Total Synthesis of (−)-Bolivianine

**Significance:** The first total synthesis of (−)-bolivianine, a sesquiterpenoid isolated from the trunk bark of the Andean forest tree *Hedyosmum angustifolium*, is reported together with some interesting preliminary experiments on possible biosynthetic pathways. The synthetic route devised towards this natural product which harbors nine contiguous stereogenic centers within a complex heptacyclic scaffold thereby affords the target molecule in only 15 steps from commercially available (+)-verbenone.

**Comment:** The synthetic strategy is based on the insight that (−)-bolivianine could be biosynthetically derived from onoseriolide and (E)-ocimene (l), both of which are constituents of *Hedyosmum angustifolium* as well. While onoseriolide itself did not react with diene l even at elevated temperatures, the oxidized derivative H was found to undergo the desired Diels–Alder/hetero-Diels–Alder domino reaction to afford the targeted natural product as a single regio- and diastereoisomer. Another salient feature of the synthesis is the palladium-catalyzed intramolecular cyclopropanation.

**SYNFACTS Contributors:** Erick M. Carreira, Nikolas Huwyler

**Category**
Synthesis of Natural Products and Potential Drugs

**Key words**
bolivianine
onoseriolide
intramolecular cyclopropanation
Diels–Alder reaction
hetero-Diels–Alder reaction
domino reaction