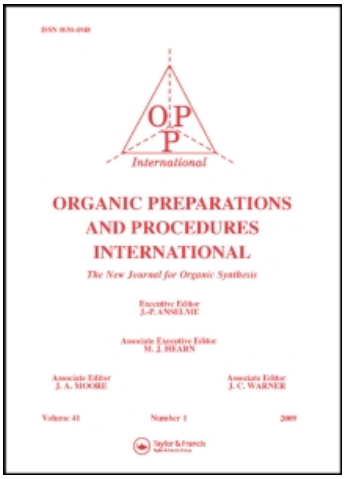


Organic Preparations and Procedures International
Publication details, including instructions for authors and subscription information:
http://www.informaworld.com/smpp/title~content=t902189982

A CONVENIENT SYNTHESIS OF SOME NEW PYRANO[2,3-d]PYRIMIDINES

V. K. Ahluwalia[ab]; Rakesh Kumar[a]; Renu Aggarwal[a]
[a] Department of Chemistry, University of Delhi, Delhi, INDIA [b] Vice Chancellor, Manipur University, Imphal, Manipur, India

To cite this Article Ahluwalia, V. K. , Kumar, Rakesh and Aggarwal, Renu(1992) 'A CONVENIENT SYNTHESIS OF SOME NEW PYRANO[2,3-d]PYRIMIDINES', Organic Preparations and Procedures International, 24: 6, 675 — 678
To link to this Article: DOI: 10.1080/00304949209356244
URL: http://dx.doi.org/10.1080/00304949209356244

2,3,4,4a,5,6-Hexahydroquinoline (1).- A solution of the enolether **6** (12 g, 72 mmol) in 2N HCl (50 mL) was refluxed under nitrogen for 2 hrs, then allowed to cool to room temperature and was made basic by adding 2N NaOH (pH>10). The aqueous phase was extracted with Et_2O (4x50 mL); the combined organic layer was dried (Na_2SO_4), concentrated under reduced pressure and the residue distilled to give the desired hexahydroquinoline **1** (8.3 g, 85%) as a slightly yellow liquid, bp. 50° (0.1 mmHg). IR (CCl_4): ν 1670,1630. ^1H NMR: δ 6.29 (m, 1H), 6.02 (dd, 1H, J = 10; 3), 3.81 (m, 1H), 3.57 (m, 1H), 3.53 (m, 1H), 2.38 (m, 1H), 2.25 (m, 1H), 2.11 (m, 1H), 1.83 (m, 1H), 1.74 (m,1H), 1.63 (m, 1H), 1.47 (m, 1H), 1.27 (m, 1H). ^{13}C NMR: δ 167.5 (s), 137.8 (d), 130.5 (d), 49.9 (t), 36.8 (d), 29.8 (t), 27.0 (t), 25.9 (t), 22.7 (t). MS (70 eV) m/z: 135 (M^+,100), 134 (66), 107 (50).
Anal. Calcd. for $C_9H_{13}N$: C, 79.95; H, 9.69; N, 10.36. Found : C, 79.84; H, 9.89; N, 10.61

REFERENCES

1. G. Jas, E. Schuster, B. Juhnke, C. Hesse and D. Schumann, *Ann.*, Submitted for publication.

2. G. Schmidt, Dissertation, TU Berlin (1979).

3. S. A. DiBiase, B. A. Lipisko, A. Haag, R. A. Wolak and G. W. Gokel, *J. Org. Chem.*, **44**, 4640 (1979).

4. J. A. Profitt, D. S. Watt and E. J. Corey, *ibid.*, **40**, 127 (1975).

5. A. L. Wilds and N. A. Nelson, *J. Am. Chem. Soc.*, **75**, 5360 (1953).

****

A CONVENIENT SYNTHESIS OF SOME NEW PYRANO[2,3-d]PYRIMIDINES

Submitted by (12/26/91)

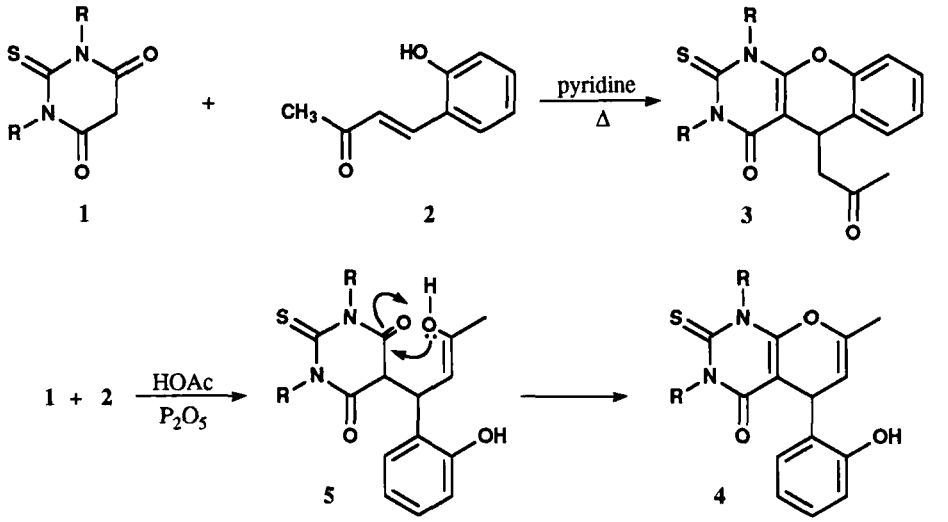
V. K. Ahluwalia*†, Rakesh Kumar and Renu Aggarwal

Department of Chemistry
University of Delhi, Delhi-110007, INDIA

Pyranopyrimidines are associated with diverse physiological activities[1] and a number of methods have been developed for their synthesis[2]. The present communication describes a convenient synthesis of some new types of pyrano[2,3-d]pyrimidines, by the condensation of 2-thiobarbituric acids **1a-h** with *o*-hydroxybenzylideneacetone (**2**) under basic as well as acidic conditions.

The reaction of 1,3-bis(4-methylphenyl)-2-thiobarbituric acid (**1a**) with *o*-hydroxybenzylideneacetone (**2**) was carried out in the presence of pyridine at reflux. The product obtained (mp. 250-251°) gave a positive 2,4-dinitrophenylhydrazine (DNP) test and a negative ferric

chloride test indicating the absence of phenolic -OH. These observations coupled with the spectral data (see Experimental Section) indicated the presence of $>CHCH_2COCH_3$ linkage in the product. In this case, the reaction proceeds *via* a Michael addition to give **5**[3] and its phenolic -OH is involved in the formation of the benzopyran ring (Eq. 1). Thus the structure of the product was assigned to be 1,3-bis(*p*-tolyl)-5-(2-oxopropyl)-4-oxo-1,2,3,4-tetrahydro-2-thioxo-5H-benzopyrano[2,3-d]pyrimidine (**3a**). Similar condensation of different 2-thiobarbituric acids (**1b-h**) with *o*-hydroxybenzylideneacetone (**2**) gave benzopyrano[2,3-d]pyrimidines (**3b-h**), characterized on the basis of their spectral data and elemental analyses.



a) R = 4-MeC_6H_4 b) R = 2-$MeOC_6H_4$ c) R = 3-$MeOC_6H_4$ d) R = C_6H_5
e) R = 2-MeC_6H_4 f) R = 3-MeC_6H_4 g) R = 3-ClC_6H_4 h) R = 4 ClC_6H_4

The reaction of 1,3-bis(*p*-tolyl)-2-thiobarbituric acid (**1a**) with *o*-hydroxybenzylideneacetone (**2**) in glacial acetic acid in the presence of phosphorus pentoxide yielded a product which was different from **3a** (mp. 185-187°). The negative DNP test coupled with the spectral data (see Experimental Section) led us to conclude that the acetyl group of **5** is protonated[4] under these conditions and cyclizes to form a pyran ring (Eq. 2) instead of benzopyran ring obtained in the base-catalyzed reaction. Thus the structure of the product was assigned to be 1,3-bis(*p*-tolyl)-5-(2′-hydroxyphenyl)-7-methyl-4-oxo-1,2,3,4-tetrahydro-2-thioxo-5H-pyrano[2,3-d]pyrimidine (**4a**). Compounds **4b-d** were synthesised and characterized similary.

EXPERIMENTAL SECTION

Melting points are uncorrected. Infrared spectra were recorded on a Shimadzu Infrared Spectrometer IR 435 as Nujol mulls. ^1H NMR spectra were recorded on a Perkin-Elmer R-32 (90 MHz) spectrometer using TMS as internal standard. The starting compounds **1a-h** were prepared by standard known method.[5]

1,3-bis(*p*-Tolyl)-5-(2-oxopropyl)-4-oxo-1,2,3,4-tetrahydro-2-thioxo-5H-benzopyrano[2.3-d]pyrimidine (3a). Typical Procedure.- The condensation was carried out by refluxing **1a** (0.5 g, 1.54 mmol) and **2** (0.25 g, 1.54 mmol) in pyridine for 1 hr. The reaction mixture was poured into a large volume of water and acidified with conc. hydrochloric acid. The solid thus obtained was collected, washed with water and dried. The residue was chromatographed on silica gel and eluted with ethyl acetate-petroleum ether (1:3) to give 0.54 g. (75%) of **1a** as a white solid, mp. 250-251°. IR (nujol): 1700, 1630 cm^{-1}; ^1H NMR ($CDCl_3$): δ 1.74 (3H, s, $-COCH_3$), 2.24 (2H, d, J = 5Hz, >CH-C$\underline{H}_2$-CO-), 2.40 (6H, s, 2C$\underline{H}_3$), 4.30 (1H, poorly resolved broad signal, C$\underline{H}$-CH_2-), 6.90-7.55 (12H, m, Ar-H).

TABLE 1. Yields, mps. and Elemantal Analyses of Compounds **3** and **4**[a,b]

Compd. No.	Yield (%)	mp (°C)	Elemental Analysis C	Calcd. (Found) H	N
3a	75	250-251	71.79 (71.62)	5.12 (5.26)	5.98 (5.86)
3b	75	200-201	67.20 (67.35)	4.80 (4.75)	5.60 (5.52)
3c	70	140-141	67.20 (67.10)	4.80 (4.85)	5.60 (5.60)
3d	72	212-213	70.90 (70.70)	4.54 (4.60)	6.36 (6.30)
3e	75	205-206	71.79 (71.70)	5.12 (5.25)	5.98 (6.05)
3f	70	118-120	71.79 (71.82)	5.12 (5.00)	5.98 (5.95)
3g	65	195-196	61.29 (61.34)	3.53 (3.40)	5.50 (5.40)
3h	67	225-226	61.29 (61.20)	3.53 (3.64)	5.50 (5.55)
4a	70	185-187	71.79 (71.49)	5.12 (5.32)	5.98 (5.85)
4b	65	120-121	67.20 (67.05)	4.80 (4.59)	5.60 (5.75)
4c	67	164-165	67.20 (67.15)	4.80 (4.85)	5.60 (5.60)
4d	65	124-125	70.90 (70.90)	4.54 (4.56)	6.36 (6.30)

a) PMR and IR data of **3b-h** and **4b-d** were found to be consistent with the data for **3a** and **4a** respectively; b) Recrystallization solvent: chloroform:methanol

1,3-bis(*p*-Tolyl)-5-(2′-hydroxyphenyl)-7-methyl-4-oxo-1,2,3,4-tetrahydro-2-thioxo-5H-pyrano[2,3-d]pyrimidine (4a). Typical Procedure.- To a solution of **1a** (0.5 g, 1.54 mmol) and

(0.25 g, 1.54 mmol) in glacial acetic acid (10 ml) was added phosphorus pentoxide (1 g), and the mixture was stirred at 120° for 1 hr. The reaction mixture was cooled and treated with crushed ice. The solid thus obtained was filtered washed with water and dried. The residue was subjected to column chromatography over silica gel and eluted with ethyl acetate:petroleum ether (1:3) to give 0.50 g. (70%) of **2a** as a white solid, mp. 185-187°. IR (nujol): 3300, 1630 cm^{-1}; ^1H NMR ($CDCl_3$): δ 2.30 (6H, s, $2CH_3$), 2.40 (3H, s, CH_3 at 7), 4.55 (1H, d, J = 5Hz, H-5), 4.90 (1H, d, J = 5Hz, H-6), 7.00-7.45(12H, m, Ar-H).

Physical characterization of all other compounds **1b-h** and **2b-d** are given in Table 1.

Acknowledgements.- We are thankful to CSIR, India for financial assistance.

REFERENCES

† Present address: Prof. V. K. Ahluwalia, Vice Chancellor, Manipur University, Canchipur, Imphal 795003, Manipur, India.

1. S. Senda, H. Fujimura and H. Izumi, Japan Patent 6824; *Chem. Abstr.*, **70**, 78001r, (1969); C. N. O'Callaghan and M. L. Conalty, *Proc. R. Ir. Acad. Sect B*, **83B**, 241 (1983); *Chem. Abstr.*, **100**, 103286K (1984); G. Levitt, U.S. Patent 4339267; *Chem. Abstr.*, **98**, 215602g (1983); R. Wrigglesworth, W. D. Inglis, D. B. Livingstone, C. J. Suekling and H. C. S. Wood, *J. Chem. Soc. Perkin Trans. 1*, 959 (**1984**).

2. A. S. Rao and R. B. Mitra, *Indian J. Chem.*, **12**, 1028 (1974); S. Noboru, K. Yoshikazu and T. Psurematsu, *Chem. Pharm Bull. Japan*, **21**, 2639 (1973); K. E. Schulte, V. V. Weissenborn and V. L. Title, *Chem. Ber.*, **103**, 1250 (1970); E. E. Smissman, R. A. Robinson and A. J. Matuszak, *J. Org. Chem.*, **35**, 3823 (1970).

3. V. K. Ahluwalia, R. Aggarwal, M. Alauddin, G. Gill and C. H. Khanduri, *Heterocycles*, **31**, 129 (1990).

4. V. K. Ahluwalia, R. Kumar, M. Alauddin, C. H. Khanduri and N. Malika, *Synth. Commun.*, **20**, 1265 (1990).

5. I. N. D. Dass and S. Dutt, *Proc. Indian Acad. Sci.*, **8A**, 145 (1938); *Chem. Abstr.*, **33**, 620^3 (1939).

****