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CROSSLINKING AND DEGRADATION OF PVP HYDROGELS AS A FUNCTION OF DOSE AND PVP CONCENTRATION

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Membranes manufactured by radio-induced crosslinking and simultaneous sterilization of hydrogels of PVP, PEG and agar, according to the Rosiak's method, have many desirable properties to be used as wound dressings. In order to understand the role of water concentration and PVP concentration on the kinetics of crosslinking and degradation, swelling experiments were performed using three different kinds of sample: the dried membrane, the extracted gel and the hydrated one. Moreover, in this study the solubility range was enlarged using a special technique for membrane preparation, as usually the mechanism of crosslinking was studied only in the range of PVP solubility, i.e., approximately 16% for PVP K90. For the hydrated membrane, the results showed the water absorption increases with PVP concentration and decrease with dose. The results of swelling of the gel fraction and the swelling of the dehydrated membrane showed that the water absorption decreased with PVP concentration and also decrease with dose. The results of mechanical strength showed that both elongation and tensile strength increase with dose and PVP concentration. Surprisingly, it was concluded that the OH yield was not the key factor for gel formation in the studied range of water concentration, being the most important parameter PVP concentration for gel formation. As the results of swelling of the gel fraction dried after extraction was much higher than results from the dehydrated membrane, it was confirmed the conclusion that the polymeric net was composed solely by PVP molecules.

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1016