

CHAPTER 4

CONCLUSION

Chemical constituents from the stems of *Arfeuillea arborescens* Pierre and their biological activity has been extensively studied and reported for the first time. Three crude extracts namely, hexane, dichloromethane and ethyl acetate extracts, were separated by means of chromatography to afford three mixtures and seven compounds:

1. a mixture of long chain aliphatic hydrocarbons (C_{18} , C_{21} , C_{25} - C_{30} , C_{32} - C_{34})
2. a mixture of stigmasterol and β -sitosterol
3. a mixture of long chain aliphatic ester
4. (+)-*proto*-quercitol
5. 3,5-Bis-[3,3-dimethylallyl]-*p*-hydroxybenzaldehyde
6. cyclic tris(ethylene terephthalate)
7. stigmasteryl-3-O- β -D-glucopyranoside
8. 7-hydroxy-6-methoxy coumarin (scopoletin)
9. 5-hydroxymethylfurfuraldehyde (5-HMF)
10. *p*-hydroxybenzoic acid

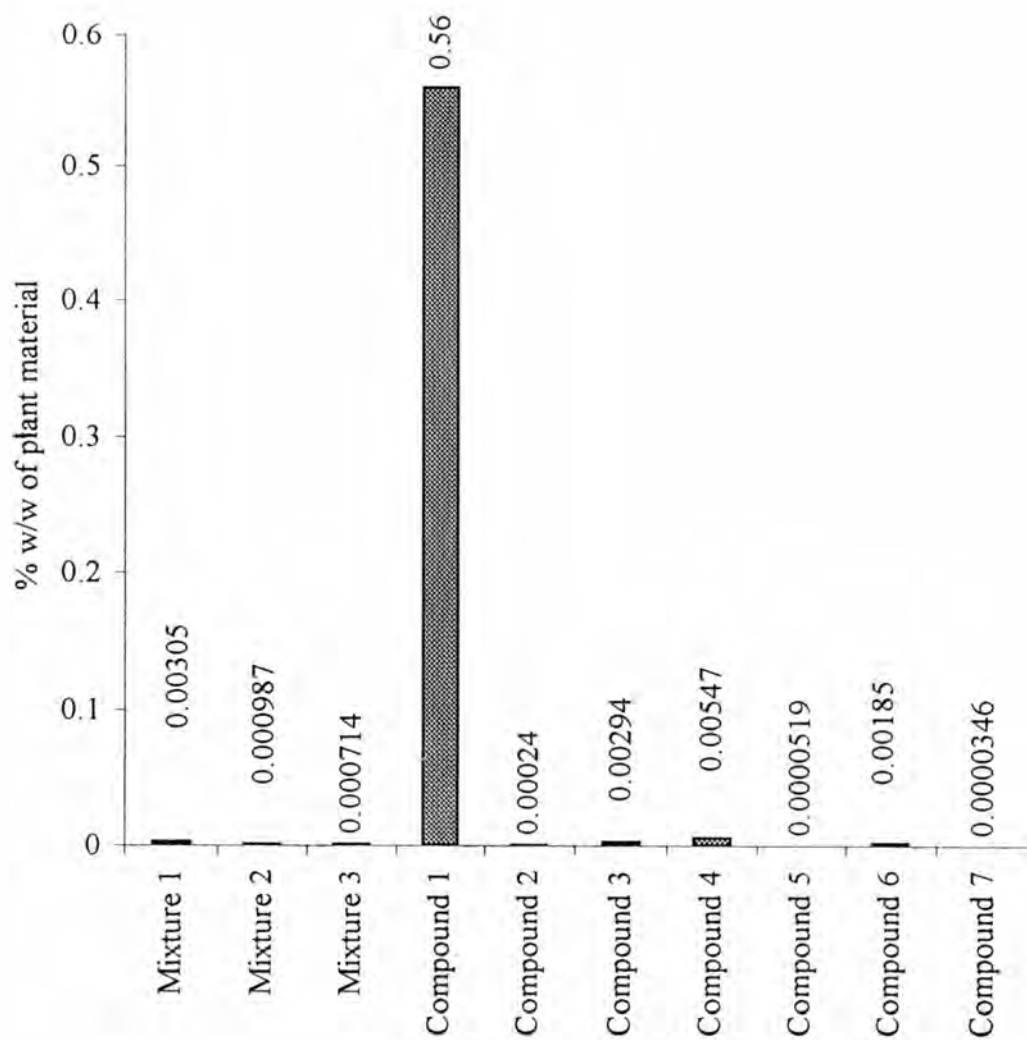


Figure 4.1 Percentage yield (%w/w of plant material) of components isolated from the stems of *A. arborescens*

With regards to biological activity of isolated compounds, 5-hydroxymethylfurfuraldehyde was the most promising metabolite because of its broad-spectrum activities which were listed below.

1. Its medium cytotoxicity toward brine shrimp (LC₅₀ 71.0 ppm)
2. Its antibacterial activity against *E. coli*, *B. cereus*, *S. aureus*, *S. derby*, *E. coli* 0157: H7, *L. monocytogenes* and flat sour spoilage with %T/C 63, 55, 30, 63, 63, 50 and 70 at dose 10µg/well where C was streptomycin
3. Its antifungal activity against *Cladosporium cucumerinum*
4. Its antioxidant activity (DPPH and β-carotene as detecting agents)
5. Its plant growth inhibitor activity against *Oryza sativa* Linn. var. RD.23

Some interesting activity outcomes and unextended study of its biological activity led us to investigate activities of certain furan analogues. As a result of the experiment, 2-furoic acid showed a very strong cytotoxicity against brine shrimp (LC₅₀ 0.91 ppm), and also inhibited the growth of *Oryza sativa* Linn. var. RD.23. Unfortunately, all of the analogues did not show antibacterial activity through several nitrofurans such nitrofurazone. *p*-Hydroxybenzoic acid was the another isolated compound which was active toward brine shrimp with LC₅₀ 33.1 ppm. Furthermore, biosynthesis of cyclic tris(ethylene terephthalate) should be carried out in order to prove how this compound was formed.

In summary, although most compounds isolated from the stems of *Arfeuillea arborescens* Pierre were simple secondary metabolites, some of them like 5-hydroxymethylfurfuraldehyde showed numerous interesting biological activities. In the future, 5-hydroxymethylfurfuraldehyde might be served as a parent compound for the development of alternative drugs for treating various diseases if the other bioassay testings are performed.