Short Communication

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PARTICIPATION OF 3,5-DINITROBENZAMIDE IN MANNICH REACTIONS

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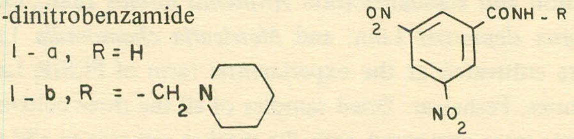
3,5-Dinitrobenzamide finds an established use in the chicken feeds for the prevention of coccidiosis and salmonella infections, growth promotion, feed efficiency and for improving pigmentation[1] Keeping in view the structure – activity relationship it was deemed to synthesise such derivatives of this compound which may bring forth better values. A study concerning the aminomethylation reaction with several benzamides established that the reaction either takes place with sufficiently basic amines or with amides derived from sufficiently strong carboxylic acid (pk_a = 1.25 – 2.85)[2]. The bare fact that 3,5,-dinitrobenzoic acid[3] had pk_a = 2.83 induced for the aminomethylation of its amide. Our optimistic hopes for the development of new biologically active compounds find their roots in a number of pharmaceutical compounds which have appeared as a result of such reaction.[4,5,6,7].

N-(Piperidinomethyl) – 3,5-dinitrobenzamide (I-b) has been prepared in a good yield by the interaction of 3,5-dinitrobenzamide (I-a), piperidine and formaldehyde in ethylene glycol. Experimental conditions are those known to be favourable for effecting a condensation of the Mannich type[8]. Some more compounds are being prepared to achieve the desired objective.



The structure I-b has been assigned to this piperidino derivative on the basis of spectral data which supports it in its details. The infrared spectrum showed bands at (in nujol mull)3320 cm^{-1} (–NH of amides) 1640 cm^{-1} (carbonyl), 1530 cm^{-1} and 1330cm^{-1} (–NO_2) 730 cm^{-1} (1,3,5-trisubstituted benzene). The N.M.R. at 100 MHz in $CDCl_3$ using tetramethylsilane as internal standard showed a multiplet at 9.1 ppm (3H, aromatic protons), broad singlet at 7.45 ppm (1H, – NH – proton), doublet at 4.35 ppm (2H, J = 10 cps CH_2 protons), peaks at 2.6 ppm (4 H, protons on carbons adjacent to N of piperidine), peaks at 1.5 ppm (6 H, protons on the carbon of piperidine ring).

EXPERIMENTAL

Into a solution of 3,5-dinitrobenzamide (4.22 gms, 0.02M) in ethylene glycol (100 ml) were added piperidine (2.5 gms, 0.04M) and formalin (37% formaldehyde) (3.6 gms, 0.04M). The mixture was stirred at room temperature for 30 mints. It was then heated on a steam bath for 15 mints. The hot solution was filtered for the removal of a small amount of insoluble material and then cooled promptly to 30°. The white tiny needles were collected by filtration, washed with ethylene glycol and then with water. It was air dried overnight to obtain N-(piperidinomethyl) -3,5-dinitrobenzamide, m.p. 148°.

Anal. calcd. for $C_{13} H_{16} N_4 O_5$: C, 50.64, H, 5.19; N. 18.18 Found:C, 51.28; H, 5.31; N, 18.06.

REFERENCES

1. a) *Food Additives Analytical Mannual,* US Department of Health, Education and Welfare. Food and Drug Administration, Washington, D.C. 20204, July 1 (1968).
   b) *The Merck Index of Chemicals and Drugs*, Merck and Co., Inc. Rahway. N.J., USA., p. 1072. (1960).
2. V.I. Stravrovskays, S.K. Drusvyatskaya and M.O. Kolosova, zh. Org.Khim., **4**, 488 (1968); C.A. **68**, 104640 (1968).
3. *A Guidebook to Mechanism in Organic Chemistry,* Peter Sykes,(Longman, green and Co., Ltd., 1963) p. 45 .
4. William J. Gottstein, William F. Minor and Lee C. Cheney, J.Am.Chem.Soc., **81**, 1198 (1959).
5. H. Schonenberger *et. al.*, Pharm. Acta Helv., **44**, 691 (1969).
6. H. Schonenberger, T. Bastug, D. Adam, Arzneimittelforschung, **19**, 1082 (1969).
7. K. Von Thiele, U. Schimassek, A. von Schilichtegroll, Arzneimittelforachung, **16**, 1064 (1966).
8. F.F. Blicke, *Adams Organic Reactions Vol. 1,* (John Willey and Sons Inc., New York. V.Y., 1942), p. 303-341.