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Analysis of structure of hyperfine poly(3-hydroxybutyrate) fibers (PHB) for controlled drug delivery

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Аннотация:

Hyperfine fibers based on biodegradable poly (3-hydroxybutyrate) with encapsulated drug substance (dipyridamol) were obtained by using electrospinning method. Addition of dipyridamol has a significant effect on geometrical shape and structure of microfibers as well as total porosity of fibrous material. Observation of fibers using scanning electron microscopy (SEM) method showed that without or at lower dipyridamol content (<3%) fibers consisted of interleaved ellipsoid and cylindrical fragments. At higher dipyridamol content (3-5%) anomalous ellipsoid structures did not practically form, and fiber's shape became cylindrical. The totality of morphological and structural characteristics determined the rate of dipyridamol diffusive transports. The simplified model of drug desorption from fibrous matrix was presented. In current work it was showed that the rate-limiting stage of transport was the diffusion of dipyridamol in the bulk of cylindrical fibers.