Formulation and evaluation of Silymarin floating microspheres

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Introduction: Silymarin has a short half life (4-6 hours) and hence requires frequent administration. It also undergoes degradation in the intestinal pH. These shortcomings can be overcome by formulating the drug as a novel drug delivery system, viz. gastroretentive drug delivery system. This study aims to develop and evaluate silymarin floating microspheres prepared with polymers like hydroxypropylmethyl cellulose E50 LV and ethyl cellulose.

Experimental: Compatibility of the drug and polymers was assessed by Fourier transform infrared spectroscopy. Differential scanning calorimetry studies were also conducted. Floating microspheres of silymarin were prepared by solvent evaporation technique by using polymers like hydroxypropylmethyl cellulose E50 LV and ethyl cellulose. Various evaluation parameters were assessed, viz. surface morphology by scanning electron microscopy, frequency distribution analysis by optical microscopy, percentage yield, drug entrapment and

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Results and Discussion: Fourier transform infrared spectroscopy showed no interaction between the drug and polymers. Silymarin floating microspheres were spherical in nature, which was confirmed by scanning electron microscopy. Silymarin floating microspheres with normal frequency distribution were obtained. A maximum of 89.60% drug entrapment efficiency was also obtained. The in vitro drug release study of silymarin floating microspheres showed controlled release which depended on the polymer concentration. The co-efficient of determination indicated that the release data were best fitted with zero order kinetics. Higuchi equation explained the diffusion controlled release mechanism. The diffusion exponent ‘n’ values of Korsemeyer-Peppas model was found to be non–fickian. The differential scanning calorimetry studies showed that there was a decrease in the crystallinity of silymarin.

Conclusion: All the nine formulations remained buoyant and showed drug release up to 12 hours. Surface smoothness and mean particle size of the silymarin microspheres was increased by increasing the polymer concentration. Entrapment efficiency increased with increase in the polymer concentration. The study also indicated that the amount of drug released decreased with increase in the polymer concentration. The in vitro drug release study of silymarin floating microspheres showed prolonged and controlled release of the drug.

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