CHAPTER 5

CONCLUSION

According to the results showing in the Table 4.1-4.10 and Table 4.11-4.20 for the studies of the various pHs and the shaking times for the microextraction technique of phenolic compounds , i.e., phenol , 2-nitrophenol , 2,4-dichlorophenol , 2,4,6-trichlorophenol , and 4-chloro-3-cresol are investigated. The pH of 2 and the shaking time of 20 min are considered as the suitable condition for all solvents including methylene chloride , carbon disulfide , and hexane.

The various effects on the percent recovery of phenolic compounds ,i.e., salting out effect , sample-to-solvent ratios , extracting organic solvents , concentration effect and matrix effect are also studied and the results of the studies are that the percent recovery is in the range of 17.74 - 106.30 % with the percent RSD of 0.08-9.95 %. The sample-to-solvent ratio of 9:1 is considered to be the most suitable ratio used for the microextraction of phenolic compounds due to the highest precision and the analytes are concentrated into the extracting organic solvent. Moreover , the percent recovery of phenolic

compounds can be further enhanced by adding 2.0 g anhydrous sodium sulfate and the methylene chloride is also selected as the suitable extracting organic solvent due to this solvent can yield the highest percent recovery comparing with the other solvent , i.e., carbon disulfide and hexane.

Therefore , the best combination for the microextraction of phenolic compounds in water samples is the pH of 2 , the equilibration time of 20 min , the sample-to-solvent ratio of 9:1 , salting out with anhydrous sodium sulfate , and methylene chloride as the extracting organic solvent. This combination is also used to determine the accuracy of the unknown synthetic mixture solutions and the percent error is in the range of 0.53-4.97 % as shown in Table 4.42.

To verify that this technique is suitable for the analysis of the real samples. The wastewater samples and water supply samples are collected and analysed by this microextraction technique and the results of the analysis is depicted in Figure 4.25-4.29. It is found that those water sample do not have any interested phenolic compounds and it might be due to the dilution of the phenolic compounds in the rainy season.

From the results of the studies , it can be concluded that the microextraction technique developed

for the trace analysis of phenolic compounds in water samples is a simple , precise , accurate , and inexpensive method.

For the future work , the studies of the other solvents , different salts should be interested in order to enhance the percent recovery of the phenolic compounds. The investigation of the other phenolic priority pollutants in the water samples and in the various environmental samples should also be considered by using microextraction technique. Moreover , the capillary column should be used in stead of the packed column to reduce the analysis time and to improve the minimum detectable level of phenolic compounds. Since the bleeding from capillary column is less than the packed column used in the temperature program of the gas chromatography , thus the baseline drift can be eliminated by using the capillary column. The high efficiency of the capillary over the packed column yields the sharppest peak comparing with the packed column. Therefore , the minimum detectable level of phenolic compounds can be lowered by using capillary column.