Facile Micelle-Enhanced Spectrofluorimetric Method for Picogram Level Determination of Febuxostat; Application in Tablets and in Real Human Plasma

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Abstract:

Ultrasensitive, specific, rapid and economic spectrofluorimetric method was developed and validated for determination of a selective xanthine oxidase inhibitor; Febuxostat (FBX) in tablets and in human plasma. The proposed method is based on the enhancement of the fluorescence intensity of an aqueous acidic solution of FBX by using 1.0% w/v sodium dodecyl sulphate (SDS) as a micellar system. A great enhancement of the relative fluorescence intensity (RFI) of FBX was observed (about 2 and 30 folds compared to the aqueous acidic solution of FBX and the aqueous solution of FBX, respectively). RFI was measured at λex. 336 nm/λem. 410 nm against a reagent blank treated similarly. A linear relationship between the fluorescence intensity of the formed FBX-SDS micellar system and the concentration of FBX was investigated. The reaction conditions and the fluorescence spectral properties of the formed micelle have been studied. The linearity range of the developed method was (0.100–25.0 ng/mL) with detection and quantitation limits of 15.08 and 45.71 pg/mL, respectively. This method was applied successfully for the estimation of FBX in its pharmaceutical dosage forms and in spiked plasma samples without matrices' interferences and with excellent recoveries (99.72–101.44%). This affords the ability to use the developed method for quantitation of FBX in real plasma samples with excellent reproducible % recoveries (96.51–101.32%). All obtained results of the developed method were statistically analyzed and validated according to ICH guidelines.

Keywords:

Febuxostat, Sodium dodecyl sulphate, Micelle-enhanced spectrofluorimetric method, Dosage forms, Human plasma.

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