

## **Influence of water in production of polyethylene glycol dimethacrylate hydrogels**

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Hydrogels are three-dimensional structures capable of absorbing large amounts of water or body fluid, property very important to increase their similarity with the biological extracellular matrix [1]. The water presence in the hydrogels structures confers them softer consistency, increasing similarity with the natural tissue, besides increasing the biocompatibility of them [2]. Herein, the influence of water in different amounts of polyethylene glycol dimethacrylate (PEGDMA) (Mn 750) were evaluated and discussed. PEGDMA was used at the follows concentrations (in DI): 100%, 75%, 50% and 25% (w/v). 0.1% (w/v) of Irgacure<sup>®</sup> 2959 was used as photoinitiator. After mixture, the samples were placed on UV light irradiation for 10 minutes to photopolymerization reaction. The following tests were performed: scanning electron microscopy (SEM), differential scanning calorimetry (DSC), Fourier transform infrared spectroscopy (FTIR) and swelling studies. Prior to SEM, DSC and FTIR analysis, the samples were dried in an incubator at 30°C for 24 hours and then maintained in desiccator until analysis. After photo-polymerization, the sample with the highest amount of water had an opaque coloring due to association with a phase separation. By the time, when higher amounts of water were used the samples were more fragile. All the produced hydrogels had smooth surfaces and without phase separation. Thermal analysis showed that the glass transition temperature was 13% lower when the sample water concentration is higher. FTIR analysis and swelling studies are been performing and will presented. It can be observed in the results obtained that when higher amounts of water were used there are a weakening of the crosslinks, apparently reducing the mechanical properties of material (not measured). For applications as scaffold, the mechanical property is very important and should be carried out in our lab looking forward to applying as biomaterial to simulate the natural tissue.

[1] A. Hoffman, *Adv. Drug. Deliv. Rev.* **54**, (2000) 2519.

[2] N. Peppas, *Eur. J. Pharm. Biopharm.* **50**, (2000) 27.