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Novel pH-sensitive polyvinyl alcohol-grafted-acrylamide microsphere based modified release system of Prednisolone: A chronotherapeutic approach for arthritis

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Research Article

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Abstract

Novel Prednisolone sodium phosphate loaded hydrolyzed acrylamide grafted polyvinyl alcohol (Hy-PVA-g-AAm) microspheres were fabricated by using spray drying method. The primary objective of the work was to synthesize Hy-PVA-g-AAm with pH dependent swelling and its microspheres. The microspheres were evaluated by scanning electron microscopy (SEM) as well as fourier-transform infrared spectroscopy (FTIR). The influence of processing conditions on particle size, drug entrapment efficiency and swelling behaviour of the developed microspheres were studied. The microspheres were filled in enteric coated hard gelatine capsules to carry out the dissolution. The average particle size of the microspheres varied between 60–100 μm and the entrapment efficiency ranged between 84 to 94%. The microspheres exhibited pH responsive swelling with appreciably high swelling under colonic pH of 7.4 compared to acidic condition. The microspheres exhibited drug release in pH dependent manner. The cumulative percent drug release was found to be less than 20% in slightly acidic pH 6.8 resembling intestine and comparatively higher drug release in pH 7.4. The formulation followed Korsemeyer-Peppas kinetics with Non-Fickian diffusion after an adequate lag period.

Key words: Microspheres, polyacrylamide, polyvinyl alcohol, Prednisolone sodium phosphate

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