

## CHAPTER IV

### CONCLUSION

From this research, the utilization of chromium (III) complexes and TBHP was accomplished to oxidize cyclohexanol to cyclohexanone in good yield. Moreover, chromium(III)stearate was an efficient catalyst yielding the high yield of cyclohexanone (91%). From the condition optimization, it was found that the reaction carried out with 5 mmol of substrate, 0.20 mmol of catalyst, 5 mL of isooctane, at 70°C for 24 hours was the optimal condition. In case of the oxidation of 1-hexanol catalyzed by chromium (III) complexes was not successful and gave moderate conversion of alcohol and very low yield of carboxylic acid. The oxidation of cyclohexene mediated by chromium(III)carboxylates and chromium (III)acetylacetonate gave cyclohexanone as the predominant product. In addition, chromium(III)stearate afforded the highest yield of enone product with good selectivity (50%) whereas chromium(III)salen-Cl gave *trans*-diol as major product with excellent yield and high selectivity (76%).

The utilization of this developed oxidation system using chromium(III)stearate as catalyst for oxidation of naturally occurring compounds declared that menthol, 1-phenylethane-1,2-diol, cholestanol and cinnamyl alcohol, naturally occurring compounds bearing secondary and primary hydroxyl group are studied under mild condition (70°C and 24 hours) over chromium (III) stearate using *tert*-butyl hydroperoxide gave moderate to excellent yields of carbonyl products. In addition, it was found that this catalyst was sensitive to steric effect. Moreover, the oxidation of  $\alpha$ -pinene,  $\alpha$ -ionone and  $\beta$ -ionone, natural products containing C=C moiety, provided verbenone, 3-oxo- $\alpha$ -ionone and 4-oxo- $\beta$ -ionone, respectively as predominant products in moderate yields with good selectivity except for the oxidation of  $\alpha$  -and  $\gamma$  - terpinenes being afforded aromatic products in high yield.

The study of chemo- and regioselectivity of the oxidation of primary alcohols in the presence of secondary ones shows the major recovered product was ketone. In addition, the oxidation of 1-phenylethane-1,2-diol gave 2-hydroxy-1-phenylethanone, an  $\alpha$ - hydroxyl ketone, without contamination of either a dicarbonyl compound or ketone acid.

Suggestion for the future work

Besides the modification of this catalytic oxidation for secondary alcohol to the larger scale could be applied in chemical industry, the oxidation of primary alcohols is required to accomplish the selective of primary alcohols.



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