Efficiency of the optical immune biosensors at the control of bacterial pollution of environmental objects

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To overcome the dangerous situation with the dispersion of pathogenic microorganisms there is necessary providing constant control food, feed and different environment objects. Unfortunately the existed approaches are very routine, expensive and require the use of stationary equipment and highly professional staff. These shortcomings may be removed through involving new methods on the basis of principles of biosensorics as well as the application of nano-materials and the use of nano-technology. Of course, there is necessary to have such devices which could able to fulfil all practice demands in respect of sensitivity, selectivity, simplicity, cost, possibility to be used in field conditions and in real time. We compare four types of the optical immune biosensors based on the surface plasmon resonance (SPR), total internal reflection ellipsometry (TIRE), nano-porous silicon (nPSi) and ZnO nanorods at the control of such pathogenic bacteria as *Salmonella thyphymurium*. In last two biosensors the specific signal was registered as changes of photoluminescence (PhL) level [1]. The maximal sensitivity was revealed in the TIRE biosensor (about 5 cells in 10 mL). It allows us to recommend its for the application at the verification of results obtained by any others methods. Next three biosensors were characterized by the sensitivity on the level of ~10 cells/mL with linearity in frame of 10^1-10^6 cells/mL. They may be used for the screening *salmonella* dispersion among environmental objects. The nPSi biosensor is suitable for the application in field conditions due to the simplicity of device construction and analysis fulfillment. We have demonstrated that the nPSi was very effective also as transducers at the creation of the immune biosensors of types as lab on a chip for simultaneous control of number of samples or analysis several parameters (Fig. 1).

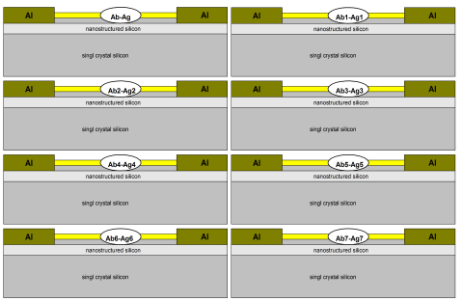

Fig. 1. General view of lab on a chip prototype based on nSPS.

References

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