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Bioavailbility evaluation of photostable fast release nifedipine tablets

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Nifedipine is a highly photosensitive drug that requires restricted protection from light during manufacturing, storage and handling of its dosage forms. Complexation of nifedipine with different types of cyclodextrins was tested for protecting the drug against the effect of light. Complexation was confirmed with differential scanning calorimetry, infrared spectroscopy and x-ray diffraction. Partial inclusion of nifedipine molecule was indicated within the cyclodextrin cavity through the dihydropyridine ring. Complexation with cyclodextrin was associated with dramatic increase in drug dissolution as well as photostability. The effect of drug exposure to fluorescence lamp and sunlight was tested. Complexation of nifedipine showed to retard drug photodegradation as indicated from degradation rate constant with values depending on light source. Cyclodextrin complexation offered higher nifedipine photostability against fluorescence light than sunlight. The fast dissoluted photostable solid nifedipine complex was formulated into tablets by direct compression method. The prepared tablets were evaluated and showed acceptable crushing strength and disintegration time. The tablets showed fast dissolution within 14 to 36.5 minutes for 80% of nifedipine depending on type of cyclodextrin. Some of the formulations presented good fast release properties similar to soft gelatin capsules containing dissolved nifedipine. Tablets containing nifedipine complex with hydroxypropyl-β-cyclodextrin were chosen for *in vivo* study. Tablets were orally administered to beagle dogs and compared with that of the commercially available 10 mg soft gelatin capsule (Adalat®) and 10 mg film coated tablets (Cornifar®). Similar onset of action was noticed for all tested dosage forms as indicated from the value of tmax. However, the formulated tablets showed significant higher Cmax as well as higher area under the curve (AUCo-∞) than the commercial soft gelatin capsule and film coated tablets indicating fast nifedipine absorption and high extent of absorption. It was concluded that the formulated fast release tablets could replace the nifedipine soft gelatin capsules with the advantages of ease of preparation and less restricted storage and handling conditions.

Biography

Mohsen A Bayomi received his PhD from the University of Connecticut, USA. He is now a professor of pharmaceutics at King Saud University, Saudi Arabia. He is interested in pharmaceutical technology and biotechnology. He published many articles in reputed journals concerning formulations of tablets, microparticles, nanoparticles, liposomal formulations, drug targeting, and in-vivo evaluation of dosage forms. He was involved in different research projects funded by the college of pharmacy research center and King Abdul Aziz City of Science and Technology. He is serving as an advisory board member of local and international Journals.

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