Supporting Information

Synthesis of Dimethyl Sulfomycinamate

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Ethyl 4-hydroxy-2-(2-propenyl)-2-oxazoline-4-carboxylate (6)

Ethyl bromopyruvate (0.9 ml, 7.17 mmol) was added to a solution of methacrylamide (**5**) (0.5 g, 6.02 mmol) and $NaHCO_3$[1] (2.5 g, 29.76 mmol) in dry tetrahydrofuran (60 ml). The mixture was heated at reflux for 18 h, filtered through Celite® and evaporated *in vacuo*. Purification by recrystallization (light petroleum-diethyl ether) gave the *title compound* as a colourless solid (0.96 g, 80%), mp 80-81 °C (ethyl acetate) (Found: C, 54.0; H, 6.4; N, 6.7. Calc. for $C_9H_{13}NO_4$: C, 54.3; H, 6.6; N, 7.0%) (Found: MH^+, 200.0916. $C_9H_{13}NO_4$ requires *MH*, 200.0917); ν_{max}(nujol)/cm^{-1} 1749, 1654, 1602, 1459, 1376, 1224, 1154, 1083, 1016 and 954; δ_H(400 MHz; d_4-methanol) 5.89 (1H, m, C*H*H), 5.52 (1H, m, CH*H*), 4.59 (1H, d, *J* 10.0, OC*H*H), 4.15 (2H, q, *J* 7.1, C*H*$_2$Me), 4.12 (1H, d, *J* 10.0, OCH*H*), 1.86 (3H, m, Me), 1.21 (3H, t, *J* 7.1, CH_2*Me*); δ_C(100 MHz; d_4-methanol) 170.6 (C), 168.6 (C), 132.2 (C), 123,8 (CH_2), 97.1 (C), 76.1 (CH_2), 62.0 (CH_2), 17.9 (Me) and 13.0 (Me); *m/z* (APcI) 200 (MH^+, 100%) and 182 (32).

Ethyl 2-(2-propenyl)oxazole-4-carboxylate (7)

A solution of 2,6-lutidine (8.12 ml, 77.12 mmol) and trifluoroacetic anhydride (4.73 ml, 33.49 mmol) in dry tetrahydrofuran (10 ml) was added to a solution of ethyl 4-hydroxy-2-(2-propenyl)-2-oxazoline-4-carboxylate (**6**) (5.55 g, 27.86 mmol) at 0 °C. After stirring for 30 minutes, water (50 ml) was added and the mixture was concentrated *in vacuo*. Purification by flash chromatography on silica, gradient eluting with light petroleum to light petroleum-ethyl acetate (3 : 1), gave the *title compound* as a colourless oil (5.06 g, 94%) (Found: MH^+, 182.0810. $C_9H_{11}NO_3$ requires *MH*, 182.0817); ν_{max}(film)/cm^{-1} 3155, 2984, 1744, 1575, 1543, 1448, 1391, 1315, 1254, 1176, 115, 982, 916 and 763;

δ_H(400 MHz; $CDCl_3$) 8.12 (1H, s, 5-H), 6.15 (1H, d, *J* 1.4, C*H*H), 5.39 (1H, dd, *J* 1.4, 0.9, CH*H*), 4.32 (2H, q, *J* 7.1, CH_2Me), 2.12 (3H, s, Me), 1.30 (3H, t, *J* 7.1, CH_2Me); δ_C(100 MHz; $CDCl_3$) 163.1 (C), 161.3 (C), 143.5 (CH), 134.2 (C), 131.1 (C), 119.9 (CH_2), 61.2 (CH_2), 19.0 (Me) and 14.3 (Me); *m/z* (EI) 181 (M^+, 100%).

2-(2-Propenyl)oxazole-4-carboxylic acid (8)

Lithium hydroxide monohydrate (6.49 g, 0.155 M) was added to a solution of ethyl 2-(2-propenyl)oxazole-4-carboxylate (**7**) (4.76 g, 26.44 mmol) in MeOH-water (1:1) (100 ml). The mixture was stirred at room temperature for 2 hours, concentrated *in vacuo* and partitioned between water (100 ml) and chloroform (50 ml). The aqueous layer was further extracted with chloroform (2 x 50 ml), acidified to pH 2-3 with dilute hydrochloric acid (3 N) and extracted with chloroform (3 x 50 ml). The combined organic extracts were washed with brine (25 ml), dried ($MgSO_4$) and evaporated *in vacuo* to give the *title compound* as a colourless solid (3.14 g, 78%), mp 121.5-122 °C (ethyl acetate) (Found: C, 54.6; H, 4.6; N, 8.9. Calc. for $C_9H_{13}NO_4$: C, 54.9; H, 4.6; N, 9.2%) (Found: MH^+, 154.0498. $C_7H_7NO_3$ requires *MH*, 154.0499); ν_{max}(nujol)/cm^{-1} 3136, 1691, 1562, 1462, 1377, 1260, 1186, 1124, 984, 910, 853, 766 and 665; δ_H(400 MHz; $CDCl_3$) 10.26 (1H, bs, CO_2H), 8.23 (1H, s, 5-H), 6.00 (1H, s, C*H*H), 5.44 (1H, s, CH*H*), 2.14 (3H, s, Me); δ_C(100 MHz; $CDCl_3$) 166.1 (C), 163.5 (C), 145.0 (CH), 133.4 (C), 130.9 (C), 120.6 (CH_2) and 19.0 (Me); *m/z* (APcI) 154 (MH^+, 100%) and 136 (80).

***N*-Methoxy-*N*-methyl-2-(2-propenyl)oxazole-4-carboxamide (9)**

Ethyl chloroformate (0.57 ml, 6.01 mmol) was added dropwise to a solution of 2-(2-propenyl)oxazole-4-carboxylic acid (**8**) (0.97 g, 6.96 mmol) and triethylamine (0.97 ml, 6.96 mmol) in dry tetrahydrofuran (30 ml) at 0 °C. After stirring for 30 minutes, *N*,*O*-dimethylhydroxlamine hydrochloride (0.68 g, 6.97 mmol) was added and the mixture was stirred for 18 hours, concentrated *in vacuo* and partitioned between water (100 ml) and chloroform (50 ml). The aqueous layer was further extracted with chloroform (2 x 50 ml) and the combined organic extracts were washed with brine (30 ml), dried (Na_2SO_4) and evaporated *in vacuo*. Purification by flash chromatography on silica, eluting with light petroleum-ethyl acetate (1 : 3), gave the *title compound* as a colourless oil (0.81 g, 81%)[2] (Found: MH^+, 197.0924. $C_9H_{12}N_2O_3$, requires *MH*, 197.0926); ν_{max}(film)/cm^{-1} 3166, 2976, 2939, 1653, 1551, 1422, 1386, 1353, 1118, 1082, 998, 965, 869 and 747; δ_H(400 MHz; $CDCl_3$) 8.07 (1H, s, 5-H),

[1] $NaHCO_3$ was ground and dried in a conventional oven at 115 °C for two days before use
[2] Yield based on recovered starting material (20%)

5.95 (1H, m, C*H*H), 5.38 (1H, m, CH*H*), 3.70 (3H, s, OMe), 3.33 (3H, s, NMe), 2.14 (3H, s, 2'-Me); (100 MHz; $CDCl_3$) 162.2 (C), 161.3 (C), 142.3 (CH), 134.3 (C), 131.3 (C), 119.4 (CH_2) 61.4 (Me), 33.3 (Me) and 19.1 (Me); *m/z* (APcI) 197 (MH^+, 100%), 167 (30).

2-Methyl-4-(hydroxymethyl)thiazole

Ethyl 2-methylthiazole-4-carboxylate[3] (20.0 g, 0.117 mol) was added portion wise to a solution of lithium aluminium hydride (1.0 M in tetrahydrofuran; 100 ml, 0.1 mol) in dry tetrahydrofuran (350 ml). The mixture was stirred for 1.5 hours, quenched sequentially with water and dilute aqueous sodium hydroxide solution (2 N; 250 ml) and stirred vigorously for one hour. The organic layer was decanted and the residue was extracted with tetrahydrofuran (3 x 250 ml), stirring vigorously for 15 minutes each time. The combined organic extracts were dried ($MgSO_4$) and evaporated *in vacuo* to give 2-methyl-4-(hydroxymethyl)thiazole as a red oil (9.06 g, 60%) (Found: MH^+, 130.0328. C_5H_7NOS requires *MH*, 130.0326); ν_{max}(film)/cm^{-1} 3281, 2924, 2855, 1532, 1478, 1438, 1171, 1130, 857 and 753; δ_H(400 MHz; $CDCl_3$) 6.94 (1H, s, 5-H), 5.03 (1H, bs, OH), 4.62 (2H, s, CH_2), 2,59 (3H, s, Me); δ_C(100 MHz; $CDCl_3$) 167.0 (C), 156.2 (C), 114.4 (CH), 60.0 (CH_2) and 18.9 (Me); *m/z* (APcI) 130 (MH^+, 42%) and 112 (100).

2-Methyl-4-[2-(trimethylsilyl)ethoxymethoxymethyl]thiazole (10)

N,N-Diisopropylethylamine (35 ml, 0.20 mol) was added dropwise over 1.5 hours to a solution of 2-methyl-4-(hydroxymethyl)thiazole (8.61 g, 66.7 mmol) and 2-(trimethylsilyl)ethoxymethyl chloride (SEM-Cl) (23.6 ml, 0.133 mol) in dry dichloromethane (500 ml). The mixture was stirred for a further hour, concentrated to 200 ml *in vacuo*, washed sequentially with dilute hydrochloric acid (3 N; 2 x 200 ml) and brine (50 ml), dried ($MgSO_4$) and evaporated *in vacuo*. Purification by distillation gave the *title compound* as a clear oil (14.35 g, 83%), bp 160-164 °C (2 Torr) (Found: MH^+, 260.1135. $C_{11}H_{21}NO_2SSi$, requires *MH*, 260.1141); ν_{max}(film)/cm^{-1} 2952, 1885, 1248, 1184, 1107, 1061, 937, 860, 836 and 734; δ_H(400 MHz; $CDCl_3$) 7.04 (1H, s, 5-H), 4.78 (2H, s, OCH_2O), 4.65 (2H, s, 4-CH_2), 3.67 (2H, m, OCH_2CH_2), 2.69 (3H, s, Me), 0.94 (2H, m, OCH_2CH_2), 0.00 (9H, s, $SiMe_3$); δ_C(100 MHz; $CDCl_3$) 166.5 (C), 153.0 (C), 115.6 (CH), 94.5 (CH_2), 65.4 (CH_2), 65.1 (CH_2), 19.2 (Me), 18.1 (CH_2) and –1.4 (Me); *m/z* (APcI) 260 (MH^+, 100%).

[3] Ciufolini, M. A.; Shen, Y.-C. *Org. Lett.* **1999**, *1*, 1843.

2-Methyl-5-(trimethylsilyl)-4-[2-(trimethylsilyl)ethoxymethoxymethyl]thiazole (11)

A solution of *n*-butyllithium in hexanes (2.5 M; 16.1 ml, 40.3 mmol) was added dropwise over a period of 5 minutes to a solution of 2-methyl-4-[2-(trimethylsilyl)ethoxymethoxymethyl]thiazole (**10**) (8.69 g, 33.6 mmol) in dry tetrahydrofuran (350 ml) at –78 °C and the mixture was stirred for 20 minutes. A solution of chlorotrimethylsilane (5.54 ml, 43.7 mmol) in dry tetrahydrofuran (20 ml) was added over five minutes. After stirring for 30 minutes, the reaction mixture was warmed to room temperature over the course of one hour, stirred for a further 30 minutes, quenched with water (200 ml), concentrated *in vacuo* and extracted into dichloromethane (3 x 150 ml). The combined organic extracts were washed with brine (50 ml), dried (Na_2SO_4) and evaporated *in vacuo*. Purification by flash chromatography on silica, eluting with light petroleum-ethyl acetate (85 : 15), gave the *title compound* as a clear oil (11.0 g, 99%) (Found: MH^+, 332.1530. $C_{14}H_{29}NO_2SSi_2$ requires *MH*, 332.1530); ν_{max}(film)/cm^{-1} 2956, 2895, 1509, 1458, 1378, 1250, 1178, 1152, 1105, 1058, 1037, 939, 840, 760 and 690; δ_H(400 MHz; $CDCl_3$) 4.80 (2H, s, OCH_2O), 4.65 (2H, s, 4-CH_2), 3.66 (2H, t, *J* 6.8, OCH_2CH_2), 2.69 (3H, s, Me), 0.96 (2H, t, *J* 6.8, OCH_2CH_2), 0.33 (9H, s, 5-$SiMe_3$), 0.00 (9H, s, $SiMe_3$); δ_C(100 MHz; $CDCl_3$) 169.5 (C), 157.8 (C), 130.3 (C), 94.7 (CH_2), 65.5 (CH_2), 65.4 (CH_2), 18.8 (Me), 18.1 (CH_2), 0.5 (Me) and –1.4 (Me); *m/z* (APcI) 332 (MH^+, 16%), 214 (11), 184 (25), 171 (23), 146 (18), 83 (32) and 71 (100).

1-[2-(2-Propenyl)oxazol-4-yl]-2-{5-(trimethylsilyl)-4-[2-(trimethylsilyl)ethoxymethoxymethyl]-thiazol-2-yl}ethanone and 1-hydroxy-1-[2-(2-propenyl)oxazol-4-yl]-2-{5-(trimethylsilyl)-4-[2-(trimethylsilyl)ethoxymethoxymethyl]thiazol-2-yl}ethene (12)

A solution of *n*-butyllithium in hexanes (2.5 M; 0.77 ml, 1.93 mmol) was added dropwise over 2 minutes to a solution of 2-methyl-5-(trimethylsilyl)-4-[2-(trimethylsilyl)ethoxymethoxymethyl]thiazole (**11**) (0.61 g, 1.84 mmol) in dry tetrahydrofuran (18 ml) at –78 °C. The mixture was stirred for 30 minutes and a solution of *N*-methoxy-*N*-methyl-2-(2-propenyl)oxazole-4-carboxamide (**9**) (287 mg, 1.46 mmol) in dry tetrahydrofuran (2 ml) was added dropwise over 5 minutes. The mixture was stirred at –78 °C for 30 minutes, warmed to room temperature over 30 minutes, stirred for a further 30 minutes and poured over ice (30 g). An aqueous solution of orthophosphoric acid (20%; 30 ml) was added and the mixture was concentrated *in vacuo* and partitioned between water (30 ml) and chloroform (30 ml). The aqueous layer was further extracted with chloroform (2 x 30 ml) and the combined organic extracts were washed sequentially with an aqueous solution of orthophosphoric acid (10%; 15 ml), saturated aqueous sodium hydrogen carbonate solution (15 ml) and brine (15 ml), dried (Na_2SO_4) and evaporated

in vacuo. Purification by flash chromatography on silica, eluting with light petroleum-ethyl acetate (3 : 1), gave the *title compounds* as an orange oil (309 mg, 45%); ν_{max}(film)/cm^{-1} 3167, 3106, 2954, 2895, 1651, 1546, 1448, 1249, 939, 916, 841, 766 and 733; δ_H(400 MHz; $CDCl_3$) 12.55 (0.74H, bs, OH), 8.23 (0.26H, s, OxaH), 7.89 (0.74H, s, OxaH), 6.52 (0.74H, s, CH), 5.99 (0.26H, m, C*H*H), 5.96 (0.74H, d, *J* 1.0, C*H*H), 5.45 (0.26H, m, CH*H*), 5.39 (0.74H, d, *J* 1.0, CH*H*), 4.78 (1.48H, s, OCH_2O), 4.77 (0.52H, s, OCH_2O), 4.68 (0.52H, s, CH_2), 4.67 (0.52H, s, ArCH_2O), 4.65 (1.46H, s, ArCH_2O), 3.66 (2H, m, OCH_2CH_2), 2.15 (3H, s, Me), 0.96 (2H, m, OCH_2CH_2), 0.34 (9H, s, 5-$SiMe_3$), 0.00 (6.66H, s, $SiMe_3$), -0.02 (2.34H, s, $SiMe_3$); δ_C(100 MHz; $CDCl_3$) 189.5 (C), 170.5 (C), 164.8 (C), 162.8 (C), 162.7 (C), 157.7 (C), 155.7 (C), 153.8 (C), 142.9 (CH), 140.5 (C), 138.1 (C), 137.2 (CH), 131.9 (C), 131.4 (C), 131.1 (C), 126.2 (C), 120.1 (CH_2), 119.0 (CH_2), 94.6 (CH_2), 94.5 (CH_2), 92.0 (CH), 65.6 (CH_2), 65.5 (CH_2), 65.4 (CH_2), 64.7 (CH_2), 43.6 (CH_2), 19.0 (Me), 18.9 (Me), 18.1 (CH_2), 0.5 (Me) and –1.4 (Me); *m/z* (APcI) 467 (MH^+, 1%), 318 (16), 90 (100).

1-[2-(2-Propenyl)oxazol-4-yl]-2-{4-[2-(trimethylsilyl)ethoxymethoxymethyl]thiazol-2-yl}ethanone and 1-hydroxy-1-[2-(2-propenyl)oxazol-4-yl]-2-{4-[2-(trimethylsilyl)ethoxymethoxymethyl]-thiazol-2-yl}ethene (13)

A solution of tetrabutylammonium fluoride in tetrahydrofuran (1 M; 0.66 ml, 0.66 mmol) and trifluoroacetic acid (51 µl, 0.66 mmol) was added to a solution of 1-[2-(2-propenyl)oxazol-4-yl]-2-{5-(trimethylsilyl)-4-[2-(trimethylsilyl)ethoxymethoxymethyl]thiazol-2-yl}ethanone and 1-hydroxy-1-[2-(2-propenyl)oxazol-4-yl]-2-{5-(trimethylsilyl)-4-[2-(trimethylsilyl)ethoxymethoxymethyl]thiazol-2-yl}ethene (**12**) (309 mg, 0.66 mmol) in tetrahydrofuran (10 ml). The mixture was stirred for 1 hour, concentrated *in vacuo* and partitioned between water (30 ml) and chloroform (30 ml). The aqueous layer was further extracted with chloroform (2 x 20 ml) and the combined organic extracts were dried (Na_2SO_4) and evaporated *in vacuo*. Purification by flash chromatography on silica, eluting with light petroleum-ethyl acetate (3 : 1), gave the *title compounds* as an orange oil (187 mg, 78%) (Found: MH^+, 395.1456. $C_{18}H_{26}N_2O_4SSi$ requires *MH*, 395.1461); ν_{max}(film)/cm^{-1} 3112, 2985, 1694, 1652, 1546, 1458, 118, 1060, 913, 860, 836, 768 and 732; δ_H(400 MHz; $CDCl_3$) 12.56 (0.58H, bs, OH), 8.23 (0.42H, s, OxaH), 7.89 (0.58H, s, OxaH), 7.19 (0.42H, s, ThzH), 6.97 (0.58H, s, ThzH), 6.51 (0.58H, s, CH), 5.99 (0.42H, m, C*H*H), 5.96 (0.58 H, m, C*H*H), 5.46 (0.42H, d, *J* 1.1, CH*H*), 5.40 (0.58H, d, *J* 1.4, CH*H*), 4.77 (2H, s, OCH_2O), 4.68 (0.84H, s, CH_2), 4.67 (1.16H, s, ThzCH_2O), 4.67 (0.84H, s, ThzCH_2O), 3.66 (1.16H, t, *J* 8.0, OCH_2CH_2), 3.64 (0.84H, t, *J* 8.0, OCH_2CH_2), 2.16 (3H, s, Me), 0.94 (1.16H, t, *J* 8.0, OCH_2CH_2), 0.93 (0.84H, t, *J* 8.0, OCH_2CH_2), 0.00 (5.22H, s, $SiMe_3$), -0.01 (3.78H, s,

$SiMe_3$); δ_C(100 MHz; $CDCl_3$) 189.2 (C), 168.2 (C), 162.8 (C), 161.9 (C), 153.6 (C), 151.7 (C), 143.6 (C), 142.8 (CH), 140.4 (C), 137.8 (C), 137.2 (CH), 131.4 (C), 131.0 (C), 120.1 (CH_2), 119.0 (CH_2), 117.2 (CH), 112.0 (CH), 94.4 (CH_2), 92.4 (CH), 65.5 (CH_2), 65.4 (CH_2), 65.1 (CH_2), 64.6 (CH_2), 43.7 (CH_2), 19.0 (Me) and –1.4 (Me); *m/z* (APcI) 395 (MH^+, 100%).

1-Amino-1-[2-(2-propenyl)oxazol-4-yl]-2-{4-[2-(trimethylsilyl)ethoxymethoxymethyl]thiazol-2-yl}ethene (3a)

Ammonium acetate (53 mg, 0.69 mmol) was added to a solution of 1-[2-(2-propenyl)oxazol-4-yl]-2-{4-[2-(trimethylsilyl)ethoxymethoxymethyl]thiazol-2-yl}ethanone and 1-hydroxy-1-[2-(2-propenyl)oxazol-4-yl]-2-{4-[2-(trimethylsilyl)ethoxymethoxymethyl]thiazol-2-yl}ethene (**13**) (45 mg, 0.11 mmol) in toluene (1.5 ml) under nitrogen and the mixture was irradiated at 120 °C (initial power 100 W) in a CEM Discover™ microwave synthesizer for 30 minutes. After cooling, the mixture was partitioned between water (15 ml) and chloroform (15 ml) and the aqueous layer further extracted with chloroform (2 x 15 ml). The combined organic extracts were dried ($MgSO_4$) and concentrated *in vacuo*. Purification by flash chromatography on silica, eluting with light petroleum-ethyl acetate (4 : 1), gave the *title compound* as a brown oil (30 mg, 67%); ν_{max}(film)/cm^{-1} 3474, 3156, 2925, 1616, 1544, 1463, 1404, 1354, 1249, 1117, 1060, 917, 860, 835 and 695; δ_H(400 MHz; $CDCl_3$) 7.82 (1H, s OxaH), 6.84 (1H, s, ThzH), 6.77 (2H, bs, NH_2), 5.96 (1H, d, *J* 1.0, C*H*H), 5.90 (1H, s, CH), 5.39 (1H, dd, *J* 1.0, 0.9, CH*H*), 4.78 (2H, s, OCH_2O), 4.67 (2H, s, ArCH_2O), 3.66 (2H, t, *J* 8.5, OCH_2CH_2), 2.16 (3H, d, *J* 0.9, Me), 0.94 (2H, t, *J* 8.5, OCH_2CH_2), 0.00 (9H, s, $SiMe_3$); δ_C(100 MHz; $CDCl_3$) 168.3 (C), 162.6 (C), 152.9 (C), 139.7 (C), 139.0 (C), 134.5 (CH), 131.4 (C) 118.9 (CH_2), 110.6 (CH), 94.3 (CH_2), 88.1 (CH), 65.3 (CH_2), 65.3 (CH_2), 19.0 (Me), 18.1 (CH_2) and –1.4 (Me); *m/z* (APcI) 394 (MH^+, 1%), 311 (10), 241 (10), 97 (29), 83 (42) and 71 (100).

Methyl 2-[2-(2-propenyl)oxazol-4-yl]-3-{4-[2-(trimethylsilyl)ethoxymethoxymethyl]thiazol-2-yl}-pyridine-6-carboxylate (2a)

A solution of methyl 2-oxo-4-(trimethylsilyl)-3-butynoate (**4**)[4] (122 mg, 0.66 mmol) in methanol (1 ml) was added to a solution of 1-amino-1-[2-(2-propenyl)oxazol-4-yl]-2-{4-[2-(trimethylsilyl)ethoxy-methoxymethyl]thiazol-2-yl}ethene (**3a**) (129 mg, 0.33 mmol) in methanol (5 ml) and the mixture was stirred overnight and concentrated *in vacuo*. The crude residue was dissolved in tetrahydrofuran (5 ml)

[4] Bagley, M. C.; Brace, C.; Dale, J. W.; Ohnesorge, M.; Phillips, N. G.; Xiong, X.; Bower, J. *J. Chem. Soc., Perkin Trans. 1* **2002**, 1663.

and a solution of tetrabutylammonium fluoride in tetrahydrofuran (1 M; 0.66 ml, 0.66 mmol) and trifluoroacetic acid (51 μl, 0.66 mmol) was added. The mixture was stirred for 1 hour at room temperature, evaporated *in vacuo* and partitioned between water (50 ml) and chloroform (50 ml). The aqueous layer was further extracted with chloroform (2 x 30 ml) and the combined organic extracts were dried ($MgSO_4$) and concentrated *in vacuo*. Purification by flash chromatography on silica, eluting with light petroleum-ethyl acetate (4 : 1), gave the *title compound* as a brown oil (80 mg, 50%) (Found: MH^+, 488.1664. $C_{23}H_{29}N_3O_2SSi$ requires *MH*, 488.1675); ν_{max}(film)/cm^{-1} 3096, 2956, 2924, 2889, 1727, 1579, 1538, 1440, 1354, 1322, 1278, 1249, 1193, 1139, 1111, 1060, 1006, 916, 860, 837, 760 and 733; δ_H(400 MHz; $CDCl_3$) 8.27 (1H, d, *J* 8.8, 4-H), 8.15 (1H, d, *J* 8.8, 5-H), 7.90 (1H, s, OxaH), 7.37 (1H, s, ThzH), 5.90 (1H, m, C*H*H), 5.35 (1H, m, CH*H*), 4.79 (2H, s, OCH_2O), 4.76 (2H, s, ThzCH_2O), 4.00 (3H, s, OMe), 3.67 (2H, t, *J* 8.4, OCH_2CH_2), 2.06 (3H, s, Me), 0.95 (2H, t, *J* 8.4, OCH_2CH_2), 0.00 (9H, s, $SiMe_3$); δ_C(100 MHz; $CDCl_3$) 165.1 (C), 163.6 (C), 162.3 (C), 154.3 (C), 148.9 (C), 148.0 (C), 139.5 (CH), 139.2 (C), 138.7 (CH), 131.9 (C), 131.4 (C), 123.8 (CH), 118.6 (CH_2), 94.4 (CH_2), 65.4 (CH_2), 65.0 (CH_2), 53.1 (Me), 19.0 (Me), 18.1 (CH_2) and –1.1 (Me); one quaternary carbon not observed; *m/z* (APcI) 488 (MH^+, 77%), 408 (47), 356 (9), 348 (15), 258 (20), 109 (27), 83 (100).

Methyl 2-(2-acetyloxazol-4-yl)-3-{4-[2-(trimethylsilyl)ethoxymethoxymethyl]thiazol-2-yl}pyridine-6-carboxylate (14)

A solution of osmium(VIII) tetroxide (4.0 mg, 0.016 mmol) in acetonitrile (0.2 ml)[5] was added to a solution of methyl 2-[2-(2-propenyl)oxazol-4-yl]-3-{4-[2-(trimethylsilyl)ethoxymethoxymethyl]-thiazol-2-yl}pyridine-6-carboxylate (**2a**) (80 mg, 0.16 mmol) in dioxane-water (1:1) (20 ml). After stirring for 10 minutes, sodium periodate (70 mg, 0.33 mmol) was added, the mixture was stirred for a further 12 hours and partitioned between water (30 ml) and dichloromethane (30 ml). The aqueous layer was further extracted with dichloromethane (30 ml) and the combined organic extracts were washed with a saturated aqueous solution of sodium metabisulfite (30 ml), dried (Na_2SO_4) and concentrated *in vacuo*. Purification by flash chromatography on silica, eluting with light petroleum-ethyl acetate (1 : 3), gave the *title compound* as a brown oil (39 mg, 50%) (Found: MH^+, 490.1464. $C_{22}H_{27}N_3O_6SSi$ requires *MH*, 490.1468); ν_{max}(film)/cm^{-1} 3116, 2953, 1728, 1709, 1527, 1441, 1370, 1320, 1288, 1248, 1224, 1193, 1133, 1110, 1059, 860, 837 and 764; δ_H(400 MHz; d_4-methanol) 8.61 (1H, s, OxaH), 8.28 (1H, d, *J* 8.0, 4-H), 8.20 (1H, d, *J* 8.0, 5-H), 7.64 (1H, s, ThzH), 4.72 (2H, s,

OCH_2O), 4.68 (2H, s, ArCH_2O), 3.96 (3H, s, OMe), 3.65 (2H, t, *J* 8.1, OCH_2CH_2), 2.39 (3H, s, Me), 0.92 (2H, t, *J* 8.1, OCH_2CH_2), 0.00 (9H, s, $SiMe_3$); δ_C(100 MHz; d_4-methanol) 185.3 (C), 173.7 (C), 164.8 (C), 164.1 (C), 157.0 (C), 154.1 (C), 147.9 (C), 142.7 (CH), 140.4 (C), 140.1 (CH), 131.3 (C), 124.0 (CH), 119.3 (CH), 94.0 (CH_2), 65.0 (CH_2), 64.2 (CH_2), 52.2 (Me), 25.3 (Me), 17.5 (CH_2) and –2.7 (Me); *m/z* (APcI) 490 (MH^+, 100%), 328 (33), 124 (100).

Formation of lithium enolate of *S*-ethyl thioacetate

A solution of *n*-butyllithium in hexanes (2.5 M; 6.24 ml, 15.6 mmol) was added to a stirred solution of diisopropylamine (2.20 ml, 15.6 mmol) in tetrahydrofuran (15.7 ml) at 0 °C. The mixture was stirred for 10 min and cooled to -78 °C. Freshly distilled *S*-ethyl thioacetate (0.83 ml, 7.8 mmol) was added and the solution was stirred for 30 min.

_S_-Ethylthio {[2-(2-propenyl)oxazol-4-yl]carbonyl}acetate and _S_-ethylthio 3-hydroxy-3-[2-(2-propenyl)oxazol-4-yl]propenoate (15)

Ethyl chloroformate (0.54 ml, 5.7 mmol) was added dropwise to a stirred solution of 2-(2-propenyl)oxazole-4-carboxylic acid (**8**) (800 mg, 5.22 mmol) and triethylamine (0.80 ml, 5.7 mmol) in dry tetrahydrofuran (11 ml) at 0 °C. After stirring for 30 minutes, the mixture was filtered, cooled to -78 °C and a solution of the lithium enolate of *S*-ethyl thioacetate was added dropwise. The mixture was stirred at -78 °C for 30 min and partitioned between saturated aqueous ammonium chloride solution (60 ml) and ethyl acetate (60 ml). The organic extract was washed with brine (40 ml), dried (Na_2SO_4) and evaporated *in vacuo*. Purification by flash chromatography on silica, eluting with dichloromethane, gave the *title compounds* as a pale yellow oil (0.94 g, 75%) (Found: MH^+, 240.0688. $C_{11}H_{13}NO_3S$ requires MH^+, 240.0689); ν_{max}(KBr)/cm^{-1} 2966, 2925, 1704, 1648, 1589, 1538, 1452, 1408, 1330, 1246, 1120, 1080, 775, 722; δ_H(400 MHz; $CDCl_3$) 12.54 (0.65H, s, OH), 8.15 (0.35H, s, OxaH), 7.93 (0.65H, s, OxaH), 6.20 (0.65H, s, CH), 5.94 (0.35H, s, C*H*H), 5.91 (0.65H, s, C*H*H), 5.40 (0.35H, s, CH*H*), 5.37 (0.65H, s, CH*H*), 4.10 (0.70H, s, CH_2), 2.90 (1.30H, q, *J* 7.4, CH_2Me), 2.86 (0.70H, q, *J* 7.4, CH_2Me), 2.09 (3H, s, Me), 1.24 (1.95H, t, *J* 7.4, CH_2*Me*), 1.19 (1.05H, t, *J* 7.4, CH_2*Me*); δ_C(100 MHz, $CDCl_3$) 195.5 (C), 192.0 (C), 186.9 (C), 163.0 (C), 162.8 (C), 161.0 (C), 142.8 (CH), 140.7 (C), 139.7 (CH), 136.6 (C), 131.2 (C), 131.0 (C), 120.1 (CH_2), 119.6 (CH_2), 98.3 (CH), 54.5 (CH_2), 24.0 (CH_2), 22.9 (CH_2), 18.91 (Me), 18.88 (Me), 14.8 (Me), 14.5 (Me); *m/z* (APcI) 240 (MH^+, 100%), 210 (44).

[5] From a 0.079 M stock solution of osmium(VIII) tetroxide (250 mg, 0.98 mmol) in acetonitrile (12.5 ml).

(*S*)-*N*-{3-Hydroxy-3-[2-(2-propenyl)oxazol-4-yl]propenoyl}-*O*-*tert*-butylserine methyl ester and (*S*)-*N*-{3-oxo-3-[2-(2-propenyl)oxazol-4-yl]propanoyl}-*O*-*tert*-butylserine methyl ester (16)

A solution of *S*-ethylthio {[2-(2-propenyl)oxazol-4-yl]carbonyl}acetate and *S*-ethylthio 3-hydroxy-3-[2-(2-propenyl)oxazol-4-yl]propenoate (**15**) (274 mg, 1.14 mmol) in dry dichloromethane (5 ml) was added to a stirred solution of triethylamine (0.32 ml, 2.29 mmol) and *O*-*tert*-butyl-L-serine methyl ester hydrochloride (242 mg, 1.14 mmol) in dry dichloromethane (15 ml). Copper(I) iodide (485 mg, 2.29 mmol) was added, the mixture was stirred at room temperature overnight, partitioned between dichloromethane (5 ml) and dilute hydrochloric acid (1 N; 5 ml) and filtered. The organic extract was washed sequentially with dilute hydrochloric acid (1 N; 10 ml), saturated aqueous sodium hydrogen carbonate solution (10 ml) and brine (10 ml), dried (Na_2SO_4) and evaporated *in vacuo*. Purification by flash column chromatography on silica gel, eluting with light petroleum-ethyl acetate (4:1), gave the *title compounds* as a pale yellow oil (0.33 g, 83%) (Found: MH^+, 353.1701. $C_{17}H_{24}N_2O_6$ requires MH^+, 353.1707); $[\alpha]_D^{24}$ +41.7 (*c* 1.1, $CHCl_3$); ν_{max}(KBr)/cm^{-1} 3366, 2971, 1750, 1694, 1661, 1609, 1549, 1438, 1364, 1248, 1204, 1093, 1054, 1020, 915, 812, 780, 737; δ_H(400 MHz; $CDCl_3$) 13.36 (0.36H, s, OH), 8.24 (0.64H, s, OxaH), 7.87 (0.36H, s, OxaH), 7.72 (0.64H, d, *J* 8.2, NH), 6.42 (0.36H, d, *J* 8.5, NH), 5.95 (0.64H, s, 2”-H), 5.90 (0.36H, s, 2”-H), 5.79 (0.36H, s, CH), 5.42 (0.64H, s, 2”-H), 5.35 (0.36H, s, 2”-H), 4.71 (0.36H, m, α-CH), 4.66 (0.64H, m, α-CH), 3.93 (0.64H, d, *J* 15.6, C*H*H), 3.89 (0.64H, d, *J* 15.6, CH*H*), 3.78 (0.36H, dd, *J* 8.9, 2.9, β-C*H*H), 3.74 (0.64H, dd, *J* 9.1, 3.0, β-C*H*H), 3.68 (1.08H, s, OMe), 3.65 (1.92H, s, OMe), 3.54 (0.36H, dd, *J* 8.9, 3.2, β-CH*H*), 3.49 (0.64H, dd, *J* 9.1, 3.2, β-CH*H*), 2.11 (1.92H, s, Me), 2.08 (1.08H, s, Me), 1.06 (1.08H, s, CMe_3), 1.04 (1.92H, s, CMe_3); δ_C(100 MHz, $CDCl_3$) 188.8 (C), 171.3 (C), 170.8 (C), 170.6 (C), 165.2 (C), 162.8 (C), 162.7 (C), 162.2 (C), 143.2 (CH), 140.7 (C), 138.1 (CH), 137.4 (C), 131.2 (C), 130.9 (C), 120.2 (CH_2), 119.2 (CH_2), 89.9 (CH), 73.4 (C), 73.3 (C), 61.9 (CH_2), 61.8 (CH_2), 53.1 (CH), 52.4 (Me), 52.3 (Me), 52.3 (CH), 47.0 (CH_2), 27.2 (Me), 27.2 (Me), 18.9 (Me), 18.8 (Me); *m/z* (APcI) 353 (MH^+, 44%), 297 (100), 279 (12), 120 (37).

(*S*)-*N*-{3-Amino-3-[2-(2-propenyl)oxazol-4-yl]propenoyl}-*O*-*tert*-butylserine methyl ester (3b)

Ammonium acetate (293 mg, 3.8 mmol) was added to a solution of (*S*)-*N*-{3-hydroxy-3-[2-(2-propenyl)oxazol-4-yl]propenoyl}-*O*-*tert*-butylserine methyl ester and (*S*)-*N*-{3-oxo-3-[2-(2-propenyl)oxazol-4-yl]propanoyl}-*O*-*tert*-butylserine methyl ester (**16**) (269 mg, 0.76 mmol) in dry methanol (15 ml) under nitrogen and the reaction heated at reflux overnight. After cooling to room

temperature, the mixture was evaporated *in vacuo*. The residue was partitioned between ethyl acetate (30 ml) and water (30 ml) and the aqueous layer further extracted with ethyl acetate (30 ml). The combined organic extracts were washed sequentially with saturated aqueous sodium hydrogen carbonate solution (30 ml) and brine (30 ml), dried (Na_2SO_4) and evaporated *in vacuo*. Purification by flash chromatography on silica, eluting with light petroleum-ethyl acetate (1:1), gave the *title compound* as a pale yellow oil (214 mg, 80%) (Found: MH^+, 352.1871. $C_{17}H_{25}N_3O_5$ requires MH^+, 352.1867); $[\alpha]_D^{24}$ +51.2 (*c* 1.0, $CHCl_3$); ν_{max}(KBr)/cm^{-1} 3452, 3324, 2974, 1748, 1644, 1598, 1540, 1363, 1198, 1098, 1050, 1021, 976, 913, 778; δ_H(400 MHz; $CDCl_3$) 7.79 (1H, s, OxaH), 6.82 (2H, bs, NH_2), 5.90 (1H, s, C*H*H), 5.89 (1H, d, *J* 8.5, NH), 5.36 (1H, s, CH*H*), 5.00 (1H, s, CH), 4.72 (1H, m, α-CH), 3.78 (1H, dd, *J* 8.9, 2.9, β-C*H*H), 3.68 (3H, s, OMe), 3.51 (1H, dd, *J* 8.9, 3.2, β-CH*H*), 2.10 (3H, s, Me), 1.08 (9H, s, CMe_3); δ_C(100 MHz, $CDCl_3$) 171.8 (C), 169.8 (C), 162.6 (C), 147.8 (C), 138.6 (C), 135.5 (CH), 131.3 (C), 119.1 (CH_2), 84.2 (CH), 73.4 (C), 62.4 (CH_2), 52.34 (CH), 52.30 (Me), 27.3 (Me), 19.0 (Me); *m/z* (APcI) 353 (100%), 352 (MH^+, 67).

(*S*)-*O*-*tert*-Butyl-*N*-({2-[2-(2-propenyl)oxazol-4-yl]-6-methoxycarbonylpyridin-3-yl}carbonyl)-serine methyl ester (2b)

A solution of (*S*)-*N*-{3-amino-3-[2-(2-propenyl)oxazol-4-yl]propenoyl}-*O*-*tert*-butylserine methyl ester (**3b**) (88 mg, 0.25 mmol) and 4-(trimethylsilyl)-2-oxobut-3-ynoate[6] (61 mg, 0.33 mmol) in methanol (10 ml) was stirred at room temperature for 24 h and evaporated *in vacuo*. Purification by flash chromatography on silica, eluting with light petroleum-ethyl acetate (1:2), gave the *title compound* as a pale yellow oil (104 mg, 93%) (Found: MH^+, 446.1925. $C_{22}H_{27}N_3O_7$ requires MH^+, 446.1927); $[\alpha]_D^{29}$ +12.0 (*c* 1.8, $CHCl_3$); ν_{max}(KBr)/cm^{-1} 2966, 1751, 1670, 1540, 1436, 1364, 1323, 1262, 1099, 801, 760; δ_H(400 MHz; $CDCl_3$) 8.18 (1H, s, OxaH), 8.05 (1H, d, *J* 8.0, PyH), 8.01 (1H, d, *J* 8.0, PyH), 7.00 (1H, d, *J* 8.0, NH), 5.93 (1H, s, C*H*H), 5.35 (1H, s, CH*H*), 4.85 (1H, m, α-CH), 3.95 (3H, s, $PyCO_2Me$), 3.80 (1H, dd, *J* 9.1, 3.0, β-C*H*H), 3.69 (3H, s, OMe), 3.57 (1H, dd, *J* 9.1, 3.2, β-CH*H*), 2.10 (3H, s, Me), 1.01 (9H, s, CMe_3); δ_C(100 MHz, $CDCl_3$) 170.5 (C), 167.0 (C), 165.0 (C), 162.6 (C), 148.5 (C), 147.5 (C), 139.5 (C), 139.0 (CH), 138.1 (CH), 133.3 (C), 131.4 (C), 123.6 (CH), 119.0 (CH_2), 73.6 (C), 61.8 (CH_2), 53.5 (CH), 53.1 (Me), 52.5 (Me), 27.2 (Me), 19.0 (Me); *m/z* (APcI) 446 (MH^+, 100%).

(*S*)-*N*-({2-[2-(2-Propenyl)oxazol-4-yl]-6-methoxycarbonylpyridin-3-yl}carbonyl)serine methyl ester (17)

A solution of (*S*)-*O*-*tert*-butyl-*N*-({2-[2-(2-propenyl)oxazol-4-yl]-6-methoxycarbonylpyridin-3-yl}carbonyl)serine methyl ester (**2b**) (60 mg, 0.14mmol) in trifluoroacetic acid-dichloromethane (1:1) (20 ml) was stirred at room temperature for 20 min and evaporated *in vacuo*. Purification by flash column chromatography on silica, eluting with ethyl acetate, gave the *title compound* as colourless crystals (50 mg, 96%), mp 74-76 °C (aqueous ethanol) (Found: MH^+, 390.1301. $C_{18}H_{19}N_3O_7$ requires *MH*$^+$, 390.1296); $[\alpha]_D^{25}$ –8.8 (*c* 0.5, $CHCl_3$); ν_{max}(KBr)/cm^{-1} 3439, 2954, 1734, 1654, 1542, 1438, 1323, 1293, 1234, 1174, 1140, 760; δ_H(400 MHz; $CDCl_3$) 8.22 (1H, s, OxaH), 7.89 (1H, d, *J* 7.9, PyH), 7.84 (1H, d, *J* 7.9, PyH), 7.50 (1H, d, *J* 7.1, NH), 5.89 (1H, s, C*H*H), 5.35 (1H, s, CH*H*), 4.70 (1H, m, α-CH), 4.32 (1H, bs, OH), 4.01 (1H, dd, *J* 8.2, 3.1, β-C*H*H), 3.94 (1H, dd, *J* 8.2, 3.7, β-CH*H*), 3.91 (3H, s, $PyCO_2Me$), 3.68 (3H, s, OMe), 2.05 (3H, s, Me); δ_C(100 MHz, $CDCl_3$) 170.5 (C), 167.6 (C), 164.9 (C), 162.8 (C), 148.0 (C), 147.2 (C), 142.2 (C), 139.7 (CH), 137.8 (CH), 132.8 (C), 131.0 (C), 123.5 (CH), 119.9 (CH_2), 62.2 (CH_2), 55.6 (CH), 53.2 (Me), 52.8 (Me), 18.9 (Me); *m/z* (APcI) 390 (MH^+, 100%).

Methyl 2-(2-acetyloxazol-4-yl)-3-[4-(methoxycarbonyl)thiazol-2-yl]pyridine-6-carboxylate (dimethyl sulfomycinamate) (1)

A solution of (*S*)-*N*-({2-[2-(2-propenyl)oxazol-4-yl]-6-methoxycarbonylpyridin-3-yl}carbonyl)serine methyl ester (**17**) (41 mg, 0.10 mmol) and Burgess reagent (28 mg, 0.11 mmol) in dry tetrahydrofuran (5 ml) was stirred at 70 °C for 1 h and evaporated *in vacuo*. Purification by flash chromatography on silica, eluting with light petroleum-ethyl acetate (1:2), gave *methyl 2-[2-(2-propenyl)oxazol-4-yl]-3-(4-methoxycarbonyl-2-oxazolin-2-yl)pyridine-6-carboxylate* (**18**) as a pale yellow oil (24 mg, 63%). A solution of this oil in methanol-triethylamine (2:1) (3 ml) was saturated with hydrogen sulfide, stirred at room temperature for 3.5 h and evaporated *in vacuo*. Purification by flash chromatography on silica, eluting with diethyl ether-acetone (5:1), gave N-*({2-[2-(2-propenyl)oxazol-4-yl]-6-methoxycarbonylpyridin-3-yl}thiocarbonyl)serine methyl ester* (**19**) as a pale yellow oil (17 mg, 71%). A solution of thioamide **19** (33 mg, 0.08 mmol) and Burgess reagent (24 mg, 0.10 mmol) in dry tetrahydrofuran (5 ml) was stirred at 70 °C for 30 min and evaporated *in vacuo*. Purification by flash chromatography on silica, eluting with ethyl acetate, gave *methyl 2-[2-(2-propenyl)oxazol-4-yl]-3-(4-*

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methoxycarbonyl-2-thiazolin-2-yl)pyridine-6-carboxylate (**20**) as a pale yellow oil (27 mg, 87%). A mixture of thiazoline **20** and activated manganese(IV) oxide (121 mg, 1.39 mmol) in dichloromethane (3 ml) was irradiated at 100 °C (initial power 300 W) for 150 min in a sealed pressure-rated reaction tube (10 ml) using a CEM Discover™ Microwave Synthesizer. The mixture was cooled rapidly to room temperature in a flow of compressed air for 5 min, filtered through Celite® washing with dichloromethane (2 x 10 ml) and evaporated *in vacuo*. Purification by flash chromatography on silica, eluting with light petroleum-ethyl acetate (1:2), gave *methyl 2-[2-(2-propenyl)oxazol-4-yl]-3-[4-(methoxycarbonyl)thiazol-2-yl]pyridine-6-carboxylate* (**21**) as a pale yellow oil (21 mg, 79%). A solution[5] of osmium(VIII) tetroxide (1.2 mg, 4.7 μmol) in acetonitrile (60 μl) was added to a solution of alkene **21** (16 mg, 0.04 mmol) in dioxane-water (1:1) (8 ml). Sodium periodate (17 mg, 0.08 mmol) was added and the mixture was stirred at room temperature overnight and extracted with dichloromethane (2 x 5 ml). The combined organic extracts were washed sequentially with saturated aqueous sodium hydrogen carbonate solution (8 ml), water (8 ml) and brine (8 ml), dried (Na_2SO_4) and evaporated *in vacuo*. Purification by flash chromatography on silica, eluting with light petroleum-ethyl acetate (1:2), gave the *title compound* as a colourless crystals (12 mg, 80%), mp 159.0-161.0 °C (diethyl ether-hexane) (lit.,[7] mp 160.5-161.0 °C) (lit.,[8] mp 157.3-160.2 °C) (Found: MH^+, 388.0604. $C_{17}H_{13}N_3O_6S$ requires *MH*$^+$, 388.0595); ν_{max}(KBr)/cm^{-1} 3150, 2954, 1728, 1702, 1573, 1534, 1477, 1435, 1373, 1338, 1316, 1219, 1128, 1096, 1005, 963, 869, 842, 768; δ_H(400 MHz; $CDCl_3$) 8.33 (1H, s, CH), 8.31 (1H, s, CH), 8.16 (2H, app s, 4,5-H), 3.98 (3H, s, OMe), 3.91 (3H, s, OMe), 2.41 (3H, s, Me); δ_C(100 MHz, $CDCl_3$) 185.6 (C), 164.7 (C), 164.2 (C), 161.6 (C), 157.0 (C), 148.8 (C), 148.0 (C), 147.2 (C), 142.7 (CH), 140.4 (CH), 140.3 (C), 130.7 (C), 129.7 (CH), 124.2 (CH), 53.3 (Me), 52.8 (Me), 26.6 (Me); *m/z* (APcI) 388 (MH^+, 100%).

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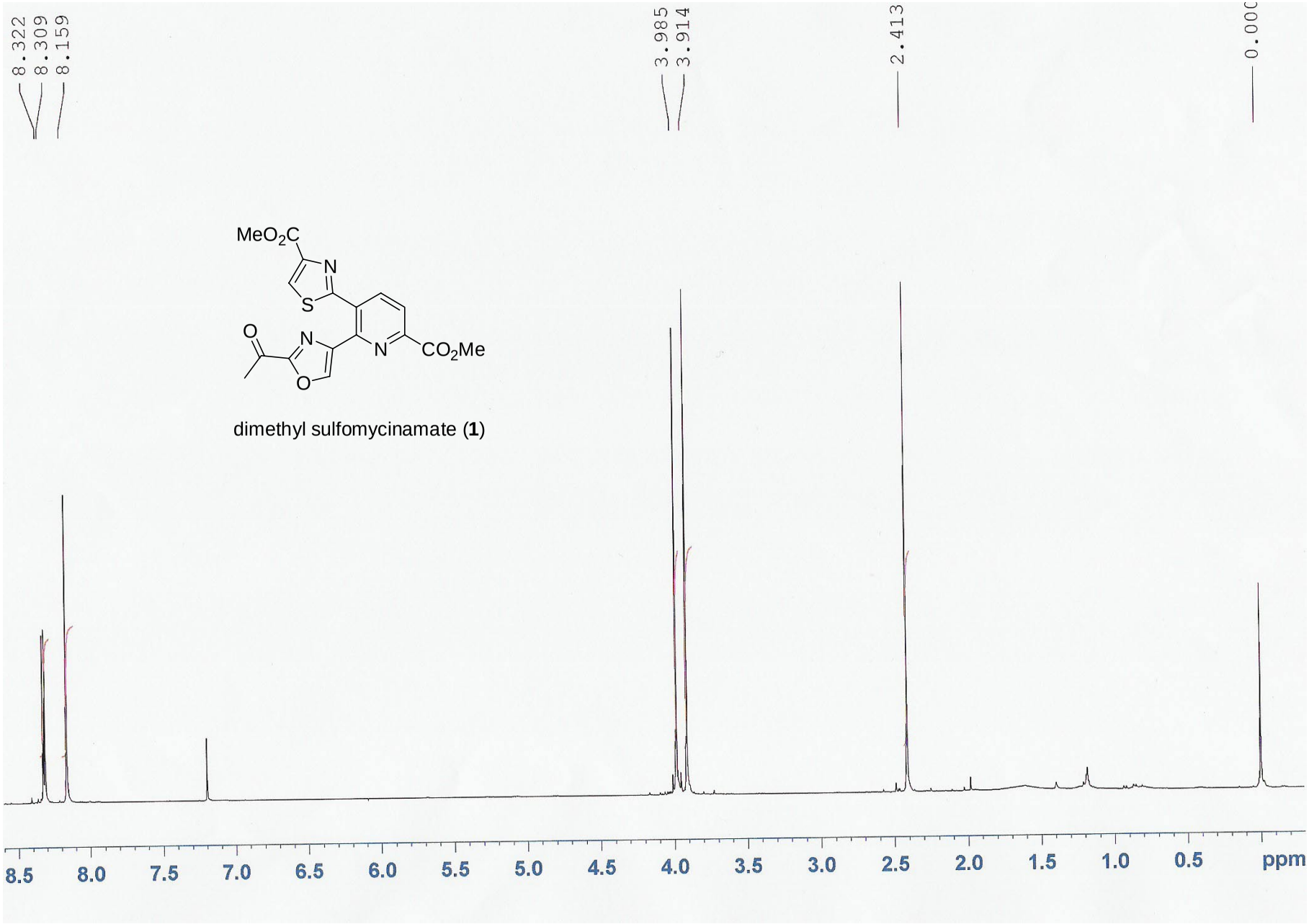
^{1}H NMR spectrum (400 MHz, $CDCl_3$) of dimethyl sulfomycinamate (**1**)



^{13}C NMR spectrum (100 MHz, $CDCl_3$) of dimethyl sulfomycinamate (**1**)