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Comparative assessment of polyvinylpyrrolidone type of membranes based on porosity analysis

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ABSTRACT

A method for computer-aided assessment of the quality of membranes in their production process is presented in this paper. The method is based on computer analysis of the scanning electron microscope (SEM) images of membrane's sections. A novelty of the method consists in fully automatic identification, contouring, size measuring and classification of the pores in SEM images of the specimens of the membranes. Two defined in the paper parameters, general porosity factor and inner penetration factor, in long series of images corresponding to the membranes produced by a given technological method for membrane's quality evaluation or for comparison of membranes produced by different methods are proposed. The proposed method was used to the assessment of the porosity of poly-L-lactide membranes obtained by the inversion phase method. The analyzed membranes were intended for use as scaffolds for culturing specific biological tissues (chondrocytes for cartilage lesion regeneration). Experimental results of the assessment of two types of membranes produced by alternative methods are presented. Plans for future work aimed at the improvement and extension of the method to a larger set of morphological parameters characterizing the porosity of membranes are presented.

Keywords: Poly-L-lactide membranes; Morphological parameters; Porosity evaluation; Computer-aided image processing; 3-D scaffold

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