

Dispersive liquid- liquid microextraction based on solidification of floating organic droplet followed by spectofluorimetry for determination of carvedilol in human plasma

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Background and Aims: Carvedilol, is a nonselective β -adrenergic blocking agent that used for the treatment of hypertension, angina pectoris and mild or moderate heart failure and determination of its levels in biological fluids is required. In present work, a new combined methodology of dispersive liquid- liquid microextraction and solidification of floating organic droplet (DLLME-SFO) followed by spectofluorimetric determination was applied to the determination of carvedilol in human plasma.

Methods: The mixture of microextraction and disperser solvents is directly injected into a plasma sample solution containing carvedilol. After centrifuging, phase separation is performed by floating the fine droplets of the microextraction solvent on the top of the test tube and was cooled in ice for a few minutes; the solidified solvent was taken and melted at room temperature. Then the extracted phase is transferred into a spectrofluorimeter cell for the determination of carvedilol at excitation/emission wavelengths of 286/344 nm. Types and volumes of microextraction and disperser solvents, pH, salt effect, time, speed of centrifuging and sample volume were optimized.

Results: Under the optimized experimental conditions, the method provides a linear range of 40- 300 ng mL⁻¹, with a correlation coefficient of linear regression of 0.996 and relative standard deviation of 2.73%. The limit of detection and limit of quantification were 18.33 and 61.1 ng mL⁻¹, respectively. This new proposed method has been validated and recovery was from 98.2to 102.2%, intra-day and inter-day precision were 6.43% and 9.11% respectively. The relative error (%RE) for accuracy was from 0.4 to 2.2%. The short-term temperature and freeze-thaw stability studies showed that carvedilol in human plasma was stable for sample preparation and analysis.

Conclusions: The developed DLLME-SFO-spectrofluorimetric method permits the fast, accurate and reliable determination of carvedilol in human plasma with low operation cost and simplicity of the instrumentation.

Keywords: Carvedilol; Spectrofluorimetry; DLLME-SFO; Plasma