



INVESTIGATION OF THE KINETIC REGULARITY OF THE FORMATION OF INTERPOLYMER COMPLEXES OF SODIUM CARBOXYMETHYLCELLULOSE WITH CARBOPOL AS THE BASIS FOR SOFT DRUGS

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Relevance: In recent years, Interpolymer complexes (IPCs) based on sodium carboxymethylcellulose polysaccharide (Na-CMC) with various polycations have aroused considerable interest due to their universal application. Cellulose-derived IPCs have great potential in drug particle delivery systems in medicinal products.

The purpose of the study: In this work, the kinetic patterns of the formation of PKI based on sodium carboxymethyl cellulose with a linear carbopol have been studied.

Materials and methods: Purified Na-CMC, a product of the Namangan Chemical Plant, obtained by heterogeneous solid-phase esterification with a degree of substitution (SZ) of 70 and a degree of polymerization (SP) of 450, was used as the main object of the study. The second component of IPK is carbopol. Carbopol are white floccular hygroscopic powders with a faint odor of acrylic acid and is practically insoluble in nonpolar organic solvents, swells to form gels in water and polar organic solvents. The aqueous suspension of the polymer has a pH value of 3.5 at a concentration of 0.2%. The amount of neutralizing agent can adjust the pH from 5 to 8. IR spectra in the range of 400-4000 cm⁻¹ were recorded on NIKOLET Magna-560 IR and Specord-75 IR spectrophotometers (Karl Zeiss, GDR).

Results: Interpolymer complexes were obtained by mixing aqueous solutions of Na-CMC and carbopol components in various ratios of components and pH of the medium. IPC was studied by potentiometric and viscometric titration methods. Experimental data have established that when polyelectrolytes Na-CMC and carbopol are mixed, IPCs are formed due to hydrogen bonding. The above experimental data is confirmed by studying the viscosity of IPC solutions. The viscosity of IPC solutions depends on the ratio of interacting components. The addition of carbopol solution under certain technological conditions to the Na-CMC solution leads to an increase in viscosity and reaches a maximum value with an equimolar ratio of interacting components. A further increase in the amount of carbopol leads to a decrease in the viscosity of the polycomplex solution. The maximum change in the viscosity of IPC solutions from additivity with an equimolar composition by 15-20 Pa • s indicates the formation of a bond between the constituent components of IPC. These data have been confirmed using IR spectroscopy methods.

Conclusions: Thus, the interpolymer complexes based on Na-CMC and carbopol obtained in moderately acidic regions are stabilized due to the cooperative hydrogen bonding between the carboxyl groups of Na-CMC and the carbonyl groups of carbopol. It has been established that an increase in the number of hydrogen bonds leads to a more ordered state of the resulting interpolymer complex and can be used as carriers of medicinal particles in medicinal preparations.