Vinylic substitution by DBN and DBU with ethyl (*E*)- and (*Z*)-3-aryl-3-chloro-2-cyanopropenoates.

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Some new 6-aryl-7-cyano-1,5-diazatricyclo[7,4,$1^{1,9}$,$0^{5,14}$]tetradeca-6,9-dien-8-ones (**4a–c**) and 6-aryl-7-cyano-1,5-diazatricyclo[7,1,$2^{1,9}$,$0^{5,12}$]dodeca-6,9-dien-8-ones (**5a–c**) have been prepared in moderate to good yields by reacting ethyl (*E*)- and (*Z*)-3-aryl-3-chloro-2-cyanopropenoates (**1a–c**) with DBU (1,8-diazabicyclo[5,4,0]undec-7-ene) and DBN (1,5-diazabicyclo[4,3,0]non-5-ene).

DBU and DBN have effectively been used in the elimination of hydrohalogens yielding alkenes,[1] as catalyst in Michael-type reactions and to accelerate addition reactions, of alcohols to triple bonds.[3] DBU ring opening reactions followed with rearrangement have also been reported.[4-6] There are only a few articles describing DBU as a nucleophilc reagent.[7-9]

Here we present the synthesis of (**4a–c**) and (**5a–c**) starting from (**1a–c**) using DBU and DBN as reagents. (Scheme 1, Table 1)

In these reactions DBU and DBN show nucleophilic character.

The synthesis is advantageous since both isomers cylize and the troublesome separation of the isomers is avoided.

The reactions were carried out at 25°C. Only tarry products were formed at higher reaction temperatures *i.e.* at the boiling point of THF (66°C). The reaction products were identified from their ^{1}H, ^{13}C NMR, mass spectra and HRMS. The purity of the products was verified by TLC analysis. Further evidence of the structures was achieved from the carbon proton long-range coupled spectra.

Techniques used: IR, TLC, EIMS, ^{1}H, ^{13}C NMR.

References: 12

Table 1 Isolated yields of reaction products (**4a–4c**) and (**5a–5c**) in the reactions of **1a, 1b** and **1c** with DBU and DBN.

Prod.	R	yield %	Prod.	R	yield %
4a	H	52	**5a**	H	65
4b	CH_3	58	**5b**	CH_3	60
4c	NO_2	98	**5c**	NO_2	65

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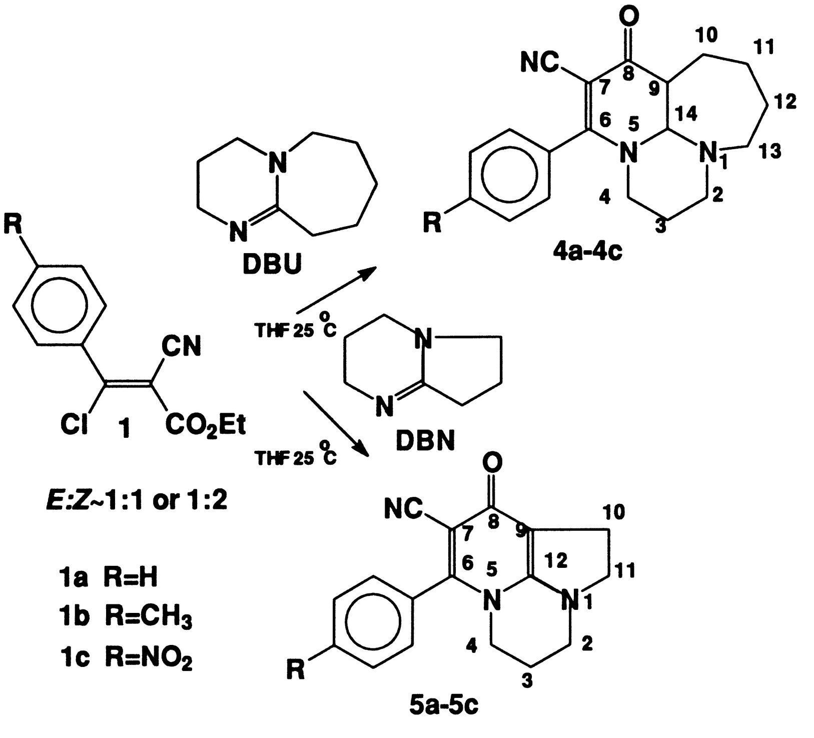
References cited in this synopsis

1 A.P. Marcand and A.Devasasagayaray, *J. Org. Chem.*,1997, **62,** 3111.
2 K. Michael and H. Kessler, *Tetrahedron Lett.*, 1996, **20**, 3453.
3 A. Llebaria, J.M. Moretó, S. Ricart, J. Ros, J.M. Viñas and R. Yáñez, *J. Org. Metal. Chem.* 1992, **440**, 79.
4 L. Ma and D. Dolphin *Tetrahedron*,1996, **52**, 849.
5 M.G. Johnson and R. Foglesong, *Tetrahedron Lett.*, 1997, **38**, 7003.
6 H. Lammers, P. Cohen-Fernandes and C.L. Habraken, *Tetrahedron*, 1994, **50**, 865
7 M. Chakrabarty, A. Batabyal and A. Patra, *J. Chem. Res.*, 1996, 190.
8 R.D. Chambers, A.J. Roche, A.S. Batsanov and J.A.K. Howard, *J. Chem. Soc. Chem. Commun.*, 1994, 2055.
9 L.L. McCoy and D. Mal, *J. Org. Chem.*, 1981, **46,** 1016.



Scheme 1

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