OPTICAL BIOSENSORS BASED ON ZNO AND TIO_2 THIN FILMS FOR THE FAST QUALITY CONTROL OF AGRICULTURE PRODUCTION

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The structural, surface and optical properties of ZnO and TiO_2 nanostructured thin films have been investigated for the development of optical immunosensors [1,2].
Novel sensitive optical immunosensor based on ZnO thin films for determination of Grapevine virus A-type proteins (GVA-antigens) has been designed [1].The immobilization of anti-GVA antibodies resulted in the intensity changes in the main near band emission (NBE) peak of ZnO and by the formation of new intense photoluminescence band, discovered in the visible range at 425 nm, caused by the immobilized proteins. The GVA-antigen detection was performed by the evaluation of changes and behavior of a corresponding photoluminescence band around 425 nm. The sensitivity of as-formed label-free biosensor towards the GVA-antigens was determined in the range from 1 pg/ml to10 ng/ml [1].
A novel optical immunosensor based on TiO_2 nanoparticles deposited on glass substrates for determination of Salmonella typhimurium proteins [2]. The changes of the photoluminescence intensity and peak positions after interaction of the immobilized anti-Salmonella-Ab with Salmonella antigens were used as immunosensor signal, allowing sensitive and selective detection of Salmonella-Ag in a label-free configuration. The sensitivity of the reported optical immunosensor towards Salmonella-Ag is in the range from 10^3 to 10^5 cell/ml. Some aspects of the interaction mechanism between ZnO and TiO_2 nanostructures and proteins have been discussed [1-3].

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