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SPECTRAL CHARACTERISTICS OF POLYMETHINE DYE IN MODEL BACTERIAL ENVIRONMENTS UNDER PHOTOIRRADIATION

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Abstract. The problem of drug resistance of microorganisms to the action of a wide range of antibiotics is very relevant for modern medicine. This stimulates the development of research in the direction of finding alternative therapeutic methods. One of the promising methods that can speed up treatment is photodynamic antibacterial therapy (PDAT). This method involves the use of drugs or photosensitizers in combination with the effects of laser radiation sources.
The maximum permeability of biological tissues is in the range of 700–900 nm. For PDAT, it is advisable to use compounds with an absorption band in the region of maximum permeability of biological tissues and with good solubility in water. To increase the effectiveness of PDAT, it is necessary to know how the photosensitizer penetrates the cell [1]. The spectral and luminescent characteristics of a polymethine dye were studied in model bacterial environment under the influence of a light-emitting diode source with a wavelength of λ=684 nm, corresponding to the long-wave absorption band of the dye. The objects of the study were a water-soluble tricarbocyanine dye used as a photosensitizer [2] and a strain of gram-positive microorganisms *Staphylococcus aureus*. Peptone yeast broth (PYB) was used as a nutrient medium for culturing bacteria. It was found that polymethine dye molecules penetrate the cell wall of bacteria in PYB. For the dye to penetrate into the cell of gram-positive bacteria *S.aureus*, substances produced by the cells themselves are required. This confirms the hypothesis that substances formed during the vital activity of microorganisms can act as dye transporters into the bacterial cell.

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