PREFACE

Guided by pharmacology and clinical sciences, and driven by chemistry, pharmaceutical research in the past has played a crucial role in the progress of development of pharmaceuticals. The contribution of chemistry, pharmacology, microbiology and biochemistry has set a standard in the drug discovery where new drugs are no longer generated only by the imagination of chemists but these new drugs are the outcome of exchange of ideas between biologists and chemists.

The process of drug development starts with the innovation of a drug molecule that has showed therapeutic value to battle, control, check or cure diseases. The synthesis and characterization of such molecules which are also called active pharmaceutical ingredients (APIs) and their analysis to create preliminary safety and therapeutic efficacy data are prerequisites to identification of drug candidates for further detailed investigations

The development of the pharmaceuticals brought a revolution in human health. These pharmaceuticals would serve their intent only if they are free from impurities and are administered in an appropriate amount. To make drugs serve their purpose various chemical and instrumental methods were developed at regular intervals which are involved in the estimation of drugs. These pharmaceuticals may develop impurities at various stages of their development, transportation and storage which makes the pharmaceutical risky to be administered thus they must be detected and quantitated. For this analytical instrumentation and methods play an important role.

In the field of pharmaceutical research, the analytical investigation of bulk drug materials, intermediates, drug products, drug formulations, impurities and degradation products, and biological samples containing the drugs and their metabolites is very important. From the commencement of official pharmaceutical analysis, analytical assay methods were included in the compendial monographs with the aim to characterize the quality of bulk drug materials by setting limits of their active ingredient content. In recent years, the assay methods in the monographs include titrimetry, spectrometry,

chromatography, and capillary electrophoresis; also the electro analytical methods can be seen in the literature.

HPLC is an advanced form of liquid chromatography used in separating the complex mixture of molecules encountered in chemical and biological systems, in order to recognize better the role of individual molecules. It was in the year 1980, HPLC methods appeared for the first time for the assay of bulk drug materials (United States Pharmacopoeia, 1980). This has become the principal method in USP XXVII (United States Pharmacopoeia, 2004) and to a lesser extent but one of the most widely used methods also in Ph. Eur. 4 (The European Pharmacopoeia and Council of Europe, 2002).

The specificity of the HPLC method is excellent and simultaneously sufficient precision is also attainable. However, it has to be stated that the astonishing specificity, precision and accuracy are attainable only if wide-ranging system suitability tests are carried out before the HPLC analysis. For the reason the expense to be paid for high specificity, precision and accuracy is also high.

During the survey of the literature it was observed that among the chromatographic techniques HPLC has been the most widely used system. In liquid chromatography the choice of detection approach is critical to guarantee that all the components are detected. One of the widely used detectors in HPLC is UV detector which is capable of monitoring several wavelengths concurrently; this is possible only by applying a multiple wavelength scanning program. If present in adequate quantity, UV detector assures all the UV-absorbing components are detected.

Liquid chromatography-mass spectrometry (LC-MS) is an analytical technique that couples high resolution chromatographic separation with sensitive and specific mass spectrometric detection. LCMS-MS has proved to be an extremely sensitive and specific technique for the analysis of pharmaceuticals. It plays important role in the studies of drug metabolism, discovery of new drug candidates and the analysis, identification and characterization of impurities and degradants in drug substances and products. The technique is still fast developing, particularly in the mass spectrometry area, with vastly

improved sensitivity and resolution. It is probably the most powerful technique currently available for pharmaceutical analysis.

Hence we develop a new simple precise liquid chromatography with UV detection and liquid chromatography with mass detection for different drugs in bulk and pharmaceutical dosage forms. The drugs undertaken for analysis belong to different class of therapeutic activity. Oxaliplatin, Capecitabine, Carboplatin, were of chemotherapeutic drugs used in the treatment of cancer. The utility of these drugs in recent years increases rapidly and there is a need to develop a simple analytical method for the analysis of these drugs. Carvedilol used in the treatment of heart Failures, Venlafaxine is an antidepressant agent, Tenofovir is a retroviral drug, and Thalidomide is an anti-nausea and sedative drug. Literature survey for these drugs reveals that there is a need for the development of suitable analytical method. Hence we develop a suitable liquid chromatographic method for the estimation of these drugs in single dosage forms. Metronidazole and Diloxanide Furoate is a combined medication used for the treatment of amoebiasis. In combination of Metformin and Glibenclamide is used for the treatment of diabetes. Telmisartan and Hydrochlorothiazide is used as anti-hypertensive drugs. A new rapid and simple HPLC method was developed for the simultaneous estimation of these drugs in bulk and pharmaceutical dosage forms.