# CHAPTER 4
# CONCLUSIONS

Batchwise amperometric method, FI amperometric system and FI amperometric system with a sample pretreatment column have been developed. It was based on the molybdenum blue reaction with electrochemical detection. Amperometric detection was made at an applied voltage of 220 mV versus Ag/AgCl. No reduction peak due to arsenate was observed, which a reduction peak of arsenate was found at 250 mV versus Ag/AgCl. This would indicate that no inferences due to silicate nor arsenate, especially in natural water sample which would contain very trace arsenate. Table 4.1 summarized analytical characteristics of the 3 procedures. A sample through put of 60 $h^{-1}$ for ppb $PO_4$-P could be achieved with a detection limit of 7 ppb $PO_4$-P for the FI without a pretreatment sample column while the FI system with a column with 5 min loading time results in a detection limit of 2 ppb $PO_4$-P. A sample of a lower concentration could be determined by having a longer period of loading. A single standard calibration can be employed by plotting a graph of peak area versus ng $PO_4$-P. A detection limit was 10 ng $PO_4$-P. The developed procedures have been applied to purified water samples and certified rain.

**Table 4.1** Summarized analytical characteristics of the 3 procedures.

| System | Linear range | Equation | Detection limit |
|---|---|---|---|
| Batchwise amperometry | 5-25 ppm $PO_4$-P | $y = 8\times10^{-3}x + 3\times10^{-2}$<br>$R^2 = 0.9986$ | 3 ppm $PO_4$-P |
| Flow injection amperometry | 20-100 ppb $PO_4$-P | $y = 9\times10^{-2}\ x + 1$<br>$R^2 = 0.9961$ | 7 ppb $PO_4$-P |
| Flow injection amperometric with pretreatment column | 2-20 ppb $PO_4$-P<br>(10-100 ng $PO_4$-P<br>20-500 ppb $PO_4$-P<br>(100-2500 ng $PO_4$-P) | $y = 6\times10^{-2}x + 5\times10^{-1}$<br>$R^2 = 0.9984$<br>$y = 5\times10^{-2}x + 1$<br>$R^2 = 0.9988$ | 2 ppb $PO_4$-P<br>(10 ng $PO_4$-P)<br>(5 min loading time) |