2-ALKYL-3-METHYL-1-ISOQUINOLONES

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We have shown [1] that N-alkylamides of 2-phenacylbenzoic acid or 2-alkyl-3-hydroxy-3-phenyl-3,4-dihydro-1-isoquinolones (I) are formed in the reactions of 3-phenylisocoumarin with alkylamines. A communication [2] regarding a similar investigation by Swedish chemists appeared recently.

The results of an investigation of the reactions of 3-methylisocoumarin (II) with alkylamines are discussed below. In contrast to I, the corresponding 3-methyl derivatives (III), which are formed in the reactions of II with alkylamines, are very readily dehydrated (the +I effect of the methyl group). 2-Alkyl-3-methyl-1-isoquinolones (IVa-c,e,f) are isolated from the reaction mixture. This route for the preparation of IV is more convenient than their synthesis by oxidation of 2-alkyl-3-methylisoquinolinium salts [3]. N-Isopropylamide V was obtained in the reaction of II with isopropylamine. This is explained by steric hindrance because of the presence of a bulky substituent attached to the nitrogen atom; this makes it impossible to form chain isomer III. Acetyl chloride also converts V to IVd. The IR spectra of IIIa-f in dioxane contain bands at 1660-1664 (C=O, ε = 650-750) and 1630 cm^{-1} (C=C, 370-490), while the spectra in mineral oil contain bands at 1642-1670 (C=O band, sometimes split) and 1623-1635 cm^{-1}. No O–H or N–H group absorption is present.

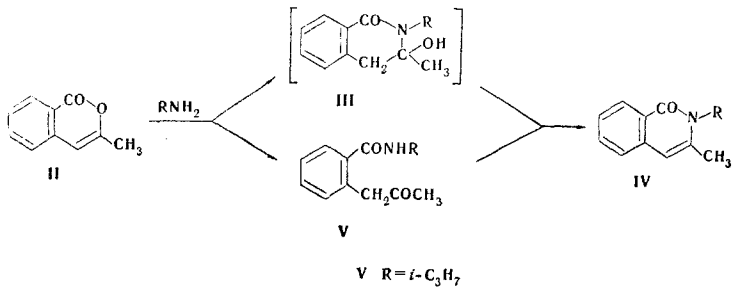

TABLE 1. 2-Alkyl-3-methyl-1-isoquinolones (IVa-f)

Comp.	R	Mp, °C	Empirical formula	Found, %			Calc., %			Yield, %
				C	H	N	C	H	N	
IVa	CH_3	102—103[a]	$C_{11}H_{11}NO$	76,5	6,4	7,9	76,3	6,4	8,1	43
IVb	C_2H_5	55—59[b]	$C_{12}H_{13}NO$	77,3	7,2	7,7	77,0	7,0	7,5	79
IVc	n-C_3H_7	53—55[b]	$C_{13}H_{15}NO$	77,2	7,7	7,3	77,6	7,5	7,0	80
IVd	i-C_3H_7	79—80[c]	$C_{13}H_{15}NO$	77,9	7,6	6,7	77,6	7,5	7,0	75[d]
IVe	n-C_4H_9	51—52[e]	$C_{14}H_{17}NO$	78,1	8,0	6,5	78,1	8,0	6,5	68
IVf	$C_6H_5CH_2$	102—103[f]	$C_{17}H_{15}NO$	81,8	6,0	5,6	81,9	6,1	5,6	40

[a]From cyclohexane (mp 100-102° [3]). [b]From benzene–n-hexane. [c]From cyclohexane. [d]The yield in the reaction V→ IV. [e]From ethyl acetate. [f]From 50% ethanol.

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EXPERIMENTAL

2-Alkyl-3-methyl-1-isoquinolones (IVa-f) and 2-Acetonylbenzoic Acid N-Isopropylamide (V). A solution of 0.01 mole of 3-methylisocoumarin [4] (II) and 0.02-0.03 mole of amine in 10 ml of dioxane was heated in a sealed ampule at 100° for 2-3 h. The solution was vacuum evaporated to give IVa-c,e,f. Prior to crystallization, IVb,c were vacuum distilled at 5 mm. Compound II was heated with isopropylamine in an autoclave at 150° for 3 h to give V (66%) with mp 119-120° (from benzene). Found,%: C 71.0; H 7.8; N 6.5. $C_{13}H_{17}NO_2$. Calculated,%: C 71.2; H 7.8; N 6.4. IR spectrum in mineral oil, cm^{-1}: 1718 (C=O), 1632 (amide I), 1536 (amide II), and 3297 (N–H); in dioxane: 1729 (ε = 310), 1663 (505), 1528 (285). A solution of 0.3 g of V, 0.5 ml of acetyl chloride, and 5 ml of benzene was refluxed for 2 h and vacuum evaporated to give IVd.

LITERATURE CITED

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