CHAPTER IV

CONCLUSIONS

The study reported the investigation on the volatile constituents of the vetiver root essential oils which were obtained from raw materials of different cultivation and from different extraction methods. It was found that methods of cultivation have significant effects on both percentage yield and volatile composition of the vetiver root essential oils. Among the three cultivation conditions, the system utilizing microbes gave the highest yield of essential oil along with higher contents of some low molecular weight volatiles such as 2-norzizaene and its derivatives and γ-vetivenene. The oil obtained by semi-hydroponic cultivation, despite its low percentage yield, gave the volatile component profile similar to that obtained by normal soil cultivation.

The volatile constituents of vetiver oils obtained from different extraction techniques namely SDE, SFE, MAE, and SE were analysed. As a result, it was found that various extraction methods had diverse effects on yield and the physical (color and odor) and chemical properties of the vetiver root oils obtained. SFE using CO_2 with dichloromethane or toluene as modifiers was found to be most appropriate for vetiver root essential oil recovery and quality. This technique offered the fastest time of extraction of all the techniques applied in this study. As for technique of analysis, GC×GC-qMS gave a greater number of identified components for vetiver oil constituents. For quantitative analysis, GCΔGC employing FID proved to be an

effective method for the determination of the chemical composition and content of such a highly complex sample as vetiver essential oils, when peak positions can be correlated for both FID and MS detection. In comparison with GC, GCΔGC showed greater capacity to differentiate the quality of essential oils obtained from diverse extraction conditions in terms of their volatile composition and content.