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Development of curcumin solid lipid nanoparticle and assessment of pharmacokinetics and brain availability in Wistar rats

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Curcumin, a traditional herb and active ingredient of curcuma longa (Turmeric) is known for its wide pharmacological actions. Poor bioavailability of curcumin curtails the therapeutic utility of this potent molecule as drug. Lipid technology is one of the recent approaches developed to enhance bioavailability. In this line, the present study focused on the development of solid lipid nanoparticle (SLN) loaded with curcumin for enhanced bioavailability. Curcumin SLN was prepared using sterotex NF, Gelucire 33/01 and sterotex HM as lipids, Tween 80, Gelucire 44/14, PVP and propylene glycol (PG) as surfactants and co-surfactants. The developed formulations were subjected to various characterisation studies. The results suggest that the formulation prepared using Sterotex HM, Tween 80 and PG (CU5b) to be optimized formulation based on the particle size (127 nm), drug entrapment (90.40%) and *in vitro* drug release (82% at the end of 24 hr) analysis. The optimized curcumin SLN is subjected to pharmacokinetic and brain distribution studies in rats. The drug concentration in plasma and brain was quantified by developed HPLC method. The curcumin SLN showed more than 10 fold increases in bioavailability and dose dependent increase in bioavailability was observed for the developed optimized formulation. Based on the results it is evident that curcumin bioavailability and brain availability was promisingly improved in the form of SLN. The curcumin & SLN curcumin in both the doses was efficient in two compartment model in rat with a fitting weight coefficient of $1/C^2$. Further and IVIVC should be carried out to establish the nutraceutical curcumin role as drug.

Biography

Habibur Rahman is an Associate professor in the department of pharmaceutics PSG College of Pharmacy, India

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