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Famotidine Loaded Solid Lipid Nanoparticles (SLN) for Oral Delivery System

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Abstract : Famotidine (FMT) is one of used substances in the treatment of hiperacidity and peptic ulcer, administered orally and parenterally via intravenous injection. Oral administration, which is more favorable, has been reported to have many obstacles in the process of the treatment, includes decreasing the bioavailability of FMT. This research was aimed to prepare FMT in form of solid lipid nanoparticles (SLN) with size ranging between 100-200 nm. The research was carried out also by optimizing factors that may affect physical stability of SLN. Formulation of Famotidine SLN was carried out by optimizing factors, such as duration of homogenization and sonication, lipid concentration, stabilizer composition and stabilizer concentration. SLN physical stability was evaluated (particle size distribution) for 42 days in 3 diferent temperatures. Entrapment efficiency and drug loading was determined indirectly and directly. The morphology of SLN was visualized by transmission electron microscope (TEM). In vitro release study of FMT was conducted in 2 mediums, at pH of 1.2 and 7.4. Chemical stability of FMT was determined by quantifying the concentration of FMT within 42 days. Famotidin SLN consisted of GMS as lipid and poloxamer 188, lecithin, and polysorbate 80 as stabilizers. Homogenization and sonication was performed for 5 minutes and 10 minutes. Physyical stability of nanoparticles at 3 different temperatures was no significant difference. The best formula was physically stable until 42 days with mean particle size below 200 nm. Nanoparticles produced was able to entrap FMT until 86.6%. Evaluation by TEM showed that nanoparticles was spherical and solid. In medium pH of 1.2, FMT was released only 30% during 4 hour. On the other hand, within 4 hours SLN could release FMT completely in medium pH of 7.4. The FMT concentration in nanoparticles dispersion was maintained until 95% in 42 days (40oC, RH 75%). Famotidine SLN was able to be produced with mean particle size ranging between 100-200 nm and physically stable for 42 days. SLN could be loaded by 86,6% of FMT. Morphologically, obtained SLN was spheric and solid. During 4 hours in medium pH of 1.2 and 7.4, FMT was released until 30% and 100%, respectively.

Keywords : solid lipid nanoparticle (SLN), famotidine (FMT), physicochemical properties, release study
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