

6-[2,6-Diacetoxy-9-(5-acetyl-2-furanyl)-5-ethyl-1,3,7-trimethyl-4-oxodecyl]- $\alpha$ -ethyltetrahydro-5-methyl-2H-pyran-2-acetic Acid (5). A magnetically stirred solution of 4.0 g (7.9 mmol) of 1 and 120 mL of  $\text{CH}_2\text{Cl}_2$  was cooled to 0–5 °C and then treated with 10.0 g (72 mmol) of  $\text{AcOSO}_2\text{Me}^{7,8}$  for 1 h. After workup, the residue was chromatographed (3:1 hexane– $\text{Me}_2\text{CO}$ ) to afford 5 as an amorphous solid: yield 1.33 g (27%); UV  $\lambda_{\text{max}}$  (MeCN) 218 ( $\epsilon$  2350), 280 nm (10 100);  $^1\text{H}$  NMR (selected peaks of interest)  $\delta$  2.01 (s, 3 H), 2.03 (s, 3 H), 2.40 (s, 3 H), 3.40 (d, 1 H), 3.92 (d, 1 H), 4.94 (q, 1 H), 5.36 (d, 1 H), 6.15 (d, 1 H), 7.19 (d, 1 H); mass spectrum,  $m/e$  634 (molecular ion), 574 (less AcOH), 514 (less two AcOH), and others.

$\alpha$ -Ethyl-6-[5-ethyl-1,3,7-trimethyl-4-oxo-2,6-bis(trifluoroacetoxy)-9-[5-(trifluoroacetyl)-2-furanyl]decyl]tetrahydro-5-methyl-2H-pyran-2-acetic Acid (6). With magnetic stirring and ice-bath cooling, a solution of 1.00 g (2.0 mmol) of 1 and 20 mL of pyridine was treated with 6.2 g (4.2 mL, 30 mmol) of  $(\text{CF}_3\text{CO})_2\text{O}$ . The reaction solution was allowed to warm to room temperature. After 3 h the reaction solution was worked up. The residue was chromatographed (AcOEt) to afford 6 as an amorphous solid: yield 1.15 g (73%); UV  $\lambda_{\text{max}}$  (MeCN) 229 ( $\epsilon$  2635), 304 nm (8960);  $^1\text{H}$  NMR (selected peaks of interest)  $\delta$  3.47 (d, 1 H), 4.00 (q, 1 H), 5.08 (dd, 1 H), 5.51 (d, 1 H), 6.32 (d, 1 H), 7.48 (dd, 1 H). This material was used without further purification in the reaction described below.

$\alpha$ -Ethyl-6-[5-ethyl-2,6-dihydroxy-1,3,7-trimethyl-4-oxo-9-[5-(trifluoroacetyl)-2-furanyl]decyl]tetrahydro-5-methyl-2H-pyran-2-acetic Acid (7). At room temperature and with magnetic stirring, a solution of 350 mg (0.44 mmol) of 6 and 20 mL of MeOH was treated with 1.0 mL of concentrated aqueous  $\text{NH}_4\text{OH}$  over a period of 1 min. Stirring was continued for 1 h; the solution was evaporated under reduced pressure to furnish an aqueous mixture of organic materials. The aqueous mixture was extracted with  $\text{CHCl}_3$ , the combined extracts were filtered, and the filtrate was dried. The filtrate was then evaporated to furnish 7 as an amorphous solid: yield 200 mg (75%); UV  $\lambda_{\text{max}}$  (MeCN) 232 ( $\epsilon$  1860), 307 nm (12500);  $^1\text{H}$  NMR (selected peaks of interest)  $\delta$  3.68 (d, 1 H), 3.79 (d, 1 H), 3.92 (q, 1 H), 4.13 (d, 1 H), 6.43 (d, 1 H), 7.44 (m, 1 H); high-resolution mass spectrum,  $m/e$  604.3191 (molecular ion  $\text{C}_{31}\text{H}_{47}\text{F}_3\text{O}_8$  requires 604.3223).

$\alpha$ -Ethyl-6-[5-ethyl-9-(2-furanyl)-1,3,7-trimethyl-4-oxo-2,6-bis(trifluoroacetoxy)decyl]tetrahydro-5-methyl-2H-pyran-2-acetic Acid (8). Under a  $\text{N}_2$  atmosphere and with magnetic stirring, a solution of 2.00 g (3.9 mmol) of 1 and 20 mL of pyridine was cooled to –10 to –5 °C;  $(\text{CF}_3\text{CO})_2\text{O}$  (1.78 g, 1.20 mL, 8.5 mmol) was added. Stirring and cooling were continued for 1.5 h, and then the reaction solution was allowed to warm to room temperature (2 h). After workup and chromatography (3:1 hexane– $\text{Me}_2\text{CO}$ ), there was obtained 8 as an amorphous solid: yield 1.05 g (38%); UV  $\lambda_{\text{max}}$  (MeCN) 222 nm ( $\epsilon$  13 700);  $^1\text{H}$  NMR (selected

peaks of interest)  $\delta$  3.50 (dd, 1 H), 3.99 (m, 1 H), 5.10 (dd, 1 H), 5.55 (dd, 1 H), 5.96 (d, 1 H), 6.27 (dd, 1 H), 7.28 (d, 1 H). This material was used without further identification or purification in the reaction described below.

6-[9-(5-Acetyl-2-furanyl)-5-ethyl-2,6-dihydroxy-1,3,7-trimethyl-4-oxodecyl]- $\alpha$ -ethyltetrahydro-5-methyl-2H-pyran-2-acetic Acid (9). With magnetic stirring, a solution of 3.70 g (5.28 mmol) of 8 and 70 mL of  $\text{CH}_2\text{Cl}_2$  was cooled to –5 °C.  $\text{AcOSO}_2\text{Me}$  (3.33 g, 26 mmol) in 15 mL of  $\text{CH}_2\text{Cl}_2$  was added, and the reaction solution was stirred for 3 h at 0 °C. After workup and chromatography (4:1 hexane–EtOAc), there was obtained 9 contaminated with about 5–10% of 5: yield 1.66 g (57%); UV  $\lambda_{\text{max}}$  (MeCN) 218 ( $\epsilon$  3170), 281 nm (13 500);  $^1\text{H}$  NMR (selected peaks of interest)  $\delta$  2.39 (s, 3 H), 3.54 (d, 1 H), 3.75 (d, 1 H), 3.96 (q, 1 H), 4.08 (d, 1 H, under EtOAc peak), 6.23 (d, 1 H), 7.05 (m, 1 H); high-resolution mass spectrum,  $m/e$  550.3516 (molecular ion  $\text{C}_{31}\text{H}_{50}\text{O}_8$  requires 550.3505).

**Method for Reduction of Ketones 6, 7, and 9.** Under a  $\text{N}_2$  atmosphere with magnetic stirring, a mixture of 30 molar equiv of  $\text{NaBH}_4$  and 60 parts of MeOH was cooled to –5 °C. Over a 30-min period, a solution of 1 molar equiv of ketone in MeOH was added dropwise to the mixture. Cooling and stirring were continued for 1 h; the mixture was allowed to warm to room temperature (3.5 h). After workup and chromatography (19:1  $\text{CHCl}_3$ –MeOH), there was obtained a mixture of the corresponding epimeric alcohols as an amorphous solid. The reaction was judged to be complete when there was no significant absorption in the 280–310-nm region of the UV spectrum.

**Biological Evaluation.** The compounds described in this article were evaluated for anticoccidial activity by the method of Lynch.<sup>11</sup> The maximum dose employed was 120 ppm of compound in feed, i.e., twice the recommended dose for salinomycin in commercial applications.<sup>12</sup>

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**Supplementary Material Available:** The X-ray structure, tables of the atomic positional and thermal parameters, bond distances, and bond angles for 1 (9 pages). Ordering information is given on any current masthead page.

(11) Lynch, J. E. *Am. J. Vet. Res.* 1961, 22, 324.

(12) *Feed Additive Compendium*; Leidahl, R., Ed.; Miller: Minneapolis, MN, 1985; p 304(a).

## Additions and Corrections

**Bruce E. Maryanoff,\* David F. McComsey, Joseph F. Gardocki, Richard P. Shank, Michael J. Costanzo, Samuel O. Nortey, Craig R. Schneider, and Paulette E. Setler:** Pyrroloisoquinoline Antidepressants. 2. In-Depth Exploration of Structure–Activity Relationships.

Page 1440. Table IV, compound 23a (in numerical sequence) was incorrectly shown as 38a.

Page 1453. Column 2, line 26: “5-HT” should be “S”; lines 31 and 32: The “5-” (before “S<sub>1</sub>” and “S<sub>2</sub>”) should be ignored.

Page 1445. Column 1: “66b” (used twice) and “7b” should read “66a” and “7a”. Also, “66b” on pp 1434 (column 2), 1438 (Table II and footnotes *r* and *u* to Table II), 1441 (Table IV), and 1443 (column 1) should read “66a”.