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A novel spectrofluorimetric method using optical sensor Eu^{3+}-ACAC as a highly selective photo probe to determine Pregabalin in biological samples and pharmaceutical form

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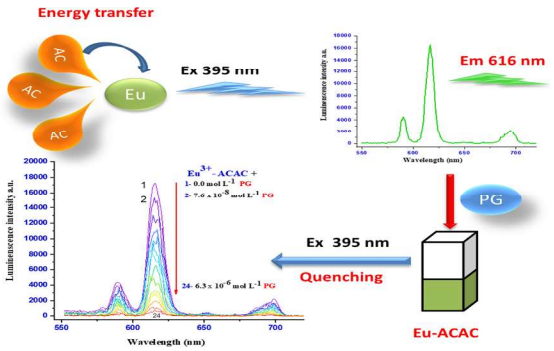
HIGHLIGHTS:

- A novel approach using a selective spectrofluorimetric method was used to determine Pregabalin (PG).
- The method depends on the effect of varying concentrations of PG on the Eu^{3+}-ACAC sensor's luminescence intensity, resulting in quenching.
- Absorption and emission were used in the optical sensor's synthesis and characterization processes.
- The method effectively determined the presence of PG in human urine, serum, and capsule samples.

GRAPHICAL ABSTRACT



ARTICLE INFO

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ABSTRACT

A novel spectrofluorimetric method with high selectivity and sensitivity was created to determine Pregabalin (PG) in pharmaceutical form, human serum, and urine. This method relies on detecting quenching in the intensity of luminescence of the europium acetylacetone complex (Eu^{3+}-ACAC) at emission wavelength $\lambda_{em} = 616$ nm, which results from interaction with various concentrations of PG after excitation at $\lambda_{ex} = 395$ nm and pH 6.5 in dimethylformamide (DMF). The calibration curve was generated using concentrations ranging from 7.6×10^{-8} to 6.3×10^{-6} mol/L. The plot showed a high correlation coefficient (r^2) of 0.994 with a detection limit (LOD) of 2.81×10^{-8} mol/L and a quantification limit (LOQ) of 8.5×10^{-8} mol/L. The remarkable luminescence intensity quenching of the Eu^{3+}-ACAC by ranged concentrations of PG was effectively employed as a photo probe to determine PG in marketable form and different body fluids. Spectroscopic characterization, such as absorption and emission spectra, confirmed the obtained sensor. The improved method is verified using a range of characteristics, such as accuracy, precision, selectivity, linearity, and robustness.

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