

# DESIGN OF EXPERIMENT BASED UV-SPECTROPHOTOMETRIC METHOD FOR QUALITY CONTROL ANALYSIS OF SILYMARIN IN MARKETED TABLET FORMULATION

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## ABSTRACT

Silymarin is a significant medication that is used to treat chronic liver disease and liver cirrhosis. The focus of the current study is on the development of UV based analytical procedures for silymarin quantification using quality by design methodologies. Materials and procedures selected significant factors, optimized using central composite design (CCD). The absorbance at 287 nm was taken into account as the response, while the mobile phase ratio and scanning speed were taken into account as independent variables. In order to predict responses within predefined ranges and optimize outcomes using mathematical modelling, we employed response surface plots and design space. These tools were instrumental in developing a framework for anticipating and enhancing responses within specified parameters. The developed analytical method was further verified in accordance with ICH Q2 recommendations. With  $r^2 > 0.999$  and % RSD  $< 2$ , the technique demonstrated high linearity and good recovery. It was discovered that the limit of detection and limit of quantification of the UV created method were adequate and perfectly within the permissible range. The established method for silymarin estimation may serve as a cost-effective quality control approach for routine and industrial-level silymarin estimation in bulk and unit dose forms.