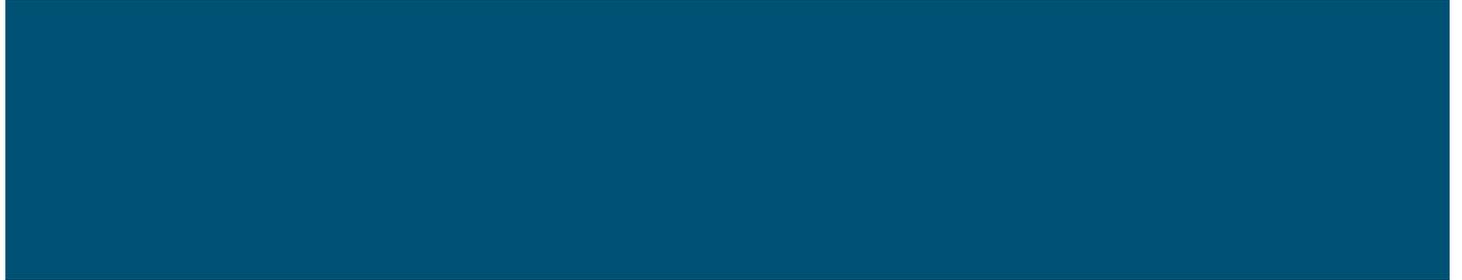

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Enhancement of Solubility and Bioavailability of Quercetin by Inclusion Complexation with the Cavity of Mono-6-deoxy-6-aminoethylamino- α -cyclodextrin

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Abstract

Quercetin (QUE) has a wide range of health benefits; however, its application is limited due to its low solubility. We synthesized mono-6-deoxy-6-aminoethylamino- β -cyclodextrin (Et- β -CD) to overcome this limitation. The solubility of QUE was increased 35.1-fold compared with QUE, by its complexation with Et- β -CD. Changes in physicochemical properties following successful complexation were investigated using field emission scanning electron microscope, differential scanning calorimetry, and Fourier transform infrared spectroscopy. The complexation behavior of QUE and Et- β -CD in aqueous solution was monitored by ^1H nuclear magnetic resonance (NMR), 2D rotating frame nuclear overhauser, and diffusion-ordered spectroscopy. The molecular docking simulation showed that the oblong shaped QUE is suitable for the formation of a stable complex with a characteristic cavity of Et- β -CD. Furthermore, the antioxidant activity and photostability of QUE was also improved after its complexation with Et- β -CD. From these results, we suggest that the characteristic elliptical cavity of Et- β -CD can be utilized for other hardly soluble drug molecules, which can expand the development of drug delivery systems.

[Citing Literature](#)

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- Dahu Li, Houjiu Wu, Wei Huang, Li Guo and Huating Dou, Microcapsule of Sweet Orange Essential Oil Encapsulated in β -Cyclodextrin Improves the Release Behaviors In Vitro and In Vivo, *European Journal of Lipid Science and Technology*, **120**, 9, (2018).
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