CONCLUSION

Oral drug delivery has been most widely utilized route of administration among all the routes that have been explored for the systemic delivery of drugs via different dosage forms. Controlled release solid dosage forms intended for oral route of administration have been widely explored and used judiciously for delivering various kinds of drugs. By studying physicochemical, pharmacokinetic and pharmacodynamic characteristics of drugs and anatomy and physiology of GIT, it is possible to develop formulations for varied reasons. Various controlled release formulations for multidrug delivery have been developed successfully. Development of multidrug formulations should be based on clinical need of such formulations.

Hypertension and hypercholesterolemia frequently coexist and may require concomitant drug treatment. We have successfully developed multidrug formulations containing lovastatin combined with diltiazem hydrochloride, atenolol and propranolol hydrochloride respectively. Bilayer regioselective tablets containing lovastatin for immediate release and diltiazem hydrochloride, atenolol and propranolol hydrochloride for controlled release were developed. Inclusion of Tablettose 80 imparted good flow characteristics and compression characteristics to the powder mass. Hence, direct compression method was employed successfully for preparation of tablets.

- IR studies and DSC studies indicated compatibility between two drugs and with formulation excipients.
- All the formulations showed uniformity in tablet dimension, hardness, friability and weight variation tests.
- Drug content of all the formulations was found within the specifications.
- In vitro buoyancy studies showed less floating lag time (<10min) extended floating duration (>12 h) and good matrix integrity of formulations.
- 5% sodium bicarbonate concentration was found to be optimum to impart buoyancy characteristics to the formulations.
- In vitro dissolution studies showed expected results of drug release. 8% sodium starch glycolate concentration was found to be optimum for immediate release of lovastatin.
- HPMC (K4 M & K100 M) and xanthan gum were proved to retard release of diltiazem hydrochloride, atenolol and propranolol hydrochloride for 12 h. Combination of HPMC and xanthan gum did not give synergistic effect.
- Drug release mechanism for drugs in controlled release layer was diffusion and or anomalous drug transport.
- After stability studies (40°C, 75% RH, 3 Months), no significant difference was found in drug content, hardness, floating characteristics, in vitro dissolution studies.
- Similarity factor (ƒ2) was found between 50 to100 for all the formulations.
- In vivo buoyancy studies showed good results. Lovastatin and diltiazem hydrochloride bilayer floating tablets showed buoyancy for 6 h, lovastatin and atenolol bilayer floating tablets showed buoyancy for 8 h, and lovastatin and propranolol hydrochloride bilayer tablets showed buoyancy for 6 h.
- A complete analytical profile of the multidrug formulations was developed successfully.
- Organoleptic properties of the formulations were found to be acceptable.
- Physical tests for the formulations were developed.
- Test for identification of APIs in the formulations was developed successfully.
- Semi quantitative tests for APIs in the formulations were developed successfully, like UV absorbance range, pH range, conductivity range and optical rotation.
- Assay methods for prepared formulations were developed successfully.
UV method for simultaneous estimation of two drugs from the formulation were developed successfully and applied successfully to in vitro dissolution studies.

HPLC methods for simultaneous determination of two drugs from the prepared formulations were developed successfully.

Hence, we conclude the thesis that, lovastatin can be combined with diltiazem hydrochloride, atenolol and propranolol hydrochloride by the preparation of bilayer regioselective tablet formulations. This could reduce cost of the treatment, improve patient compliance and have better control over disease.