

Studies on Total Synthesis of the Cytotoxic Marine Alkaloid Agelastatin A

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J. Org. Chem. **1998**, *63*, 7594



↓ 1



↓ 2



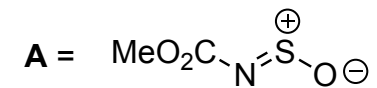
↓ 3,4

1) **A**, Benzene, 0 °C

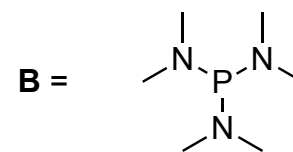
2) PhMgBr, THF, -60°C

3) **B**, EtOH, 80 °C

4) Boc₂O, DMAP, Et₃N, MeCN, 80 °C



How would you make **A**?
O-Methylcarbamate + SOCl₂



What is the name of this reaction?

Please draw a mechanism and the frontier molecular orbitals.



↓ 5



↓ 6

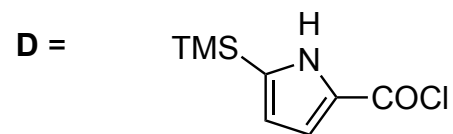
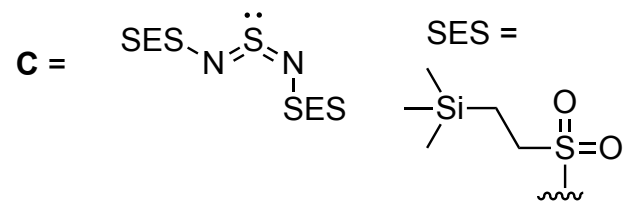


↓ 7

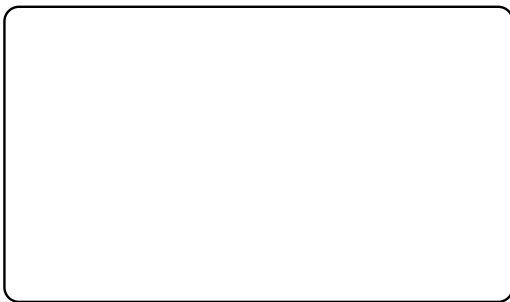
5) **C**, Benzene, 80 °C

6) NaBH₄ or P(OMe)₃, MeOH

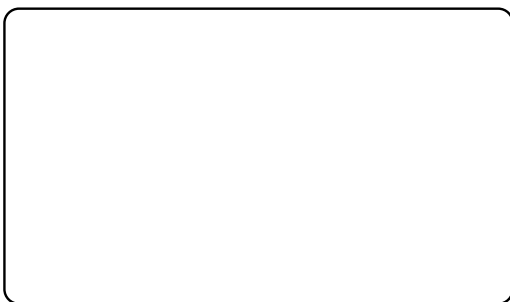
7) **D**, DMAP, Et₃N, THF



*Provide a plausible synthesis for **D** starting with pyrrole.*



↓ 8



↓ 9

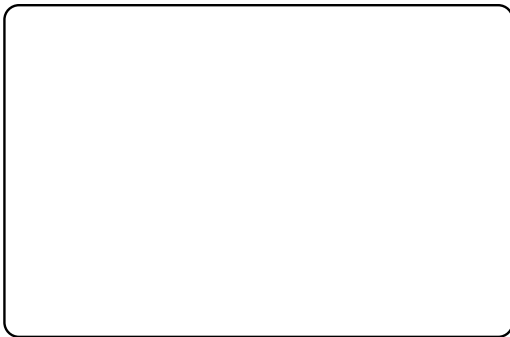


↓ 10,11

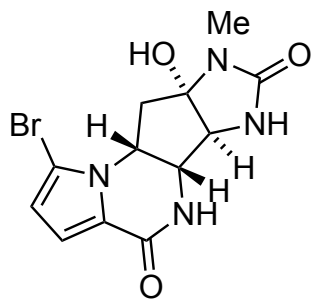
8) TBAF, THF

9) LiOH, THF, Water

10) PDC, DMF
11) Cs₂CO₃, MeOH



↓
12,13,14



(±)-agelastatin A

12) NBS, THF
13) TMSI, DCM
14) MeNCO, NaOH, H₂O