

REVIEW

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Applications of 1,8-diazabicyclo[5.4.0]undec-7-ene (DBU) in heterocyclic ring formations

Ravi Varala,^a Murali Mohan Achari Kamsali,^c Mohamed Hussein^d and Mohammed Mujahid Alam^d

1,8-Diazabicyclo[5.4.0]undec-7-ene (DBU), a commercially readily available and easily handled bicyclic amidine base, is a renowned organic strong base and deprotonating agent with nucleophilic characteristics that has gained considerable significance in organic synthesis in recent years due its selectivity (chemo-, regio-, and stereo-); hence, this review article provides a concise update on several types of heterocyclic rings (spiro, fused/bridged, simple) synthesized using important techniques with DBU as a catalyst, solvent, base, or reactant, from June 2022 until the present.

1. Introduction

The extensive application of amidine and guanidine bases in synthetic chemistry necessitates a comprehensive understanding of their chemical properties.^{1–3} 1,8-Diazabicyclo[5.4.0]undec-7-ene (DBU), a bicyclic amidine base recognized as a

potent organic base and deprotonating agent with a nucleophilic nature (Fig. 1), serves not only as a basic additive but also functions as a Lewis base catalyst to facilitate product formation.^{4–6} Additionally, DBU serves as a crucial participant in reactions, resulting in the synthesis of DBU derivatives.^{7–11} Moreover, neat DBU is stable for extended durations under dry conditions; but, even minimal contact with water, whether from an aged container or air moisture, will lead to significant hydrolysis over time.¹² Conversely, the interaction of DBU with electrophiles, yielding *N*-functionalized amino-lactam adducts, has also been documented.

DBU may be produced in three stages from caprolactam and acrylonitrile. The nitrile first participates in an addition process at the nitrogen of caprolactam, yielding *N*-(2-cya-

^aScripts Pharma, Mallapur, Hyderabad 500076, Telangana, India.

E-mail: ravivarala@gmail.com; Tel: +91-9618286529

^bResearch Fellow, INTI International University, 71800 Nilai, Malaysia

^cDepartment of Chemistry, Sri Venkateswara College, University of Delhi, New Delhi-110021, India

^dDepartment of Chemistry, College of Science, King Khalid University, Abha, 61421, Saudi Arabia



Ravi Varala

Dr V. Ravi pursued his Ph.D. at the Indian Institute of Chemical Technology (CSIR), India, during 2000–2006 and did postdoctoral research at FCT-UNL, Portugal, during 2007–2009. Since 2010, he has gained vast experience in both academic and research fields. During 2015–2016, he was an 'Invited Researcher' (Visiting Scientist) at the University of Sao Paulo, Brazil. Presently, he is working as R&D Senior Scientist in Scripts

Pharma, Hyderabad, and has also been elected as 'Research Fellow' at INTI International University, Malaysia, during 2023–2025. His fields of research interests are organic synthesis, catalysis, nanomaterials, medicinal chemistry and biofuels.



Murali Mohan Achari Kamsali

Dr K. Murali Mohan Achari received his Ph.D. from Pondicherry University, Pondicherry, India, in 2018. His research interests are asymmetric synthesis, organocatalysis and computer aided drug discovery (CADD). He has 12 years of research experience and published several international research papers in reputed journals. He is currently working as Assistant Professor in the Department of Chemistry, Sri Venkateswara College, University of Delhi, New Delhi, India.