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Abbreviations: IMC: Indomethacin; SEM: Scanning Electron Microscopy; TEM: Transmission Electron Microscopy; FTIR: Fourier Transform Infrared Spectroscopy with it [4].

In ophthalmology, IMC is used as topical eye drops for prevention of miosis during cataract surgery, cystoid macular edema and conjunctivitis [5,6]. Its use in liquid formulations is limited due to its properties.

During the past decade, research defines the use of Nanoparticles (NPs) from biocompatible and biodegradable polymers as an effective drug-release system, whose aim is to increase the solubility, with consequent increase of the bioavailability and reduction of the irritating effects of the drug [6]. The choice of a polymer, method and technological factors has a crucial role for the degree of drug loading, stability and its dissolution rate.

Different possibilities about polymer choice and IMC loading methods are discussed in the literature. For example NPs, based on copolymers of methyl methacrylate and glycidyl methacrylate with IMC were developed, via emulsion radical polymerization [7].

Moreover, some studies were already made on NPs containing cyclodextrins and IMC [8].

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the extraction of the monomer and the initiator from the matrix is, the monomer due to a lack or a shifting of peaks that are typical for the more pores are formed, which allows a complete release of IMC. Examination of the release of IMC from model carriers in incorporated in the matrix. After 9 hours of dialysis, the extraction of the residual monomer and initiator was complete, no more pores were formed and the amount of released IMC became independent from the time of dialysis. At the time of the dialysis between 23 and 50 h apparently occur chemical changes where the weak hydrogen bonds between the polymer and IMC in the models which were dialyzed less time from 23 h are probably converted into stable chemical bonds. Possible reason for this interaction is the liquid medium in which the IMC-PVAc-NPs are located. In previous study [11] we showed the presence of chemical bonds between IMC and polymer in primary latex, before it is undergone any other technological treatment. This could be a probable reason for their more dense structure compared to the models which were obtained by combination of Methods 1 and 2 with Method B.

FT-IR results

Figure 3 shows the IR-spectrum of the four models. In the spectra of pure IMC (β-type, more stable and less soluble polymorph modification of the drug in comparison with α-modification) are shown two most intensive peaks at 1717 cm⁻¹ and at 1690 cm⁻¹ [10]. Spectra of models IMC-PVAc-1B and IMC-PVAc-2B (Figure 3a) show a similarity with this of pure IMC (not showed) [10,12,14,15]. Obviously, the current systems IMC-PVAc-1B and IMC-PVAc-2B are not about a chemical interaction between polymer and IMC but rather for an interaction with hydrogen bonds. At IMC-PVAc-1A and IMC-PVAc-2A (Figure 3b) we see some of the characteristic absorption peaks, but we must probably look for a complex between the drug and

the NPs from the low molecular weight substances in combination with applied sonication is essential for the morphology of the NPs and the state of IMC which is incorporated therein.

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