Original Abstract

This thesis explores the practical applications of DPEN (1,2-diphenylethylene diamine) guanidine as a chiral shift reagent for imino acids and as a catalyst for transamination. A fast and simple three-component protocol in determining the enantiopurity of amino acids by $^1$H NMR spectroscopy is described. Racemic amino acids are solubilized in CDCl$_3$ with the chiral guanidine to form diastereomeric salts. The salts are reacted with 2-pyridinecarboxaldehyde to form the imino acid salts where the $^1$H NMR signals of the ortho-hydrogens on the pyridine group for the pairs of diastereomeric imino acid salts are well resolved for determining the enantiopurity of 8 amino acids.

2-(aminomethyl)-4,6-dichlorophenol is used as a pyridoxamine analog to transaminate acetophenone, 2-acetylpyridine, 4-nitroacetophenone and methyl pyruvate to give the corresponding products $\alpha$-phenethylamine, 1-(pyridin-2-yl)ethan-1-amine, 1-(4-nitrophenyl)ethan-1-amine and methyl alaninate. When compared with 2-(aminomethyl phenol), 2-(aminomethyl)-4,6-dichlorophenol is about 100 times more reactive in the transamination of methyl pyruvate. DPEN guanidine catalyzes the transamination reaction but the stereoselectivity is too low to be detected.