Category

Synthesis of Natural Products and Potential Drugs

Key words

(±)-pentacyclo-anammoxic acid methyl ester

C_{20}-fatty acid methyl ester

[4+2] cycloaddition

[2+2] photo-cycloaddition

N_2 extrusion

Wolff rearrangement

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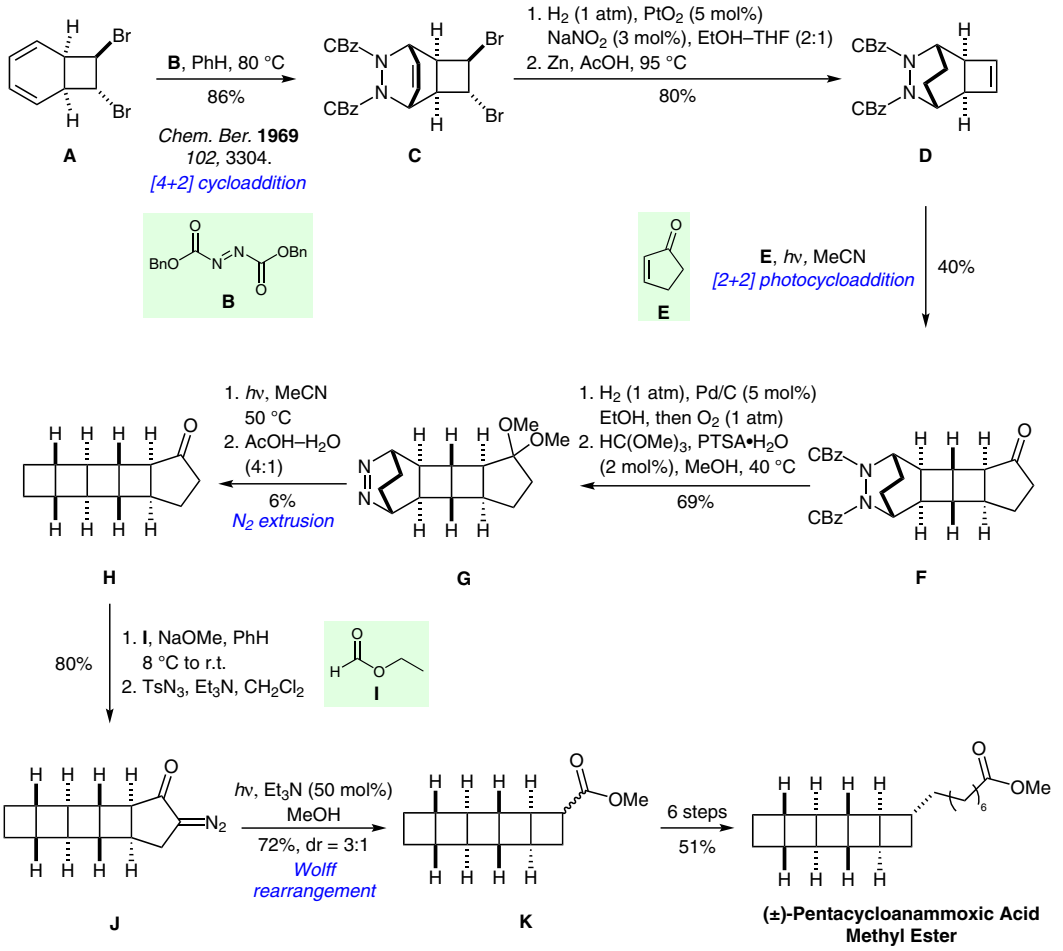
Total Synthesis of (±)-Pentacycloanammoxic Acid

J. Am. Chem. Soc. **2004**, *126*, 15664–15665, DOI: 10.1021/ja044089a.

Synthesis of (±)-Pentacycloanammoxic Acid Methyl Ester



Significance: In 2004, Corey and Mascitti reported the first synthesis of the C_{20}-fatty acid methyl ester of (±)-pentacycloanammoxic acid which was isolated from anammoxic microbe *Candidatus Brocadia anammoxidans* in 2002. It is characterized by five anti-fused cyclobutanes. Key transformations are [4+2] cycloaddition, [2+2] photocycloaddition, N_2 extrusion, and Wolff rearrangement.

Comment: [4+2] Cycloaddition of **B** to dibromide **A**, obtained from cyclooctatetraene via bromination, resulted in tricyclic dibromide **C**. Two successive reductions of tricycle **C** gave cyclobutene **D**. [2+2] Photocycloaddition of **D** to 2-cyclopentenone gave pentacyclic ketone **F**. Photochemical N_2 extrusion reaction of azo-bridged **G** resulted in ketone **H** which was converted into α-diazo ketone **J** in two additional steps. Photo-Wolff rearrangement of **J** gave as a 3:1 mixture of *endo*- and *exo*-methyl esters **L**. (±)-Pentacycloanammoxic acid methyl ester was obtained from **K** in six additional steps.

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Synfacts 2021, 17(10), 1080 Published online: 17.09.2021
DOI: 10.1055/s-0040-1720190; **Reg-No.:** C05621SF

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