Extended Abstract

Simultaneous Determination of Silymarin and Glibenclamide by HPLC–ESI–MS Technique: Method Development and Validation †

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(1) Background: The aim of the study was to develop and validate a HPLC–ESI–MS method to simultaneously determine silymarin (Sil) and glibenclamide (Gly) in aqueous solutions, from chitosan-based microparticles. (2) Methods: Sil and Gly, in different concentrations, were loaded into chitosan microparticles using the ionic gelation method [1]. Briefly, the drugs were dissolved in the minimum volume (0.5 mL) of proper solvent and this solution was then added to 3 mL of 1% chitosan acetic acid solution. The mixture was stirred at room temperature for 2 h and then dropped through a syringe needle into 20 mL of 2% sodium tripolyphosphate (TPP) solution. After 12 h of stirring at room temperature, the beads formed were separated from the TPP solution, washed with distilled water, and then dried at room temperature [2]. For identification and quantification of the loaded drugs, a HPLC–ESI–MS method using an Agilent 1200 Series HPLC system coupled to an Agilent 6520 accurate-mass quadrupole time-of-flight (Q-TOF) mass spectrometer, was developed. The separation was made on a Hypersil C18 column with 0.1% formic acid in MiliQ water (A) and acetonitrile (B) applied in gradient (% B: 0′–25; 5′–55; 9′–70; 12′–30; 15′–25). The diode-array detector DAD separation was monitored at 230, 280, 298, 300 nm, 0.1 mL/min of the elute was directed to ESI/Q-TOF MS, operated at an ionization voltage of −4000 V, 325 °C, with an ion scan value of 50–1000 m/z in negative ion mode. The method was validated using recommended parameters [3] and Sil:Gly (1:1) standard solutions. (3) Results: By using the M8 method, the SilARt was registered at 5.41 min, SilB at 5.66 min, and Gly at 10.54 min. The loaded drugs were identified using MS-MS spectra and m/z characteristics for all compounds were found in the higher intensity for Rt presented above. The selectivity and precision of the methods are absolute because the Rt for the sample and standard have the same value, and the blank solution proved no interference. The linearity of the answer function is absolute for SilA (R2 = 1), and almost absolute for SilB (R2 = 0.9998), and Gly (R2 = 0.9991). S/N values for all compounds at all studied concentrations maintained similar values. For SilA, we obtained an LOD = 0.285 mg/mL and LOQ = 0.95 mg/mL; for SilB we obtained an LOD = 0.045 mg/mL and LOQ = 0.15 mg/mL, for Gly we obtained an LOD = 0.038 mg/mL and LOQ = 1.275 mg/mL. (4) Conclusion: We developed a high resolution HPLC–ESI–MS method to simultaneously determine Sil and Gly in a concentration range of 0.025–1 mg/mL.

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References