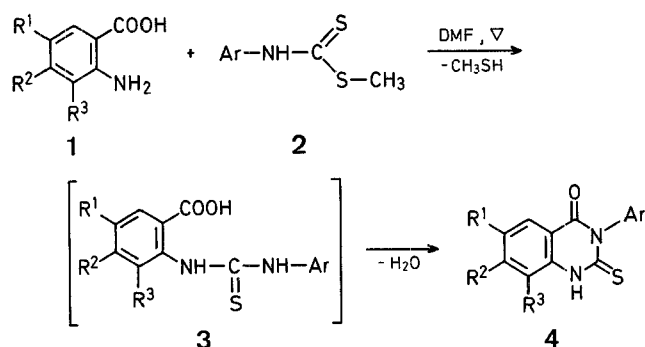


### Preparation of 3-Aryl-4-oxo-2-thioxo-1,2,3,4-tetrahydroquinazolines from Methyl *N*-Aryldithiocarbamates and Anthranilic Acid

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3-Aryl-4-oxo-2-thioxo-1,2,3,4-tetrahydroquinazolines **4** have been synthesized by a variety of methods<sup>1-6</sup>, some of which require starting materials such as isothiocyanates. In order to avoid the use of such reagents, we have developed a synthetically important method to prepare the title compounds **4** in good yields. This reaction involves the use of methyl *N*-aryldithiocarbamates<sup>7</sup> **2** and dimethylformamide as solvent.



The reaction is easily performed by addition at room temperature of the compound **2** in dimethylformamide to a solution of anthranilic acid **1** in the same solvent. After reflux, the crude product **4** is isolated by precipitation of the mixture in water.

The data summarized in the Table show several examples (we have prepared 35) of compounds **4**, using various anthranilic acids **1** and methyl *N*-aryldithiocarbamates **2**, in order to show the generality of the procedure.

Melting points were determined using a Mettler FP-61 automatic apparatus. The I.R. spectra were recorded with a Perkin-Elmer 283 instrument. <sup>1</sup>H-N.M.R. spectra were obtained with a Perkin-Elmer R-12 spectrometer using TMS as internal reference. Mass spectra were recorded with a Hewlett-Packard 5930-A spectrometer.

#### 3-Aryl-4-oxo-2-thioxo-1,2,3,4-tetrahydroquinazolines **4**; General Procedure:

To a stirred solution of the anthranilic acid **1** (0.01 mol) in dimethylformamide (20 ml) is added at room temperature and dropwise a solution of the methyl *N*-aryldithiocarbamate **2** (0.01 mol) in dimethylformamide (10 ml). After addition, the mixture is refluxed for 4–6 h. The solution thus obtained is cooled and poured into water (300–350 ml) to yield the crude solid product **4**. The precipitate is isolated by filtration, washed with hexane, dried, and recrystallized.

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Table. 3-Aryl-4-oxo-2-thioxo-1,2,3,4-tetrahydroquinazolines **4** (selected examples)

Ar	R <sup>1</sup> R <sup>2</sup>	R <sup>3</sup>	Yield [%]	m.p. [°C] (solvent)	Molecular formula <sup>a</sup>	I.R. (nujol) [cm <sup>-1</sup> ] ν <sub>NH</sub> ν <sub>C=O</sub> ν <sub>C=N</sub>	<sup>1</sup> H-N.M.R. (DMSO-d <sub>6</sub> ) δ [ppm]	M.S. (70 eV) m/e (M <sup>+</sup> ) (rel. int.)
4-H <sub>3</sub> C—C <sub>6</sub> H <sub>4</sub>	H H	H	83	304° (CH <sub>3</sub> CN)	C <sub>13</sub> H <sub>12</sub> N <sub>2</sub> OS (268.3)	3255 1670 1630	2.30 (s, 3H); 6.7–8.0 (m, 8H); 12.90 (s, 1H)	268 (72%)
2,4-di-H <sub>3</sub> C—C <sub>6</sub> H <sub>3</sub>	H H	H	74	273° (CH <sub>3</sub> CN)	C <sub>16</sub> H <sub>14</sub> N <sub>2</sub> OS (282.3)	3260 1660 1620	1.80 (s, 3H); 2.15 (s, 3H); 6.8–8.0 (m, 7H); 13.00 (s, 1H)	282 (48%)
2-H <sub>3</sub> C-3-Cl—C <sub>6</sub> H <sub>3</sub>	H H	H	76	286° (CH <sub>3</sub> CN)	C <sub>13</sub> H <sub>11</sub> ClN <sub>2</sub> OS (302.7)	3240 1680 1630	2.35 (s, 3H); 7.2–8.3 (m, 7H); 13.10 (s, 1H)	302 (86%)
3,4-(O—CH <sub>2</sub> —O)—C <sub>6</sub> H <sub>3</sub>	H H	H	77	264° (CH <sub>3</sub> CN)	C <sub>13</sub> H <sub>10</sub> N <sub>2</sub> O <sub>3</sub> S (298.3)	3260 1670 1625	5.90 (s, 2H); 6.6–7.9 (m, 7H); 12.70 (s, 1H)	298 (100%)
3-F <sub>3</sub> C—C <sub>6</sub> H <sub>4</sub>	H H	H	84	265° (CH <sub>3</sub> CN)	C <sub>13</sub> H <sub>9</sub> F <sub>3</sub> N <sub>2</sub> OS (322.3)	3270 1670 1635	6.5–8.0 (m, 8H); 13.20 (s, 1H)	322 (41%)
C <sub>6</sub> H <sub>5</sub>	H NO <sub>2</sub>	H	40	> 300° (CH <sub>3</sub> NO <sub>2</sub> )	C <sub>14</sub> H <sub>9</sub> N <sub>3</sub> O <sub>3</sub> S (299.3)	3240 1660 1615	7.1–8.0 (m, 8H); 13.10 (s, 1H)	299 (28%)
4-H <sub>3</sub> C—C <sub>6</sub> H <sub>4</sub>	H NO <sub>2</sub>	H	93	> 300° (CH <sub>3</sub> NO <sub>2</sub> )	C <sub>15</sub> H <sub>11</sub> N <sub>3</sub> O <sub>3</sub> S (313.3)	3200 1660 1610	2.60 (s, 3H); 7.9–8.1 (m, 7H); 13.20 (s, 1H)	313 (29%)
4-H <sub>3</sub> CO—C <sub>6</sub> H <sub>4</sub>	H NO <sub>2</sub>	H	68	> 300° (CH <sub>3</sub> NO <sub>2</sub> )	C <sub>15</sub> H <sub>11</sub> N <sub>3</sub> O <sub>4</sub> S (329.3)	3200 1650 1620	3.70 (s, 3H); 6.9–8.1 (m, 7H); 13.00 (s, 1H)	329 (97%)
4-H <sub>3</sub> C—C <sub>6</sub> H <sub>4</sub>	H Cl	H	58	> 300° (CH <sub>3</sub> CN)	C <sub>15</sub> H <sub>11</sub> ClN <sub>2</sub> OS (302.7)	3220 1665 1610	2.40 (s, 3H); 7.1–8.3 (m, 7H); 13.1 (s, 1H)	302 (57%)
4-H <sub>3</sub> CO—C <sub>6</sub> H <sub>4</sub>	H Cl	H	47	> 300° (CH <sub>3</sub> CN)	C <sub>15</sub> H <sub>11</sub> ClN <sub>2</sub> O <sub>2</sub> S (318.7)	3225 1660 1615	3.75 (s, 3H); 6.9–8.2 (m, 7H); 13.00 (s, 1H)	318 (100%)
4-H <sub>3</sub> C—C <sub>6</sub> H <sub>4</sub>	Cl H	Cl	53	> 300° (CH <sub>3</sub> CN)	C <sub>13</sub> H <sub>10</sub> Cl <sub>2</sub> N <sub>2</sub> OS (337.2)	3220 1660 1610	2.50 (s, 3H); 7.0–8.0 (m, 6H); 13.00 (s, 1H)	336 (20%)
4-H <sub>3</sub> CO—C <sub>6</sub> H <sub>4</sub>	Cl H	Cl	51	> 300° (CH <sub>3</sub> CN)	C <sub>15</sub> H <sub>10</sub> Cl <sub>2</sub> N <sub>2</sub> O <sub>2</sub> S (353.2)	3215 1665 1605	3.80 (s, 3H); 7.0–8.1 (m, 6H); 12.90 (s, 1H)	352 (100%)

<sup>a</sup> The microanalyses were in satisfactory agreement with the calculated values: C ± 0.40; H, ± 0.25; N, ± 0.32.