Chapter IV
CONCLUSION

The main purpose of this research is to find out the optimum conditions for radical deoxygenation of a model compound, cyclododecanol, and to apply the most appropriate conditions for deoxygenation of natural occurring compounds. Variable parameters investigated are chain carriers, initiators, alcohol derivatives and solvents. It was found that the optimum conditions for deoxygenation of cyclododecanol are cyclododecyl *S*-methyl xanthate derivative 0.4 mmol, Ph_2SiH_2 as a chain carrier 0.8 mmol, AIBN as an initiator 0.08 mmol in refluxing toluene 4 mL for 80 minutes which gave an excellent yield better than utilizes nBu$_3$SnH as a chain carrier. Furthermore, Ph_2SiH_2 is more suitable due to the reaction can occur in milder condition (lower temperature) and employs a shorter reaction time.

To extend the conditions explored to other alcohols and natural products, it was observed that the conditions suited for secondary alcohols still required the redressed conditions in terms of reaction time, amount of both chain carrier and initiator for the deoxygenations of primary alcohols and other related compounds.

Fascinating results are attained from the application of this developed optimum conditions to deoxygenate some selected natural products. Among various thiocarbonyl derivatives prepared, three of them, namely *O*-menthyl *S*-methyl xanthate (**3c**), taraxeryl *S*-methyl xanthate (**3h**) and taraxeryl *N*-phenylthioxocarbamate (**4h**), are new derivatives. Their structures are well-characterized by means of various spectroscopic techniques including IR, ^{1}H and ^{13}C NMR and elemental analysis.

Two examples were obviously demonstrated that utilizing this developed methodology could fruitfully achieve the deoxygenation of natural products. The first one was the deoxygenation of cholesterol after derivatized to xanthate gave 62% of cholestene in a good yield. One of the main reasons is because this derivative did not rearrange under the reaction conditions employed. The other was the deoxygenation

of taraxerol *via* its methyl xanthate. This was found to accomplish with almost quantitative yield based on its methyl xanthate, while in previous report only 50% of the desired product was attained.

Proposal for the Future Work

Development of Barton-McCombie type deoxygenation still needed to carry on undoubtedly. The more selective and more generally applicable method for deoxygenation of particularly complex natural products are still awaiting to disclose. The seeking for novel chain carrier such as new organosilanes or other compounds is another challenging field to examine. The dideoxygenation reaction, another topic that related to this work, is also very promising field to investigate, since deoxynucleotides have recently been well-recognized as potential active ingredients in the treatment of AIDS.[28] Moreover, this reaction should be expanded to the dehalogenation, not only limited to the deoxygenation.

It could obviously be seen based upon this research that the application of methodologies in organic synthesis in fact stemmed from the study on the fundamental concept of methodology. Therefore, another fascinating area of organic chemistry is to study and to search for new methodologies in organic transformation.