β -Oxo N-Substituted Benzotriazoles

In continuation of our studies on β -oxo N-substituted benzotriazoles¹ which involved the use of tertiary ketonic Mannich Bases as a source of alkylating agent², we now wish to report the preparation of the β -oxo N-substituted benzotriazoles.

(log ϵ 3.81–3.91) and 279–283 nm (log ϵ 3.68) ranges and the 2-substituted ones a single maximum at 274 nm (log ϵ 3.96).

Melting points and UV-absorption data of the new benzotriazoles are summarized in the Table^{4,5}.

Compound	mp	$\lambda_{\text{max}}^{\text{EtOH}}$ nm (log ϵ)	Yield (%)
Benzotriazole	96–98°	252 (3.82); 273 (3.74)	
IIa	–	244 (4.17); 277 (3.10)	
IIb	–	236 (4.12); 325 (4.16)	
IIIa (C ₁₆ H ₁₃ ON ₃)	82–84°	243 (4.25); 252 sh (4.21); 280 (3.89)	73
IIIb (C ₁₆ H ₁₇ O ₂ N ₃)	103–105°	236 (4.23); 262 (3.71); 290 sh (3.97); 322 (4.22)	50
IVa	92–94°	245 (4.26); 278 (4.23)	24
IVb	135–138°	234 (4.07); 286 (4.15); 322 (4.26)	23
Va (C ₁₆ H ₁₅ ON ₃)	80–82°	255 (3.91); 276 (3.81)	75
Vb (C ₁₈ H ₁₉ O ₂ N ₃)	106–108°	262 (4.19); 293 sh (3.96)	98

Benzotriazole (I) and the appropriate dimethylamino Mannich Base (II) reacted in ethanol under reflux. After complete elimination of the volatile amine and concentration of the solvent, the residue was purified by recrystallization or by column chromatography and afforded the desired compounds (III) as well as the isomeric products (IV). NaBH₄ reduction of the new ketones gave the secondary alcohols (V).

Alkylation at either of 2 different nitrogen atoms has previously been shown to occur with a number of N-substituted benzotriazoles and the structural isomerism is clearly resolved by UV-spectroscopy³: the 1-substituted derivatives exhibit double maxima in the 256–266 nm

Résumé. L'alkylation du benzotriazole au moyen des bases de Mannich a permis d'obtenir de nouveaux dérivés β -oxo N-substitués en position 1. La réaction a également fourni les dérivés de substitution en 2.

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Kinetik der Reaktion von Imidazol-SH-Verbindungen mit Ellman Reagenz [5,5'-Dithio-bis-(2-nitrobenzoesäure)]

Im Rahmen unserer Untersuchungen über die Reaktivität von SH-Gruppen unter dem Einfluss ideal benachbarter Imidazolreste^{1,2} haben wir uns bisher mit der Kinetik der Reaktion von Imidazol-SH-Verbindungen mit N-Äthylmaleinimid³ und Bromacetamid⁴ sowie der pH-Abhängigkeit der durch diese Verbindungen katalysierten Esterhydrolyse befasst⁵. Es handelt sich bei

diesen Reaktionen um nucleophile Additions- und Verdrängungsreaktionen.

In neuerer Zeit hat das ELLMAN-Reagenz⁶ (5,5'-Dithio-bis-2-nitrobenzoesäure) nicht nur zum qualitativen und quantitativen Nachweis von SH-Gruppen Verwendung gefunden, sondern auch zur Beurteilung der Reaktivität von SH-Gruppen in niedermolekularen Ver-

¹ R. ZELNIK and F. STREHLAU, *Experientia* 21, 617 (1965).

² J. H. BREWSTER and E. L. ELIEL, in *Organic Reactions* (Ed. R. ADAMS; John Wiley and Sons, New York 1953), vol. 7, p. 99.

³ R. H. WILEY, N. R. SMITH, D. M. JOHNSON and J. MOFFAT, *J. Am. chem. Soc.* 76, 4933 (1954). – R. H. WILEY, K. H. HUSSUNG and J. MOFFAT, *J. Am. chem. Soc.* 77, 5105 (1955). – D. DAL MONTE, A. MANGINI, R. PASSERINI and C. ZAULI, *Gazz. chim. ital.* 88, 977 (1958); and references cited therein.

⁴ Biological activities. Compounds (IIIa) and (IIIb) did not display any activities: 1. in the in vivo tests with mouse transplanted tumors *Mecca lymphosarcoma* and *Ridgway osteogenic sarcoma*, we are indebted to Drs. C. CHESTER STOCK and GEORGE S. TARNOWSKI (The Sloan-Kettering Institute for Cancer Research, New York) for these assays; 2. in mouse infected with *Plasmodium berghei* or *Schistosoma mansoni*, we are indebted to Dr. Z. BRENER (Instituto Nacional de Endemias rurais) and to Dr. J. PELLEGRINO (Instituto de Biologia da Universidade de Minas Gerais) for these tests.

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