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Development of new drug forms based on echinochrome a using electrospun micro/nanofibers

Key words: echinochrome A, electrospinning, micro/nanofibers, pharmaceutical polymers, drug formulations

The most well-known sea urchin pigment echinochrome A (Ech A) is the active substance in the antioxidant drug Histochrome® produced in Russia from the sand dollar *Scaphochinus mirabilis* that is used in cardiology and ophthalmology. Histochrome is available only in ampoules in the form of echinochrome di- and trisodium salts for intravenous injections or infusions, since Ech A is insoluble in water.

Recently appeared a large number of publications revealing a wide range of new pharmacological activities of Ech A, for example gastroprotective [1], anti-diabetic [4], anti-allergic [2], and mitochondria-protective properties against cardiotoxic drugs [3]. Therefore, development of new drug forms based on echinochrome with various components able to increase its solubility in water, to provide targeted and controlled release of the drug preserving or enhancing its pharmacological properties to expand the limits of drug's application is of great interest.

We obtained electrospun micro-/nanofibers from commercially used in pharmaceutical technology polymers (polyvinylpyrrolidone, polycaprolactone, cellulose acetate, hypromellose and polyethylene oxide) with Ech A incorporated and performed the *in vitro* dissolution tests at pH values 1.2 and 6.8. The most promising materials appeared to be polycaprolactone, hypromellose and polyethylene oxide since they provided a prolonged release of Ech A at pH 6.8.

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This study was supported by the grant of the Ministry of Education and Science of Russian Federation (project RFMEFI61317X0076).

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