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Marine polysaccharide based matrixes for oral delivery of echinochrome

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Due to diverse physiological activity, safety and biocompatibility, natural polysaccharides represent a promising biomedicine class of polymers that can be used as carriers for pharmacological agents. The combination of gelling properties and biological activity of sulfated polysaccharides–carrageenan (CRG) and their complexes with chitosan makes it possible to create on their basis a carrier for the slow release drug substance. Echinochrome (Ech) is the water-insoluble active substance in the cardioprotective and antioxidant drug HistoChrome®, produced in Russia. Different systems as nanoparticle, gel, film and liposomes based on biologically active polysaccharides of marine organisms–chitosan and CRG for the targeted delivery of Ech with a prolonged affect were investigated. CRGs structure plays an important role in its interaction with chitosan. The data of DLS, electrokinetic measurements, and AFM demonstrated that the mechanism of formation of complex nanoparticles was defined by polymer structure and concentration. Ech interacts with carrageenans and is incorporated into the macromolecular structure of the polysaccharide. The inclusion of Ech in carrageenan matrices decreased its oxidative degradation and improved its solubility. The interactions caused changes in the morphology, charge and size of the polysaccharides. The CRG and its complexes with Ech exhibited mucoadhesive properties. The release rate of the active substance depends on the structure of used polysaccharide and the specific ions. Polysaccharides modified the biological activity of Ech. CRG retain cardioprotective properties of Ech and enhances its gastro protection effect that exceeded the activity of the reference drug Phosphalugel. New polysaccharide based matrices may be beneficial for oral administration and prolonging the action of Ech.

Biography

Irina M Yermak has completed her PhD in 1985 and 20 years later received ScD Degree from of Elyakov Pacific Institute of Bioorganic Chemistry, Far-Eastern Branch of the Russian Academy of Sciences. She is Principal Scientist of Elyakov Pacific Institute of Bioorganic Chemistry of the Russian Academy of Sciences. She worked in Republic of Korea, China and in France as a Visiting Scientist. She has published more than 120 papers, five patents and four book chapters. For the last five years she has been the Head of five projects, under her leadership eight researchers received a PhD.

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