Towards the biomimetic synthesis of racemic alkaloids

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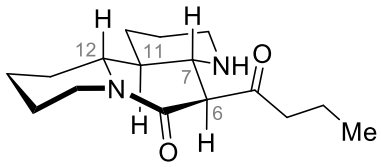
Natural products (secondary metabolites) have been a leading source of drug discoveries. Many biologically active natural products exist only in extremely low quantities in nature, making their extraction and isolation challenging and resulting in low yields. Total synthesis allows chemists to produce these compounds in sufficient quantities for further studies and potential therapeutic applications. By mimicking processes found in nature, biomimetic synthesis has become a powerful strategy to replicate the chemical transformations of natural compounds based on proposed biosynthetic pathways in a laboratory setting. This approach has enabled the successful synthesis of several complex molecules. Herein, we report our progress on the biomimetic synthesis of racemic alkaloids.

Haloxine is a naturally racemic tricyclic alkaloid isolated in 1967 from the desert shrub *Haloxylon salicornicum* [1]. This plant is native to North Africa and Pakistan and has been used in traditional medicine. Interestingly, the structurally unique (±)-haloxine has not been the subject of synthetic studies since its isolation nearly 60 years ago. We describe progress toward its first total synthesis and present a plausible biosynthetic hypothesis inspired by its natural origin.



(±)-Haloxine (**1**)
Isolated from *Haloxylon salicornium* in 1967

[1] B. Nilsson, *Acta Crystallographica,* **1968**, 24, 252–258.