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Chiral separation of α -cyclohexyl-mandelic-acid by aqueous two phase system combined with Cu₂- β -cyclodextrin complex

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HIGHLIGHTS

G R A P H I C A L A B S T R A C T

- ► ATPS was introduced for the resolution of α-cyclohexyl-mandelic-acid enantiomers.
- Cu₂-β-CD inclined to prefer monovalent ionic state of R-CHMA than that of S-CHMA.
- Cu₂-β-CD was introduced as a selector for the resolution of (R, S)-CHMA.
- Under the optimal condition, α could reach 1.36 after just one step extraction.

A R T I C L E I N F O

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1. Introduction

Chiral separation continues to be an active area of research due to their prevalence in the pharmaceutical industry, agrochemicals, and food additives to name a few [1,2]. At the present time, it remains a challenge to separate enantiomers from each other due to their identical physicochemical properties in an achiral environment, and the research on specialized separation techniques continues to be





ABSTRACT

Based on the Polyethylene glycol (PEG)-salt aqueous two phase system (ATPS), a novel, green and economical approach was proposed for the chiral separation and determination of α -cyclohexyl-mandelicacid (CHMA). The result showed that this new technique has good chiral recognition ability for CHMA. The separation factor, α , was affected by various factors, including the molecular weight of PEG, pH, temperature, the amount of Cu₂- β -cyclodextrin, which influenced on either the formation of the host–guest complex or the distribution of the complex. In this work, Cu₂- β -cyclodextrin was inclined to recognize R-CHMA. Under the optimum conditions, α could reached 1.36 after just one step extraction. This method has explored a new path for preparative separation of racemic compounds.

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developed to resolve individual enantiomers [3–9]. The diastereomeric salt crystallization is the most used in plant for the large-scale production of optically pure products. However, an inherent drawback of this method is that many required process causes considerable loss of product. Chromatography separation and enzymatic kinetic resolution are not cost-effectively for large-scale preparation of the target molecular, while the application of kinetic resolution is also limited due to its time-consuming. As a result, there is an ongoing search for economically attractive alternatives.

As a potential large scale production technique, enantioselective liquid–liquid extraction (ELLE) has attracted a lot of researchers to



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