Synthesis of 2-amino-4-arylamino-6-benzo[*b*]furan-2-yl-1,3,5-triazines

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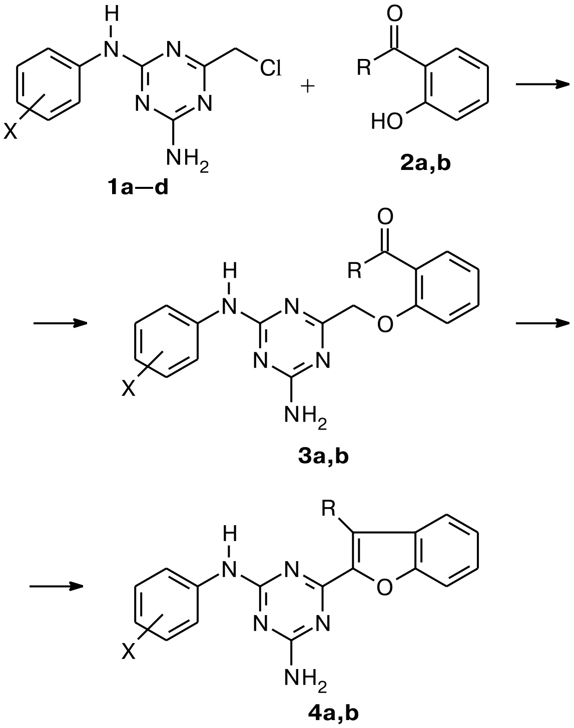
The alkylation of salicylaldehyde and *o*-hydroxyacetophenone with 2-amino-4-arylamino-6-chloromethyl-1,3,5-triazines is accompanied by intramolecular condensation and affords 2-aryl-4-arylamino-6-benzo[*b*]furan-2-yl-1,3,5-triazines.

Key words: 2-amino-4-arylamino-6-chloromethyl-1,3,5-triazine, salicylaldehyde, *o*-hydroxyacetophenone, alkylation, 2-amino-4-arylamino-6-benzo[*b*]furan-2-yl-1,3,5-triazines.

As shown in the previous works,[1,2] 2-amino-4-arylamino-6-chloromethyl-1,3,5-triazines **1** synthesized by the reactions of arylbiguanides with monochloroacetic esters are efficient alkylating agents and can be used for the syntheses of various linear triazine-containing heterocyclic systems. In this work, we used chloride **1** to alkylate hydroxyl-containing arenes bearing a carbonyl group in the *ortho*-position, *viz.*, salicyladehyde (**2a**) and *o*-hydroxyacetophenone (**2b**). Only alkylation products **3** were isolated upon refluxing the reagents in dioxane in the presence of potash for 4—6 h, while compounds **3** primarily formed by the reaction in anhydrous dimethylacetamide already after 20—30 min underwent intramolecular ring closure to form benzofuran-2-yl-1,3,5-triazines **4** (Scheme 1).

Scheme 1



1: X = H (**a**), 4-Me (**b**), 2,4-Me_2 (**c**), 4-MeO (**d**);
2: R = H (**a**), Me (**b**); **3:** X = H, R = H (**a**), X = 4-MeO, R = Me (**b**);
4: X = 4-Me, R = Me (**a**), X = 2,4-Me_2, R = H (**b**)

Experimental

^{1}H NMR spectra were recorded on a Bruker WM-250 spectrometer (250 MHz) in DMSO-d_6 relatively to Me_4Si.

2-(4-Amino-6-anilino-1,3,5-triazin-2-ylmethoxy)benzaldehyde (3a). A mixture of compound **1a** (2.35 g, 10 mmol), aldehyde **2a** (1.22 g, 10 mmol), and calcined potash (3.0 g) in anhydrous dioxane (10 mL) was refluxed for 5 h. After cooling, a colorless precipitate of aldehyde **3a** was filtered off and recrystallized from dioxane. The yield was 2.02 g (63%), m.p. 218—219 °C. Found (%): C, 63.42; H, 4.66; N, 21.90. $C_{17}H_{15}N_5O_2$. Calculated (%): C, 63.54; H, 4.71; N, 21.79. ^{1}H NMR, δ: 5.01 (s, 2 H, OCH_2); 6.82 (s, 2 H, NH_2); 6.95—7.32 (m, 5 H, H arom.); 7.53—7.78 (m, 4 H, H arom.); 9.49 (br.s, 1 H, NH); 10.52 (s, 1 H, CHO).

1-{2-[4-Amino-6-(4-methoxyanilino)-1,3,5-triazin-2-yl-methoxy]phenyl}-1-ethanone (3b) was synthesized similarly. The yield was 2.11 g (58%), m.p. 203—205 °C. Found (%): C, 62.42; H, 5.43; N, 19.30. $C_{19}H_{19}N_5O_3$. Calculated (%): C, 62.46; H, 5.24; N, 19.17. ^{1}H NMR, δ: 2.71 (s, 3 H, Me); 3.74 (s, 3 H, OMe); 5.00 (s, 2 H, OCH_2); 6.72 (s, 2 H, NH_2); 7.01—7.28, 7.48—7.78 (both m, 4 H each, H arom.); 9.14 (s, 1 H, NH).

2-Amino-6-(3-methylbenzo[*b*]furan-2-yl)(4-methylphenylamino)-1,3,5-triazine (4a). A mixture of chloride **1b** (2.49 g, 10 mmol), 2-hydroxyketone **2b** (1.36 g, 10 mmol), and calcined potash (3.0 g) in anhydrous dimethylacetamide (10 mL) was refluxed for 1.5 h. The reaction mixture was cooled and poured into cold water (200 mL). A precipitate of compound **4a** that formed was filtered off, dried, and recrystallized from dioxane. The yield was 1.56 g (47%), m.p. 180—181 °C. Found (%):

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C, 68.62; H, 5.26; N, 21.39. $C_{19}H_{17}N_5O$. Calculated (%): C, 68.87; H, 5.17; N, 21.13. ^{1}H NMR, δ: 2.31, 2.74 (both s, 3 H each, Me); 6.72 (br.s, 2 H, NH_2); 7.02 (d, 2 H, H arom., J = 7.9 Hz); 7.25, 7.36 (both t, 1 H each, H arom., J = 7.3 Hz); 7.51 (d, 1 H, H arom., J = 7.9 Hz); 7.58—7.73 (m, 3 H, H arom.); 9.24 (s, 1 H, NH).

2-Amino-6-benzo[*b*]furan-2-yl-(2,4-dimethylphenylamino)-1,3,5-triazine-2,4-diamine (4b) was synthesized similarly. The yield was 1.92 g (58%), m.p. 193—194 °C. Found (%): C, 68.96; H, 5.16; N, 21.43. $C_{19}H_{17}N_5O$. Calculated (%): C, 68.87; H, 5.17; N, 21.13. ^{1}H NMR, δ: 2.28, 2.32 (both s, 3 H each, Me); 6.71 (br.s, 2 H, NH_2); 6.96 (d, 2 H, H arom., J = 7.9 Hz); 7.27, 7.37 (both t, 1 H each, H arom., J = 7.3 Hz); 7.52—7.73 (m, 4 H, H arom.); 8.62 (s, 1 H, NH).

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