransducer in the immunebiosensors designed for the control of retroviralbovineleucosis (RBL) and the determination of the level such my cotoxinsas T2 and patulin among environmental objects.

Nanostructuredsilicon, immunebiosensors, T2 mycotoxin, patulin,l eucosis, diagnostics.

Previously [1] we have developed several types of optical imunobiosensoriv based on surface plasmon resonance and total internal reflection ellipsometry. To fulfill all practical requirements for high sensitivity analysis, and simplicity, cheapness and speed of it, we suggest using a structured nanoporous silicon (sNPK) as transdyuserdlya imunobiosensoriv the registration of a specific signal based on the change of chemiluminescence (CL) or photocurrent this structure.

As a model, we used low-toxin T-2 mycotoxin patulin and. Also, consider the effectiveness of the proposed imunobiosensora for biochemical diagnosis LVRH.

Mycotoxins, including T2, aflatoxins, zearelenon, patulin, are of great interest because they are common and are characterized by high levels of toxicity. Mycotoxins, which is the product life microscopic fungi, recently attracted increasing attention. These substances are toxic to living organisms (embryotoxic, mutagenic and carcinogenic effects) and recently there was a danger of their use in bioterrorism purposes (for example, the use of such a representative, as T2, compared with mustard or Lewisite, is several orders of magnitude more deaths) [2].

Viral leukemia as mycotoxins, distributed everywhere and on all continents. It must be emphasized that this disease can be transmitted through food from infected

animals to humans. Quality and food safety are a priority on the background of the environment on the one hand and by reducing sanitary conditions on the other.

The traditional methodology of analysis of mycotoxins and other low molecular weight toxins, and biochemical diagnosis of diseases, including retroviral LVRH, based generally on the use of instrumental analysis such as high performance liquid or gas chromatography with mass spectroscopy or liquid chromatography with mass spectroscopy or ELISA- method. Due to the extremely high complexity and cost analysis performed by these methods, the development of innovative approaches, such as immune assays and the development of specific chemo- and biosensors are very important [3].

The purpose of research - to provide data on some physical and chemical properties sNPK, development of algorithm analysis, results of biosensor and plausible mechanism for the formation of a specific signal.

Materials and methods research. We used boron doped monocrystalline silicon square plate with resistivity 1 Ohm × cm, area of 100 cm2 and a thickness of 0.3 mkm.Poverhnyu plates not polished. Layers sNPK were obtained by etching in a solution of HF: HNO3 at room temperature, natural sunlight and a duration of 1 to 20 minutes. The thickness of the layer sNPK ranged from 3 to 60 nm process parameters controlled by chemical modification of the surface of single-crystal silicon was determined using Auger electron (Auger) electron spectroscopy in LAS-2000. SNPK surface structure was studied using a scanning tunneling microscope (STM) and scanning electron microscope. Analysis of the images shows that the surface sNPK regularly covered with pores up to 20 nm.

Using a transducer sNPK helps create a very simple to use and stable imunobiosensoriv. Specific immune complex formation on the surface sNPK can be registered by measuring the PL or photoconductivity. In accordance with the results of the application of the immune biosensors to monitor the content of mycotoxins in the environment, as well as biochemical diagnosis of bovine leukemia, we can conclude that they comply with the requirements of practice, such as sensitivity, simplicity, speed of analysis and the possibility of conduct in the field. These biosensors can be used to record any significant biochemical variables that can form immune complexes.

Further research should focus on the study of the biochemical mechanisms of signal registration sNPK and technical characteristics of the specific points in performance analysis.

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