

Public Abstract

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Title:Formal Synthesis of Pseudopteroxazole. Progress Toward Total Synthesis of Hamigeran B.

Pseudopteroxazole is an anti-TB natural product, which could potentially serve as a lead for developing novel pharmaceuticals to treat TB. Our second generation synthetic route improved the diastereoselectivity of the key step and is more convergent. In the first chapter, a formal total synthesis of pseudopteroxazole is presented, highlighting an E-selective Horner-Emmons reaction, a Buchwald-Hartwig coupling, and a diastereoselective intramolecular Michael addition. Hamigeran B is a potent anti-herpes and anti-polio natural product with minimum cell toxicity. In the second chapter, the effort toward synthesizing hamigeran B is summarized. Several routes to the core structure were shown separately, including those unexpected discoveries when pursuing those routes. Tius-Nazarov cyclization was first applied in synthesizing natural product; an efficient palladium-catalyzed oxidative intramolecular carbocyclization was realized on an alpha-hydroxy enone for the first time; a novel interrupted Nazarov cyclization of a hydrolysis intermediate of dithiane was also discovered. Besides, the unexpected formation of substituted stilbene from phosphonate was discovered, which would provide an alternative way to make substituted stilbenes.