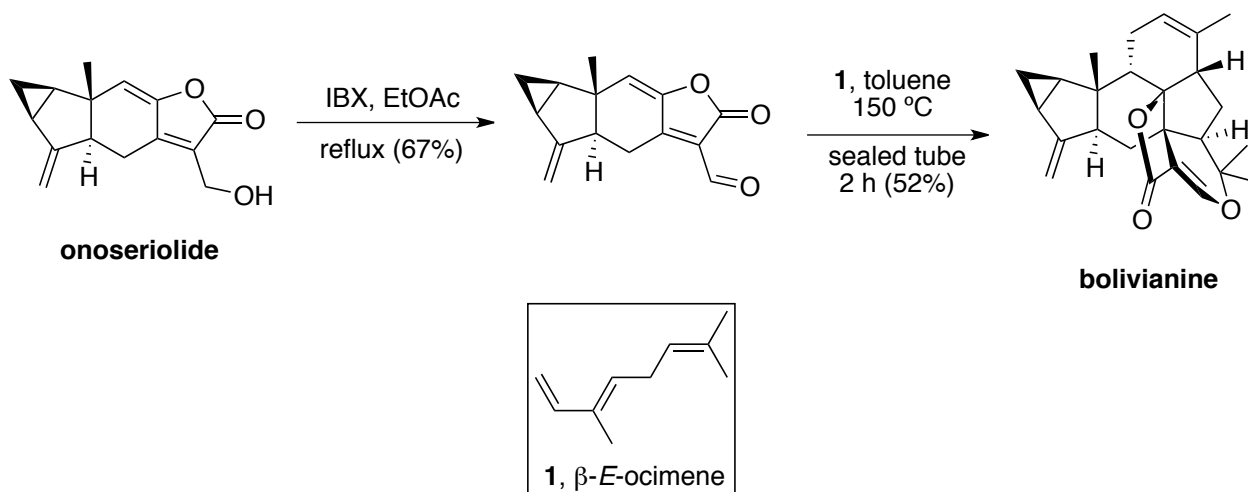


## Bioinspired Total Synthesis of Bolivianine: A ???/??? Cascade Approach

*Problem:*

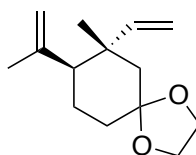


For Master students:

- Give the mechanism for the IBX oxidation.
- What is the difference to DMP?

For the rest:

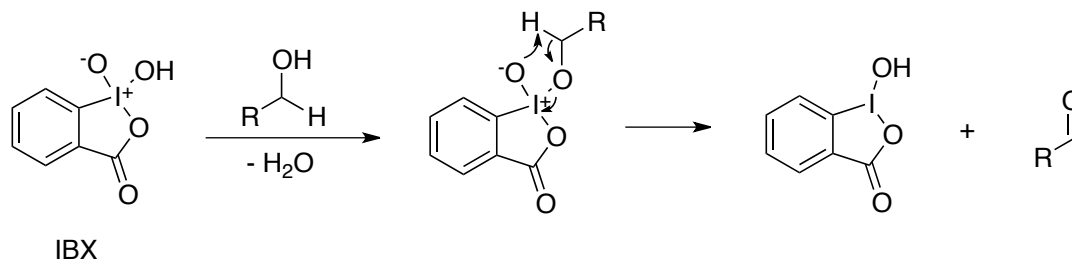
- Give the mechanism for the formation of bolivianine. What is the name of this cascade transformation?
- For the enantioselective Total Synthesis of Onoseriolide compound **2** is a precursor. Propose a retrosynthesis for compound **2**. (*Hints: They start from a commercially available enantiopure product; 3 steps to 2*)



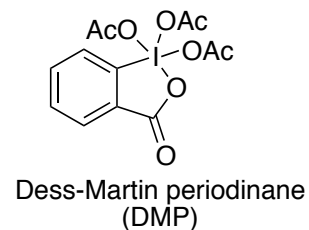
**2**

**Solution:**

For Master students:

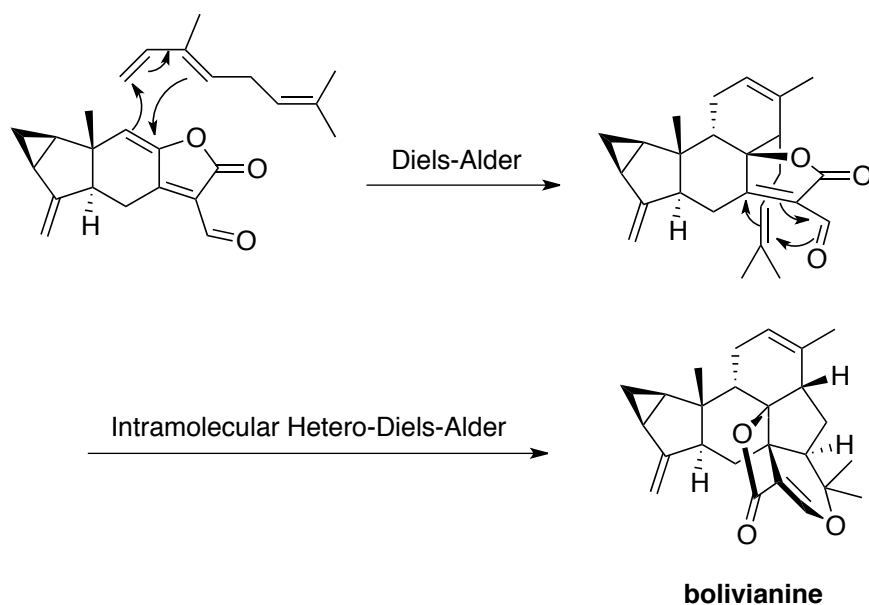


The Dess-Martin periodinane (DMP) is commercially available and decomposes only slowly. But DMP is heat- and shock-sensitive, and shows an exotherm when heated >130 °C. 2-Iodoxybenzoic acid (IBX), the impact-sensitive intermediate in the synthesis of the Dess-Martin periodinane, is available in a DMSO solution and is also used as an oxidizing agent.

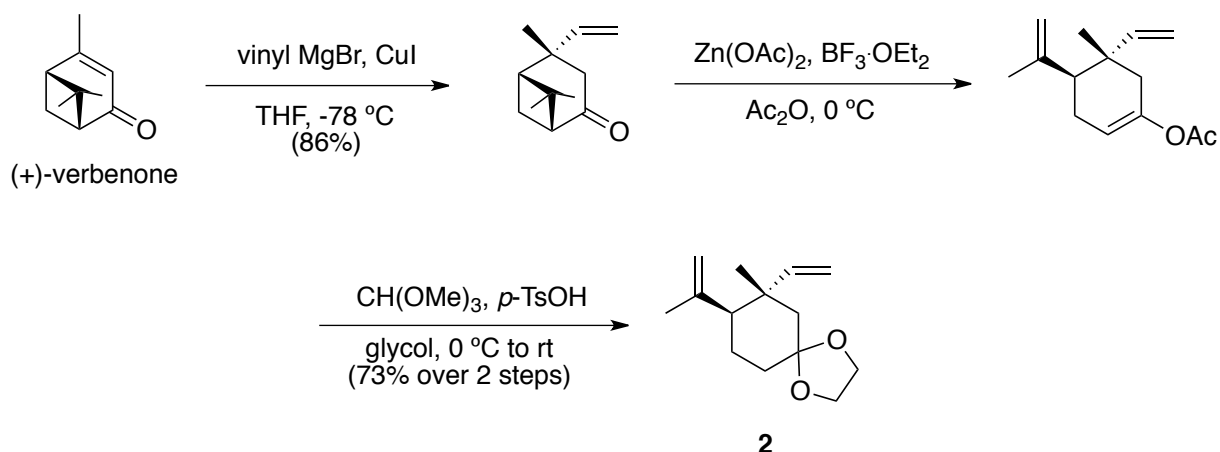


For the rest:

- Diels-Alder/Intramolecular Hetero-Diels-Alder Cascade:



## - Retrosynthesis:

*Comments:*

First total synthesis of bolivianine in a 14-step pathway involving the synthesis of onoseriolide. Diels-Alder/intermolecular Hetero-Diels-Alder cascade, allowing the single-step assembly of a tricyclic system with proper configuration.

*References:*

C. Yuan, B. Du, L. Yang, B. Liu, *J. Am. Chem. Soc.*, Web published: 28 May **2013**.

*Keywords:*

Diels-Alder/Intramolecular Hetero-Diels-Alder Cascade, IBX oxidation