New insights on the Chemical Stability of Curcumin in Aqueous Media at Different pH: Influence of the Experimental Conditions

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From spectrophotometric and electrochemical measurements recorded in curcumin aqueous solutions at different pH values, both the stability and the acidity constants of curcumin were evaluated. It was found that contrary to hitherto acceptances, curcumin becomes stable at basic pH values while at acid ones curcumin rate of degradation is around 20 times higher than in neutral or basic conditions. Notwithstanding, by controlling the experimental conditions the degradation rate of curcumin can be diminished even at acid and neutral conditions. Our results show that curcumin has 3 pKa values, namely: 7.428 ± 0.015 , 9.552 ± 0.024 and 10.946 ± 0.034 , and for the first time, the molar absorptivity coefficients of the curcumin species in aqueous media: H_3Cur , H_2Cur^- , $HCur^{2-}$ and Cur^{3-} , were reported as a function of the wavelength.

Keywords: Curcumin; stability; aqueous solution; pH; pKa

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