

## CHAPTER V

### CONCLUSIONS

UKM first reported that some roselle breeding lines have high contents of HCA. The study on HCA from roselle accessions in UKM was the first study ever conducted in identifying roselle with high content of HCA. The study has successfully extracted HCA in the chemically stable form as potassium hydroxycitrate. The employment of HCA extraction method was conducted with a minor adjustment in the process which finally produced potassium hydroxycitrate. The extraction method employed used methanol as the main solvent to capture HCA which was later stabilised into potassium hydroxycitrate form. Potassium hydroxycitrate obtained through this method however lacked the physical stability as it claimed. In working with roselle, a modification method was established to overcome the problem which was due to the presence of anthocyanins. The modification method established involved a treatment of activated charcoal in one of its process which would later remove anthocyanins in the extracts. Potassium hydroxycitrate obtained through this modification extraction method was more physically stable even when left in open-air environment. Potassium hydroxycitrate obtained from both HCA extraction methods were tested for their physico-chemical characteristics compared with controls. All samples fulfilled the requirement tests which showed that they were in the form of potassium hydroxycitrate. In term of extract yield, in the original extraction method Acc. 21 gave the highest yield with 17.8%. In modified extraction method Acc. 21 and HS03100-29-7-1-6-3-1 were the highest yielding at 6.0%.

Determination of potassium hydroxycitrate content in the extracts using HPLC analysis was successfully achieved. HPLC employed had completely eluted the

compound studied which was potassium hydroxycitrate. The mobile phase used was 0.01M sulphuric acids. Based on the availability of potassium hydroxycitrate standard, we were able to quantify potassium hydroxycitrate concentration in all 13 samples used in the study. HPLC results showed potassium hydroxycitrate concentration was the highest in Acc. 6 with 82.1mg/100g or 0.082% in the original extraction method. While in modified HCA extraction method, the highest potassium hydroxycitrate concentration was in HS1250-1-18-1-1-1-1 with 42.5mg/100g or 0.043%. HPLC is an excellent tool in determining HCA content in samples used in the study because it has high reproducibility, accuracy and sensitivity compared from other determination methods available previously.

Efforts to extract HCA in the form of potassium hydroxycitrate is good as it is thought as being the most stable form available towards the prospect of product development of HCA-based products. However, for future studies comparative study is needed especially in producing HCA in other salt forms in order to see the potential they possess aside from potassium hydroxycitrate. Furthermore, feeding trials using these salt forms of HCA is also needed to test for their bioefficacy. Alternatively, extractions using other part of roselle such as leaves, flowers and stem barks as samples are also critical to make sure the part of roselle which contains higher concentration of HCA. It would also be interesting if the gene analysis can be done in understanding the genetics that control the expression of HCA in roselle. All this is needed in steps towards the development of roselle HCA-based products.

Overall, determination of HCA content in roselle through extraction of potassium hydroxycitric using HPLC is a promising study and the most plausible approach conducted because the outcome from this study could be further use in prospect of development of HCA-based product from roselle. Roselle also produces HCA which is a value-added apart from being rich in anthocyanins and vitamin C. If high contents of HCA are found and identified in roselle breeding lines, there is a very good potential that roselle can be cultivated as an important source of HCA which is a great alternative since it is an annual plant compared to *Garcinia* species which is perennial. The potential value of HCA lies in the fact that it may be extracted from roselle and can be used in commercial applications such as to produce dietary

supplements and weight loss aids. Furthermore, with appropriate extraction technologies, HCA has a good potential to be commercialised. This is essential in promoting broader usage of roselle in our local food and other industries and most importantly in supporting roselle industry in Malaysia which is highly promising.

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