Title of the research topic: “Formulation and Evaluation of Floating Drug Delivery Systems for Some Selected Drugs”

Name of the Candidate: Mr. Gangadharappa H.V.

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Name of the Guide: Dr. T.M. Pramod Kumar

Dosage forms prepared using drug and polymers:

a) Effervescent floating tablets:
   - Drug: Verapamil Hydrochloride
   - Polymers: HPMC K15M, Karaya gum, PVP K30

b) Floating hollow microspheres:
   - Drug: Rosiglitazone Maleate
   - Polymers: Polyethylene oxide, Eudragit L-100, HPMC K15M and Ethyl cellulose

c) Non-Effervescent floating tablets:
   - Drug: Losartan Potassium
   - Polymers: Polypropylene foam powder, Chitosan, Eudragit L-100, HPMC K15M

Progress of the work:

REPORT I

Literatures available on floating drug delivery systems were collected and reviewed. Totally 13 tablet formulations were prepared using HPMC and Karaya gum for verapamil hydrochloride. The prepared tablets were evaluated for hardness, friability, floating lag time, in vitro floating capabilities and swelling index. Among the formulation F1 was found to be better. FT-IR spectral study revealed that similar characteristic peaks appear with minor differences for the pure drug and drug formulations. Hence it may be confirmed that no chemical interaction has taken place between the drug and polymer used.

REPORT II

In vitro dissolution study was carried out for all 13 formulations. The formulation which showed best result among all was found to be F1. The dissolution data were fitted in to different models. From the result data obtained concluded that the release of drug from the tablets was Fickian and non-Fickian diffusion. The release kinetics
of profiles tablets followed Korsmeyer-Peppas, Higuchi and matrix model. The floating dosage forms exhibited prolonged residence time in the stomach. The F1 showed a satisfactory dissolution profile, floating lag time and floating characteristics. All the tablets remained floating for up to 24 h.

REPORT III
Eleven different hollow microspheres containing rosiglitazone maleate were prepared by changing ratio of polymers such as Eudragit S100, ethyl cellulose and HPMC successfully by the modified quasi emulsion solvent diffusion method. The prepared microspheres were evaluated for their buoyancy, bulk density.

REPORT IV
The prepared microspheres were evaluated for drug content uniformity, entrapment efficiency, sphericity, surface morphology, compatibility studies by FTIR and DSC etc.

REPORT V
In vitro drug release and in vivo evaluation was carried out for the prepared formulations. The in vitro release showed the F3 formulation was maintain up to the 12th h and blood glucose was found to be 88.9 mg/dL. Results of the stability studies showed that there were no significant changes in the drug content and physical appearance. It may be concluded that dosage form can control the release, avoid dose dumping, and extend the duration of action of a drug with prolonged floating time.

REPORT VI
Floating matrix tablets formulated employing polypropylene foam powder (Accurel® MP1000) as low density polymer to achieve immediate gastric floating, karaya gum and chitosan natural polymers for sustained drug delivery of Losartan Potassium by direct compression technique. Characterization and evaluation of the prepared tablets were carried out. The following conclusions were drawn from the results obtained. The evaluation parameters of tablets were found be within Pharmacopoeial limits. Density of tablets were found be less than that of gastric fluid (< 1.004 g/cm³) which indicates that the tablet floats in gastric fluid. The tablets floated immediately with floating lag time zero and remained buoyant for more than 12 h.