

Spectroscopic data of the products **4a-4g**, **4i**, **5**, **6**, **8**, and **9** are deposited.

1-(4-Methoxycarbonyl-2-methyl-1-selenoxobutyl)pyrrolidine (**4a**)

IR (Neat) 2970, 2873, 1732, 1488, 1446, 1329, 1256, 1198, 1089, 990, 960, 909, 857, 824, 782, 638 cm^{-1} ; ^1H NMR (400 MHz, CDCl_3) δ 1.22 (d, $J = 6.6$ Hz, 3 H, CH_3), 1.80-1.92 (m, 1 H, NCH_2CH_2), 1.96-2.08 (m, 2 H, CH_2), 2.08-2.50 (m, 5 H, NCH_2CH_2 , $\text{CH}_3\text{O}_2\text{CCH}_2$), 2.95-3.75 (m, 1 H, CH_3CH), 3.50-3.60 (m, 1 H, NCH_2), 3.60-3.70 (m, 1 H, NCH_2), 3.66 (s, 3 H, OCH_3), 3.83-4.00 (m, 2 H, NCH_2); ^{13}C NMR (100 MHz, CDCl_3) δ 21.0 (CH_3), 23.7, 26.0, 31.2, 32.7 (CH_2), 45.3 (CH_3CH), 51.1 (NCH_2), 51.4 (OCH_3), 57.7 (NCH_2), 173.7 (C=O), 209.8 (C=Se); Mass (m/z) 277 (M^+), 196 (M^+-Se), 110 ($\text{M}^+-(\text{Se}+\text{CH}_3\text{O}_2\text{CCH}_2\text{CH}_2)$); Anal. Calcd for $\text{C}_{11}\text{H}_{19}\text{NO}_2\text{Se}$: C, 47.83; H, 6.93. Found: C, 47.77; H, 7.12.

1-(4-Ethoxycarbonyl-3-methyl-1-selenoxobutyl)pyrrolidine (**4b**)

IR (Neat) 2973, 1732, 1496, 1448, 1374, 1329, 1256, 1195, 1032 cm^{-1} ; ^1H NMR (400 MHz, CDCl_3) δ 1.09 (d, $J = 6.6$ Hz, 3 H, CH_3), 1.26 (t, $J = 7.2$ Hz, 3 H, CH_3), 2.00-2.20 (m, 4 H, NCH_2CH_2), 2.29 (dd, $J = 15.6$ Hz, 6.6 Hz, 1 H, CH_2), 2.57 (dd, $J = 15.4$ Hz, 5.9 Hz, 1 H, CH_2), 2.74-2.80 (m, 2 H, CH_2), 2.85-2.95 (m, 1 H, CH), 3.50-3.65 (m, 2 H, NCH_2), 3.87 (t, $J = 7.08$ Hz, 2 H, NCH_2), 4.13 (q, $J = 7.2$ Hz, 2 H, $\text{CH}_3\text{CH}_2\text{O}$); ^{13}C NMR (100 MHz, CDCl_3) δ 14.3, 19.7 (CH_3), 24.2, 26.5 (NCH_2), 30.4 (CH), 40.6, 51.8, 53.5, 58.1, 60.3 (CH_2), 172.7 (C=O), 201.8 (C=Se); Mass (m/z) 291 (M^+), 210 (M^+-Se), 168 ($\text{M}^+-(\text{Se}+\text{CH}_3\text{CH}_2\text{O})$), 96 ($\text{M}^+-(\text{Se}+\text{NC}_4\text{H}_8+\text{CH}_3\text{CH}_2\text{O})$); Anal. Calcd for $\text{C}_{12}\text{H}_{21}\text{NO}_2\text{Se}$: C, 49.66; H, 7.29. Found: C, 49.90; H, 7.38.

1-(2,3-Dimethyl-4-ethoxycarbonyl-1-selenoxobutyl)pyrrolidine (**4c**)

IR (Neat) 3442, 2975, 2874, 1732, 1446, 1372, 1328, 1256, 1184, 1096, 1029, 992, 955, 921, 893, 860, 815, 683, 639, 602 cm^{-1} ; ^1H NMR (400 MHz, CDCl_3) δ 1.08 (d, $J = 6.8$ Hz, 3

H, CH₃), 1.20-1.28 (m, 6 H, CH₃), 1.99-2.72 (m, 5 H, NCH₂CH₂, COCH₂CH), 2.26 (dd, *J* = 6.8 Hz, 15.1 Hz, 1 H, COCH₂), 2.43 (dd, *J* = 4.7 Hz, 14.9 Hz, 1 H, COCH₂), 2.87-2.96 (m, 1 H, CSeCHCH₃), 3.50-3.68 (m, 1 H, NCH₂), 3.72-3.80 (m, 1 H, NCH₂), 3.84-3.97 (m, 2 H, OCH₂), 4.03-4.17 (m, 2 H, NCH₂); ¹³C NMR (100 MHz, CDCl₃) δ 13.9, 15.8 18.7 (CH₃), 23.5, 25.8 (NCH₂CH₂), 36.0 (CH), 39.1 (COCH₂), 50.5 (CH), 51.1 (CH₃CH₂O), 57.6, 59.8 (NCH₂), 172.4 (C=O), 209.6 (C=Se); Mass (m/z) 305 (M⁺), 224 (M⁺-Se), 110 (M⁺-(Se+CH₃CH₂O₂CCH₂CHCH₃)); Anal. Calcd for C₁₃H₂₃NO₂Se: C, 51.31; H, 7.62. Found: C, 51.55; H, 7.64.

1-(2, 4-Dimethyl-4-methoxycarbonyl-1-selenoxobutyl)pyrrolidine (**4d**)

IR (Neat) 2972, 2874, 1732, 1487, 1446, 1377, 1329, 1257, 1198, 1086, 1023, 981, 961, 922, 879, 822, 763, 692 cm⁻¹; ¹H NMR (400 MHz, CDCl₃) major isomer δ 1.17 (d, *J* = 6.8 Hz, 3 H, CH₃), 1.25 (d, *J* = 6.3 Hz, 3 H, CH₃), 1.68-1.82 (m, 1H), 1.97-2.30 (m, 5 H), 2.45-2.67 (m, 1 H), 2.87-2.96 (m, 1 H), 3.46-3.58 (m, 1 H, NCH₂), 3.64-3.72 (m, 1 H, NCH₂), 3.68 (s, 3 H, OCH₃), 3.82-4.02 (m, 2 H, NCH₂) minor isomer δ 1.15 (d, *J* = 7.6 Hz, 3 H, CH₃), 1.25 (d, *J* = 6.3 Hz, 3 H, CH₃), 1.68-1.82 (m, 1 H), 1.97-2.30 (m, 5 H), 2.45-2.67 (m, 1 H), 2.87-2.96 (m, 1 H), 3.46-3.58 (m, 1 H, NCH₂), 3.64-3.72 (m, 1 H, NCH₂), 3.66 (s, 3 H, OCH₃), 3.82-4.02 (m, 2 H, NCH₂); ¹³C NMR (100 MHz, CDCl₃) major isomer δ 18.1, 20.6 (CH₃), 23.8, 26.2 (NCH₂CH₂), 36.7 (CH), 41.1 (CH₂), 44.4 (CH), 51.1 (NCH₂), 51.6 (OCH₃), 57.8 (NCH₂), 177.0 (C=O), 210.3 (C=Se) minor isomer δ 18.1, 21.6 (CH₃), 23.8, 26.1 (NCH₂CH₂), 37.6 (CH), 42.5 (CH₂), 44.7 (CH), 51.1(NCH₂), 51.5 (OCH₃), 57.9 (NCH₂), 177.1 (C=O), 210.1 (C=Se); Mass (m/z) 291 (M⁺), 210 (M⁺-Se), 191 (M⁺-CH₃O₂CCHCH₃CH₂), 110 (M⁺-(Se+CH₃O₂CCHCH₃)); Anal. Calcd for C₁₂H₂₁NO₂Se: C, 49.66 ; H, 7.29 Found: C, 49.75 ; H, 7.51.

1-(2,3-Dimethyl-5-oxo-1-selenoxohexyl) pyrrolidine (**4e**)

IR (KBr) 2968, 2872, 1706, 1499, 1439, 1358, 1331, 1306, 1258, 1227, 1201, 1096, 1040, 950, 924, 909, 689, 600, 538 cm^{-1} ; ^1H NMR (400 MHz, CDCl_3) δ major isomer 1.03 (d, $J = 6.8$ Hz, 3 H, CH_3), 1.22 (d, $J = 6.6$ Hz, 3 H, CH_3), 2.13 (s, 3 H, CH_3CO), 1.90 - 2.20 (m, 6 H, NCH_2CH_2 , CSeCH , $\text{CSeCHCH}_3\text{CH}$), 2.60 - 2.70 (m, 1 H, COCH_2), 2.80 - 2.95 (m, 1 H, COCH_2), 3.50 - 3.70 (m, 2 H, NCH_2), 3.80 - 4.00 (m, 2 H, NCH_2). minor isomer δ 0.93 (d, $J = 6.8$ Hz, 3 H, CH_3), 1.23 (d, $J = 6.6$ Hz, 3 H, CH_3), 1.62 (s, 3 H, CH_3CO), 1.90 - 2.20 (m, 5 H, NCH_2CH_2 , CH), 2.30 - 2.40 (m, 1 H, COCH_2), 3.00 (dd, $J = 16.6$ Hz, 3.7 Hz, 1 H, COCH_2), 3.50 - 3.70 (m, 2 H, NCH_2), 3.80 - 4.00 (m, 2 H, NCH_2); ^{13}C NMR (100 MHz, CDCl_3) major isomer δ 16.4, 19.1 (CH_3), 23.8, 26.2 (NCH_2CH_2), 30.2, 36.2 (CH), 49.3, 51.5, 57.9 (NCH_2 , CH_2), 51.7 (CH_3CO), 209.5, 210.2 ($\text{C}=\text{O}$, $\text{C}=\text{Se}$). minor isomer δ 18.6, 18.9 (CH_3), 23.8, 26.2 (NCH_2CH_2), 30.5, 34.6 (CH), 46.2, 51.5, 57.9 (NCH_2 , CH_2), 51.7 (CH_3CO), 209.5, 210.2 ($\text{C}=\text{O}$, $\text{C}=\text{Se}$); Mass (m/z) 274 (M^+), 232 (M^+-COCH_3), 194 (M^+-Se), 191 ($\text{M}^+-(\text{NCC}_4\text{H}_8+\text{CH}_3)$); Anal. Calcd for $\text{C}_{12}\text{H}_{21}\text{NOSe}$: C, 52.55 ; H, 7.71. Found: C, 52.59 ; H, 7.55.

1-(3-Methoxy-2-methyl-5-oxo-1-selenoxohexyl)pyrrolidine (**4f**)

IR (Neat) 2972, 1715, 1494, 1447, 1358, 1328, 1257, 1193, 1103, 952, 603, 527 cm^{-1} ; ^1H NMR (400 MHz, CDCl_3) δ 1.31 (d, $J = 6.6$ Hz, 3 H, CSeCHCH_3), 2.00-2.20 (m, 4 H, NCH_2CH_2), 2.18 (s, 3 H, CH_3CO), 2.60 (dd, $J = 15.4$ Hz, 6.1 Hz, 1 H, CH_3COCH_2), 2.96 (dd, $J = 15.4$ Hz, 3.7 Hz, 1 H, CH_3COCH_2), 3.17-3.21 (m, 1 H, CSeCHCH_3), 3.48 (s, 3 H, CH_3O), 3.45-3.55 (m, 1 H, NCH_2), 3.70-4.00 (m, 3 H, NCH_2), 4.10-4.20 (m, 1 H, $\text{CH}_3\text{COCH}_2\text{CH}$); ^{13}C NMR (100 MHz, CDCl_3) δ 18.3 (CH_3), 23.9, 26.1 (NCH_2CH_2), 31.6 (CH_3CO), 45.3 (CH_3COCH_2), 51.1 ($\text{C}_4\text{H}_8\text{NCSeCH}$), 51.6, 57.7 (NCH_2), 60.0 (OCH_3), 83.2 (CHO), 206.3 ($\text{C}=\text{O}$), 208.1 ($\text{C}=\text{Se}$); Mass (m/z) 291 (M^+), 210 (M^+-Se), 190 ($\text{M}^+-(\text{NC}_4\text{H}_8+\text{OCH}_3)$), 110 ($\text{M}^+-(\text{Se}+\text{NC}_4\text{H}_8+\text{OCH}_3)$); Anal. Calcd for $\text{C}_{12}\text{H}_{21}\text{NO}_2\text{Se}$: C, 49.66 ; H, 7.29. Found: C, 49.87 ; H, 7.23.

1-[2-Methyl-3-(3-oxocyclohexyl)-1-selenoxopropyl]pyrrolidine (**4g**)

IR (KBr) 2963, 2870, 1710, 1488, 1446, 1370, 1328, 1257, 1205, 1104, 989, 952, 913, 524 cm^{-1} ; ^1H NMR (400 MHz, CDCl_3) major isomer δ 1.24-1.26 (d, $J = 6.34$ Hz, 3 H, CH_3) 1.45- 1.90 (m, 2 H, CH_2), 1.90-2.30 (m, 8 H, CH_2), 2.25-2.45 (m, 1 H, CH), 2.50-2.60 (m, 1 H, CH), 2.60-2.80 (m, 2 H, CH_2), 3.40-3.60 (m, 2 H, NCH_2), 3.87-3.95 (m, 2 H, NCH_2).
 minor isomer δ 1.15-1.19 (d, $J = 17.6$ Hz, 3 H, CH_3), 1.48-1.70 (m, 2 H, CH_2), 1.85-2.25 (m, 8 H, CH_2), 2.25-2.45 (m, 1 H, CH), 2.50-2.60 (m, 1 H, CH), 2.60-2.80 (m, 2 H, CH_2), 3.45-3.70 (m, 2 H, NCH_2), 3.80- 4.00 (m, 2 H, NCH_2); ^{13}C NMR (100 MHz, CDCl_3) major isomer δ 19.1 (CH_3), 23.8, 24.1, 26.2, 29.9 (CH_2), 41.4, 44.9 (CH_2CO), 44.9 (CH), 51.7 (NCH_2), 52.6 (CH), 57.9 (NCH_2), 209.9, 210.7 ($\text{C}=\text{O}$, $\text{C}=\text{Se}$). minor isomer δ 18.8 (CH_3), 23.8, 24.8, 26.2, 27.1 (CH_2), 41.5, 44.5, (CH_2CO), 46.3, 50.9 (CH), 51.7, 58.0 (NCH_2), 209.6, 211.3 ($\text{C}=\text{O}$, $\text{C}=\text{Se}$); Mass (m/z) 287 (M^+), 206 (M^+-Se), 110 ($\text{M}^+-\text{CCH}_3\text{CSeNC}_4\text{H}_8$); Anal. Calcd for $\text{C}_{13}\text{H}_{21}\text{NOSe}$: C, 54.55 ; H, 7.39 Found: C, 54.62 ; H, 7.36.

1-(5-Oxo-1-selenoxo-2, 3, 3-trimethylhexyl)pyrrolidine (**4i**)

IR (Neat) 2966, 1708, 1475, 1444, 1365, 1256, 1173, 949 cm^{-1} ; ^1H NMR (400 MHz, CDCl_3) δ 1.18 (s, 3 H, CH_3), 1.19 (s, 3 H, CH_3), 1.23 (d, $J = 6.8$ Hz, 3 H, CH_3), 2.12 (s, 3 H, CH_3CO), 1.90-2.20 (m, 4 H, NCH_2CH_2), 2.51 (d, $J = 16.8$ Hz, 1 H, CH_3COCH_2), 3.04 (d, $J = 16.8$ Hz, 1 H, CH_3COCH_2), 3.40-3.60 (m, 2 H, NCH_2), 3.80-4.00 (m, 3 H, NCH_2 , CSeCHCH_3); ^{13}C NMR (100 MHz, CDCl_3) δ 17.4 (CH_3), 23.9 (NCH_2CH_2), 25.2, 25.7 (CH_3), 36.5 (CSeCHCH_3), 51.7 (CH_3CO), 51.8, 52.2 (NCH_2), 57.9 (COCH_2), 208.4, 209.4 ($\text{C}=\text{O}$, $\text{C}=\text{Se}$); Mass (m/z) 289 (M^+), 208 (M^+-Se), 110 ($\text{M}^+-\text{(Se+NC}_4\text{H}_8+\text{CH}_3+\text{CH}_3)$); Anal. Calcd for $\text{C}_{13}\text{H}_{23}\text{NOSe}$: C, 54.16 ; H, 8.04. Found: C, 54.19 ; H, 7.83.

1-(5-Hydroxy-1-selenoxo-2,3,5-trimethylhexyl)pyrrolidine (**5**)

IR (Neat) 3416, 2968, 1487, 1446, 1378, 1328, 1256, 1198, 950, 891 cm^{-1} ; ^1H NMR (400 MHz, CDCl_3) δ 1.03 (d, $J = 6.3$ Hz, 3 H, CH_3) 1.20 (d, $J = 6.8$ Hz, 3 H, CH_3), 1.21 (s, 3 H, CH_3), 1.23 (s, 3 H, CH_3), 1.15-1.25 (m, 1 H, CH_2), 1.48 (d, $J = 13.6$ Hz, 1 H, CH_2), 2.00-2.20 (m, 2 H, NCH_2), 2.26 (s, 1 H, OH), 2.40-2.50 (m, 1 H, CH), 2.60-2.70 (m, 1 H, CH), 3.45-3.65 (m, 2 H, NCH_2), 3.80-4.00 (m, 2 H, CH_2); ^{13}C NMR (100 MHz, CDCl_3) δ 18.8, 19.0 (CH_3), 23.8, 26.1 (NCH_2CH_2), 29.8, 31.1 (CH_3), 35.5 (CH), 48.9, 51.7 (NCH_2), 53.9 (CH), 57.9 ($(\text{CH}_3)_2\text{COHCH}_2$), 70.7 ($(\text{CH}_3)_2\text{COH}$), 211.4 (C=Se); Mass (m/z) 290 (M^+), 190 ($\text{M}^+-(\text{CH}_3+\text{CH}_3+\text{NC}_4\text{H}_8)$), 110 ($\text{M}^+-(\text{Se}+\text{NC}_4\text{H}_8+\text{OH}+\text{CH}_3)$); Anal. Calcd for $\text{C}_{13}\text{H}_{25}\text{NOSe}$: C, 53.79 ; H, 8.68 Found: C, 53.61 ; H, 8.39.

2-Pyrrolidyl-2,3,4,6,6-pentamethyltetrahydropyrane (**6**)

IR (Neat) 3425, 2968, 1654, 1560, 1458, 1372, 1100 cm^{-1} ; ^1H NMR (400 MHz, CDCl_3) δ 0.86 (d, $J = 6.8$ Hz, 3 H, CH_3), 0.86 (d, $J = 6.3$ Hz, 3 H, CH_3), 0.96-1.08 (m, 1 H, $\text{OC}(\text{CH}_3)_2\text{CH}_2$), 1.07 (s, 3 H, $\text{OC}(\text{CH}_3)_2$), 1.13 (s, 3 H, $\text{OC}(\text{CH}_3)_2$), 1.23 (s, 3 H, $\text{OC}(\text{CH}_3)_2$), 1.28-1.32 (m, 1 H, $\text{CH}(\text{CH}_3)$), 1.46 (dd, $J = 3.2$ Hz, 12.9 Hz, 1 H, $\text{OC}(\text{CH}_3)_2\text{CH}_2$), 1.52-1.64 (m, 1 H, $\text{CH}(\text{CH}_3)$), 1.64-1.68 (m, 4 H, $\text{N}(\text{CH}_2\text{CH}_2)_2$), 2.72-2.84 (m, 4 H, $\text{N}(\text{CH}_2\text{CH}_2)_2$); ^{13}C NMR (100 MHz, CDCl_3) δ 13.0, 20.4, 24.3 (CH_3), 24.5 (NCH_2CH_2), 27.8, 29.2 (CH_3), 32.9 (CH), 44.1 (CH), 44.5 (NCH_2), 46.9 (CH_2), 70.6 (C), 90.2 (C); Mass (m/z) 225 (M^+), 210 (M^+-CH_3), 155 ($\text{M}^+-\text{NC}_4\text{H}_8$); Anal. Calcd for $\text{C}_{14}\text{H}_{27}\text{NO}$: C, 74.61 ; H, 12.07 Found: C, 74.59 ; H, 11.87.

trans-1-(2-hydroxy-2-methylethyl)-2-(1-methyl-2-oxo-propyl)-cyclopropane (**8**)

IR (Neat) 3455.9, 2971.6, 2932.2, 1707.3, 1458.7, 1358.8, 1232.9, 1161.0, 945.9, 914.3, cm^{-1} ; ^1H NMR (400 MHz, CDCl_3) δ 0.25-0.30 (m, 1 H, CH_2), 0.57-0.61 (m, 1 H, CH_2), 0.81-0.90 (m, 2 H, CH, CH), 1.10 (s, 3 H, CH_3), 1.22 (s, 3 H, CH_3), 1.25 (s, 3 H, CH_3), 1.79-1.86 (m, 1 H, $\text{CHC}=\text{O}$), 2.19 (s, 3 H, CH_3); ^{13}C NMR (100 MHz, CDCl_3) δ 7.5 (CH_2), 16.2 (CH_3),

17.6 (CH), 27.6, 28.2, 29.2 (CH₃), 29.9, 51.8 (CH), 69.4 (C), 212.0 (C=O); HRMS calcd for C₁₀H₁₈O₂: 170.13060. Found: 170.13038.

1-(4-Ethoxycarbonyl-3-methyl-1-selenoxo-6-heptenyl)pyrrolidine (9)

IR (Neat) 2972, 2345, 1719, 1654, 1560, 1458 cm⁻¹; ¹H NMR (400 MHz, CDCl₃) δ 1.05 (d, *J* = 6.8 Hz, 3 H, CH₃) 1.26 (t, *J* = 7.1 Hz, 3H, CH₃CH₂O), 1.95 -2.20 (m, 4 H, N(CH₂CH₂)₂), 2.30-2.50 (m, 2 H, CH₂), 2.50-2.55 (m, 1 H, CH), 2.60-2.75 (m, 1 H, CH), 2.75-2.85 (m, 2 H, CH₂C=Se), 3.45-3.65 (m, 2 H, NCH₂), 3.88 (t, *J* = 7.1 Hz, 2 H, NCH₂), 4.14 (q, *J* = 7.3 Hz, 2 H, CH₃CH₂O), 5.02 (d, *J* = 10.3 Hz, 1 H, CH₂CH(cis)), 5.08 (d, *J* = 17.1 Hz, 1 H, CH₂CH (trans)), 5.75-5.85 (m, 1 H, CH₂CH); ¹³C NMR (100 MHz, CDCl₃) δ 14.3 (CH₃CH₂O), 17.0 (CH), 24.0 (CH₂), 26.3 (CH₂), 33.5 (CH₂), 35.4 (CH), 50.5 (CH), 50.7 (CH₂) 51.8, 58.8 (NCH₂), 60.1 (CH₃CH₂O), 116.6 (CH₂), 135.3 (CH), 174.5 (C=O), 202.4 (C=Se); Mass (m/z) 330 (M⁺), 250 (M⁺-Se), 175 (M⁺-(CH₂CSeNC₄H₈)); Anal. Calcd for C₁₅H₂₅O₂Se: C, 54.54 ; H, 7.63 Found: C, 54.76 ; H, 7.78.