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Determination of Meloxicam and Flufenamic Acid in Pharmaceutical Formulations and Biological Fluids using lanthanide Sensitized Luminescence

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Two highly selective and sensitive luminescence methods for the assay of anti-inflammatory drug meloxicam (MX) and flufenamic acid (FFA) in biological fluid and tap water are described. The assay of MX was based on europium sensitized luminescence. The method makes use of radiative energy transfer from the enolate ring to europium ions in methanol and in aqueous system. Optimum conditions for the formation of the enolate Eu^{3+} complexes were investigated. In methanol, the Eu-MX complex was found to depend on the concentration of Tris buffer and Eu^{3+}. In aqueous system, maximum sensitization was obtained in the presence of 0.28% Tween –80, 0.01M tris buffer pH 8.0, 6 μM of 1, 10- phenanthroline, 1.75 mM Eu^{3+} and 7 μM of gadolinium ions as co-luminescence reagent. Under the optimum conditions linear calibration curves between 0-1000 and 0-800 ppb for MX in methanol and in aqueous medium respectively were obtained with the detection limit being 6.0 ppb. The proposed method was successfully applied for the determination of MX in Mobic and Co-Oxicam tablets and in tap water and urine samples. Excellent recovering were obtained for the MX samples. The second method, a novel sequential injection analysis (SIA) approach was used for the determination of FFA in samples of urine and tap water. The method was based luminescence sensitization of terbium by complex formation with FFA. The luminescence signal was monitored at λ_{em} = 565nm when excited at λ_{ex} = 298nm using time resolved mode. Experimental factors that influenced fluorescence reaction were systematically optimized in aqueous medium using chemometric optimization. Under the optimum conditions linear calibration curves between 0-1200 ppb for FFA in aqueous medium were obtained with a LOD of 80 ppb. When applied to Urine and Tap water samples the procedures were found to be free from matrix interferences except for Fe3+ that had significant interference effect. The results obtained for the assay of FFA in urine and tap water samples demonstrated good accuracy and precision.