

CHAPTER V

CONCLUSION

5.1 Conclusion

A simple method for the determination of elements in biodiesel by using emulsification technique and inductively coupled plasma atomic emission spectrometry (ICP-AES) was successfully developed. Regarding the preparation of biodiesel sample, 10% v/v of Triton X-100 was used as surfactant to form an oil-in-water emulsion system. Moreover, 10% v/v butanol was used as co-solvent to enhance the emulsion stability and reduce viscosity and become more aqueous-like in nature which would possibly allow the calibration from inorganic aqueous standard solution. The emulsified biodiesel samples were then analyzed by ICP-AES under the optimized parameters i.e. RF power 1200 W, nebulizer gas flow rate 0.7 L/min, and sample uptake rate 50 rpm, using conventional aqueous standards with the external calibration procedure. The method detection limits were found to be in the range of 2.6 µg/L for Mn up to 9.6 µg/L for Cu with the RSD of lower than 3%. Eventually, the proposed method showed ability to determine the considered elements in spiked biodiesel samples with good recoveries of 82.93-102.41% which were acceptable with AOAC guideline.

According to these results, the emulsification technique potentially proved to be a very efficient yet simple and rapid sample preparation technique for elemental analysis of biodiesel by ICP-AES. Furthermore, this technique also facilitated the use of aqueous standards for calibration instead of expensive and unstable organometallic standards.

5.2 Suggestions for future work

The proposed method should be developed for the determination of other elements and applied to other oil samples.

