PHYSICOCHEMICAL CHARACTERIZATION OF PAAM-CO-MC HYDROGELS AS CONTROLLED RELEASE SYSTEMS.

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1. INTRODUCTION

Hydrogel, a polymer gel that detains a three-dimensional network with high mechanical resistance, absorbs large quantity of water and is a biocompatible device. However, the characterization of this material is essential for obtaining a stable dosage form. This study aims at characterizing the physical and chemical properties of polyacrylamide-co-methylcellulose (PAAMA-co-MC) hydrogels in the following proportions: 3.6%, 7.2%, 14.7% and 21.7% (w / v).

2. METHODS

The characterization of the systems was performed through the analysis of the swelling, particle size, zeta potential, scanning electron microscopy (SEM).
These properties were analyzed through the hydrogels behavior in buffer solutions at pH 1.2, 4.0, 7.4 and 10.0 with constant ionic strength. In the Microscopy the samples under study were lyophilized during 24 hours in -55°C and metallized with a thin layer of Au. And, the hydrogel that had the best characteristics was a captopril matrix carrier, thus developing a controlled release system.

3. RESULTS

Photomicrographs showed that the hydrogels have porous structure characteristic of the system, and the 3.6% hydrogel showed a larger pore size. Due to this feature this latter was the hydrogel that obtained a greater swelling level, which stood out at pH 1.2, was observed in Figure 1.

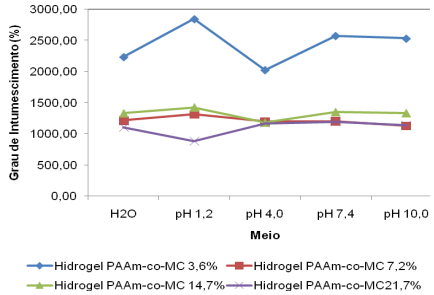

Figure 1: Swelling of hydrogels.

However, the second that obtained the same result successfully was the 7.2% hydrogel.

The zeta potential of all the hydrogels remained close to its isoelectric point with variable particle size. The largest were observed in the 14.7% hydrogel at pH 7.4 with a mean size of 350µm. Therefore the hydrogel chosen to be the captopril carrier was the 3.6% one in which we can observe that the adsorption took place successfully through microscopes in Figures 2 and 3.

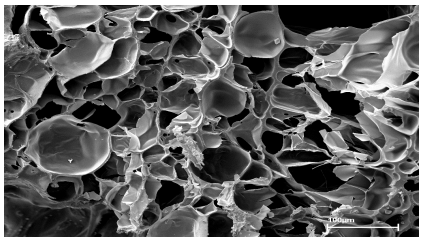

Figure 2: SEM of the hydrogel of 3.6% (w / v) with at 200× magnification.

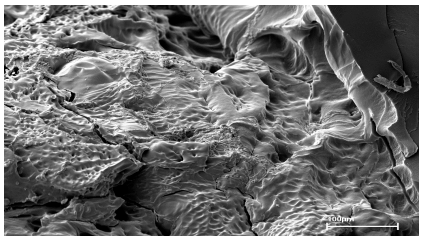

Figure 3: SEM of the hydrogel of 3.6% (w / v) with captopril adsorved at 200× magnification.

4. CONCLUSION

The hydrogels 3.6 and 7.2% showed better properties to be drugs carriers among the others. And the 3.6% hydrogel demonstrated success in the adsorption of captopril.

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