Abstract

Piroxicam is non-steroidal anti inflammatory, poorly water soluble, highly permeable drug and the rate of its oral absorption is often controlled by the dissolution rate in the gastrointestinal tract. So, piroxicam was selected as model drug for this study .The poor dissolution rate of water-insoluble drugs is still a major problem confronting the pharmaceutical industry. There are several techniques to enhance the dissolution of poorly soluble drugs. Among them, the technique of liquisolid compacts which is a promising technique towards such a predicted aims.

Different piroxicam liquisolid compacts were prepared using a mathematical model to calculate the required quantities of powder and liquid ingredients to produce acceptably flowable and compressible admixture. Microcrystalline cellulose, Colloidal silicon dioxide and Croscarmellose sodium were employed as carrier, coating material and disintegrant; respectively for preparing liquisolid compacts. Also polyethylene glycol 400 and propylene glycol were used as liquid vehicles. The ratio of carrier to coating material was kept constant in all formulations at 20: 1.

The prepared liquisolid compacts were evaluated for their flow properties such as bulk density, tapped density, angle of repose, Carr's compressibility index and hausner's ratio. Also the formulated liquisolid tablets were evaluated for post compaction parameters such as hardness, drug content uniformity, percentage friability and disintegration time. The in-vitro release characteristics of the drug from directly compressed tablets, marketed capsule and liquisolid compacts were studied in two different dissolution media. The interaction between drug and excipients in prepared liquisolid compacts were studied by Fourier transform infrared analysis, Differential scanning calorimetry and X- ray powder diffraction.

The tableting properties (hardness, drug content uniformity, percentage friability and disintegration time) of the liquisolid compacts were within the acceptable limits and drug release rates of all prepared liquisolid compacts were distinctly higher as compared to directly compressed tablets, and marketed capsules. According to one way analysis of variance (ANOVA) the liquisolid tablets formulated with PEG 400 at drug concentration of 10%w/w (LS-1) was the best formula among the all batches of liquisolid tablets prepared, in terms of faster disintegration time, superior dissolution profile and acceptable tablet properties.Both Differential scanning calorimetry and X- ray powder diffraction suggested loss of piroxicam crystallinity upon liquisolid preparation indicating that even though the drug existed in a solid dosage form, it is held within the powder substrate in a solubilized, almost molecularly dispersed state, which may be contributed to the enhanced drug dissolution properties.

The Fourier transform infrared spectra showed disappearance of the characteristic absorption band of piroxicam (3338.78 cm^{-1}) in liquisolid formulations which may be attributed to the formation of hydrogen bonding between the drug and liquid vehicle; this resulted in drug dissolution enhancement. More over the shelf life of LS-1 was found about (3.3) years.