Synthesis of a Novel Biopolymer-Based Superabsorbent Hydrogel: Collagen-Poly(Acrylic Acid-Co-HEMA)

Mohammad Sadeghi

Department of Chemistry, Science Faculty, Islamic Azad University, Arak Branch, Arak, Iran.
m-sadeghi@iau-arak.ac.ir

In recent years, increasing interest in natural-based superabsorbent hydrogel has developed mainly due to high hydrophilicity, biocompatibility, low-toxicity, and biodegradability of biopolymers [1]. These materials are defined as crosslinked macromolecular networks that can absorb water or physical fluids up to many times of their own weight in a short time, but are not dissolved when brought into contact with water [2].

In this paper, attention is paid to synthesis of a superabsorbent hydrogel based on collagen and polyacrylic acid and 2-hydroxyethyl acrylate. The graft copolymerization reaction was carried out in a homogeneous medium and in the presence of ammonium persulfate (APS) as an initiator and N,N'-methylene bisacrylamide (MBA) as a crosslinker[3]. A proposed mechanism for collagen-g-(PAA-co-PHEMA) formation was suggested and the hydrogel structure was confirmed using FTIR spectroscopy. The reaction variables affecting on the swelling capacity of the were systematically optimized to achieve a hydrogel with swelling capacity as high as possible[4,5]. Furthermore, the water absorbency of hydrogels was measured in solutions with pH ranged 1 to 13. The collagen-based hydrogel exhibited a pH-responsiveness character so that a swelling-deswelling pulsatile behavior was recorded at pHs 2 and 8.

REFERENCES