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REGIOSELECTIVE CYCLISATION OF ANIL DERIVATIVES-A SHORT SYNTHESIS OF DIBENZACRIDINES

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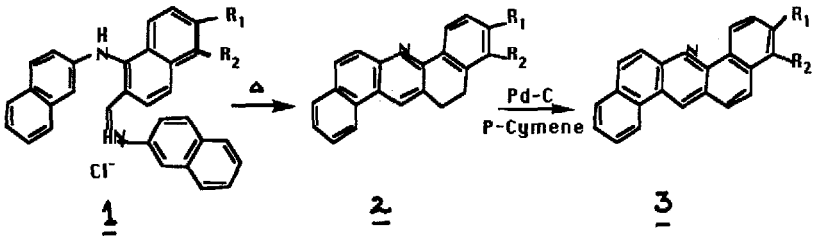
Summary:Dibenzacridines have been synthesised in almost quantitative yields by regioselective thermal cyclisation of anil hydrochlorides followed by dehydrogenation.

Dihydrodiols and diol epoxides of dibenzacridines with defined stereochemistry are expected to be proximate and ultimate carcinogenic compounds[1]. Recently, Subodh Kumar[2] has published a multistep syntheses of trans-10,11-dihydroxy-10,11-dihydrodibenz(a,h)acridine in moderate yields.

We present here a one step synthesis of dihydrodibenz(a,h)acridine derivatives (2) from the corresponding anil hydrochlorides (1) by heating them just above their melting points for three minutes. The anil-derivatives were obtained in excellent yields from the chloroaldehydes[3] by reaction with 2-naphthylamine and ethanolic 2N HCl in excellent yield. The thermal cyclisation produced the required regioisomer in excellent yield and no traces of the other possible regioisomers were found in the reaction mixture. The procedure produced fruitful results for cyclisation of other anils(vide table) and provides a general method for the synthesis of dihydrodibenz(a,h)acridines.

The aromatisation of the dihydroacridines(2) was smoothly achieved by heating with Pd-C(10%) in p-cymene. To prepare the oxidative metabolites(dihdrodiols) of benzacridines, we have recently shown[4] a useful method following the protocol of functional group transformation methoxy->phenol->orthoquinone->dihydrodiol. For this, the introduction of the methoxy group in either of the terminal rings could be achieved by taking starting materials having the methoxy group in proper position in either the chloroaldehyde or the aromatic amine.

Thus, this one step preparation of acridines is found to be superior in every respect to earlier methods and also represents the formal total synthesis of dihydrodiols of dibenzacridines[5] by the methods already developed by us[4].



1 2 3

Table

Compound	m.p. (°C)	R_1, R_2	Yield (%)	I.R.(cm^{-1})	^{1}H-NMR
1a	215-216 (d)	$R_1=R_2=H$	90.0	1610,1620,2900 3310	--
1b	208-209 (d)	$R_1=H, R_2=OCH_3$	81.5	1590,1595,2900, 3375	
1c	248-249 (d)	R_1,R_2=CH=CH-CH=CH-	99.8	1605,1620,2820, 3400	---
2a	155-156	$R_1=R_2=H$	98.5	--	2.96-3.36(m,4H) 7.28-8.16(m,8H) 8.56-8.84(m,3H)
2b	162-163	$R_1=H, R_2=OCH_3$	61.1	--	2.92-3.32(m,4H) 3.84(s,3H)6.76-7.04(m,2H),7.52-7.66(m,2H)7.70 8.08(m,3H)8.48-8.80(m,3H).
2c	282-283	R_1,R_2=-CH=CH-CH=CH-	77.3	--	3.28-3.68(m,4H 7.20-8.96(m,13H
3a	226-227 (lit.226°C)	$R_1=R_2=H$	100	--	---
3b	213-214	$R_1=H, R_2=OCH_3$	100	--	4.00(s,3H),7.30-8.40(m,8H),8.75 (d,1H)8.80(d,1H
3c	318-319 (lit.318°C)[7]	R_1,R_2=-CH=CH-CH=CH-	100		9.40(s,1H),9.55 (d,1H).

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