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Preparation of Nano Triblock Co-polymer for Desferoxiamine Delivery and Cross-Linked Copolymer for Iron Overload Disease

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ABSTRACT

Hydrogels show reversible volume phase transitions based on external stimuli such as solvent composition, pH, temperature, electric field, ionic strength, light, etc. These properties make hydrogels promising substances in various fields including pharmaceutical, agriculture, biotechnology and industrial applications. The various applications include wastewater treatment, enzyme supports; metal extraction, controlled release of drugs, soft contact lenses, water managing materials, wound dressing, agrochemical release and diapers. Hydrogels are networks of cross-linked polymers, fully or semi interpenetrating networks of polymers, core-shell microspheres and inter polymer complexes. In latest years, maximum studies focus on the characterization and synthesis of synthetic poly hydrogels.

Poly hydrogels are cross linked networks of macromolecular. The synthetic poly gels have a resemblance to proteins triggered them to apply in the modeling of organic processes. In hydrogels, apart from the hydrogen bonding hydrophobic interactions and hydrogen bonding, the coulombic attraction between oppositely charged monomer units, play an important role in determining their phase transitions that leads to a different chain configuration within the network structures.

Some copolymer and IPNs were synthesized from bisacryl amide at different ratios as crosslinking agent by Redox polymerization. These IPNs (polyacrylamide-poly electrolyte) (polyacrylamide –poly ethylene imine) and poly (acrylamide-acrylic acid) copolymer are examined by means of UV-VIS spectrophotometry method to decide their capability for linking with iron ions which might be prepared with standard solution employed for this reason. The results, obtained indicate that copolymer synthesized from (AcAm:AcAc) with 20% (wt/wt) from bisacrylamide has the capability of removing the iron ions from the solution. The ratio of swelling for the prepared IPNs and copolymers was evaluated as a function of time at different pH conditions (1.2, 8.4) and distilled water; the resulted data show that the ratio of swelling was increased with increasing in pH. To determine the pore size, the morphology of copolymers was carried out by using scanning electron microscopy (SEM). By ring opening polymerization, A new triblock copolymer of (Polylactide-Pluronic127-Polylactide) is prepared using Diazabicyclo-[5.4.0]-udec-7-ene as a catalyst. The triblock copolymer is characterized by 1HNMR. Semi IPNs from triblock copolymer with acrylamide was synthesized to apply as a drug delivery of polymer with Iron overload chelating drug. The SEM of the semi IPN indicates the nano shape due to the ordinary orientation of lactide fibers. The release of Desferoxiamine study as a function of time at pH 1.2 and 8.4 for 24 hours with semi IPNs coated with tetramethylourea

and without coating was also carried out. The releasing studies show that the releasing rate at SGF is lower than GIF.
Keywords: Drug delivery, Desferoxiamine,Nano block copolymer