CHAPTER V
CONCLUSION AND SUGGESTION

5.1 Conclusion

5.1.1 Effects of Variable on Separation of Triethylamine

Triethylamine could be separated from residual of mother liquor of amoxicillin trihydrate production. By - product from triethylamine distillation was acetone, which was recycled or reused in the process of amoxicillin trihydrate and sodium cloxacillin monohydrate. The parameters of recovery of triethylamine were pH, reaction temperature, and reaction time. The results could be summarized as follows:

a) The higher mother liquor concentrate yielded the higher percentage recovery and purity of triethylamine.

b) Sodium hydroxide was used to maintain the pH of the triethylamine mixture, in the range of 9 to 13, and the appropriate pH was found at 12 to13. The triethylamine was used as catalyst in process of amoxicillin trihydrate.

c) The key to the success of triethylamine separation is the property of inverse miscibility. At temperatures below 15^{o}C, triethylamine is miscible with water, above 15^{o}C triethylamine and water are only slightly miscible. Therefore, triethylamine was separated from the water-triethylamine mixture by heating the solution to temperatures above the miscibility point (about 55 ^{o}C).

d) The effect of reaction time on triethylamine separation was studied. The reaction of triethylamine occurred completely at time greater than 15 minutes

The appropriate conditions for separation of triethylamine are as follows:

- Residual of mother liquor : 75 ml
(Volume decrease 55% of residual mother after solvent separation)
- Reaction temperature : 75 °C
- Reaction time : 15 mins
- pH : 13
- %w/v NaOH : 3.9 %w/v

Triethylamine had very small amount of the 2,6-lutidine, because 2,6-lutidine was used in amoxicillin trihydrate process. The 2,6-lutidine was salt same as triethylamine and could be separated with sodium hydroxide but 2,6-lutidine was decomposed.

5.1.2 Purification of Triethylamine

Distillation and demoisturization were used to separate mixture of triethylamine, water and 2,6-lutidine. The 2,6-lutidine and water in triethylamine were separated by distillation and adsorption, respectively. The recovery of triethylamine was approximately 74 % of original triethylamine in process.

The loss of triethylamine was as follows:

1. Approximately 18% in separation
2. Approximately 8% in distillation
3. Approximately 2% in demoisturization

Therefore, the percentage of triethylamine recovery was approximately 74%.

The separation of organic compound from mother liquor, caused the decrease of COD approximately 50% to 60% from the COD of original mother liquor.

5.1.3 Preparated of Amoxicillin Trihydrate

The comparison of amoxicillin trihydrate yield and percentage potency between using fresh triethylamine and recovered triethylamine was made. The percentage yield and potency of amoxicillin trihydrate of amoxicillin trihydrate prepared from fresh triethylamine and recovered triethylamine were the same.

5.2 Suggestion for Future Work

In separation of triethylamine from residual of mother liquor, it should be further studied in the following aspects:

1. The effect of the properties of raw materials on the triethylamine recovery.
2. The effect of the contaminants in mother liquor of amoxicillin trihydrate on the triethylamine recovery.