

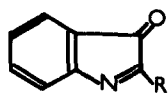
THE REACTION OF INDOLONES (3-OXOINDOLENINES) WITH DIENES.

H.S. Ch'ng and M. Hooper

(School of Pharmacy, The Polytechnic, Sunderland, England).

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We have recently prepared the previously unknown 2-phenylindolones with electron releasing substituents in the phenyl ring (1b-d) and 2-naphthyl indolones (1e-f) from the corresponding indoles by the well documented method of Baeyer.<sup>1,2\*</sup> All the reactions proceeded smoothly in high yields (80-90%). The products were isolated as stable red solids and identified by infrared, mass spectra,<sup>3</sup> and elemental analysis. The indolones (1a,b) reacted at room temperature with cyclopentadiene in benzene solution and with 2-methylbutadiene and hexa-2,4-diene in refluxing benzene in the presence of aluminium trichloride or perchloric acid giving the bright yellow Diels-Alder adducts (2a), (3a,d), and (4a). The adducts were identified by infrared spectroscopy (nujol) 1690 (C=O), 1655 (C=C)  $\text{cm}^{-1}$ , mass spectrometry and elemental analysis. The mass spectrum of the adduct (2a) showed a parent ion  $m/e$  273 and fragment ions at  $208(M-65)^+$  and  $207(M-66)^+$  as well as the expected ions resulting from the breakdown of 2-phenylindolone.<sup>3</sup> The structure of the adduct formed by the reaction of (1a) with isoprene may be (3a) or (5); structure (3a) is favoured since the ionic intermediate (6) leading to it would have the lowest energy.<sup>4</sup> Diels-Alder reactions in which the azomethine group functions as a dienophile are rare.<sup>5</sup> Under the above conditions only starting material was recovered from the reaction of (1a) or (1b) with butadiene, 1,3-cyclohexadiene, furan, and anthracene. Although the azomethine linkage of indolones is highly reactive<sup>6</sup> the very limited extent of their reactions with dienes provides further evidence for the reluctant participation of this grouping in the Diels-Alder reaction.

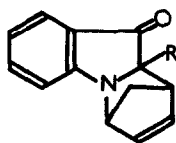


(1)

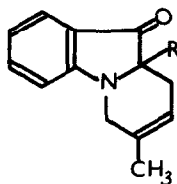
R = a. phenyl b. p-tolyl c. 2',4'-  
dimethylphenyl

d. p-methoxyphenyl e. 2'naphthyl

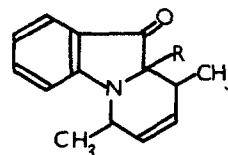
f. 1'-naphthyl



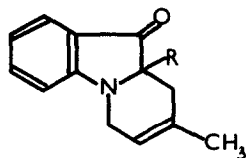
(2a)



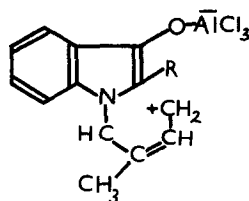
(3a,d)



(4a)



(5)



(6)

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