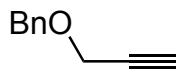


Total Synthesis of (±)-Bukittingine

Jeffrey A. Stafford, Clayton H. Heathcock and David L. Clark *J. Org. Chem.* **1992**, *57*, 2575–2585



1-4

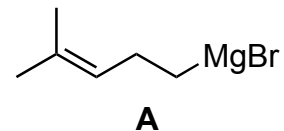


5-7

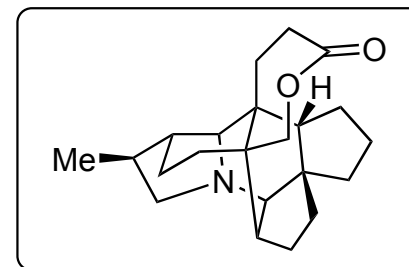


- 1) *n*-BuLi, CICO₂Et
- 2) TMEDA, **A**, CuI, -78 °C
- 3) LiAlH₄
- 4) Swern

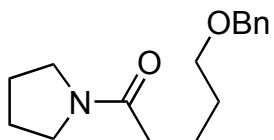
- 5) CH₃PPh₃Br, PhLi
- 6) Disiamylborane, H₂O₂, NaOH
- 7) PPh₃, I₂, Imidazole



Provide two alternatives for methylation in step 5



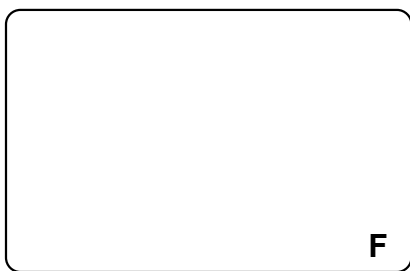
(±)-Bukittingine



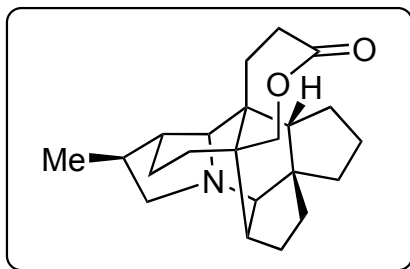
8-11



12-15



16-20

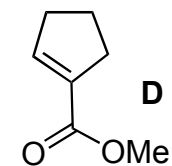


(±)-Bukittingine

- 8) LDA, -78 °C, **D**, then **C**
- 9) DIBAL, excess, -78 °C
- 10) KOH, H₃O⁺
- 11) LiAlH₄

- 12) Exhaustive Swern
- 13) NH₃
- 14) AcOH, 75 °C
- 15) Pd(CF₃COO)₂, quinone, PPh₃

- 16) BH₃, sodium perborate
- 17) TsCl
- 18) LiEt₃BH
- 19) NH₃, Na
- 20) Ag₂CO₃ in celite



Explain the stereochemistry of step 8, show 2 possible cyclic transition states.

Explain the mechanism of 14

15: Mechanism and role of each additive

What are the advantages of sodium perborate?

Explain the mechanism of 19

Provide a reaction mechanism and reagent name for 20