Synthesis of Novel Amino Acid Derived Schiff Base Ligands and Their Application in Asymmetric Henry Reaction

Kadir Özek\textsuperscript{a}, Erkan Halay\textsuperscript{b}, Demet Astley\textsuperscript{a}

\textsuperscript{a) Ege University, Faculty of Science, Chemistry Department, İzmir, 35100, Turkey
\textsuperscript{b) Celal Bayar University, Faculty of Science and Art, Chemistry Department, Manisa, Turkey
erkanhalay@hotmail.com

Among the various C-C bond forming reactions, the nitro aldol (Henry) reaction is one of the most important and atom-economical reactions in organic synthesis providing \(\beta\)-nitroalcohols which can be transformed into valuable chiral building blocks, such as 1,2-amino alcohols and \(\alpha\)-hydroxyl carboxylic acids, especially in an enantiopure form \cite{1,2}. Traditionally this reaction was mainly carried out in the presence of strong bases, leading to dehydration with concomitant formation of a nitroolefin. The interest in asymmetric versions of this reaction started growing after the groundbreaking work of Shibasaki and co-workers on the use of chiral bimetallic lithium-lanthanum catalysts \cite{3,4}. In the last two decades many other asymmetric metal catalysts have been developed and nowadays, aldehydes or \(\alpha\)-keto esters can be converted to the corresponding nitroalcohols with good to excellent enantioselectivities \cite{5}.

The design and development of the ligand plays a pivotal role in the development of efficient metal-catalyzed asymmetric Henry reactions. As a part of our ongoing study on using Schiff base ligands as catalyst in such reaction, we report in the present work the synthesis, spectroscopic characterization of novel hydroxy naphthaldehyde ligands based on chiral amino acid derived subunits of general structures shown below and application of these ligands in the asymmetric Henry reaction.

\begin{align*}
\text{Ar} - \text{CHO} + \text{CH}_3\text{NO}_2 & \quad \text{10\% mol catalyst} \\
& \quad \text{solvent, rt} \\
\text{Ar} - \text{CH(OH)NO}_2 \quad & \quad \text{Catalyst:}
\end{align*}

KAYNAKLAR

\cite{1} Henry, L., \textit{C. R. Hebd. Seances Acad. Sci.}, \textbf{120}, 1265, 1895.