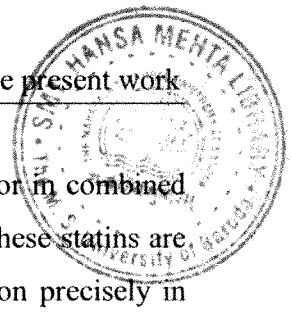
4. AIM OF THE PRESENT WORK



4. Aim of the present work

New antihyperlipidemic drugs and their formulations either in single or in combined dosage forms are regularly introduced in the Indian market. Most of these statins are very potent and hence there is a need to determine their concentration precisely in respective formulations. The objective of the present investigation was therefore, to develop analytical methods which were simple, sensitive, selective, and inexpensive and use minimum step for sample treatment.

4.1 The objective of this work were

- To develop validated analytical methods using spectrophotometry for single component and combination drug products.
- To develop validated analytical methods on Fourier Transform Infrared Spectrophotometer for single component and combination drug products.
- To develop RP-HPLC methods that would serve as stability indicating assay method for single and combination drug products.
- To develop RP-HPLC methods for the estimation of single and combination drug in human plasma with limit of quantitation in sub nano gram level.
- To develop and validate HPTLC methods of analysis for single as well as combination drug products.
- To develop and validate HPTLC methods of analysis for single in its degraded products.
- To illustrate how spectroscopic technique can be use in conjunction with chemometric tools in order to achieve rapid and efficient analytical method for the simultaneous estimation of drugs in their combination dosage forms.
- To validate the new analytical methods which should be simple, accurate, precise, selective, specific, reproducible, highly sensitive and stability indicating.
- To compare the methods statistically.

4.2 The specific aim of the research work was

- To develop validated analytical methods with proper statistical analysis based on spectrophotometry (UV) for single component formulations of (i) Ezetimibe (ii) Pravastatin (iii) Rosuvastatin (iv) Simvastatin (v) Lovastatin.

- To develop validated analytical methods with proper statistical analysis based on spectrophotometry (UV) for two component formulations of (i) Ezetimibe+ Pravastatin (ii) Ezetimibe + Rosuvastatin (iii) Ezetimibe + Simvastatin (iv) Ezetimibe+ Lovastatin.
- To develop validated analytical methods with proper statistical analysis based on spectrophotometry (FTIR) for single component formulations of (i) Ezetimibe (ii) Pravastatin (iii) Rosuvastatin (iv) Simvastatin (v) Lovastatin.
- To develop validated analytical methods with proper statistical analysis based on spectrophotometry (FTIR) for two component formulations of (i) Ezetimibe + Pravastatin (ii) Ezetimibe + Rosuvastatin (iii) Ezetimibe + Simvastatin (iv) Ezetimibe + Lovastatin.
- To develop validated stability indicating reveres phase high performance liquid chromatographic (RP-HPLC) method for single component formulations of (i) Ezetimibe (ii) Pravastatin (iii) Rosuvastatin (iv) Simvastatin (v) Lovastatin.
- To develop validated stability indicating reverse phase high performance liquid chromatographic (RP-HPLC) method for two component formulations of (i) Ezetimibe + Pravastatin (ii) Ezetimibe + Rosuvastatin (iii) Ezetimibe + Simvastatin (iv) Ezetimibe + Lovastatin.
- To develop validated reveres phase high performance liquid chromatographic (RP-HPLC) method for estimation of single component in plasma of (i) Ezetimibe (ii) Pravastatin (iii) Rosuvastatin(iv) Simvastatin (v) Lovastatin.
- To develop validated stability indicating reverse phase high performance liquid chromatographic (RP-HPLC) method for estimation of two component of (i) Ezetimibe + Pravastatin (ii) Ezetimibe + Rosuvastatin (iii) Ezetimibe + Simvastatin (iv) Ezetimibe + Lovastatin.
- To develop and validate high performance thin layer chromatographic (HPTLC) method for single component formulations of (i) Ezetimibe (ii) Pravastatin (iii) Rosuvastatin (iv) Simvastatin (v) Lovastatin.
- To develop and validate high performance thin layer chromatographic (HPTLC) method for single component formulations and also for its degradation products of (i) Ezetimibe (ii) Pravastatin (iii) Rosuvastatin (iv) Simvastatin (v) Lovastatin

- ❖ To develop and validate high performance thin layer chromatographic (HPTLC) method for multicomponent formulations of (i) Ezetimibe + Pravastatin (ii) Ezetimibe + Rosuvastatin (iii) Ezetimibe + Simvastatin (iv) Ezetimibe + Lovastatin (v) Simvastatin + Nicotinic acid
- ❖ To develop and validate chemometric (CLS and ILS) method for multicomponent formulations of (i) Ezetimibe + Pravastatin (ii) Ezetimibe + Rosuvastatin (iii) Ezetimibe + Simvastatin (iv) Ezetimibe + Lovastatin.

All this work is summarized in Table 4.1.

Table 4.1: Newly developed analytical methods

Sr. No.	Drug	Method	Page No.
1	Ezetimibe	Simple UV spectroscopy	91
		First derivative spectroscopy	91
		Second derivative spectroscopy	91
		Difference spectroscopy	98
		Quantitative IR	103
		Stability Indicating RP-HPLC	108
		RP-HPLC for estimation in plasma	121
		HPTLC for formulation and degradation separation	130
2	Pravastatin	Simple UV spectroscopy	140
		First derivative spectroscopy	140
		Second derivative spectroscopy	140
		Difference spectroscopy	146
		Three wavelength spectroscopy	146
		Quantitative IR	151
		Stability Indicating RP-HPLC	156
		RP-HPLC for estimation in plasma	165
		HPTLC for formulation and degradation study	172
3	Rosuvastatin	Simple UV spectroscopy	181
		First derivative spectroscopy	181
		Three wavelength spectroscopy	181
		Quantitative IR	188
		Stability Indicating RP-HPLC	192
		RP-HPLC for estimation in plasma	203
		HPTLC for formulation and degradation study	210
4	Simvastatin	Simple UV spectroscopy	219
		First derivative spectroscopy	219
		second derivative spectroscopy	219
		Three wavelength spectroscopy	226

		Quantitative IR	230
		HPTLC for formulation and degradation study	235
5	Lovastatin	Simple UV spectroscopy	245
		First derivative spectroscopy	245
		Second derivative spectroscopy	251
		Three wavelength spectroscopy	251
		Quantitative IR	255
		HPTLC for formulation and degradation study	259
6	Ezetimibe + Pravastatin	First Derivative Zero Crossing Method	298
		Differential Derivative Zero Crossing Method	298
		Quantitative IR	304
		RP-HPLC method to study degradation	309
		HPTLC	319
		Chemometric method (ILS and CLS)	324
7	Ezetimibe + Rosuvastatin	First Derivative Zero Crossing Method	339
		Quantitative IR	344
		Stability Indicating RP-HPLC method	349
		HPTLC	362
		Chemometric method (ILS and CLS)	369
8	Ezetimibe + Simvastatin	First Derivative Zero Crossing Method	270
		Ratio derivative zero crossing Spectroscopic method	270
		Quantitative IR	279
		Chemometric method (ILS and CLS)	285
9	Ezetimibe + Lovastatin	First derivative zero crossing method	381
		Ratio derivative zero crossing Spectroscopic method	381
		Quantitative IR	390
		Chemometric method(ILS and CLS)	394
10	Simvastatin + Nicotinic acid	HPTLC for formulation	408
11	Ezetimibe + Simvastatin & Ezetimibe+ Lovastatin	HPTLC for formulation	414
12	Ezetimibe+ Simvastatin+ Lovastatin	Stability indicating RP-HPLC	420
12	Simvastatin+ Lovastatin	bioanalytical RP-HPLC in human plasma	439