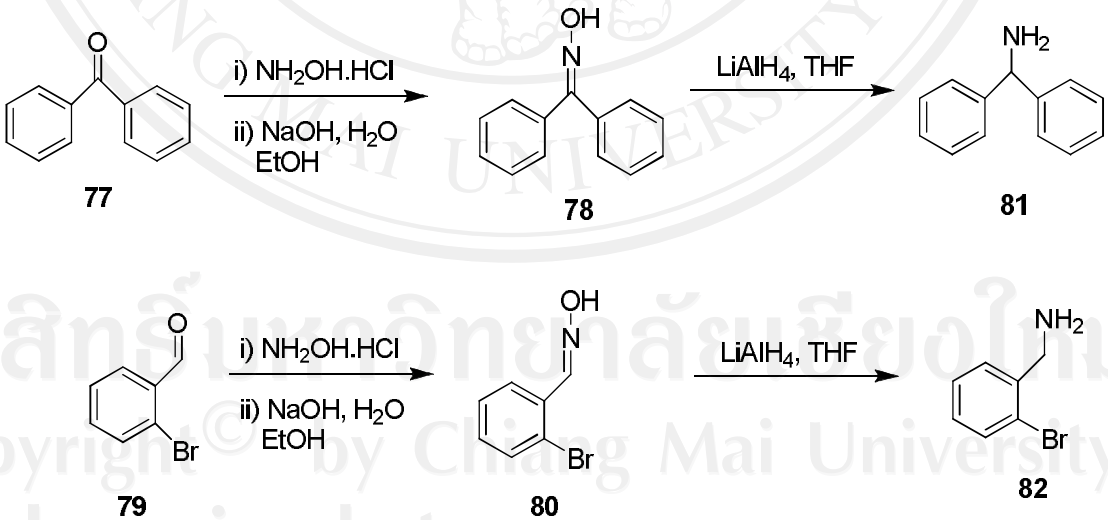
CHAPTER IV

CONCLUSIONS

In conclusion, piperine (**1**) is isolated from black pepper by refluxing with ethanol and also purified by recrystallized from ethanol, 1.13 % yield.

The oxime compounds, benzophenone oxime (**78**) and 2-bromobenzaldehyde oxime (**80**) were synthesized using benzophenone (**77**) and 2-bromobenzaldehyde (**79**) as starting materials, reacted with hydroxylamine hydrochloride and sodium hydroxide respectively.

Diphenylmethanamine (**81**) and 2-bromobenzylamine (**82**) were obtained by a reduction with $LiAlH_4$ in THF solution.



Scheme 24 Oximation reaction and reduction with $LiAlH_4$

Novel piperine analogues, oxime-esters (**83** and **85**) and amides (**84, 86, 87** and **88**) were synthesized from piperic acid (**5**) by conversion of piperic acid to acid chloride and then react with benzophenone oxime (**78**), 2-bromobenzaldehyde oxime (**80**), diphenylmethanamine (**81**), 2-bromobenzylamine (**82**), allyl amine and 4-amino-pyridin in the present of triethylamine. These compounds displayed antibacterial, antifungal and antioxidant activity. For the antibacterial assays, compounds **83, 84, 86, 87** and **88** against *E. coli* with clear zone values 0.8, 0.9, 1.0, 0.8 and 0.6 cm respectively, while all compounds were inactive to *S. aureus*. Compounds **84**, **86**, **87** and **88** showed against *P. aeroginosa*, values clear zone of 0.8, 0.7, 0.6 and 0.6 cm respectively. In addition, compounds **84, 86** and **88** were against *S. typhimurium* with clear zone values of 0.8, 0.9 and 0.8 cm respectively. For the antifungal assays, compounds **84, 86, 87** and **88** against *C. albicans* with clear zone values 1.0, 1.0, 0.7 and 1.2 cm respectively, while these synthetic compounds were inactive to *C. krusei*. For the antioxidant assays, all compounds exhibited inactivity.