

A. Siva Prasad, J. S. Sandhu\* and J. N. Baruah

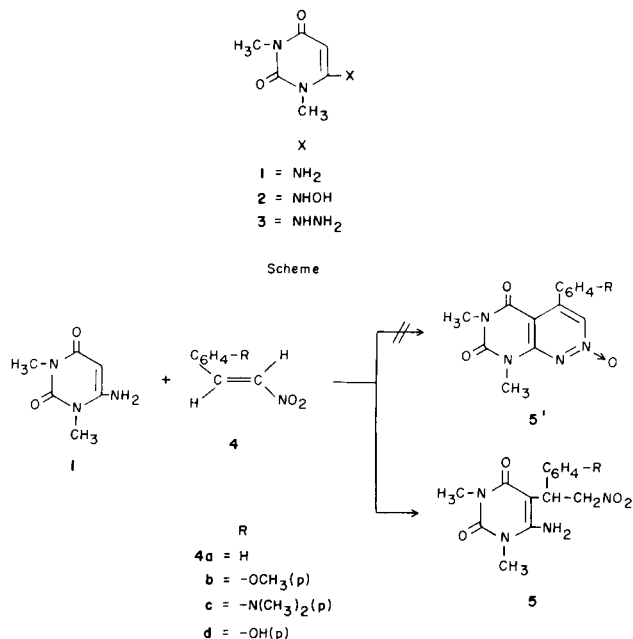
Regional Research Laboratory,  
Jorhat-785006, India

Received February 14, 1984

A series of 5-(2-nitro-1-phenyl)ethyluracils were obtained when  $\beta$ -nitrostyrenes were reacted with 1,3-dimethyl-6-substituted uracil derivatives, instead of cyclic compounds. The structures of the compounds **5**, **6**, and **7** were proved by spectroscopic methods and their mass fragmentation patterns are discussed.

*J. Heterocyclic Chem.*, **21**, 1657 (1984).

Uracil fused heterocycles occupy a position of unique significance in medicinal chemistry. The double bond of  $C_5$ - $C_6$  position can display an interesting range of reactions including cycloaddition reactions. More important is its enamine character when  $C_6$  bears electron releasing groups like amino, hydroxylamino and hydrazino. Utilising this property a variety of uracil derivatives have been prepared [1]. Reactions of  $\alpha,\beta$ -unsaturated nitro compounds with 6-amino, 6-hydroxylamino and 6-hydrazino-1,3-dimethyluracils in the hope of obtaining fused pyrimidines as given in the Scheme.



When equimolar quantities of 6-amino-1,3-dimethyluracil (**I**) and  $\beta$ -nitrostyrenes **4** were refluxed in dry methanol and the product thus obtained after the usual work up was characterized to be a simple Michael type addition product **5** rather than the cyclized **5'** product.

The compounds thus obtained were characterized by high resolution mass spectroscopy, <sup>1</sup>H nmr, ir and elemental analyses. The <sup>1</sup>H nuclear magnetic resonance spectra in all of the compounds showed the presence of the methylene protons on the  $\alpha$ -carbon atom as doublet of doublets

presumably due to their non-equivalent position and a triplet for one proton on the  $\beta$ -carbon atom of the styrene moiety. In addition to these signals the two *N*-methyls of the uracil are shown as singlets. In hydroxylamino derivatives **6a-d** the hydroxyl group proton is shown as a singlet at about  $\delta$  10.5. The nmr data for all the compounds are given in Table II.

The ir spectra of these compounds showed a strong band at 1450-1460  $\text{cm}^{-1}$  which is characteristic of the  $-\text{CH}_2-\text{NO}_2$  group. The amino derivatives **5a-d** and the hydrazino derivatives **7a-d** showed two bands. The symmetrical stretching and another anti stretching due to the  $-\text{NH}\{$  around 3300-3450  $\text{cm}^{-1}$ , whereas the absorption due to  $\text{NH-OH}$  group in the hydroxylamino derivatives **6a-d** is rather broad at 3340-3300  $\text{cm}^{-1}$ . In addition to these absorptions all of the compounds show other characteristic absorptions of substituted uracil systems. One of the characteristic peculiarities that has been observed in the ir spectra of these compounds is the  $\text{C}=\text{O}$  bands of the 2,4-positions which are shifted to lower frequency by 50-70  $\text{cm}^{-1}$  when compared to that of other uracil and barbituric derivatives.

The molecular ion peak  $M^+$  in **5a** is at  $m/z$  304. The intensity of this peak is only about 10%. The immediate next peak is at  $M^+-30$  which is due to loss of  $-\text{NO}$ . Then the next accountable peak is at  $m/z$  270 ( $M^+-34$ ). This can be explained as due to the simultaneous loss of "HOH" and "O" (18 + 16). Then the peak at  $m/z$  258 is due to the loss of  $-\text{NO}_2$  ( $M^+-46$ ) which is the base peak in this case with an intensity of 100%. Next to it there is also a peak at  $m/z$  257 ( $M^+-47$ ) ( $\text{HNO}_2$ ). Then the peak at  $m/z$  242 is due to the loss of  $-\text{C}=\text{O}$  (-28) from  $m/z$  270. Then the next accountable peak is at  $m/z$  201 that is the loss of  $\text{Me-N-C}=\text{O}$  (57) from base peak  $m/z$  258 and the peak at  $m/z$  185 is also due to the loss of  $\text{Me-N-C}=\text{O}$  from  $m/z$  242 which is a very characteristic feature in uracil and purine derivatives [4]. The peak at  $m/z$  193 and  $m/z$  180 are the result of loss of 77 (Ph) from the  $m/z$  270 and  $m/z$  257. In addition to these the peaks at  $m/z$  155 and  $m/z$  104 are the result of the fragmentation of base peak  $m/z$  258 into the styrene moiety ( $\text{PhCH}=\text{CH}_2$ ) and the 6-aminouracil moiety. But the intensity of these peaks in this case is only of the order of 20%.

Table I

Compound No.	Reaction time, hours	Mp °C	Yield %	Molecular formula	C %		N %		IR cm <sup>-1</sup> (potassium bromide)
					Calcd.	(Found)	Calcd.	(Found)	
5a	6	185-186	70	C <sub>14</sub> H <sub>16</sub> N <sub>4</sub> O <sub>4</sub>	55.26	(55.18)	18.42	(18.27)	3400, 3350, 1680, 1660, 1490, 1450
5b	2	225-227	80	C <sub>15</sub> H <sub>18</sub> N <sub>4</sub> O <sub>5</sub>	53.89	(53.65)	16.77	(16.65)	3410, 3360, 1680, 1660, 1490, 1450
5c	12	189-191	80	C <sub>16</sub> H <sub>21</sub> N <sub>4</sub> O <sub>4</sub>	55.33	(55.16)	20.17	(20.20)	3440, 3340, 1680, 1660, 1490, 1421
5d	12	165-167	70	C <sub>14</sub> H <sub>16</sub> N <sub>4</sub> O <sub>5</sub>	52.50	(52.32)	17.81	(17.69)	3420, 3350, 1680, 1660, 1490, 1425
6a	12	145-147	60	C <sub>14</sub> H <sub>16</sub> N <sub>4</sub> O <sub>5</sub>	52.50	(52.25)	17.81	(17.72)	3500-3450, 1700, 1660, 1450, 1420
6b	8	149-151	65	C <sub>15</sub> H <sub>18</sub> N <sub>4</sub> O <sub>6</sub>	51.43	(51.24)	16.00	(16.2)	3475-3400, 1700, 1660, 1450, 1420
6c	12	174-176	65	C <sub>16</sub> H <sub>21</sub> N <sub>4</sub> O <sub>5</sub>	52.89	(52.45)	20.41	(20.14)	3450-3330, 1680, 1660, 1450, 1420
6d	24	190-192	60	C <sub>14</sub> H <sub>16</sub> N <sub>4</sub> O <sub>6</sub>	50.00	(49.81)	16.66	(16.5)	3450-3350, 1680, 1660, 1450, 1420
7a	6	163-165	70	C <sub>14</sub> H <sub>17</sub> N <sub>5</sub> O <sub>4</sub>	52.66	(52.49)	21.94	(20.85)	3320, 3260, 1680, 1650, 1450, 1410
7b	24	216-218	60	C <sub>15</sub> H <sub>19</sub> N <sub>5</sub> O <sub>5</sub>	50.14	(49.98)	20.06	(20.1)	3300, 3250, 1680, 1650, 1450
7c	12	255-257	65	C <sub>16</sub> H <sub>22</sub> N <sub>6</sub> O <sub>4</sub>	53.04	(52.85)	23.20	(23.15)	3310, 3240, 1680, 1650, 1450
7d	12	281-282	65	C <sub>14</sub> H <sub>17</sub> N <sub>5</sub> O <sub>5</sub>	49.25	(48.96)	20.89	(20.74)	3380, 3200, 1680, 1650, 1450

Table II

<sup>1</sup>H NMR Data of Compounds 5a-d, 6a-d and 7a-d δ ppm

5a [a]	2.7 (s, 3H, N-Me), 2.85 (s, 3H, N-Me), 4.4-4.9 (t, 1H), 4.8-5.02 (q, 2H), 6.9 (s, 2H, NH <sub>2</sub> ), 6.49-7 (m, 5H)
5b [b]	2.85 (s, 3H, N-Me), 3.25 (s, 3H, N-Me), 3.6 (s, 3H, OMe), 4.4-4.5 (t, 1H), 4.8-5.11 (q, 2H), 6.5-6.85 (m, 4H)
5c [b]	2.8 (s, 3H, N-Me), 3.1 (s, 3H, N-Me), 3.25 (s, 6H, N-Me <sub>2</sub> ), 4.4-4.5 (t, 1H), 4.85-5.02 (q, 2H), 6.85-7.35 (m, 4H)
5d [a]	2.75 (s, 3H, N-Me), 2.8 (s, 3H, N-Me), 4.02-4.3 (t, 1H), 4.75-5 (q, 2H), 6.2 (s, 2H, NH <sub>2</sub> ), 6.25-6.8 (dd, 4H, aromatic), 8.75 (s, H, OH)
6a [a]	2.41 (s, 3H, N-Me), 2.4 (s, 3H, N-Me), 4.0-4.1 (4.75-4.9 (q, 2H), 6.5-6.8 (m, 5H), 10.55 (s, 1H)
6b [b]	2.65 (s, 3H, N-Me), 2.8 (s, 3H, N-Me), 3.01 (s, 6H, N-Me <sub>2</sub> ), 4.0-4.1 (t, 1H), 4.4-4.6 (q, 2H), 6.8-7.2 (m, 2H)
6c [b]	2.65 (s, 3H, N-Me), 2.8 (s, 3H, N-Me), 3.01 (s, 6H, N-Me <sub>2</sub> ), 3.52-3.70 (t, 1H), 4.5-4.8 (q, 2H), 6.2-6.5 (m, 4H), 10.49 (s, 1H)
7a [a]	2.22 (s, 3H, N-Me), 2.4 (s, 3H, N-Me), 2.8 (s, 1H, NH), 3.8-4.0 (t, 1H), 4.45-4.75 (m, 2H), 6.2 (d, 2H) and 6.6-7.2 (m, 5H)
7b [b]	2.85 (s, 3H, N-Me), 3.01 (s, 3H, N-Me), 3.59 (s, 3H, OMe), 4.40-4.51 (t, 1H), 4.9-5.12 (q, 2H), 6.64-6.82 (dd, 4H, aromatic)
7c [b]	3.12 (s, 6H, N-Me <sub>2</sub> ), 3.22 (s, 3H, N-Me), 3.4 (s, 3H, N-Me), 3.85-4.01 (t, 1H), 4.5-4.75 (m, 2H), 7.2-7.68 (dd, 1H)
7d [a]	2.70 (s, 3H, N-Me), 2.85 (s, 2H), 2.94 (s, 3H, N-Me), 3.85-4.0 (t, 1H), 4.52-4.74 (m, 2H) and 6.34-6.45 (dd, 2H, aromatic), (J = 11.54 Hz), 7.07-7.18 (dd, 2H, aromatic) (J = 11.45 Hz), 7.83 (s, 1H)

[a] Varian-FT.80A (dimethylsulfoxide-d<sub>6</sub> solvent). [b] Varian-T60 (trifluoroacetic acid solvent).

Hydroxylamino derivatives **6a-d** and hydrazino derivatives **7a-d** have shown the ions for the presence of the styrene moiety and the uracil fragment *m/z* 170 + 1 (6-hydroxylamino-1,3-dimethyluracil) and *m/z* 169 + 1 (6-hydroxylamino-1,3-dimethyluracil) and *m/z* 169 + 1 (6-hydrazino-1,3-dimethyluracil) respectively. In addition to this the other fragments are those of normal occurrence in this series. The mass spectral data are given in Table III.

Table III

Mass Spectral Data of Compounds 5a-d, 6a-d and 7a-d, *m/z*

Compound	<i>m/z</i>
5a	304 M <sup>+</sup> , 270, 258, 257, 242, 201, 200, 185, 180, 171, 170, 155, 142, 104, 77
5b	334 M <sup>+</sup> , 300, 288, 287, 272, 226, 180, 179, 156, 155, 134
5c	347 M <sup>+</sup> , 313, 301, 300, 286, 285, 258, 244, 195, 192, 156, 155, 147
5d	320 M <sup>+</sup> , 274, 257, 256, 199, 198, 171, 170, 155, 154, 120
6a	320 M <sup>+</sup> , 274, 257, 256, 215, 201, 199, 171, 170, 154, 104
6b	350 M <sup>+</sup> , 304, 303, 287, 286, 229, 201, 171, 170, 154, 134
6c	363 M <sup>+</sup> , 317, 316, 300, 299, 242, 171, 170, 154, 147
6d	336 M <sup>+</sup> , 290, 289, 283, 282, 171, 170, 154, 120
7a	319 M <sup>+</sup> , 334, 273, 270, 242, 194, 193, 170, 104
7b	349 M <sup>+</sup> , 334, 303, 302, 289, 287, 272, 191, 170, 134
7c	362 M <sup>+</sup> , 347, 316, 302, 301, 285, 284, 273, 271, 204, 170, 147
7d	335 M <sup>+</sup> , 320, 289, 288, 286, 256, 232, 193, 170, 120

## EXPERIMENTAL

All melting points were taken in an open capillary on a Buchi melting point apparatus and are uncorrected. The IR spectra were recorded in potassium bromide on a Perkin-Elmer 237 spectrophotometer. The <sup>1</sup>H nmr spectra were recorded in DMSO-d<sub>6</sub> on a Varian FT 80-A and in TFA on a Varian T-60 spectrometer using TMS as internal standard (Chemical shifts in δ ppm). Mass spectra were obtained by EIMS method (ionization potential 70 eV).

β-Nitrostyrene and phenyl substituted β-nitrostyrenes were prepared according to the reported literature methods [5].

## 1,2-Dimethyl-5-(1'-phenyl-2'-nitroethyl)-6-aminouracil (5a).

A mixture of 6-amino-1,3-dimethyluracil (**1**), 1.55 g (10 mmoles) and β-nitrostyrene (**4a**), 1.45 g (10 mmoles) were refluxed in 30 ml of dry methanol for 6 hours. On cooling the reaction mixture in the refrigerator for 2 hours a light brown solid separated out which on crystallization (methanol) yielded 2.1 g (70%) of **5a** as a white crystalline material mp 185-186°.

Similarly were prepared other nitro derivatives **5b-d**. 6-Hydroxylamino-1,3-dimethyluracil (**2**) and 6-hydrazino-1,3-dimethyluracil (**3**) on reacting with β-nitrostyrenes **4a-d** afforded compounds **6a-d** and **7a-d** respectively. The reaction time, yields, melting points and elemental analyses and IR spectral data are given in Table I.

## Acknowledgement.

We are thankful to Dr. G. Thyagarajan, Director, Regional Research Laboratory, Hyderabad for mass spectral and to Dr. J. R. Patil, Research Director, Hico Pvt. Limited, Bombay for recording FT 80-A nmr spectra.

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