research in the field of photochromic systems exhibiting modulation of fluorescence is mainly carried out using organic phosphors, which have a limited service life and insufficient image contrast. The particular interest is the study of the efficiency of photo-induced modulation of photochromic systems based on the quantum dots, since the use of quantum dots provides an increased service life and image contrast compared to organic phosphors.

Inductive-resonant energy transfer is a mechanism of energy transfer between two chromophores (from the donor to the acceptor), which occurs without intermediate emission of photons and is the result of the dipole-dipole interaction between the donor and the acceptor. In this study, complexes of initial quantum dots with photochromic compounds were created. The study of these complexes and initial quantum dots was carried out by using the spectrophotometry methods. Of the photochromic compounds, the photochromic diaryletene F-18 was chosen as a donor in the "QD-photochromic molecule" complex.

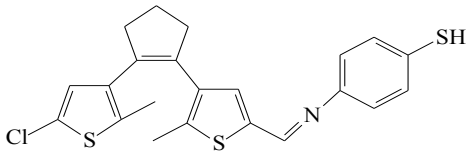

Fig. 1. Compound F-18

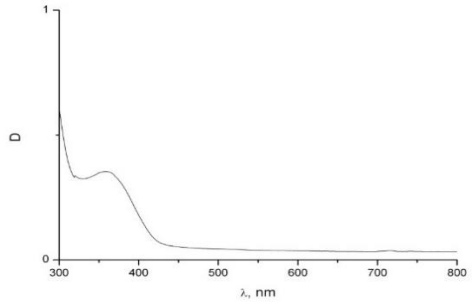

*Fig. 2. Absorption spectrum of the compound F-18 in toluene; C = 7 * 10-5M*

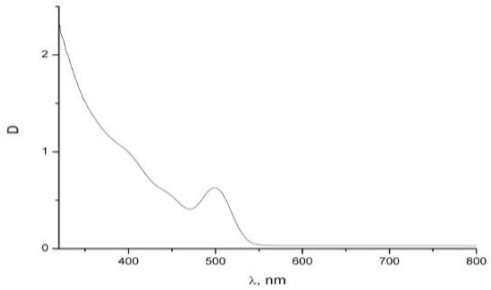

Fig. 3. Absorption spectrum of purified CT in toluene

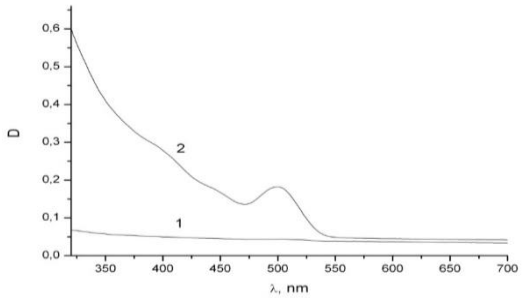

Fig. 4. Absorption spectrum: mixtures of toluene and methanol (1) and the complex "CT-photochromic F-18 molecule" in toluene (2)

MODIFICATION OF POLYELECTROLYTE MICROCAPSULES BY DYE MOLECULES RHODAMINE 6G

A. Scherbovich

Belarusian State University, ISEI BSU,
Minsk, Republic of Belarus
scherbovich.a.a@gmail.com

Intensive studies of multilayer polyelectrolyte microcapsules made it possible to introduce various functional properties into these delivery systems. For example, the inclusion of nanoparticles, dye molecules, which react to the external effect in the shell of microcapsules, can provide greater functionality. In this study, the modification of the capsules by the Rhodamine 6G dye molecules from water and ethanol solutions was carried out.

Keywords: microcapsule, Rhodamine 6G, layer-by-layer adsorption, polyelectrolyte, absorption spectrum.

The inclusion of biologically active compounds in order to target them in vivo delivery is a problem for molecular and nanotechnology. Depending on the specific ultimate goal of a diagnostic or therapeutic nature, strategies are developed and the interrelated tasks of encapsulating certain chemical reagents, transporting them in the body and a controlled (sometimes multi-stage) biochemical reaction are solved. Micro and nanocapsules obtained by layer-by-layer adsorption of oppositely charged polyelectrolytes on colloidal particles are promising as a means of drug delivery.

One of the ways to ensure the sensitivity of the capsules to laser radiation is the inclusion of organic dye molecules in their shells. This leads to the possibility of photosensitized destruction of such structures.

In this study, the modification of the capsules by the Rhodamine 6G dye molecules from water and ethanol solutions was carried out. Two methods were used: adsorption of dye molecules on calcium carbonate microspherolites and inclusion of dye molecules into the polyelectrolyte shell. The inclusion of dye molecules was monitored by measuring the absorption spectra of the samples obtained. There is a memory effect of the dye, both from water and ethanol solutions.

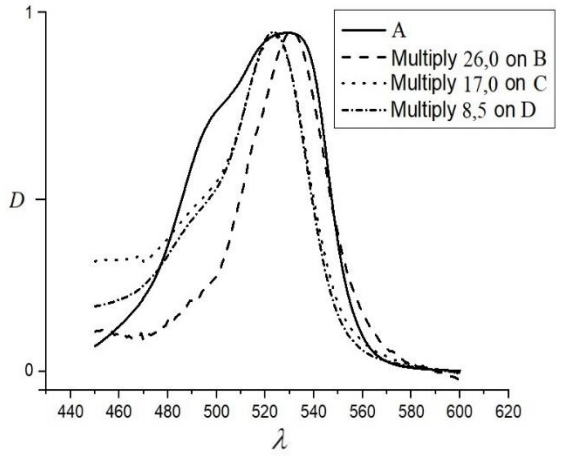

Fig. 1. Absorption spectrum of R6G (adsorption of dye molecules on cores): A – water solution of R6G; B – dye molecules adsorbed on nuclei; C – the sample A coated with 8 polyelectrolyte layers; D – sample B after cores dissolution

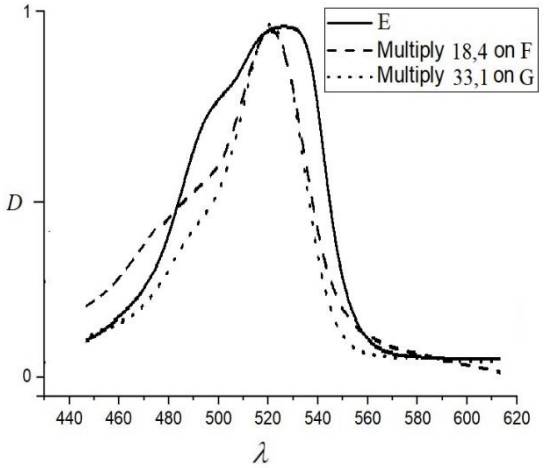

Fig. 2. Absorption spectrum of R6G (inclusion of dye molecules in the composition of a polyelectrolyte shell): E – water solution of R6G; F – 7 polyelectrolyte layer was replaced with a dye solution; G – the sample F after cores dissolution

RADICAL-RECOVERY PROPERTIES OF BLACK CURRANT JUICE, BILBERRY AND BLUEBERRY

D. Selina, E. Tarun, P. Podorovskaya

Belarusian State University, ISEI BSU,
Minsk, Republic of Belarus
daryaselina@bk.ru

The comparative study of the antioxidant activity of the packaged juices of black currants, bilberry and blueberry. The dependence of the fluorescence intensity of fluorescein from the logarithm of the concentration of juice, of which graphically determined indicators IC_{50}.

Keywords: antioxidant activity, juices of black currants, bilberry, blueberry, fluorescein.

Excess concentration of free radicals in the body is the central risk factor for cardiovascular, oncological diseases and other pathologies. Flavonoids have strong antioxidant properties and can be used to prevent various diseases. Many berries include flavonoids such as quercetin and rutin, as well as anthocyanins and other phenolic glycosides that act as free radical inhibitors [1–3].

A comparative study of antioxidant activity (AOA) of 4 packaged juices containing black currant of various brands was conducted: “Moya semya” (Belarus) (1), “Nastoyashchiy” (Belarus) (2),” Fruto nyanya “(Russia) (3), "Sta Dar" (Belarus) (4) (Table 1), and 4 packaged juices containing blueberries and blueberries: " Sochnii" (Belarus) (1) and (2), "Asaloda" (Belarus) (3), " Dlya druzei" (Belarus) (4) (table 2). Also we made a comparison of these juices with juices from fresh berries. The method of determining AOA in relation to activated forms of oxygen (ROS) is based on measuring the fluorescence intensity of the oxidizable compound and its decrease under the influence of ROS. In this work, fluorescein is used to detect free radicals, which has a high extinction coefficient and close to 1 quantum yield of fluorescence. Generation of free radicals was carried out using the Fenton system, in which hydroxyl radicals are formed during the interaction of iron (Fe2 +) complex with ethylenediaminetetraacetic acid (EDTA) and hydrogen peroxide [4, 5].