THE SPECTRAL PROPERTIES OF STILBAZOLIUM MEROCYANINE COMPLEXES WITH Fe (II) AND Fe (III) IONS

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The incorporation of stilbazolium betaine dye 1-(12-hydroxydodecyl)-4-[(3-hydroxy-4-oxocyclohexa-2,5-dienylidene)-ethylidene]-1,4-dihydropyridine into different types of human peripheral blood leukocytes were previously shown. Merocyanine with a hydroxyl group in the quinoid ring in the orto position of the carbonyl group are an excellent indicator of the presence of transition metal ions. Dye-ion complexes demonstrate the quality of charge-transfer complexes. In this work, changes in the spectral properties of this compound’s complexes with Fe$^{2+}$ and Fe$^{3+}$ ions were investigated using a basic medium and polyvinyl alcohol film (PVA). The 300% stretched PVA film served as an important model of cell membranes.

The changes in the visible absorption spectra and fluorescence spectra showed that only the basic form of the dye formed complexes with iron ions. The addition of distilled water to the alcohol solution of these complexes induced their precipitation. These properties make it possible to identify Fe$^{2+}$ and Fe$^{3+}$ ions, as well as to remove them from solutions.

The information received from the polarized absorption spectra of merocyanine-Fe ions immobilized into anisotropic (stretched) PVA film cast a light on the orientation of the complexes embedded in the membrane. The degree of the ordered state was established according to the formula:

$$r = \frac{A_1 + A_\perp}{A_1 - 2 A_\perp}$$

This study was financially supported by Poznań University of Technology, grant PB-62-192/02-BW.