A Ring Fragmentation 1,3-Dipolar Cycloaddition Approach to Demissidine

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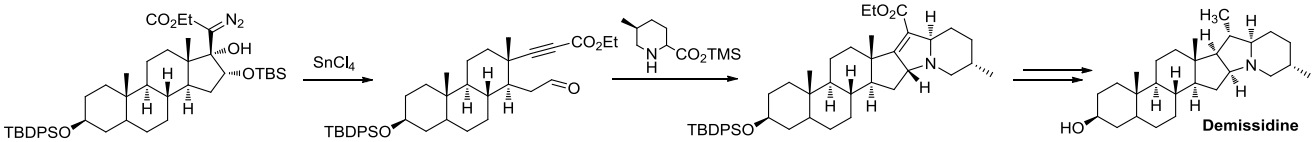

As a principle alkaloid isolated from potatoes and other Solanaceous plants, demissidine is known to act as an insect deterrent in potato species and has potential medical applications (anti-cancer, anti-diarrhea and anti-pathogen) for humans. Reports detailing synthetic routes to demissidine appeared in the 1950s and 1960s; however, neither group unambiguously confirmed a successful synthesis due to the highly complicated structure of the molecule.

Herein, we report a strategy for the synthesis of demissidine from isoandrosterone. Key steps in this synthesis include a Lewis acid-mediated ring fragmentation of the D-ring of a γ–silyoxy-β-hydroxy-α-diazoesters derivative of isoandrosterone, which provides a tethered aldehyde ynoate product that can be subjected to a subsequent intramolecular azomethine ylide 1,3-dipolar cycloaddition to provide the carbon skeleton of demissidine. The synthesized product has been fully characterized and is identical to the naturally occurring compound.