PHOTOCHEMICAL SYNTHESES OF HETEROCYCLIC COMPOUNDS FROM HETERO-ENONE SYSTEM AND YNNONE SYSTEM

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Irradiation of β-N,N-dialkylaminovinyl phenyl ketones (1) in benzene with high pressure mercury lamp through a Pyrex filter under nitrogen gave the corresponding pyrroles (2) in 11-46 % yield. Irradiation of the (β-benzoylvinyl)trialkylammonium chlorides (3) in ethanol under the same conditions afforded the 1,4-diketones (4). Irradiation of β-ethoxyvinyl phenyl ketone (5) gave an intractable mixture, while the corresponding thioketone (6) was photochemically inactive. Photolysis of the 2-dialkylaminobenzophenones (7) gave the corresponding indoles (8), accompanied by dealkylation products. The formation of the pyrrole (2) was pressumed to occur from the n-π^* triplet state. The formation of pyrrole (2), 1,4-diketone (4), and indole (8) is considered to arise via δ-hydrogen abstraction by an excited carbonyl through a seven-membered ring transition state initially. Irradiation of 3-phenylpropyn-3-one (9) in various alcohols yielded the corresponding furans (10) in 12-27 % yield. The formation of the furan is considered to arise intermolecular α-hydrogen abstraction of alcohol by an excited carbonyl of 9. These photochemical reactions might be useful for the synthesis of pyrrole, indole, and furan derivatives.