

SSNN 18P DNA-BASED COMPOSITE WITH QUERCETIN AND FLUORESCEIN FOR MEDICAL APPLICATIONS

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DNA-based composites are intensively investigated because of their attractive properties and possibility for application in different domains, including medicine, biofotonics, etc. [1]. Composite materials containing a DNA matrix and photoluminescent dyes present interest as promising materials for sensing applications and for luminescent labeling in fluorescent detection technique. DNA matrix turns to be an efficient host for luminescent organic molecules both in solutions, as well as in solid-state films [2,3].

We report here preparation and characterization of DNA based composites, containing DNA as a matrix, and luminescent additives - fluorescein, an organic dye, and quercetin, an organic antioxidant. DNA, as well as quercetin, and fluorescein are all well soluble in water. For preparation of DNA based thin-film samples a water solution of these materials was deposited on glass substrates by spin-coating method. Thin film layers were then dried out at room temperature for about 24 hours, and subsequently kept for 2-3 hours in a vacuum chamber at 40 °C. DNA composite films were characterized by optical microscopy, UV-Vis absorption and PL spectroscopy. PL spectra of composite thin films were registered at room temperature under the excitation of a laser beam 337 or 405 nm. PL measurements were carried out using a MDR-23 monochromator and a Hamamatsu photomultiplier module H9319-12 operating in a photon counting mode.

Under excitation of the laser beam 405 nm DNA-based composite thin films with quercetin additive exhibit a rather weak PL emission in the visible range 450-600 nm. The most interesting results were obtained with DNA-based composites with fluorescein additive. DNA composites with fluorescein exhibits an intense PL signal under the excitation of the laser beam 405 nm. The PL spectrum in this case is characterized by a strong emission in the visible region, while the major band is almost a Gaussian-shaped, with the maximum around 530 nm and the half-width ~ 40 nm. The strong PL emission of DNA-based composite with fluorescein additive indicates on good potential for application of this material in luminescent labeling in medicine.

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[3]. D. Proudnikov and A. Mirzabekov, Chemical methods of DNA and RNA fluorescent labeling, *Nucleic Acids Research*, 1996, **24**, No. 22 4535-4532