

Study of the Biocompatibility of Modified Polypropylene with Two Different Kinds of Polyfunctional Monomers

H. Otaguro¹⁾, S. O. Rogero¹⁾, A. Yoshiga¹⁾, L. F. C.P. Lima¹⁾, D. F. Parra¹⁾, B. W. H. Artel²⁾
A. B. Lugão¹⁾

¹⁾ IPEN/CNEN - Instituto de Pesquisas Energéticas e Nucleares.

²⁾ EMBRARAD - Empresa Brasileira de Radiações Ltda.

E-mail address of main author: ablugao@ipen.br

The aim of this paper is to investigate if Polypropylene (PP) modified by ionization radiation (gamma rays) in the presence of two different monomers, can be used in the food and medical area, in the last case as biomaterial. For this purpose the samples were obtained by mixture in a twin-screw extruder system with two different polyfunctional monomers. It was studied the Ethylene Glycol Dimethacrylate (EGDMA) and the Trimethylolpropane Trimethacrylate (TMPTMA) with concentration in the range of 0.5 to 5.0 mmol. After mixture they were irradiated with dose of 20kGy of gamma radiation. The structural modification of polypropylene have been analyzed, in the melt state, by measuring the melt flow rate (MFR), η^* (complex viscosity) and G' (storage modulus) in the angular frequencies range of 10^{-1} to $3 \times 10^2 \text{ s}^{-1}$. From the oscillatory rheology data it was possible to obtain for each sample the values of η^0 (zero shear viscosity), that will be related with the molar mass. All results are discussed with respect to the crosslinking and degradation process that occur in the post-reactor treatment to produce controlled rheology polypropylene.

For investigation of any type of toxicity in these polymeric materials they were submitted to in vitro test of cytotoxicity by neutral red uptake methodology with NCTC L 929 cell line from American Type Culture Collection bank. In the first test of biocompatibility all of modified PP samples presented no cytotoxicity, indicating that these materials could be used as biomaterial and other kinds of biocompatibility test have to be done.

11555 ✓