

# **SYNTHESIS OF AMPHIPHILIC TRIBLOCK COPOLYMERS AND THEIR APPLICATION IN THE CONTROLLED RELEASE OF BIOLOGICALLY ACTIVE SUBSTANCES**

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## **ABSTRACT**

Hydrogel based carriers have been developed from biocompatible block copolymers composed by polycaprolactone (PCL), and polyvinylpyrrolidone (PVP) crosslinked with  $\gamma$ -methacryloxypropyltrimethoxysilane (MPS), and were used in the release of ascorbic acid and diclofenac. PVP-PCL-PVP amphiphilic triblock copolymers were synthesized via reversible addition-fragmentation chain-transfer polymerization (RAFT). PCL samples with two different molecular weight (14 and 45 KDa) end-capped with O-ethyl xanthate were used as macrochain transference agents, and AIBN was used as a free radical initiator. The polymerization reactions were carried out in bulk at 60 °C in presence of 10 mol% of MPS and different amounts of VP. Since most of the materials suffered premature crosslinking and were poorly soluble, the residual monomer was removed by rinsing the solids with diethyl ether several times.

The materials thus obtained were kept under reduce pressure during 72 h at 40 °C to eliminate any residual monomer, and complete the crosslinking reaction. According to the morphological characterization, polycaprolactone segments are forming segregated domains imbibed in hydrophilic PVP matrix. The hydrogels swelling in water were from 10 to 40 %, depending on the VP content. Ascorbic acid and diclofenac were used as model hydrophilic and hydrophobic substance to observe their sustained release *in vitro* from the amphiphilic hydrogels.

**Acknowledgement:** The authors thank to the Pontificia Universidad Javeriana for the financial support through the grant number 5097.