Total Syntheses of (+)-Hyperbeanols A–C, (+)-Hyperpatulol A, and (−)-Hypercohone G, as Well as Structure Revision of Hyperpatulol A, and Hyperbeanol B

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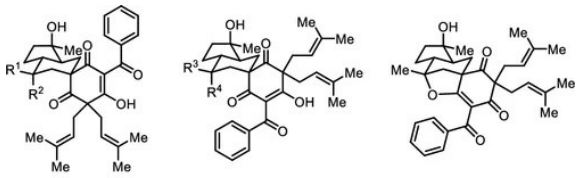



## Scheme 2. Synthesis of Compounds 6 and 7

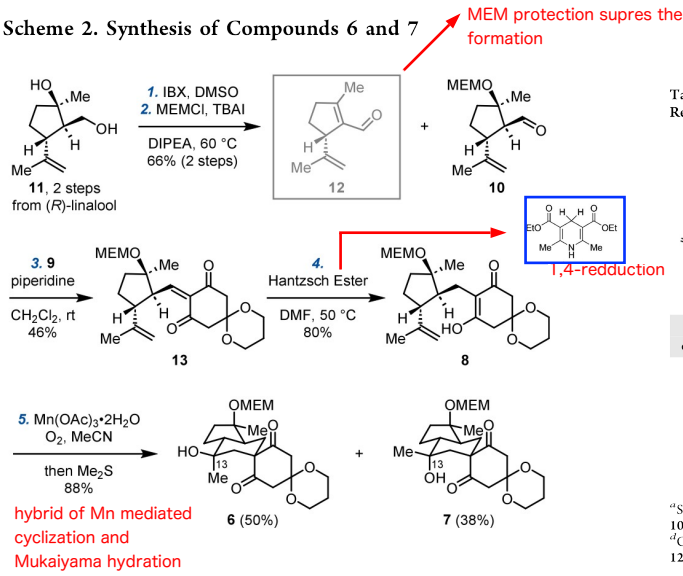
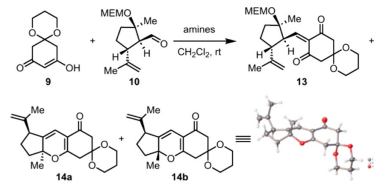
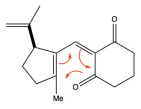



Table 1. Optimization of the Knoevenagel Condensation Reaction[a]

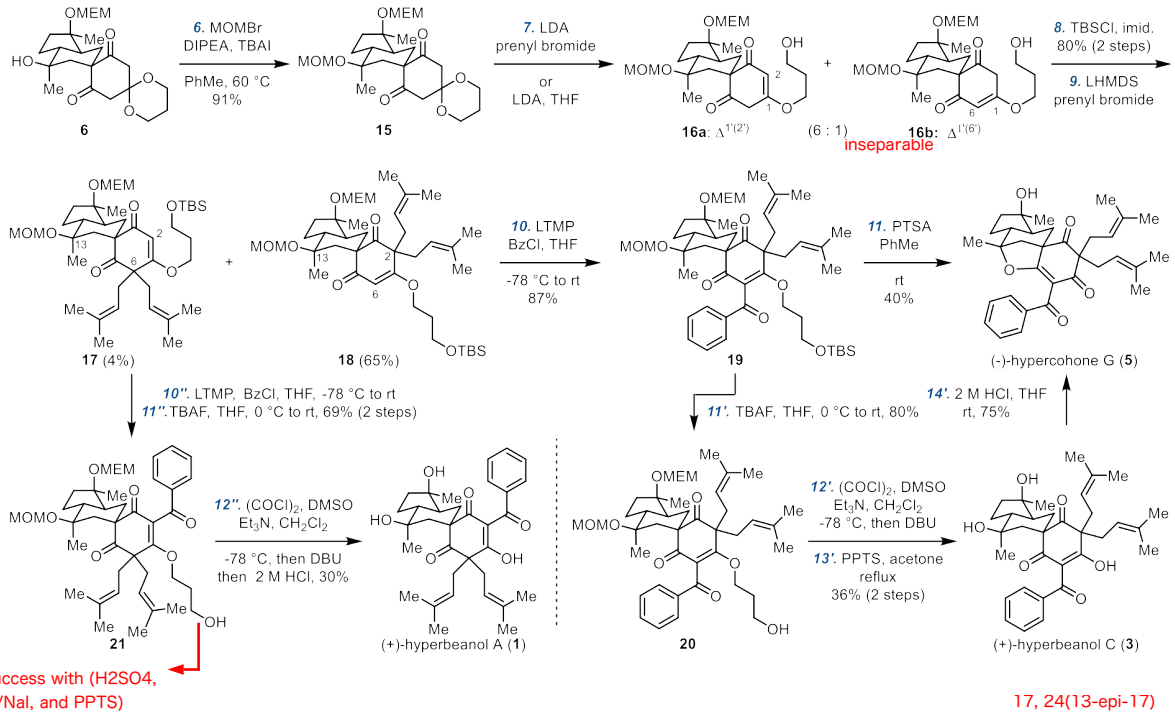



| entry | equiv(9/10) | amines | isolated yields (%) 13 | 14a + 14b |
|---|---|---|---|---|
| 1[b] | 1.0/1.0 | L-proline | 18 | 30 |
| 2[b] | 1.0/1.0 | piperidine | 25 | 20 |
| 3[b] | 1.0/1.0 | diethylamine | 20 | 28 |
| 4[c] | 2.0/1.0 | piperidine | 30 | 35 |
| 5[c] | 3.0/1.0 | piperidine | 22 | 36 |
| 6[d] | 1.0/2.0 | piperidine | 11 | 30 |
| 7[d] | 1.0/3.0 | piperidine | trace | 26 |
| 8[c] | 2.5/1.0 | piperidine | 46 | 35 |

[a] See the Supporting Information for detailed procedures. [b] Both 9 and 10 remained. [c] A high conversion for compound 10 was observed. [d] Compound 10 was recovered in substantial quantities, and aldehyde 12 was observed.



## Scheme 3. Total Syntheses of (+)-Hyperbeanol A (1), (+)-Hyperbeanol C (3), and (−)-Hypercohone G (5)




## Scheme 4. Total Syntheses of (+)-Hyperbeanol B (4) and (+)-Hyperpatulol A (2)