CHAPTER V

CONCLUSIONS

5.1 Conclusions and outlook

This work presents the first application of microchip CE-ED in normal mode for the simultaneous determination of lead, cadmium, and copper in vegetable juices. It has been demonstrated that microchip CE-ED is characterized by its simplicity, quickness, higher resolution and sensitivity, excellent reproducibility, low expense of operation and minor amounts of samples and reagent. The reproducibility of quantitative analysis is satisfactory. Electrochemical detection coupled with microchip CE enabled selective and sensitive detection of the electroactive constituents and simplification of the electropherograms. It is concluded that microchip CE-ED is a powerful technique for study of the heavy metal ions and has become an alternative, competitive and supplementary method for CE, because of its special attributes.

Microchip CE is characterized by a high degree of integration, portability, minimal solvent/reagent consumption, high performance, and speed. The coupled ED offers such microsystems remarkably sensitive detection, inherent miniaturization of both the detector and control instrumentation, and high compatibility. Microchip CE has been employed to separate and detect a variety of pollutants. Only a few reports have used it for real sample analyses. A major obstacle to the realization of real-life applications of such microdevices is that only electroactive or ionic pollutants can be detected directly. The ongoing maturation of microchip CE and further developments in ED and preconcentration methods will provide separation, quantitation, and characterization of complex mixtures of various pollutants, such as those described in this thesis. Undoubtedly, microchip CE will become a more firmly established methodology for the analysis of pollutants, as further investigations will be devoted to evaluate the role of microchip CE in environmental studies effectively.

In addition, it may provide a good approach of portable analytical device for rapid screening and the analysis of complex system simultaneously containing metals and heavy metals. Such a microchip CE–ED system may have wide applications, particularly in food environments.