



## CHAPTER V

## EXPERIMENTAL CONSIDERATION

## 5.1 Choice of Chemical System

The methyl isobutyl ketone (MIBK)-water-acetic acid system was used for this research work for the following reasons:-

1. The water and methyl isobutyl ketone are highly immiscible. Thus the two phases are easily separated.
2. Mass transfer of acetic acid to the two phase is rapidly. Thus it is not take time to operate.
3. The densities of water and methyl isobutyl ketone are highly different. The larger the difference the better for separation.

## 5.2 Properties of Chemicals

## 1. Methyl isobutyl ketone

Formula:  $\text{CH}_3\text{COCH}_2\text{CH}(\text{CH}_3)_2$

Boiling point:  $119^\circ\text{C}$

Solubility: very slightly soluble

Densities:  $0.8277 \text{ gm/cm}^3$  at  $30^\circ\text{C}$

## 2. Acetic acid

Formula:  $\text{CH}_3\text{COOH}$

Boiling point:  $118^\circ\text{C}$

Solubility: infinity

Density:  $1.048 \text{ gm/cm}^3$  at  $30^\circ\text{C}$

### 3. Water

Boiling point:  $100^{\circ}\text{C}$

Density:  $1 \text{ gm/cm}^3$  at  $30^{\circ}\text{C}$

### 5.3 Experimental Procedure

1. The mixture of MIBK and acetic acid was mixed thoroughly to the desired concentration in the light phase feed tank.

2. Deionised water was prepared by passing ion exchange resin and poured to water feed tank.

3. The water was pumped to the column in order to fill the bottom part of column and then pump the light phase to the column. All the switches were opened.

4. Electric timer was adjusted to open and closed to desire time interval period. Then adjusted valves to open in order to obtaining desired flowrate. The extract solution was permitted to flow to the extracted tank.

5. The samples of extract solution and raffinate solution were taken every ten minutes to find the concentration of the solutions by titration with standard NaOH solution.

After the concentration of samples were constant (or a little deviate), the system was said to be steady state.

6. After steady state was reached, the concentration of raffinate and extract solutions were measured by titration with standard NaOH solution. And flow rate of extract and raffinate were measured by measuring cylinder.

7. Varying flowrate of throughput by controlling valves at constant flow ratio. Then followed step (5-6) for five runs.

8. The procedures (1-7) were repeated by varying flow ratio, controlled periods, and total cycle time.