



PREPARATION AND CHARACTERIZATION OF MEFENAMIC ACID LOADED POLYMERIC NANOPARTICLES BY SOLVENT EVAPORATION AND IONOTROPIC GELATION TECHNIQUES

Isham Alzoubi¹, Farhad Mirzaei

Department of Surveying and Geometric Eng., Engineering Faculty, University of Tehran, Iran

Abstract:

Mefenamic acid is used for the treatment for rheumatoid arthritis, post-operative pain and dysmenorrhea. It is chemically [2-[(2, 3-dimethylphenyl) amino] benzoic acid], an anthranilic acid derivative, which is a prostaglandin inhibitor. It is water insoluble, bitter drug with good oral bioavailability (but poor physico chemical parameters, aqueous solubility) are responsible for its decreased biological activity. It is available as tablets, capsules and suspensions. Nanoparticles have shown significant advancements in delivery of drugs and biomolecules. The primary objective of this investigation was to develop and characterize polymeric nanoparticles of Mefenamic acid. Mefenamic acid nanoparticles were prepared by solvent evaporation method and ionic gelation technique by changing the polymers and stabilizers.

In solvent evaporation method, Ethyl cellulose (EC) and Eudragit S-100(ED) were used as polymers and tween 80 as stabilizer. For each polymer, five formulations were prepared by varying the concentrations of polymer and drug. All the formulations were characterized for particle size, zeta potential, scanning electron microscopy and FTIR analysis. Among the five formulations of Ethyl cellulose and Eudragit S-100, F3 formulation of EC and ED showed promising results. On comparison, F3 of ED was found to be the best formulation with mean particle diameter of 103.6nm and zeta potential value of -59.5mV. The drug release was sustained till 12hrs following first order with Fickian diffusion.

For ionic gelation technique, Chitosan was used as polymer and Sodium tripolyphosphate as cross linking agent. Five formulations were prepared by varying the concentrations of polymer and drug. The mean particle diameter and zeta potential value of the best formulation (F2) was found to be 194.6nm and -35.3 mV respectively. FTIR studies showed the absence of chemical interaction between Mefenamic acid and polymer and the encapsulation of drug into the nanoparticles. The SEM results indicated that Mefenamic acid nanoparticles were found to be spherical in shape. The *In vitro* drug release studies showed that the drug release followed Higuchi pattern with Fickian diffusion. The drug release was sustained till 11hrs following first order rate constant for the best formulation.



Comparative study was performed between the best formulations of both the techniques. Solvent evaporation method was found to be the best technique for the formulation of Mefenamic acid nanoparticles because of the minimum mean particle diameter (103.6nm) and greater stability (59.5 mV).

Key words: - Entrapment efficiency, Loading capacity, Particle size, zeta potential

Biography:

Working as Associate editor for Pharmaceutical Biotechnology published by Bio info publications working as Associate editor for Pharmaceutical Biotechnology published by Bio info publications.

Publication of speakers:

- 1. A.Krishna Shailaja. A Comparative Study of Aspirin Loaded Bovine Serum Albumin Nanoparticles Prepared by Desolvation Technique Using Various Desolvating Agents. Nano biomedicine and engineering
- 2. A.Krishna sailaja. A Comparative study of Aspirin loaded Alginate nanoparticles prepared by desolvation technique using acetone and ethanol as desolvating agents. Nano science & Nanotechnology-Asia.2016.
- 3. A.Krishna Shailaja, R.supraja, Ayesha siddiqua. Comparison of mefenamic acid nanoparticles by desolvation technique. Micro and nano system.2016.vol 8 (3), 1
- 4. A.Krishna sailaja. Formulation characterization and optimization of process variables of chitosan nanoparticles containing sulphasalazine. Journal of chemical and pharmaceutical sciences.2014.

9th International Conference on Smart Materials and Structures; October 18th, 2020; Amsterdam, Netherlands

Citation: Preparation and characterization of mefenamic acid loaded polymeric nanoparticles by solvent evaporation and ionic gelation techniques; Smart Materials 2020; October 18th, 2020; Amsterdam, Netherlands.

1. A.Krishna Shailaja. *In vitro* dissolution studies of Nimesulide loaded cellulose acetate Hydrogen phthalate polymeric nanoparticles by solvent evaporation. Chemical and pharmaceutical sciences.2014.

- 6. A.Krishna sailaja. *In vitro* dissolution studies of BSA loaded carbapol nanoparticles by polymerization technique. International journal of basic and applied chemical sciences.2015.
- 7. A.Krishna sailaja and K.Anusha. Preparation and evaluation of ibuprofen loaded microspheres. International