The thesis entitled "Analysis of Certain Cardiovascular drugs in drug formulations" is comprised of five chapters. The first chapter describes a general literature survey of the subject matter. The very relevant matters include a brief discussion on analytical chemistry, its role played in the field of pharmaceutical and biomedical analysis; various types of analytical techniques which are frequently used in the field under discussion; the validation of the developed method and the statistical treatments adopted during the data analysis to ensure and enforce the validity of the method.

It is well known that the human nature is the most cautious in every era of the development. This lead to the birth of analytical chemistry as it deals with the study of the intrinsic properties of the materials to discover their applicability or to warn the concerned one with the possibility of harm from them. Unlike other areas of studies in science there are different properties, which heavily influence the results of the analytical methodology at each and every step; thus having direct impact on the results. These important properties have been discussed. With the passing time, the demands of the biochemical sciences and the advancement of the physical sciences opened the door of sophisticated instrumentation in the field by analytical chemistry. The different types of well-established analytical techniques have been discussed.

Before or during the development of a method, it is necessary to be very careful of certain important things. These concepts have been discussed briefly. Once the analytical method is advent, it is necessary to decide its suitability for the intended purpose. This is known as the method validation. Brief discussion of the validation, its
components and the different international organization involved in it, has been presented. When deciding for the validation of the method, the role of statistical analysis can not be ignored. It is the only way to get the most conclusive results from the mathematical data obtained during the analysis. It also helps to decide with the progress of work at each step. A detailed discussion of the statistical analysis has been given. A brief literature and classification of the concerned pharmaceuticals have also been presented.

Second chapter described three simple spectrophotometric methods for the determination of amlodipine besylate in pure form and in pharmaceutical formulations. The first two methods, i.e. A and B, are based on the oxidation of the drug with Fe(III) and the estimation of Fe(II) produced after chelation with either 1,10-phenanthroline or 2,2'-bipyridyl at 500 and 515 nm, respectively. The Beer's law was obeyed in the concentration ranges of 2 – 10 and 4 – 14 μg mL⁻¹ with molar absorptivity of 2.9 x 10⁴ and 2.7 x 10⁴ L mol⁻¹ cm⁻¹ for methods A and B, respectively. The third procedure depends on the interaction of amlodipine besylate with ammonium heptamolybdate tetrahydrate, which resulted in the formation of molybdenum blue (λ_max 825 nm). The linear dynamic range and the molar absorptivity values were found to be 15 – 59 μg mL⁻¹ and 1.8 x 10⁴ L mol⁻¹ cm⁻¹, respectively. The results of the proposed procedures were validated statistically and compared with those obtained by the reference method. The proposed methods were applied successfully to the determination of amlodipine besylate in commercial tablets.

Third chapter deals with a simple, sensitive and economical method for the determination of labetalol hydrochloride. The method is based on the reaction of
labetalol with sodium nitroprusside and hydroxylamine hydrochloride in sodium dihydrogen phosphate – sodium hydroxide buffer solution of pH 12. The green – blue colour produced due to the formation of a nitroso derivative has been measured at 695 nm. The Beer's law was obeyed in the concentration range of 2 – 51 μg mL⁻¹ with molar absorptivity of 0.48 × 10⁴ L mol⁻¹ cm⁻¹. Rigorous statistical analyses were performed for validation of the method. A detailed investigation of the selectivity of the method has been done and was found to be highly selective for the determination of labetalol hydrochloride in the presence of its acidic degradation product and common excipients of formulations. The proposed method was successfully applied to the determination of labetalol hydrochloride in the laboratory prepared dosage forms. Comparison of the means of the proposed procedure with a reference method using point as well as interval hypotheses showed no statistically significant difference. The developed method was extended to investigate the possibility of its applicability in biological samples.

Fourth chapter described two simple and sensitive spectrophotometric methods for the assay of lisinopril in pure form and pharmaceutical preparations. The first method is based on the reaction of the drug with ninhydrin in N,N'-dimethylformamide (DMF) medium at room temperature which is followed spectrophotometrically by measuring the increase in absorbance at 595 nm as a function of time. The initial-rate, rate-constant and fixed-time (at 10 min) procedures are utilized for constructing the calibration graphs to determine the concentration of the drug. The initial-rate and fixed-time procedures show a linear response over the concentration range 10-50 μg mL⁻¹ whereas rate-constant procedure is applicable in the range 10-40 μg mL⁻¹. In the second method, the drug reacts with ascorbic acid in
DMF medium resulting in the formation of a coloured product, which absorbed maximally at 530 nm. Beer’s law is obeyed in the concentration range of 5-50 μg mL\(^{-1}\) of lisinopril with molar absorptivity of 4.548×10\(^3\) L mol\(^{-1}\)cm\(^{-1}\). The variables affecting the development of the colour are optimized and the developed methods are validated statistically and through recovery studies. The proposed methods have been successfully applied to the determination of lisinopril in commercial tablets.

The last chapter includes a simple, sensitive and economical simultaneous volumetric and spectrophotometric methods for the determination of captopril. The methods were based on the reaction of captopril with potassium iodate in HCl medium. Amaranth was used as indicator to detect the end point of the titration in aqueous layer. The iodine formed during the titration was extracted into CCl\(_4\) and subsequently determined spectrophotometrically at 510 nm. The Beer’s law was obeyed in the concentration range of 120-520 μg mL\(^{-1}\). Rigorous statistical analyses were performed for the validation of the proposed methods. The proposed methods were successfully applied to the determination of captopril in dosage forms. Comparison of the means of the proposed procedures with those of reference methods using point and interval hypothesis tests showed no statistically significant difference.