CHAPTER V

Conclusion and Recommendation

Analysis of organophosphorus insecticides: malathion, methyl parathion, profenofos and chlorpyrifos in water by solid-phase extraction technique followed by HPLC system and effects of variuos factors on the percent recoveries are studied. The sample volume for extraction at 100 mL, 100 mg of sorbent mass which maximum percent recoveries for malathion, methyl parathion, profenofos and chlorpyrifos were 104.55 ± 3.93, 101.45 ± 1.30, 102.22 ± 2.65 and 70.60 ± 2.35, respectively. 60% acetonitrile in water as elution solvent and the best percent recoveries for each pesticides were 100.00 ± 1.13, 100.96 ± 1.51, 99.89 ± 1.92 and 84.81 ± 0.47, respectively. The eluent volume 5.0 mL was the best conditions and the percent recoveries were 91.68 ± 0.62, 98.55 ± 2.40, 88.84 ± 0.43 and 78.55 ± 0.73, respectively. The pressure of SPE pump17.0 in.Hg;the best percent recoveries for each pesticides were 98.04 ± 0.41, 99.82 ± 1.31, 90.78 ± 0.75 and 71.51 ± 0.73, respectively. These parameters were the best optimum conditions for solid-phase extraction in the determination of organophosphorus pesticides in water samples (Table A-1-A-10 and Figure 4.1-4.7).

To verify this technique was suitable for determination of real water samples. Thirty-six samples collected from agricultural farms were analyzed by this SPE optimum conditions. There was found only profenofos pesticide in water samples and concentrations of profenofos were ranges 0.11 ± 0.01 to 0.75 ± 0.06 ppm and average concentration were at 0.44 ± 0.07 ppm in crop cycle of sampling site I, II and IV (Table 4.3). The main peak was confirmed the chemical structure by MS techniques (Table 4.4). The method detection limit for malathion, methyl parathion, profenofos and chlorpyrifos were 50, 25, 25 and 25 ppb, respectively. Therefore, the method for quantitation of trace OPs residues by using HPLC/UV detection could be found the concentration of OPs in natural water at high ppb level. To determine the trace pesticides concentration in low ppb level, The gas chromatography was usually equipped with the optimum selected detector such as nitrogen-phosphorus detector.

The main accomplishment of this thesis, however, is the clear demonstration that SPE following HPLC and MS techniques provide an acceptable qualitative and quantitative analysis. We believe that the optimum conditions found in this study has strong potential to be applied as a screening tool for organophosphate pesticides analysis. However, the issue of acceptable quantification for regulatory purposes remains to be proven. This project presented only gives a simple, cheap and accessible approach to validate pesticide residue monitoring. It is still a continued work which required a lot of collected samples. therefore, this would be used as a tool in control the pesticides use in agriculture.