290c Amino Acid Resolution Using Supported Liquid Membranes

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Separation of chiral intermediates is of tremendous importance in a number of fields. In the pharmaceutical industry, it is often essential to determine the pharmacological and toxicological activity of each stereoisomer in drugs that consist of more than one stereoisomer. As new single stereoisomer drugs are developed the need for new chiral separation methods will increase. The resolution of phenylalanine and methionine has been studied using a supported liquid membrane. Experiments were conducted in batch mode using a diffusion cell. The organic liquid membrane phase consisted of a 50%:50% (volume basis) decane:decanol solvent. Resolution of the racemic amino acid feed solution depended upon the formation of a chiral transition metal complex with each of the enantiomers of the amino acid to be resolved. The chiral carrier and transition metal were N-decyl-(L)-hydroxyproline and copper (II). The ratio of copper to N-decyl-(L)-hydroxyproline was 1:2. Resolution of the two amino acid enantiomers depends upon the solubility and stability of the resulting diastereomeric transition metal complex. The results obtained here indicate that the experimentally determined separation factor and flux of each enantiomer initially decrease rapidly. The initial separation factor is the highest separation factor achieved during the run. The highest separation factors for phenylalanine and methionine is 1.8 and 1.9 respectively. The initial separation factor may be used to determine the ratio of the enantioselective equilibrium constants for the D and L stereoisomers. As the two enantiomers are resolved, the ratio of the D to L enantiomer in the feed suspension will deviate from one. The ratio of the enantioselective equilibrium constants may be used to estimate the maximum concentration difference possible between the D and L enantiomers in the feed solution.