# Box-Behnken Design Based Development of UV-Reversed Phase High Performance Liquid Chromatographic Method for Determination of Ascorbic Acid in Tablet Formulations



**By** Azmi, SNH (Azmi, Syed Najmul Hejaz) ; Al Hoqani, U (Al Hoqani, Umaima) ; Al Mamari, JOS (Al Mamari, Juhaina Obaid Said) ; Al Mamari, BMS (Al Mamari, Buthaina Mohamed Salim) ; Al Jassasi, BSAR (Al Jassasi, Balaqis Sultan Ali Rashid) ; Al Rubaiai, ASS (Al Rubaiai, Aziza Saleh Saif) ; Rahman, N (Rahman, Nafisur) ; Nasir, M (Nasir, Mohd) ; Haque, SM (Haque, Sk Manirul) ; Khan, SA (Khan, Shah Alam) ; ...More

View Web of Science ResearcherID and ORCID (provided by Clarivate)

**Source** SEPARATIONS
Volume: 9 Issue: 11
DOI: 10.3390/separations9110361

**Article Number** 361

**Published** NOV 2022

**Indexed** 2022-11-27

**Document Type** Article

**Abstract**

A simple, sensitive, accurate and inexpensive UV-reversed-phase high-performance liquid chromatographic method was developed for the determination of ascorbic acid in tablet formulations. The method was based on the separation of ascorbic acid using a mobile phase of an acetonitrile-NaH2PO4-H3PO4 buffer solution (pH = 3) (5:95 v/v) with a UV detection wavelength of 245 nm and a flow rate of 0.8 mL min(-1) at ambient column temperature. The variables of the proposed method, such as acetonitrile fraction (%), flow rate (mL min(-1)) and column temperature (degrees C), were optimized on the peak area by response surface methodology via the Box-Behnken design. The mobile phase was passed isocratically, and the separation of ascorbic acid was performed at the retention time of 4.1 min. A calibration graph was obtained and found to be linear in the concentration range of 10-180 mu g mL(-1). The method suitability was assessed and an asymmetry factor of 1.15 was obtained. The proposed method was successfully applied for the determination of ascorbic acid in tablet formulations and statistically compared with the results of the reference method. The performance of the proposed method was excellent and in agreement with the reference method. The recovery percentage of the proposed and reference methods was in the range of 99.98-100.04% and showed compliance (100 +/- 2%) with regulatory guidelines.

**Keywords**

**Author Keywords:** ascorbic acid; Box-Behnken design; HPLC; ICH; validation

**Keywords Plus:** KINETIC SPECTROPHOTOMETRIC METHOD; THIN-LAYER-CHROMATOGRAPHY; VITAMIN-C; HPLC METHOD; VALIDATION; EXTRACTION; QUANTIFICATION; PARACETAMOL

**Addresses**

[1] Univ Technol & Appl Sci, Higher Coll Technol, Appl Sci Dept, Chem Sect, POB 74, Muscat 133, Oman

[2] Univ Technol & Appl Sci, Higher Coll Technol, Appl Sci Dept, Biol Sect, POB 74, Muscat 133, Oman

[3] Aligarh Muslim Univ, Dept Chem, Aligarh 202001, Uttar Pradesh, India

[4] Jubail Ind Coll, Dept Chem Engn, Jubail Ind City 31961, Saudi Arabia

[5] Natl Univ Sci & Technol, Coll Pharm, Dept Pharmaceu' Chem, POB 620, Muscat 130, Oman

29