

Accepted Manuscript

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PII: S0167-7322(18)31060-2
DOI: doi:[10.1016/j.molliq.2018.07.040](https://doi.org/10.1016/j.molliq.2018.07.040)
Reference: MOLLIQ 9361
To appear in: *Journal of Molecular Liquids*
Received date: 1 March 2018
Revised date: 6 June 2018
Accepted date: 9 July 2018

Please cite this article as: A. Antony Muthu Prabhu, Madi Fatiha, B. Sivaraman, Maria Josefa Yáñez-Gascón, Horacio Pérez-Sánchez, Effect of natural and modified cyclodextrins on the excited state proton transfer of 7-hydroxy-4-methylcoumarin. Molliq (2018), doi:[10.1016/j.molliq.2018.07.040](https://doi.org/10.1016/j.molliq.2018.07.040)

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Effect of natural and modified cyclodextrins on the excited state proton transfer of 7-hydroxy-4-methylcoumarin

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ABSTRACT

Effect of natural and modified cyclodextrins on the absorption and 2D, 3D fluorescence spectra of 7-hydroxy-4-methyl coumarin (HMC) have been investigated in different buffer solutions (pH s – 1.0, 6.5 and 10.0). Both neutral and monoanion species were formed in the ground state, whereas three species such as zwitterion, neutral and monoanion in the excited state in the above mentioned pH ranges. The excited state property of HMC obviously varied with the results from the absorption data. The excited state proton transfer was observed at low pH from the hydroxyl group to carbonyl group of HMC. FT-IR, PXRD, SEM results showed the apparent variation in the natural and modified CDs with the HMC molecule. The results demonstrated that in three pH solutions, HMC forms 1:1 inclusion complex with the three CDs. Finally the proposed structures of the inclusion complexes were predicted using Semi-empirical calculations.

Keywords 7-hydroxy-4methylcoumarin. Cyclodextrins. ESPT. 2D&3D fluorescence.

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