CHAPTER 4

Conclusions

4.1 Structural Elucidation/ Structural Characterization

The phytochemical constituents study from the aerial parts of *V. scandens* afforded six known compounds, lupeol palmitate (**134**), lupeol acetate (**135**), eugenol (**98**), macelignan (**136**), *β*-sitosterol (**137**) and stigmasterol (**70**) as shown in Figure 4.1. The structures of all compounds were elucidated by spectroscopic techniques and compared with spectroscopic data and some physical properties with those reported in the literature. All identified compounds were reported for the first time in this plant. The biological activities of isolated compounds in this plant has been reported. Therefore, they were not test in this research.

The investigation of the seeds of *C. nervosum* var. *paniala* resulted in the isolation of two known compounds, 2′,4′-dihydroxy-6′-methoxy-3′,5′-dimethylchalcone or DMC (**128**) and hariganetin (**138**) shown in Figure 4.2. The structures of these compounds were elucidated by spectroscopic techniques and compared with spectroscopic data and some physical properties with those reported in the literature.

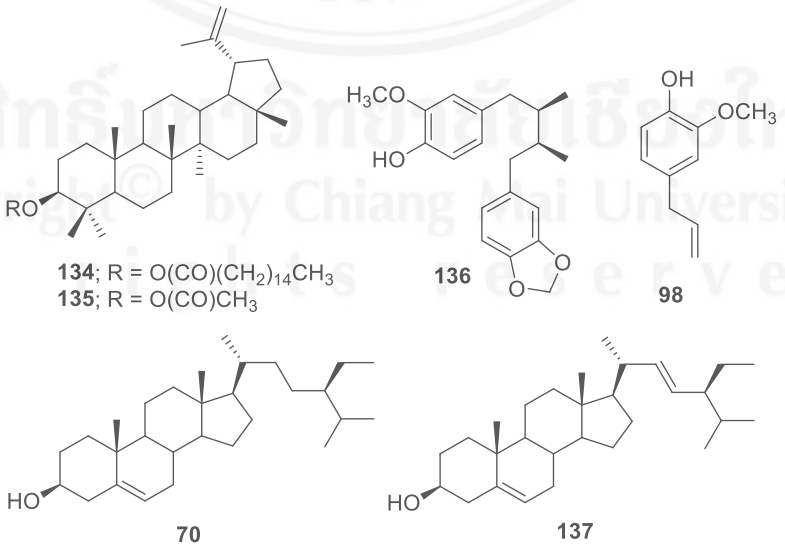


Figure 4.1 Isolated compounds from CH_2Cl_2 extract of *V. scandens* aerial parts

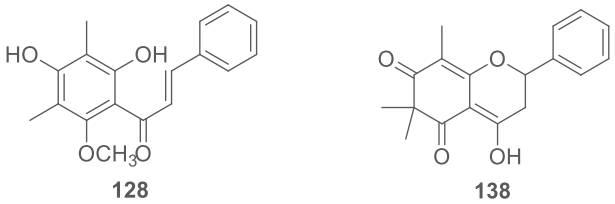
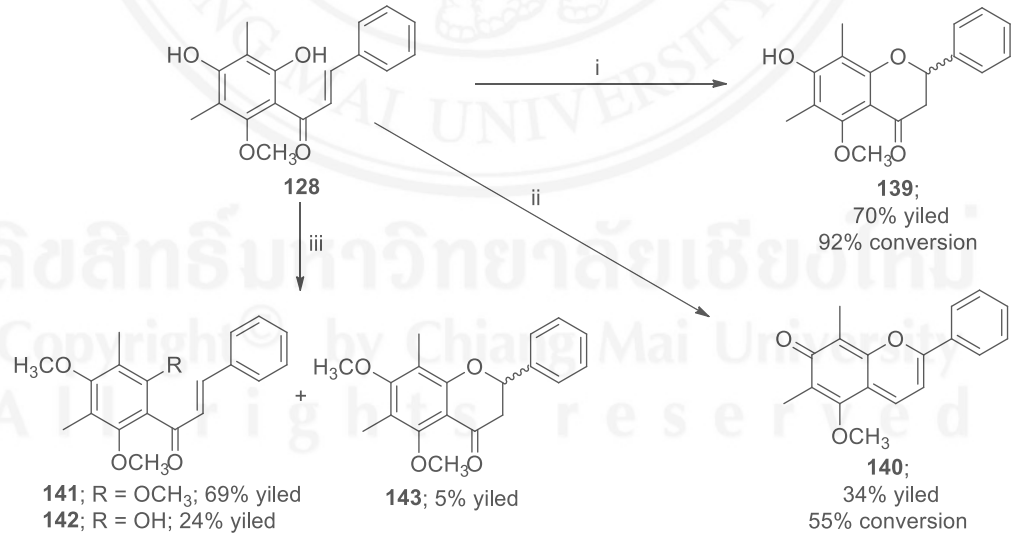


Figure 4.2 Isolated compounds from dichloromethane extract of *C. nervosum* var. *paniala* seeds

4.2 Synthetic derivatives of 2',4'-dihydroxy-6'-methoxy-3',5'-dimethylchalcone (DMC) (128)

Five flavonoid compounds **139-143**, were successively synthesized by starting material DMC (**128**), obtained from synthesis three pathways as shown in Scheme 4.1. Reactions of chalcone **128** with concentrate sulfuric acid in refluxing methanol afforded adduct **139** in 70% yields and 92% conversion. Reduction of compound **133** with sodium borohydride in the ratio of tetrahydrofuran and methanol (1:1) at 0 °C provided adduct **140** in 34% yields and 55% conversion. In addition, methylation of DMC with potassium carbonate and methyl iodide at room temperature gave both chalcones **141** and **142**, and flavanone **143** in 69, 24, and 5% yields, respectively.



i) Refluxing in MeOH, using conc.H_2SO_4 as a catalyst for overnight
ii) Using 3.2 eq.$NaBH_4$ in THF:MeOH (1:1) at 0 ^oC, stirred in room temperature for overnight
iii) Using 10 eq.K_2CO_3, CH_3I in anhyd.acetone at room temperature for 10 h, work up the reaction

Scheme 4.1 Synthesis of derivatives of 2',4'-dihydroxy-6'-methoxy-3',5'-dimethylchalcone (DMC) (**128**)

4.3 Biological activities of 2',4'-dihydroxy-6'-methoxy-3',5'-dimethylchalcone or DMC (128), hariganeine (138) and derivatives of DMC (139-142)

Interestingly, two known natural products, 2',4'-dihydroxy-6'-methoxy-3',5'-dimethylchalcone (DMC) (**128**) and hariganeine (**138**) were isolated from the seeds of *Cleistocalyx nervosum* var. *paniala*, and tested biological activities by using Salmonella mutation assay against AFB1, MeIQ and AF-2 induced mutagenesis. It was found that DMC has high potential antimutagenic compound more than hariganetin in concentrated of 10 μg/pl, and showed 100.0 ± 5.4, 99.5 ± 0.3, 56.8 ± 22.0 % inhibition respectively. The cytotoxicity of the isolated compounds against cancer, P-388, KB, HT29, MCF-7, A549, ASK and Hek293 cell lines were studied. The test compound **142** has shown high cytotoxic activities with ED_{50} values 2.06, 3.12, 3.56, 2.51, 3.28, 4.79 and 2.15 μg/mL respectively. Likely, compound **141** has shown high cytotoxic activities as **142**. Moreover, DMC (**128**) and compound **140** exhibited moderate cytotoxic activities, while hariganetin (**138**) and compound **139** were inactive. For inhibitory on anti-HIV-1 RT activity, compound **140** showed the highest activities against anti-HIV-1 RT in 93.40% inhibition whereas DMC, hariganetin, and compound **141** showed moderate activities, compound **139** showed week activities, while compound **142** was inactive to anti-HIV-1 RT.