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Floating controlled drug delivery system of Verapamil hydrochloride loaded hollow microspheres (microballoons)

Nishi Gupta, Sania Jawed, Gyanendra Singh and **A K Srivastava**
Indian Institute of Technology-BHU, India

The purpose of this study was to develop a sustained release floating drug delivery system (hollow microsphere or microballoons) of verapamil hydrochloride using ethylcellulose and Eudragit RS 100. Verapamil hydrochloride is a phenylalkylamine derivative and calcium channel blocker: Class IV drug. Verapamil Hydrochloride loaded floating microspheres of ethyl cellulose and Eudragit RS 100 were prepared by non-aqueous solvent evaporation method and optimized by changing drug:polymer ratio and polymer combination. 13 batches containing Ethyl cellulose, Eudragit RS 100 and both Ethyl cellulose and Eudragit RS 100 respectively were prepared and evaluated with respect to percentage yield, micromeritic properties, drug entrapment efficiency, particle size, percentage buoyancy, *in-vitro* drug release study and morphological studies. It was found that with increase in polymer with respect to drug formulation parameters such as particle size and percentage yield entrapment efficiency also increased. Drug:polymer ratio (1:2) was found to be optimal and this attributed to various factors like more availability of polymer, increase in viscocity of polymer solution, decrease in surface/volume ratio and increased percentage yield. Various combinations of Ethyl cellulose and Eudragit RS 100 were optimized in different ratio. Ethyl cellulose:Eudragit RS-100 (2:1) ratio showed best results when evaluated for percentage yield, particle size, entrapment and % buoyancy. Verapamil hydrochloride loaded hollow microspheres were stable, white colored, spherical, free flowing in nature and showed controlled release up to 12 hours. The drug release from the hollow microspheres followed Higuchi model indicating diffusion controlled non-Fickian drug release. Optimized formulation batch F5 showed percentage yield 82.99%, percentage buoyancy 86.05±0.93%, particle size 305.17±3.43 μm and percentage drug entrapment efficiency 83.45±0.21%.

Biography

Nishi Gupta is currently pursuing her Post Graduation (MPharm IDD) from Indian Institute of Technology, Banaras Hindu University (IIT-BHU) with CGPA 8.51 ranked among top 3 students of the batch 2011-16. She qualified GATE-2015 examination and was selected for MHRD Post-graduate scholarship. For MPharm dissertation, she is working under supervision of Mr. A.K.Srivastava, Associate Professor, Department of Pharmaceutics, IIT-BHU.

nishi.gupta.phe11@itbhu.ac.in

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