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Search of co-solvents of poorly water-soluble bioactive compounds in natural products on the basis of the solubility measurements

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The object of this study is to search a suitable co-solvent of poorly water-soluble bioactive compounds in natural products on the basis of the solubility measurements. In this study, curcumin (diferuloylmethane), the Indian solid gold, the major active component of turmeric, was selected as a model bioactive compound. Curcumin is used as a spice in curry and as a coloring agent in yellow mustards, cosmetics, and pharmaceuticals. It has attracted great interest because of its antioxidant, anti-inflammatory, and potential cancer chemopreventive activities. However, the major problem with curcumin is its extremely low solubility in aqueous solution and poor bioavailability. If addition of a suitable co-solvent makes an enhancement of solubilities of curcumin, it would be useful for the development of drug or functional food which an efficient systemic absorption is available. In this work, several β -CD derivatives, e.g., 2-hydroxypropyl- (2-HP-), sulfobutyl ether (SBE-), and methyl- (M-) β -CDs, were investigated as a co-solvent. The solubilities of curcumin in water + CD mixed solvents, and a suitable co-solvent for an enhancement of the solubilities in curcumin was examined. The solubilities of curcumin in water + CD mixed solvents at 298.15 K were determined using high-performance liquid chromatography (HPLC). Enhancement in the solubility of curcumin could be achieved in all β -CD derivatives. Maximum solubilization shows M- β -CD, and follows SBE- β -CD and 2-HP- β -CD. Stability constants k_c were evaluated by Takeru Higuchi-Konnors solubility method. The order of the determined stability constants were M- β -CD > SBE- β -CD > 2-HP- β -CD.

Biography

Hiroyuki Matsuda has completed his PhD from Nihon University. His research field is Chemical Engineering Thermodynamics. He is the Associate Professor of Nihon University. He has published more than 30 papers in reputed journals.

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