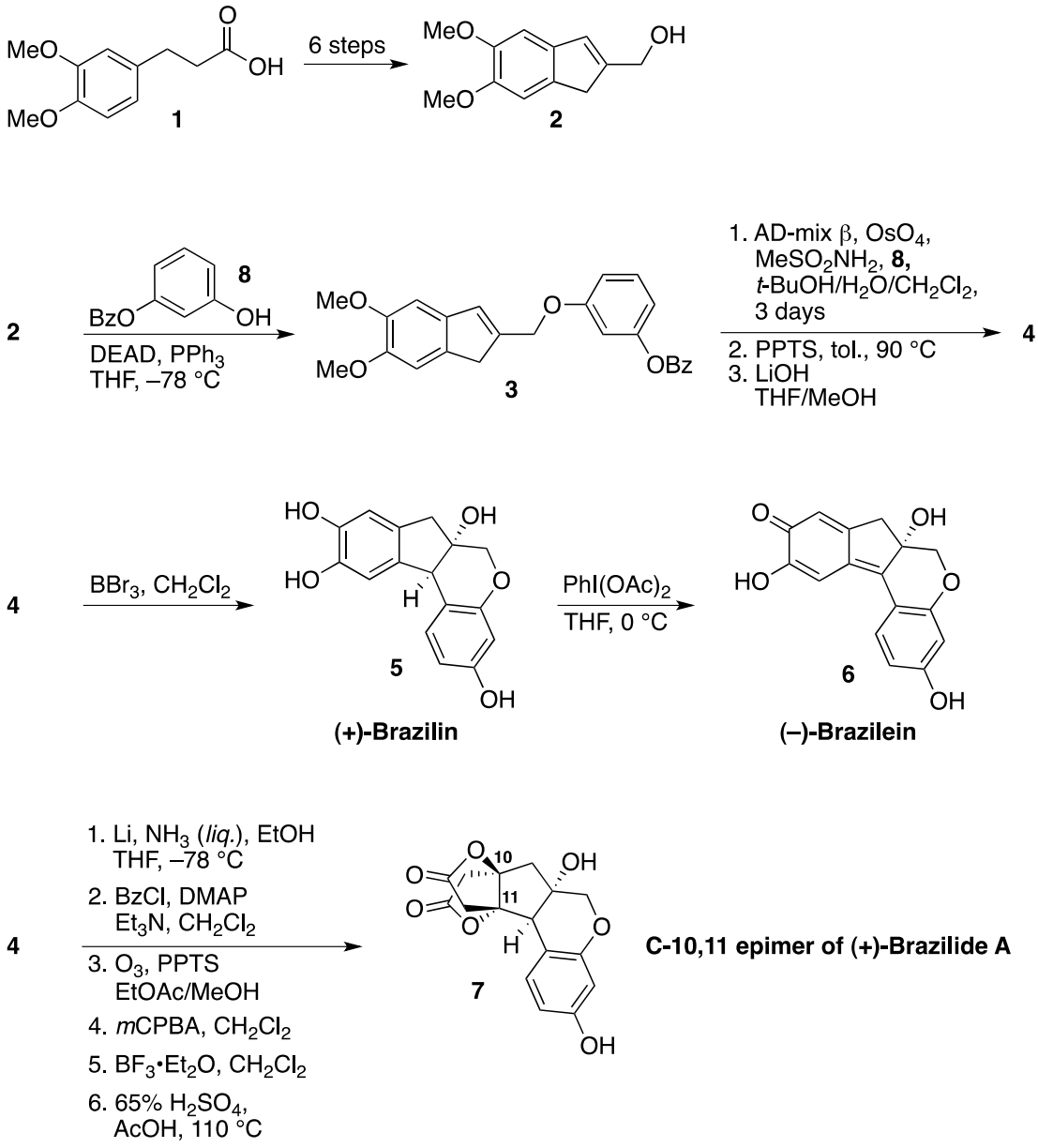
Enantioselective Total Synthesis of (+)-Brazilin, (–)-Brazilein and (+)-Brazilide A

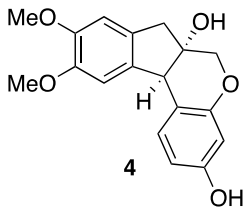
Problem:



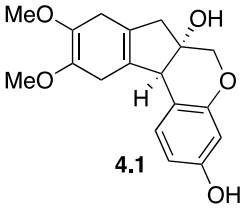
1) Propose the structure of the key intermediate **4**.
2) Describe the steps/intermediates leading to **7** from **4**.
3) Propose a sequence to prepare the starting material **2**.

Solution:

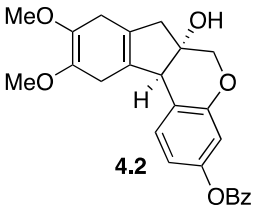
1) & 2)



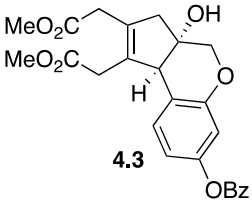
4



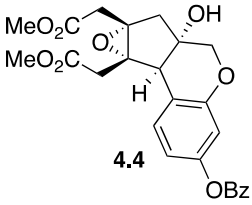
4.1



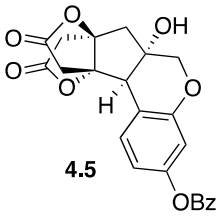
4.2



4.3

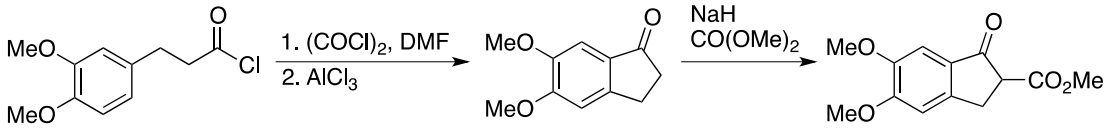


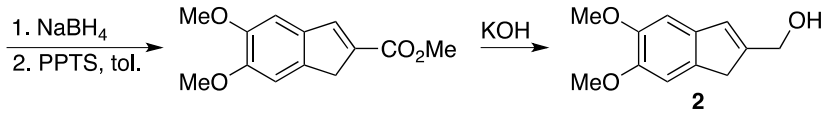
4.4



4.5

3)





2

Comments:

The (+)-Brazilide A could finally be obtained by isolating the C-10,11 epimer of **4.4**.[1]

The use of methanesulfonamide to accelerate the Sharpless asymmetric dihydroxylation has been documented.[2] On the other hand, the exact effect of **8** (also accelerating the reaction) was not established by the authors.[1]

The preparation of **2** had been previously reported.[3]

References:

[1] X. Wang, H. Zhang, X. Yang, J. Zhao, C. Pan, *Chem. Commun.* **2013**, *49*, 5405–5407.

[2] M. H. Junttila, O. O. E. Hormi, *J. Org. Chem.* **2009**, *74*, 3038–3047.

[3] C. Pan, X. Zeng, Y. Guan, X. Jiang, L. Li, H. Zhang, *Synlett* **2011**, 425–429.

Keywords:

Brazilin, Brazilein, Brazilide A, Total Synthesis, Sharpless Asymmetric Dihydroxylation.