

A Regio- and Stereodivergent Synthesis of *vic*-Amino Alcohols

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Abstract

This thesis describes a synthetic strategy that provides all eight possible isomers of a given *vic*-amino alcohol starting from vinyloxyepoxides. The usefulness of a general route is evident as several isomers are needed in investigations of structure-activity relationships for pharmacologically active derivatives and for optimizing the performance of chiral ligands containing the amino alcohol moiety. Vinyloxyepoxides, obtained in high enantiomeric excess, were ring-opened both with inversion and retention of stereochemistry, delivering two diastereomeric amino alcohols with high selectivity. Via ring-closure to aziridines and subsequent regioselective ring-opening with suitable oxygen nucleophiles, the two remaining amino alcohols were selectively achieved.

As an integrated part of this strategy, a detailed study of the microwave-assisted aminolysis of vinyloxyepoxides yielding vicinal amino alcohols is presented. Compared to previous methods, this procedure uses milder reaction conditions, shorter reaction times, generally gives higher yields and is applicable to a larger set of substrates.

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Abbreviations

Δ	heat
aq	aqueous
Bn	benzyl
calcd	calculated
cat.	catalytic
concd	concentrated
ds	diastereoselectivity
dba	dibenzylideneacetone
DEAD	diethyl azodicarboxylate
DME	1,2-dimethoxyethane
DMF	<i>N,N</i> -dimethyl formamide
DIAD	diisopropyl azodicarboxylate
DIBAL	diisobutyl aluminium hydride
DIPT	diisopropyl tartrate
dist.	distilled
DMAP	4-dimethylaminopyridine
eq	equivalent
es	enantioselectivity
LA	Lewis acid
NMR	nuclear magnetic resonance
NOE	nuclear Overhauser effect
Pg	protective group
PMB	<i>p</i> -methoxybenzyl
rt	room temperature
SAE	Sharpless asymmetric epoxidation
sat.	saturated
TBHP	<i>t</i> -butyl hydroperoxide
THF	tetrahydrofuran
Ts	<i>p</i> -toluenesulfonyl
<i>vic</i>	vicinal

List of publications

This thesis is based on the following papers, referred to in the text by their Roman numerals.

- I. **Microwave-assisted Aminolysis of Vinylepoxides**
Ulf M. Lindström, Berit Olofsson and Peter Somfai
Tetrahedron Lett. **1999**, *40*, 2973-2976.

- II. **A Regio- and Stereodivergent Synthesis of *vic*-Amino Alcohols**
Berit Olofsson, Uttam Khamrai and Peter Somfai
Submitted.

