

CHAPTER IV

CONCLUSION

The work had focused on the synthesis of α -hydroxyphosphonate *via* the reaction of aldehyde and dialkyl phosphite. For racemic synthesis of α -hydroxyphosphonates, the low chemical yields were obtained when base such as triethylamine and alumina was used as catalysts. Alternatively, lithium aluminium hydride was introduced in reaction to catalyze the Pudovik reaction. Moderate to high yield were obtained.

The investigation had been carried out to search for effective catalysts for asymmetric Pudovik reaction. The utilization of various chiral ligands such as chiral Schiff's base, peptide Schiff's base and amino alcohols formed complexes with various Lewis acids and heterobimetallic were studied. The enantioselectivities of the α -hydroxyphosphonates were monitored by chiral gas chromatography. It was found that α -hydroxyphosphonates obtained from catalytic Pudovik reaction using complexes derived from Lewis acids and chiral ligands provided rather low yield and no enantioselectivity observed. In addition, a general method for catalytic asymmetric synthesis of α -hydroxyphosphonates using LAH:*N*-salicyl- β -aminoalcohol complexes as an asymmetric catalyst have been developed. Enantiomeric excess as well as chemical yield were obtained moderate to high. The bulkiness of substituents on salicyl moiety provides high enantioselectivity in reaction. Furthermore, the high enantiomeric excesses were observed when aliphatic aldehydes were used as substrates.

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