IRAP163

Alternative methodology for hydrogels average pore size identification

Tiago Luiz de Almeida[1], Andrea C. Dórion Rodas[2], Kely Cristina Soares Bispo[3], Priscila Caproni[2], Daniele Yoshito[1], Ademar B. Lugão[4], Monica B. Mathor[1]

[1] Centro de Tecnologia das Radiações Instituto de Pesquisas Energéticas e Nucleares (Ipen/CNEN-SP) e-mail: tig_luiz@yahoo.com.br

[2] Centro de Biotecnologia Instituto de Pesquisas Energéticas e Nucleares (Ipen/CNEN-SP)

[3] Laboratório de Histotecnologia do Departamento de Patologia da Faculdade de Medicina da Universidade de São Paulo

[4] Centro de Química e Meio Ambiente Instituto de Pesquisas Energéticas e Nucleares (Ipen/CNEN-SP)

Hydrogels are widely used as a biomaterial device for many purposes as contact lens and wound covers. Nowadays their use is increasing with the purpose as scaffold for tissue engineering. For the development of the materials like a scaffold in tissue engineering, many variables must be known, and one of them is the average pore size. The determination of the average pore size of the soft materials is still a challenge because they deform easily depending on the technique applied. For this reason, the aim of this work is presenting an alternative technique which can be easily applied to complement the pore size identification.

In this study, were prepared poly (vinilalcohol) (PVA) solutions in the concentration of 8% (v/v) in water, poured in petri dishes and irradiated with gamma radiation from between 10 to 50 kGy to provide hydrogels with different pore size. The membranes, after had been prepared, were swelling with purified water until achieve the maximum absorption, they were immersing on freezing medium for 12 hours and frozen until -70ºC. These samples were sectioned using a cryostat at 4 micrometer. These slices were placed on a glass slide for staining with Hematoxilin and Eosin. The slices were observed and photographed at the optical microscopy. A computer program (UTHSCSA IMAGE TOOL 3.0 version) was used to determinate the average of the hydrogel porosity.

The sample slice sections showed significant differences between hydrogels irradiated in different doses. The pores size was approximated between 5 and 200 microns. By this method is possible to determine the relationship dose/porosity. Our results indicate that the utilization of this method for the determination of hidrogels average porosity can be possible, complementing the methods already existing. In high porous hydrophilic membranes this method leads the advantage of the higher facility to sample preparation since as the usual sample preparations methods are more difficult.