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Floating mucoadhesive beads of amoxicillin trihydrate for effective eradication of *Helicobacter pylori*

Amalesh Samanta

Jadavpur University, India

Helicobacter pylori, the major culprit for peptic ulcer, have a unique way of survival in harsh acidic environment of the stomach by colonizing in the gastric mucosal layer. One reason for the incomplete eradication of *Helicobacter pylori* is probably due to the short residence time of antimicrobial agents in the stomach. The objective of this investigation was to design sunflower oil entrapped floating and mucoadhesive beads of amoxicillin trihydrate using sodium alginate and hydrophilic polymer hydroxypropyl methylcellulose as matrix polymers and chitosan as coating polymer to localize the antibiotic at the stomach site and to evaluate its potential for the eradication of *Helicobacter pylori*. Beads were prepared by ionotropic gelation technique and were subjected to evaluations of different physicochemical, *in-vitro* and *in-vivo* properties. Beads of all batches were floated for >24 hours with a maximum lag time of 46.33±3.2 seconds. Scanning electron microscopy (SEM) revealed that the beads were spherical in shape with few oil filled channels distributed throughout the surfaces. SEM of the cross section of the beads demonstrated small pocket structures inside the matrix confirming oil entrapment. Prepared beads showed good mucoadhesiveness of 75.7±3.0% to 85.0±5.5%.

The drug release profile was best fitted with Higuchi model and the drug release from the beads was non Fickian type ($1 < n < 0.5$). The optimized batch showed 100% *Helicobacter pylori* growth inhibition in 15 hours in *in-vitro* culture. Furthermore, x-ray study in rabbit stomach confirmed the gastric retention of optimized formulation. The results provide evidence that formulated optimized beads may be used effectively to localize the antibiotic in the gastric region to allow more antibiotic to be available at gastric mucus layer to act on *Helicobacter pylori* and thereby improve the therapeutic efficacy.

Biography

Amalesh Samanta has completed his PhD in Pharmaceutical Microbiology from Jadavpur University. He is working as Professor in the Department of Pharmaceutical Technology of Jadavpur University, Kolkata, India. He has published more than 76 papers in reputed journals and has been serving as Coordinator of M Pharm course in Clinical Pharmacy and Pharmacy Practice of Jadavpur University. His research interest involves formulation development and dosage designing. He is associated with Indian Pharmaceutical Association, American Chemical Society (ACS).

asamanta61@yahoo.co.in