

## CHAPTER V

### CONCLUSION

#### 5.1 Conclusion

A new naked eye detection of inorganic arsenic in water samples, which is simple, rapid, low cost and applicable for field analysis, was developed by using difluoroboron-curcumin (BF<sub>2</sub>-curcumin) in both solution and solid phase. The BF<sub>2</sub>-curcumin solution in 60% ethanol displayed an orange solution with the maximum absorbance at 509 nm. In the presence of As(III), the color of this solution changed to blue, and the maximum absorbance shifted to a longer wavelength at 632 nm. The change of color and the absorbance can be described by the changing of the BF<sub>2</sub>-curcumin molecular structure, which was deprotonated by As(III) in oxyanion form. The color of solution changing from orange to blue can be detected by visual observation both in solution and solid phase and by UV-vis spectrophotometry.

Determination of arsenic in solution system was conducted by using the concentration of BF<sub>2</sub>-curcumin solution at 10 μM and 20 μM, pH 8 of As solution and the sampling time within 3 min. In terms of naked eye detection, the detection range was 0-100 μM and the LOD was 25 μM (1.87 mg/L) for As(III). For UV-vis spectrometry, this method provided the linearity with R<sup>2</sup> above 0.99 in 2 detection ranges which were 2 to 100 μM for As(III) detection and 2 to 60 μM for total As detection. The limit of detection (LOD) was 0.26 μM (19.8 μg/L) for both As(III) and total As.

Naked eye detection of arsenic in solid system was performed by using BF<sub>2</sub>-curcumin coated resin as a solid phase for As determination by visual observation of the change in resin color. Under optimal condition, i.e., concentration of BF<sub>2</sub>-curcumin solution for coating resin was 50 μM and pH 10 of As solution, this method showed the detection range of 0 to 5×10<sup>-3</sup> M and the LOD of As(III) and total As were 3×10<sup>-5</sup> M (2.25 mg/L) and 1×10<sup>-4</sup> M (7.5 mg/L), respectively.



In addition, this proposed method was applied to determine As(III) and total As in real water samples. The results produced good agreement with those obtained from ICP-OES method. Therefore, this method can be applied for the determination As in water samples by naked-eye detection in BF<sub>2</sub>-curcumin solution and BF<sub>2</sub>-curcumin coated resin. However, PO<sub>4</sub><sup>3-</sup> and CO<sub>3</sub><sup>2-</sup> interfered the naked eye detection of As(III) by BF<sub>2</sub>-curcumin and thus should be removed or masked prior to the analysis.

## 5.2 Suggestions for future work

For elimination of the effect of interfering anions in the naked eye detection of As, a suitable removal method and masking agent for PO<sub>4</sub><sup>3-</sup> and CO<sub>3</sub><sup>2-</sup> should be studied.

