



## CHAPTER 7

### CONCLUSIONS AND FURTHER STUDY

#### Conclusions.

According to the experimental results from this study, the following conclusions can be obtained:

1. From the extraction equilibrium experiment, the distribution coefficient ( $D^+$ ) of  $\text{Phe}^+$  and  $\text{Trp}^+$  increased as the pH of the feed solution increased.

2. It was found that one mole of  $\text{Phe}^+$  and one mole of  $\text{Trp}^+$  reacted with 2 moles of dimeric form of D2EHPA to form complex in the membrane phase.

3. Extraction equilibrium for 0.006 M phenylalanine and 0.006 M tryptophan solution with 0.072-0.361 M dimeric form of D2EHPA solution were studied. It was found that average  $K_{\text{ex}}$  for phenylalanine is  $0.167 \text{ dm}^3/\text{mol}$  and for tryptophan is  $0.11 \text{ dm}^3/\text{mol}$ .

4. From the emulsion liquid membrane extraction of phenylalanine and tryptophan, the initial transport rate of amino acid corresponded with the initially high hydrogen ions gradient. The flux gradually decreased as the driving force decreased.

5. It was found that tryptophan had a higher flux than phenylalanine. This can be attributed to the higher hydrophobicity of tryptophan than phenylalanine.

6. In the extraction of dilute binary mixture of tryptophan and phenylalanine, tryptophan does not have significant effect on the transport rate of phenylalanine.

7. The simple uniform flat sheet model can be used to predict the influence of pH in the feed phase on the permeation rate.

#### Further Study.

In the emulsion liquid membrane extraction study, the concentration of amino acid used were 0.006 M and 0.001 M and the concentration of D2EHPA was 0.144 M. It would be more beneficial if the study can be done at other concentration.

## NOMENCLATURE

$a$	:	area of liquid membrane [ $m^2$ ]
$D$	:	diffusivity [ $m^2/s$ ]
$D_A$	:	diffusivity of amino acid [ $m^2/s$ ]
$D_c$	:	diffusivity of amino acid - D2EHPA complex [ $m^2/s$ ]
$D^+$	:	distribution coefficient of cation [-]
$K_{ex}$	:	extraction equilibrium constant [ $dm^3/mol$ ]
$K_1, K_2$	:	dissociation constant of amino acid [ $mol/dm^3$ ]
$k_1, k_{-1}$	:	interfacial reaction rate constant
$k$	:	mass transfer coefficient in the aqueous film [ $m/s$ ]
$l$	:	thickness of membrane [ $m$ ]
$\delta$	:	thickness of aqueous diffusion layer [ $m$ ]
$\tau$	:	membrane constant

### (Subscript)

$A$	:	amino acid
$c$	:	amino acid - D2EHPA complex
$eq$	:	equilibrium
$i$	:	initial state

### (Superscript)

—	:	property or concentration in the membrane phase
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