Chapter 2

AIM AND OBJECTIVES

2.1 PROBLEM STATEMENT

- The combinational antimicrobial drugs for therapy contains two or more drug moiety which are to be utilized for the treatment requires quick reliable analysis method.
- Analysis & Testing of these combinational drugs are difficult or erroneous i.e. error inducing at the time of simultaneous analysis in various dosage forms in laboratories by the chemist or analyst.
- Hence it is of prime importance for the testing of drugs by a safe, quality, efficient , reliable and validated analytical methods for the drugs in synthetic mixture as well as in marketed formulations
- In the Selected class of antimicrobial agents there is necessity of Analytical method Development and Validation for the testing of the therapeutic drug combinations as per the following points that indicates major problem domains and areas which creates a necessity for the proposed research work. The newer antiviral drugs requires an appropriate validated method for qualitative and quantitative analysis.
- The Drugs and combinations are not listed currently in official pharmacopoeia, hence the assay testing methods, stability- forced degradation analytical methods are not available.
- The stability degradation study methods for API and dosage forms are not available for testing of drugs in synthetic mixture as well as in marketed formulations, as well as in-vitro dissolution studies are important for dosage forms. Either the developed existing methods for testing are not available and either can be expensive, inaccurate, time consuming or an expensive process.
- Existing methods seems to be using Expensive solvents, Reagents, Testing equipment , Instruments, Exhaustive & Lingering extraction purification methods, which may not be reliable for industrial or academic puposes.
- Appropriate Guidelines & official methods, literatures are deficient or not susceptible for the testing of the combination of drugs in synthetic mixture as well as in marketed formulations. For these selected class of antimicrobial agents and

their combinations, the combinational stability indicating HPLC analytical methods are not available.

- The developed HPLC methods are incapable to apply in the in-vitro dissolution release profiles of these drugs, hence there is a need for the stability indicating HPLC analytical methods to be developed in the assay estimation with different combinations, as well as application of the developed HPLC analysis method to be applied into for the in-vitro dissolutionnn profile study drugs and combinations's.

2.2 CONTRIBUTION OF RESEARCH WORK TOWARDS PROBLEM DOMAIN

- The research work is carried out on the selected class of antimicrobial agents on the basis of the research problem and the research gap which is lack of the availability of Validated RP-HPLC analytical method as well as stability indicating RP-HPLC methods for the selected class of drugs which helps in the routine analysis of these drugs in combined dosage forms.
- In the current research work which is carried on the analytical method development for the newly approved drugs in their combinations, that are widely analyzed by HPLC techniques, that is quick, reliable, accurate and robust method adopted in industries, laboratories , academics and Research & Development organizations.
- These developed analytical methods in the current research work are validated as per the ICH guidelines validation parameters i.e Accuracy, Precision, Linearity, Range LOD, LOQ which are in acceptance criteria of ICH guidelines along with the statistical proof, that proves the authenticity and reliability of the developed analytical methods.
- The RP-HPLC methods that are developed in this research work are helpful to analyse the drugs in the pharmaceutical dosage forms for Assay Testing, individually as well as in the drug combinations.
- The developed methods are stability indicating HPLC methods, which works in under the stress- degradation conditions like Acidic, Basic, Oxidation, Photo and thermal conditions, hence, it can selectively analyse the drug under these stress degradation conditions.

- Furthermore, the application of these developed HPLC methods can be done in the in-vitro -dissolution study- profile drugs in the-solid-oral dosage forms and substances.
- Development of Spectrophotometric methods & chromatographic methods for the selected class of drugs is done, along with stability studies, forced degradation studies as per ICH Q1-A-R2 guidelines.

2.3 AIMS AND OBECTIVES OF RESEARCH

- The Main Research objective is Analytical Method development & Validation by adopting spectroscopic & chromatographic techniques for the selected class of Antimicrobial Agents & their combinations in pure api synthetic mixture and assay method for the pharmaceutical dosage forms.
- The specific objective is for research is that, the selected drug combinations for which the analytical methods have been developed and validated as per ICH guidelines:
    1. HPLC METHOD DEVELOPMENT AND VALIDATION FOR DELSTRIGO COMBINATION
    2. STABILITY INDICATING HPLC DEVELOPMENT AND VALIDATION FOR DELSTRIGO COMBINATION
    3. HPLC METHOD DEVELOPMENT AND VALIDATION FOR CABOTEGRAVIR AND RILPIVIRINE
    4. STABILITY INDICATING HPLC METHOD DEVELOPMENT AND VALIDATION FOR CABOTEGRAVIR AND RILPIVIRINE
    5. HPLC METHOD DEVELOPMENT AND VALIDATION FOR DOLUTEGRAVIR, TENOFOVIR AND RILPIVIRINE
    6. STABILITY HPLC METHOD DEVELOPMENT AND VALIDATION FOR DOLUTEGRAVIR, TENOFOVIR AND RILPIVIRINE
    7. HPLC METHOD DEVELOPMENT AND VALIDATION FOR FEXINIDAZOLE
    8. STABILITY INDICATING HPLC METHOD DEVELOPMENT AND VALIDATION FOR FEXINIDAZOLE
    9. HPLC METHOD DEVELOPMENT AND VALIDATION FOR MARIBAVIR

10. STABILITY INDICATING HPLC METHOD DEVELOPMENT AND VALIDATION FOR MARIBAVIR
11. HPLC METHOD DEVELOPMENT AND VALIDATION FOR MOLNUPIRAVIR
12. STABILITY INDICATING HPLC METHOD DEVELOPMENT AND VALIDATION FOR MOLNUPIRAVIR
13. HPLC METHOD DEVELOPMENT AND VALIDATION FOR VOQUEZNA COMBINATION- AMOXICILLIN, CLARITHROMYCIN AND VONOPRAZAN
14. STABLITY HPLC METHOD DEVELOPMENT AND VALIDATION FOR VOQUEZNA COMBINATION- AMOXICILLIN, CLARITHROMYCIN AND VONOPRAZAN

- To produce cost effective, economic & easy analytical method for particular the selected class of drugs, dosage forms, in synthetic mixture as well as in marketed formulations
- The significance to perform this Research is to bring about newer methods of analysis for newly approved drugs (API/Dosage Forms) which are required for testing in Quality Control & Assurance departments in Industry, Analytical Laboratories, Academics or in any field of pharmacy/ analytical chemistry.
- Application of the Developed method for the formulations in synthetic mixture as well as in marketed formulations. As new/novel drugs are approved & their various dosage forms are constantly upgraded , which do not have any official analytical techniques, for that economic, reliable and practically applicable analytical methods must be generated.
- Another aspect of this research is to advance the testing methods by use of sophisticated instrumental techniques, which are best useful for testing both, Active Pharmaceutical Ingredients in bulk form, as well as in the Purity testing/Assay methods in their respective dosage forms.
- The Developed Analytical method is to be validated by the ICH guideline Q2-R1 by performing the validation parameters : Accuracy by Recovery studies, Precision inter intra repeatability, Specificity, Linearity and the Range, Repeatability & , Limit of Detection LOD , Limit of Quantitation LOQ.