

Advancements in Analytical Techniques: Optimization and Validation of RP-HPLC Method for Evaluating the Efficacy of Anti-Diabetic Drugs

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Abstract: *This review article provides a comprehensive overview of the optimization and validation of reversed-phase high-performance liquid chromatography (RP-HPLC) methods for assessing the efficacy of anti-diabetic drugs. The review begins with a discussion of the background on diabetes and the growing need for effective treatment methods. It explores the role of RP-HPLC in evaluating anti-diabetic drug efficacy and outlines the purpose of the review article. Subsequently, the article delves into the various aspects of RP-HPLC method development, including an overview of RP-HPLC technique and its principles, factors influencing method development, and optimization of RP-HPLC parameters. It then examines the importance of method validation in ensuring accuracy and reliability, detailing the parameters evaluated during validation and regulatory guidelines for method validation in pharmaceutical analysis. The review further discusses the applications of RP-HPLC in anti-diabetic drug analysis through case studies and examples, highlighting its versatility and effectiveness in pharmacokinetic studies, formulation analysis, and metabolite profiling. Challenges encountered in optimizing and validating RP-HPLC methods are addressed, along with opportunities for further research and advancement in this field. The implications of RP-HPLC method optimization and validation for the pharmaceutical industry and clinical practice are discussed, emphasizing the importance of reliable analytical methods in drug development and patient care. Finally, recommendations for future research directions and applications of RP-HPLC in anti-diabetic drug analysis are provided, underscoring the potential for continued innovation and advancement in this critical area of pharmaceutical science*

Keywords: RP-HPLC, anti-diabetic drugs, optimization, validation, pharmaceutical analysis, diabetes management, pharmacokinetics, chromatographic techniques