Enteric targeted drug delivery: Preparation and Evaluation of Mucoadhesive microsphere/discs of alginate of naproxen

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Abstract:
The purpose of this research was to decrease the gastric-side effects of naproxen to formulate enteric microspheres of alginate. Ionotropic gelation was used to entrap naproxen into sodium alginate (Na Alg) mucoadhesive microspheres as a potential drug carrier for the oral revealed amorphous form. The results were found that microparticles (Na Alg) prepared had slower delivery of this anti-inflammatory drug. Microparticles with different drug to polymers ratios were prepared and characterized for encapsulation efficiency, particle size, DSC (Differential Scanning Calormetry), mucoadhesive properties, gastroretentive time and drug release profiles.

The best drug of polymer ratio for microparticles was 1:1 (F₁) with 200 mg naproxen and 200 mg Na Alg. The microparticles formulations F₁, F₂ and F₃ showed loading efficiency of 92.5%, 50.01% and 45.41%, production yields of 92.5%, 105% and 110% and mean particle size of 945.4, 1105 and 1202.4 µm respectively. The DSC showed stable character of naproxen in the drug loaded microparticles and revealed amorphous form. The results were found that microparticles (Na Alg) prepared had slower release than the untreated naproxen (p<.05). The microparticles exhibited very good mucoadhesion and flowability properties. The results of mucoadhesion strength and retention time study showed better retention of naproxen microparticles in intestine. The results also showed significant higher retention of mucoadhesive microparticles in upper GI tract.

It was concluded that the alginate bioadhesive formulations exhibit promising properties of a sustained release form for naproxen and that they provide distinct tissue protection in the stomach.

Keyword: Sodium alginate, Microspheres, Naproxen, Intestinal, Muco-adhesive, Ionotropic gelation.