CHAPTER 5

DISCUSSION AND CONCLUSION

A suitable method for analysis of some organophosphorus pesticides was obtained in this study. The study began with developing ODS SPME fiber to replace commercial SPME fiber for extraction and using GC-PFPD method for analysis of methyl parathion, chlorpyriphos, dicrotophos, prothiophos and profenofos. Using SPME to extract the analytes from sample solutions the analytes are present in both fiber and solution. The distribution of analytes between both fiber and sample solution depends on the affinity of analyte for fiber and water. There are several reasons why a fiber coating was chosen. In the initial development of the SPME for determination of OPPs in the sample that has different matrix complexity such as water, soil and food. Most papers described the use of 100 μm polydimethylsiloxane (PDMS) and polyacrylate (PAC) fiber coatings. (32,38)

Effectiveness on extraction of OPPs using ODS SPME was compared with commercial SPME, results showed that the ODS SPME is as effective as PAC. The ODS SPME is suitable for extracting methyl parathion, chlorpyriphos, dicrotophos, prothiophos and profenofos at 1.43-5.50 %RSD. The most suitable condition for analysis of the OPPs by ODS SPME/ GC-PFPD method is using the DB-1 column with 30 m in length, 0.32 mm I.D.,1μm film thickness, of which has low polarity. The column temperature started at 80ºC and it was increased after 30 seconds until it

reached 300 ºC at the rate of 20ºC /min. This process took 20 mins altogether, using nitrogen gas as a transmitter.

Direct immersion method was found most suitable for extraction of the OPPs in vegetable. With this method, the suitable conditions for using PDMS and ODS SPME were 30 mins for absorption, 4 mins for desorption and the desorption temperature was 250 ºC. The capacity of ODS SPME was 0.2 mg/l for methyl parathion, prothiophos and profenofos and >1 mg/l for chlorpyriphos.

No report was found on using for coating SPME fiber but ODS coated column has been reported to be used for analysis in the reversed phase of HPLC technique (54,55). More over, these was no report on using SPME fiber with GC-PFPD. It is believed that this ODS SPME can be used with not only GC-PFPD but also GC-FPD methods.

In general, LLE, SPE and SCF is used for OPP analysis, of which requires instrument and much solvent (5,10,16,52). At the Royal Project Foundation (RPF) GT pesticide test kit has been used for a routine check of pesticides residues in vegetables and fruits. This test kit has been now used by most people who are involved with purchase of agricultural produces (57). Any random samples that were found of high chemical residue by this test kit would be analyzed further to find out what kind (name) of pesticide is, using ODS/GCPFPD analytical method. The samples are extracted with organic solvent and each analysis consumes a lot of organic solvent. This ODS SPME is considered to be able to replace the organic solvent extraction. If so, it will help reducing the time for analysis; reducing the cost of investment and keeping the environment clean and avoiding hazard from the solvent to the analyst. Even though,

this study did not include analysis of carbamate and other pesticide group, there is a hope for using the ODS SPME to extract other pesticides. One thing that still cannot be done is making the bare fiber for coating . In this study, commercial coated fibers were used and the fibers must be washed of the coated materials before coating with ODS. However, there is an advantage of using expired fiber of any kind which can no longer reuse by coating with ODS.

It is expected that this ODS SPME can be used to extract the pesticide residue directly from some fruit and vegetables by inserting the needle into them and allow the SPME fiber to absorb the pesticide directly from the fruit. If this expectation is correct it would be very useful for the analytical work in the future because it is no need to blend the sample for extraction.