Z-Selective Hydrofunctionalization of Dienes

Clara Vicera, Raphael Dada, and Rylan J. Lundgren

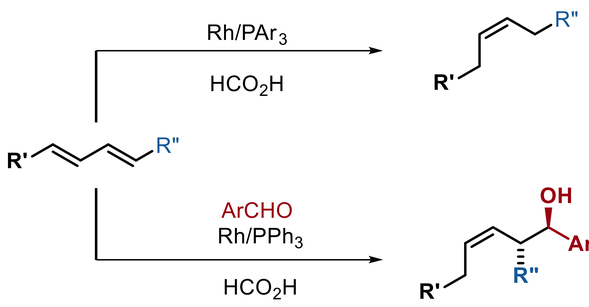
Department of Chemistry, University of Alberta, Edmonton, AB, T6G 2G2

Supported By:

Canada Dr. Lundgren

INTERNATIONAL PAPER

Introduction

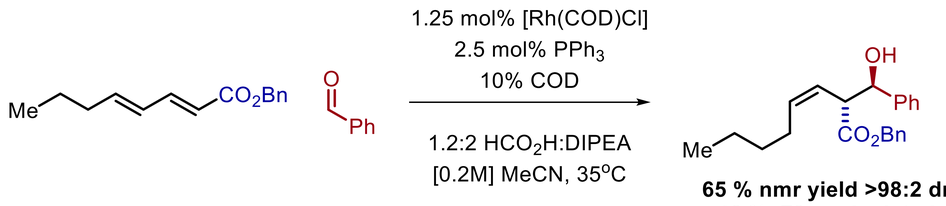


Previous Study
- Rh-catalyzed Z-Selective reduction of dienes.
- Tolerates unsaturated functionalities.
- >95:5 *Z:E* ratio
- Mild reaction conditions.

Project Goal
- Z-Selective reductive coupling of Dienes and Aldehydes.
- Control over regio- and chemo-selectivity.
- Reducible functional group tolerance

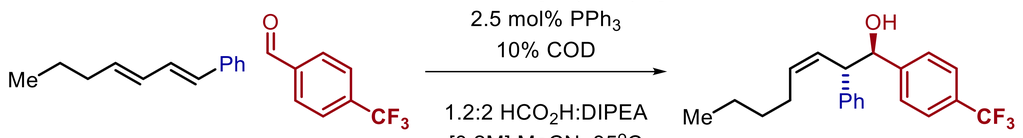
Methods

a) Reductive Coupling of Diene Ester and Aldehyde



65 % nmr yield >98:2 dr
46 %, 78 mg isolated

b) Reductive Coupling of Phenyl Diene and Aldehyde



61 % nmr yield >98:2 dr
59 %, 103 mg isolated

Figure 1: Glovebox

Figure 2: Nuclear Magnetic Resonance (NMR) Instrument

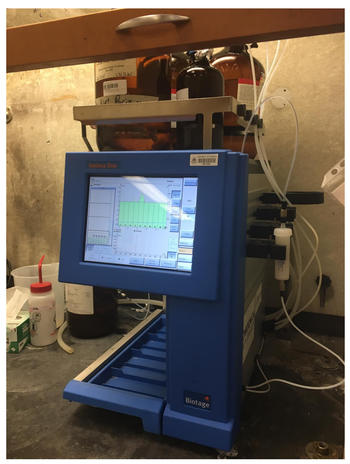
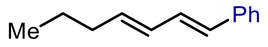


Figure 3: Biotage

Results

Figure 4: NMR Spectrum of Starting Material



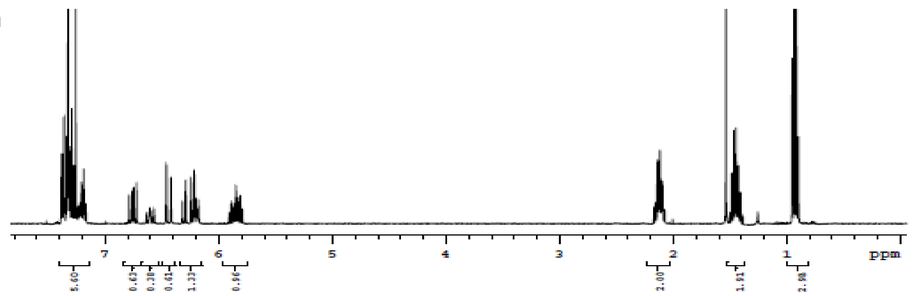
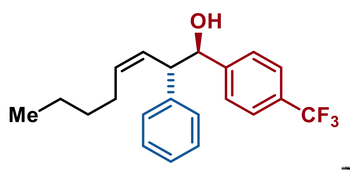
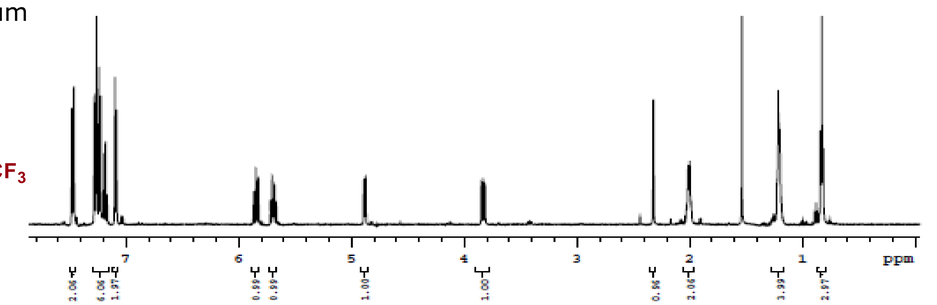


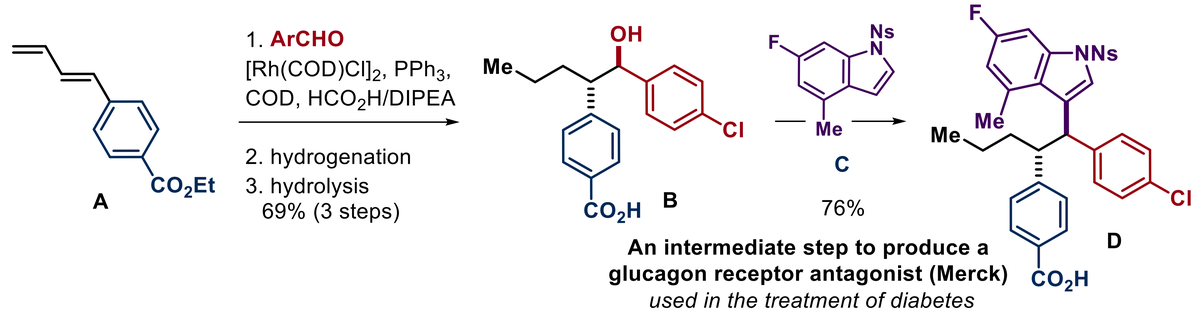
Figure 5: NMR Spectrum of Product





Applications

- Successfully obtained *Z*-homoallylic alcohols from reductive coupling of dienes and aldehydes
- Method can be used in the development of complex drug molecules



An intermediate step to produce a glucagon receptor antagonist (Merck)
used in the treatment of diabetes

References

1. *Angew. Chem. Int. Ed.* **2018**, *57*, 3981– 3984
2. *Angew. Chem. Int. Ed.* **2019**. *DOI:10.1002/anie.201905540*

Acknowledgements

This project would not have been possible without the help from my supporters. I would like to extend my gratitude towards:
- Dr. Lundgren and the Lundgren Research Team
- Raphael Dada
- WISEST
- The University of Alberta
- Canada Summer Jobs
- The International Paper