

## Chapter 2 Aims and Objectives

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### AIM

With the advent of complexities of samples encountered by analysts, their methods of analysis also needs progression. Thereby, it was planned to investigate some novel analytical approaches like QBD, Chemometrics, Total error approach, Microfluidics and Impurity profiling for some drugs and pharmaceuticals.

### OBJECTIVES

Keeping this aim in mind, the specific objectives for the study were as follows:

#### **1. Development of novel spectrophotometric and chromatographic analytical methods**

- To develop and validate stability indicating analytical method for Cyproheptadine HCl along with separation, isolation and characterization of major degradation product.
- To develop and validate a new bioanalytical HPLC method for the determination of Cyproheptadine hydrochloride in human plasma and its application to rat pharmacokinetic study.
- To develop and validate various classical and chemometric assisted UV spectrophotometric methods for estimation of Chlorhexidine gluconate and Cetrime in its bulk and pharmaceutical dosage forms.
- To develop and validate DOE based analytical method for Chlorhexidine gluconate and Cetrime in its bulk and pharmaceutical dosage forms. The normal distribution of data in the study was verified by statistical analysis.
- To develop and validate stability indicating analytical method for Pomalidomide using DOE and total error approach: Application to degradation kinetics study.

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### **2. Exploration of novel spectroscopic and chromatographic techniques for counterfeit drug analysis in phytopharmaceuticals**

- To develop and validate chemometric based spectroscopic analytical techniques for examining the adulteration of *Withania somnifera* formulations by synthetic analogues.
- To develop and validate DOE based HPLC method for simultaneous estimation of 5 component system encasing quantitative estimation of synthetic analogues added as adulterant in *Withania somnifera*.

### **3. Development of Paper microfluidic devices for analytical and diagnostic application**

- To develop paper microfluidic device for diagnosis of pernicious anemia utilizing methyl malonic acid as a early biomarker in urine
- To develop paper microfluidic device for analysis of Tadalafil as counterfeit in Ashwagandha herbal formulation.