CHAPTER 5

CONCLUSION

According to the results shown in Tables 4.1 - 4.5, the equilibration time is 3 minutes for ethylbenzene, 5 minutes for chlorobenzene, 10 minutes for 1,3-dichlorobenzene and 1,4-dichlorobenzene, and 20 minutes for 1,2-dichlorobenzene. Therefore, 30 minutes is chosen for equilibrating the samples to ensure that the system will be in the equilibrium. To increase the sensitivity of this technique, various factors such as temperature for equilibrating the sample, the phase ratio, and the injection volume are studied and the results are shown in Tables 4.6 through 4.10. The liquid to gas phase ratio of 25:35, the injection volume of 2.00 mL, and the temperature at 45.0 ^{o}C are selected as the headspace analysis condition which gives a sufficient sensitivity for the determination of the semivolatile organic compounds in water samples. The effect of added salts i.e., NaCl and anhydrous Na_2SO_4 into solutions on the percent recovery is also studied and the results of the percent recovery range from 42.10-79.30% with 0.43-10.01 % %RSD for sodium chloride , and from 53.30-91.51 % with 0.77 - 10.62 % %RSD for anhydrous sodium sulfate as shown in Table 4.11 through 4.12. Hence, the anhydrous Na_2SO_4 is a suitable salt to be used for increasing of the percent recovery of each

semivolatile organic compound in water samples. Therefore, the following condition namely liquid to gas phase ratio of 25:35, equilibration at 45.0 ^{o}C for 30 minutes, injection volume of 2.00 mL and 10.00 g of anhydrous sodium sulfate is selected as the optimum headspace analysis condition for the analysis of the semivolatile organic compounds in water samples.

The accuracy of headspace technique is also studied and the results of the studies are presented in Tables 4.17 - 4.18. The percent errors of this technique depend upon the quantitative methods used, i.e., external standardization and standard addition methods. It is found that the % error is in the ranges of 0.04-11.63 % for the analysis with standard addition method and of 0.71-5.98 % for the analysis with external standardization method.

To investigate whether this technique is suitable for the analysis of the real samples, the wastewater samples collected from three pools in the Chulalongkorn University are analyzed by this headspace technique and one of those samples which collected from the pool behind Chemistry Building 2 seems to have 0.60 ppb of chlorobenzene.

From the results of the studies, it can be concluded that the headspace technique developed for the trace analysis of the semivolatile organic compounds in water samples is a simple, precise, accurate and economic method.

For the further work, the study of salting out effect with

different salts should be of interest so as to increase the sensitivity of this technique. Moreover, the capillary column may be used to reduce the analysis time and to improve the minimum detectable level of the semivolatile organic compounds owing to the high efficiency and the low bleeding of the capillary column.