Short Communication

iMedPub Journals
http://www.imedpub.com

Archives in Chemistry

2022
Vol 3. No. 2

Mechanistic Insights into the Reaction of Amidines with 1,2,3-Triazines and 1,2,3,5-Tetrazines

Dale L. Boger
The Scripps Research Institute, United States

Abstract

1,2,3-Triazines and 1,2,3,5-tetrazines react rapidly, efficiently, and selectively with amidines to form pyrimidines/1,3,5-triazines, exhibiting an orthogonal reactivity with 1,2,4,5-tetrazine-based conjugation chemistry. Whereas the mechanism of the reaction of the isomeric 1,2,4-triazines and 1,2,4,5-tetrazines with alkenes is well understood, the mechanism of the 1,2,3-triazine/1,2,3,5-tetrazine–amidine reaction as well as its intrinsic reactivity remains underexplored. By using 15N-labeling, kinetic investigations, and kinetic isotope effect studies, complemented by extensive computational investigations, we show that this reaction proceeds through an addition/N2 elimination/cyclization pathway, rather than the generally expected concerted or stepwise Diels–Alder/retro Diels–Alder sequence. The rate-limiting step in this transformation is the initial nucleophilic attack of an amidine on azine C4, with a subsequent energetically favored N2 elimination step compared with a disfavored stepwise formation of a Diels–Alder cycloadduct. The proposed reaction mechanism is in agreement with experimental and computational results, which explains the observed reactivity of 1,2,3-triazines and 1,2,3,5-tetrazines with amidines.

Received Date: 05 June, 2022 **Accepted Date:** 08 June, 2022 **Published Date:** 30 June, 2022

Biography

Department of Chemistry, The Scripps Research Institute, La Jolla, California 92037, United States; Department of Chemistry, The Skaggs Institute for Chemical Biology, La Jolla, California 92037, United States.