Electronic Supplementary Material (ESI) for MedChemComm.

Supplementary Information

5-Iodo-2-arylalkylthio-6-aryl pyrimidin-4(3H)-ones as non-nucleoside anti-HBV agents

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Experimental section:

Contents:

Analysis data of new compounds

6-(3,4-dimethoxybenzyl)-2-(4-nitrobenzylthio)pyrimidin-4(3H)-one (**5d1**)
Yield: 63%. mp: 203-204°C. ^{1}H NMR(400MHz, $CDCl_3$) δ: 3.78(s, 2H, $ArCH_2$), 3.83(s, 3H, OCH_3), 3.88(s, 3H, OCH_3), 4.41(s, 2H, SCH_2), 6.02(s, 1H, 5-H), 6.73-6.82(m, 3H, ArH), 7.39(m, 2H, ArH), 8.05(m, 2H, ArH), 13.32(s, 1H, NH); ^{13}C NMR(100MHz, $CDCl_3$) δ: 33.5, 43.5, 56.0, 108.6, 111.4, 112.7, 121.6, 123.6, 130.0, 144.6, 147.2, 148.2, 149.1, 159.4, 165.7, 168.3; MS (ESI): m/z, 412.42 $[M-H]^-$.

6-(3,4-dimethoxybenzyl)-2-(4-cyanobenzylthio)pyrimidin-4(3H)-one (**5d2**)
Yield: 53%. mp: 208-209°C. ^{1}H NMR(400MHz, DMSO) δ: 3.70(s, 3H, OCH_3), 3.73(s, 2H, $ArCH_2$), 3.74(s, 3H, OCH_3), 4.74(s, 2H, SCH_2), 6.05(s, 1H, 5-H), 6.76-6.84(m, 3H, ArH), 7.45-7.47(d, 2H, o-ArH, *J* = 8 Hz), 7.64-7.66(d, 2H, m-ArH, *J* = 8 Hz), 12.54(s, 1H, NH); ^{13}C NMR(100MHz, DMSO) δ: 33.3, 42.7, 55.9, 56.0, 110.2, 112.4, 113.7, 119.2, 121.8, 130.4, 132.6, 148.0, 149.1; MS (ESI): m/z, 392.23 $[M-H]^-$.

6-(3,4-dimethoxybenzyl)-2-(2-(4-nitrophenoxy)ethylthio) pyrimidin-4(3H)-one (**5d3**)
Yield: 46%. mp: 206-208°C, ^{1}H NMR(400 MHz, DMSO) δ: 3.50-3.53(t, 2H, SCH_2), 3.67(s, 3H, OCH_3), 3.69(s, 2H, $ArCH_2$), 3.70 (s, 3H, OCH3) , 4.26-4.29(t, 2H, OCH_2), 5.99(s, 1H, 5-H), 6.78(m, 2H, ArH), 6.88(s, 1H, ArH), 7.11-7.13(d, 2H, o-ArH, *J* = 8.8 Hz), 8.17-8.19(d, 2H, m-ArH, *J* = 9.2 Hz), 12.57 (s, 1H, NH); ^{13}C NMR(100MHz, DMSO) δ: 28.9, 42.7, 55.9, 67.3, 112.2, 113.6, 115.4, 121.6, 126.3, 130.6, 141.5, 148.0, 149.1, 163.8, 170.8; MS (ESI): m/z, 392.23 $[M-H]^-$.

6-(3,4-dimethoxybenzyl)-2-(4-iodobenzylthio)pyrimidin-4(3H)-one (**5d4**)
Yield:47%. mp: 180-181°C. ^{1}H NMR(400MHz, DMSO) δ: 3.71(s, 3H, OCH_3), 3.73(s, 2H, $ArCH_2$), 3.75(s, 3H, OCH_3), 4.29(s, 2H, SCH_2), 6.00(s, 1H, 5-H), 6.72-6.97(m, 3H, ArH), 7.05-7.07(d, 2H, o-ArH, *J* = 8.4 Hz), 7.54-7.56(d, 2H, m-ArH, *J* = 8.4 Hz), 12.54(s, 1H, NH); ^{13}C NMR(100 MHz, DMSO) δ: 32.6, 42.3, 55.5, 93.0, 111.8, 113.2, 121.3, 130.2, 131.3, 137.0, 138.0, 147.5, 148.6; MS (ESI): m/z, 493.19 $[M-H]^-$.

6-(3,4-dimethoxybenzyl)-2-(4-trifluoromethylthio)pyrimidin-4(3H)-one (**5d5**)
Yield: 50%. mp: 172-174°C. ^{1}H NMR(400 MHz, $CDCl_3$) δ: 3.81(s, 2H, $ArCH_2$), 3.85(s, 3H, OCH_3), 3.89 (s, 3H, OCH_3), 4.41(s, 2H, SCH_2), 6.03(s, 1H, 5-H), 6.76-6.81(m, 3H, ArH), 7.36-7.38(d, 2H, o-ArH, *J* = 7.6 Hz) , 7.48-7.49(d, 2H, m-ArH, *J* = 7.6 Hz); ^{13}C NMR(100 MHz, $CDCl_3$) δ: 33.9, 43.4, 55.9, 108.4, 111.4, 112.6, 121.6, 125.4, 129.5, 140.9, 148.2, 149.1, 159.9, 165.7, 168.2; MS (ESI): m/z, 435.38 $[M-H]^-$.

6-(3,4-dimethoxybenzyl)-2-(3,5-dimethoxybenzylthio) pyrimidin-4(3H)-one (**5d6**)
Yield: 48%. mp: 162-163°C. ^{1}H NMR(400 MHz, $CDCl_3$) δ: 3.76(s, 6H, OCH_3), 3.79(s, 2H, $ArCH_2$), 3.85(s, 3H, OCH_3), 3.88(s, 3H, OCH_3) , 4.37(s, 2H, SCH_2) , 5.97(s, 1H, 5-H), 6.36(s, 1H, p-ArH), 6.52(s, 2H, ArH), 6.77-6.81(d, 3H, ArH), 13.25(s, 1H, NH); ^{13}C NMR(100 MHz, $CDCl_3$) δ: 34.9, 43.6, 55.3, 55.8, 55.9, 99.6, 107.2, 108.3, 111.4, 112.5, 121.6, 129.4, 138.5, 148.0, 149.0, 160.4, 160.8, 168.5; MS (ESI): m/z, 427.41 $[M-H]^-$.

6-(3,4-dimethoxybenzyl)-2-(2-(4-methyl-phenoxy)ethylthio) pyrimidin-4(3H)-one (**5d7**)
Yield: 51%. mp: 200°C. ^{1}H NMR(400 MHz, DMSO) δ: 2.22(s, 3H, $PhCH_3$), 3.44-3.47(t, 2H, SCH_2), 3.67-3.69(d, 8H, OCH_3;$ArCH_2$), 4.06-4.09(t, 2H, OCH_2), 5.96(s, 1H, 5-H), 6.77-6.82(m, 4H, ArH), 6.89(s, 1H, ArH), 7.06-7.08(d, 2H, m-ArH, *J* = 8 Hz), 12.62(s, 1H, NH); ^{13}C NMR(100 MHz, DMSO) δ: 20.5, 29.3, 55.8, 66.2, 112.2, 113.5, 114.7, 121.6, 129.9, 130.3, 147.93 149.0, 156.4; MS (ESI): m/z, 303.23 $[M-H]^-$.

6-(3,4-dimethoxybenzyl)-2-(2-(4-bromophenoxy)ethylthio) pyrimidin-4(3H)-one (**5d8**)
Yield: 47%. mp: 208-209°C. ^{1}H NMR(400 MHz, DMSO) δ: 3.49-3.52(t, 2H, SCH_2), 3.67(s, 3H, OCH_3), 3.69(s, 2H, $ArCH_2$), 3.70(s, 3H, OCH_3), 4.26-4.29(t, 2H, OCH_2), 5.98(s, 1H, 5-H), 6.75-6.80(m, 2H, ArH), 6.88(s, 1H, ArH), 7.11-7.13(d, 2H, o-ArH, *J* = 8 Hz), 8.17-8.19(d, 2H, m-ArH, *J* = 8 Hz) , 12.72(s, 1H, NH); ^{13}C NMR(100MHz, DMSO) δ: 28.9, 42.7, 55.9, 67.3, 112.2, 113.5, 115.5, 121.59, 126.3, 130.6, 132.3, 141.4, 147.9, 149.0, 163.8; MS (ESI): m/z, 477.51 $[M-H]^-$.

6-(3,4-dimethoxybenzyl)-2-(cycloheptylthio)pyrimidin-4(3H)-one (**5d9**)
Yield: 26%. mp: 261-263°C. ^{1}H NMR(400MHz, DMSO) δ: 1.24-1.98(m, 12H, $SCHCH_{12}$), 3.66(s, 2H, $ArCH_2$) , 3.72(s, 3H, OCH_3), 3.73(s, 3H, OCH_3), 3.88(m, 1H, SCH), 5.92(s, 1H, 5-H), 6.78-6.98(m, 3H, ArH), 12.36(s,

1H, NH); ^{13}C NMR(100 MHz, DMSO) δ: 22.3, 25.5, 27.6, 33.1, 34.0, 42.4, 44.9, 55.4, 55.506, 103.4, 111.6, 113.1, 121.2, 130.3, 147.5, 148.6, 156.3, 161.0; MS (ESI): m/z, 373.45 [M-H]$^-$.

6-(3,4-dimethoxybenzyl)-2-(cyclohex-2-en-1-ylthio)pyrimidin-4(3H)-one (**5d10**)
Yield: 44%. mp: 159-160°C. ^{1}H NMR(400MHz, $CDCl_3$) δ: 1.69-2.06(m, 6H, CH_2), 3.74(s, 2H, $ArCH_2$) , 3.87(s, 3H, OCH_3), 3.88(s, 3H, OCH_3), 4.62(s, 1H, CH), 5.72-5.89(m, 2H, CH), 5.98(s, 1H, 5-H) , 6.78-6.81(m, 3H, ArH), 13.07(s, 1H, NH); ^{13}C NMR(100 MHz, $CDCl_3$) δ: 19.6, 24.8, 29.0, 41.7, 43.7, 55.8, 56.0, 107.9, 111.4, 112.6, 121.6, 125.4, 129.7, 131.9, 148.0, 149.0, 160.8, 165.7, 168.4; MS (ESI): m/z, 357.38 [M-H]$^-$.

6-(3,4-dimethoxybenzyl)-2-(2-nitrobenzylthio)pyrimidin-4(3H)-one (**5d11**)
Yield: 57%. mp: 160-161°C. ^{1}H NMR(400MHz, $CDCl_3$) δ: 3.80(s, 2H, $ArCH_2$), 3.85(s, 3H, OCH_3), 3.89(s, 3H, OCH_3), 4.74(s, 2H, SCH_2), 6.05(s, 1H, 5-H), 6.76-6.84(m, 3H, ArH), 7.32-7.41(m, 3H, ArH), 8.04-8.03(d, 1H, ArH), 13.08(s, 1H, NH); ^{13}C NMR(100 MHz, $CDCl_3$) δ: 31.4, 43.5, 55.9, 56.0, 108.5, 111.4, 112.5, 121.7, 125.1, 128.7, 129.6, 132.5, 133.4, 133.5, 148.0, 149.1, 160.1, 165.5, 168.0; MS (ESI): m/z, 412.42 [M-H]$^-$.

6-(3,4-dimethoxybenzyl)-2-(3-chlorobenzyl)pyrimidin-4(3H)-one (**5d12**)
Yield: 66%. mp: 161-162°C. ^{1}H NMR(400MHz, $CDCl_3$) δ: 3.08(s, 2H, $ArCH_2$), 3.85(s, 3H, OCH_3), 3.89(s, 3H, OCH_3), 4.36(s, 2H, SCH_2), 6.00(s, 1H, 5-H), 6.76-6.85(m, 3H, ArH), 7.15-7.24(m, 3H, ArH), 7.36(s, 1H, ArH), 13.02(s, 1H, NH); ^{13}C NMR(100 MHz, $CDCl_3$) δ: 33.9, 43.5, 55.9, 56.0, 108.4, 111.4, 112.5, 121.6, 127.3, 127.8, 129.3, 129.7, 134.2, 138.7, 148.1, 149.1, 159.1, 165.6, 168.4; MS (ESI): m/z, 401.34 [M-H]$^-$.

6-(3,4-dimethoxybenzyl)-2-(3-Methoxylbenzyl)pyrimidin-4(3H)-one (**5d13**)
Yield: 54%. mp: 181°C. ^{1}H NMR(400MHz, $CDCl_3$) δ: 3.78(s, 3H, OCH_3), 3.80(s, 2H, $ArCH_2$), 3.85(s, 3H, OCH_3), 3.89(s, 3H, OCH_3), 4.40(s, 2H, SCH_2), 5.96(s, 1H, 5-H), 6.77-6.90(m, 6H, ArH), 7.16-7.19(m, 1H, ArH), 13.04(s, 1H, NH); ^{13}C NMR(100MHz, $CDCl_3$) δ: 34.6, 43.6, 55.2, 55.8, 56.0, 108.2, 111.3, 112.5, 113.1, 114.7, 121.6, 129.6, 137.9, 148.0, 149.0, 159.7, 160.4, 165.6, 168.4; MS (ESI): m/z, 397.50 [M-H]$^-$.

6-(benzo[d]triazol-1-yl)methyl-2-(4-nitrobenzylthio) pyrimidin-4(3H)-one (**5e1**)
Yield: 45%. mp: 223-224°C. ^{1}H NMR(400 MHz, DMSO) δ: 4.18(s, 2H, $ArCH_2$), 5.87(s, 2H, SCH_2), 6.16(s, 1H, 5-H), 7.21-7.24(d, 2H, o-ArH, *J* = 8.4 Hz), 7.37-7.41(t, 1H, ArH), 7.51-7.54(t, 1H, ArH), 7.83-7.85(d, 1H, ArH), 7.93-7.95(d, 2H, m-ArH, *J* = 8 Hz), 8.04-8.06(d, 1H, ArH); ^{13}C NMR(100 MHz, DMSO) δ: 32.7, 55.3, 111.3, 119.6, 1237, 124.5, 128.0, 130.2, 133.9, 145.6, 146.4, 146.8; MS (ESI): m/z, 393.18 [M-H]$^-$.

6-(benzo[d]triazol-1-yl)methyl-2-(4-cyanobenzylthio)pyrimidin-4(3H)-one (**5e2**)
Yield: 36%. mp: 221-222°C. ^{1}H NMR(400 MHz, DMSO) δ: 4.12(s, 2H, $ArCH_2$), 5.87(s, 2H, SCH_2), 6.15(s, 1H, 5-H), 7.15-7.19(d, 2H, o-ArH, *J* = 8 Hz), 7.38-7.42(t, 1H, ArH), 7.51-7.56(m, 3H, ArH), 7.83-7.86(d, 1H, ArH), 8.07-8.-8.09(d, 1H, ArH), 12.76(s, 1H, NH); ^{13}C NMR(100 MHz, DMSO) δ: 33.1, 51.5, 110.2, 111.3, 119.1, 119.7, 124.5, 128.0, 130.0, 132.5, 133.9, 144.1, 145.6; MS (ESI): m/z, 373.19 [M-H]$^-$.

6-(benzo[d]triazol-1-yl)methyl-2-(2-(4-nitrophenoxy)ethylthio) pyrimidin-4(3H)-one (**5e3**)
Yield: 44%. mp: 217-218°C. ^{1}H NMR(400 MHz, DMSO) δ: 3.16(t, 2H, $ArCH_2$), 3.81(t, 2H, OCH_2), 5.86 (s, 2H, SCH_2), 6.10(s, 1H, 5-H), 6.96-6.98(d, 2H, o-ArH, *J* = 8.8 Hz), 7.38-7.41(t, 1H, ArH), 7.54-7.58(t, 1H, ArH), 7.88-7.90(d, 1H, ArH), 8.04-8.06(d, 1H, ArH), 8.20-8.23(d, 2H, m-ArH, *J* = 8.8 Hz) , 12.85(s, 1H, NH); ^{13}C NMR(100 MHz, DMSO) δ: 29.0, 51.4, 66.7, 111.4, 115.4, 119.6, 124.5, 126.3, 128.0, 134.1, 141.5, 145.5, 163.7; MS (ESI): m/z, 423.23 [M-H]$^-$.

6-(benzo[d]triazol-1-yl)methyl-2-(4-iodobenzylthio)pyrimidin-4(3H)-one (**5e4**)
Yield: 36%. mp: 202-204°C. ^{1}H NMR(400 MHz, DMSO) δ: 3.99(s, 2H, $ArCH_2$), 5.87(s, 2H, SCH_2), 6.12(s, 1H, 5-H), 6.74-6.77(d, 2H, o-ArH, *J* = 7.6 Hz), 7.44-7.55(m, 4H, ArH), 7.86-7.88(d, 1H, ArH), 8.08-8.-8.10(d, 1H, ArH), 12.82(s, 1H, NH); ^{13}C NMR(100MHz, DMSO) δ: 33.0, 51.6, 93.5, 111.4, 119.6, 124.5, 128.0, 131.4, 134.0, 137.4, 145.7, 170.8; MS (ESI): m/z, 474.34 [M-H]$^-$.

6-(benzo[d]triazol-1-yl)methyl-2-(4-trifluoromethylthio) pyrimidin-4(3H)-one (**5e5**)
Yield: 43%. mp: 178-180°C. ^{1}H NMR(400 MHz, DMSO) δ: 4.13(s, 2H, $ArCH_2$), 5.88(s, 2H, SCH_2), 6.16(s, 1H, 5-H), 7.16-7.18(d, 2H, o-ArH, *J* = 8 Hz), 7.42-7.55(m, 4H, ArH), 7.85-7.87(d, 1H, ArH), 8.06-8.08(d, 1H, ArH), 12.82(s, 1H, NH); ^{13}C NMR(100 MHz, DMSO) δ: 32.8, 51.6, 111.3, 119.6, 124.5, 125.4, 128.0, 134.0, 145.7, 170.8; MS (ESI): m/z, 416.27 [M-H]$^-$.

6-(benzo[d]triazol-1-yl)methyl-2-(3,5-dimethoxybenzylthio) pyrimidin-4(3H)-one (**5e6**)
Yield: 9%. mp: 111-112°C. ^{1}H NMR(400 MHz, DMSO) δ: 3.77 (s, 6H, OCH_3), 4.19(s, 2H, $ArCH_2$), 5.68(s, 2H, SCH_2), 5.74(s, 1H, 5-H), 6.37(s, 1H, ArH), 6.43(s, 2H, ArH), 7.33-7.36(t, 1H, ArH), 7.49-7.52(t, 1H, ArH), 7.81-7.83(d, 1H, ArH), 7.99-8.01(d, 1H, ArH), 13.11(s, 1H, NH); ^{13}C NMR(100 MHz, DMSO) δ: 35.1, 51.9, 55.4, 99.7, 107.1, 107.4, 109.4, 120.3, 124.2, 127.9, 137.6, 146.1, 160.9, 161.5, 162.3, 164.7; MS (ESI): m/z, 408.30 $[M-H]^-$.

6-(benzo[d]triazol-1-yl)methyl-2-(2-(4-methyl-phenoxy) ethylthio)pyrimidin-4(3H)-one (**5e7**)
Yield: 37%. mp: 176°C. ^{1}H NMR(400 MHz, DMSO) δ: 2.23(s, 3H, $PhCH_3$), 3.11(t, 2H, SCH_2), 3.61(t, 2H, OCH_2), 5.85(s, 2H, $ArCH_2$), 6.07(s, 1H, 5-H), 6.63-6.65(d, 2H, o-ArH, *J* = 8 Hz), 7.06-7.08(d, 2H, m-ArH, *J* = 8 Hz), 7.40-7.44(t, 1H, ArH), 7.54-7.58(t, 1H, ArH), 7.88-7.90(d, 1H, ArH), 8.07-8.-8.09(d, 1H, ArH) , 12.80(s, 1H, NH); ^{13}C NMR(100 MHz, DMSO) δ: 20.5, 29.7, 51.4, 111.4, 114.6, 119.6, 124.5, 127.6, 129.9, 130.3, 134.1, 145.6, 156.3; MS (ESI): m/z, 392.23 $[M-H]^-$.

6-(benzo[d]triazol-1-yl)methyl-2-(2-(4-bromophenoxy) ethylthio)pyrimidin-4(3H)-one (**5e8**)
Yield: 36%. mp: 182-183°C. ^{1}H NMR(400 MHz, DMSO) δ: 3.09-3.12(t, 2H, $ArCH_2$), 3.62-3.65(t, 2H, OCH_2), 5.85(s, 2H, SCH_2) , 6.08(s, 1H, 5-H), 6.72-6.74(d, 2H, o-ArH, *J* = 8.8 Hz), 7.44-7.58(m, 4H, ArH) , 7.88-7.90(d, 1H, ArH) , 8.06-8.08(d, 1H, ArH), 12.84(s, 1H, NH); ^{13}C NMR(100 MHz, DMSO) δ: 29.4, 51.4, 111.4, 112.7, 117.1, 119.6, 124.1, 128.0, 132.6, 134.1, 145.5, 157.7; MS (ESI): m/z, 458.20 $[M-H]^-$.

6-(3,4-dimethoxybenzyl)-2-(4-nitrobenzylthio)-5-iodopyrimidin-4(3H)-one (**6d1**)
Yield: 57%. mp: 264-266°C. ^{1}H NMR(400 MHz, DMSO) δ: 3.68(s, 3H, OCH_3), 3.71(s, 3H, OCH_3), 4.03(s, 2H, $ArCH_2$), 4.41(s, 2H, SCH_2), 6.71-6.73(d, 1H, ArH), 6.83-6.85(d, 1H, ArH), 6.94(s, 1H, ArH), 7.42-7.44(d, 2H, o-ArH, *J* = 8.4 Hz) , 7.98-8.01(d, 2H, m-ArH, *J* = 8.4 Hz), 12.96(s, 1H, NH); ^{13}C NMR(100MHz, DMSO) δ: 33.1, 46.2, 55.9, 112.2, 113.6, 121.3, 123.7, 130.2, 130.8, 146.7, 146.8, 148.1, 149.0; HRMS (ESI): m/z, calcd. for $C_{20}H_{17}N_3O_5SI$ $[M-H]^-$: 537.9934, found 537.9938.

6-(3,4-dimethoxybenzyl)-2-(4-cyanobenzylthio)-5-iodopyrimidin-4(3H)-one (**6d2**)
Yield: 47%. mp: 241-242°C. ^{1}H NMR(400 MHz, DMSO) δ: 3.69(s, 3H, OCH_3), 3.72(s, 3H, OCH_3), 4.03(s, 2H, $ArCH_2$), 4.38(s, 2H, SCH_2), 6.71-6.73(d, 1H, ArH), 6.84-6.86(d, 1H, ArH), 6.94-6.94(d, 1H, ArH), 7.37-7.39(d, 2H, o-ArH, *J* = 8.4 Hz) , 7.60-7.62(d, 2H, m-ArH, *J* = 8 Hz), 13.02(s, 1H, NH); ^{13}C NMR(100MHz, DMSO) δ: 33.4, 55.9, 56.0, 110.3, 112.4, 113.6, 119.2, 121.3, 130.1, 130.3, 132.6, 144.3, 148.1, 149.1; HRMS (ESI): m/z, calcd. for $C_{21}H_{17}N_3O_3SI$ $[M-H]^-$: 518.0035, found 518.0034.

6-(3,4-dimethoxybenzyl)-2-(2-(4-nitrophenoxy)ethylthio)-5-iodopyrimidin-4(3H)-one (**6d3**)
Yield: 39.8%. mp: 210-212°C. ^{1}H NMR(400 MHz, DMSO) δ: 3.46-3.49(t, 2H, SCH_2), 3.65(s, 3H, OCH_3), 3.70(s, 3H, OCH_3) , 4.00(s, 2H, $ArCH_2$), 4.18-4.21(t, 2H, OCH_2), 6.75-6.79(m, 2H, ArH), 6.90-6.93(m, 2H, ArH), 7.05-7.07(d, 2H, o-ArH, *J* = 9.2 Hz), 8.15-8.17(d, 2H, m-ArH, *J* = 9.2 Hz), 13.05(s, 1H, NH); ^{13}C NMR(100MHz, DMSO) δ: 30.0, 46.2, 55.6, 67.1, 112.2, 113.4, 115.4, 121.2, 126.3, 130.1, 141.5, 148.0, 149.0, 163.8, 179.8; HRMS (ESI): m/z, calcd. for $C_{21}H_{19}N_3O_6SI$ $[M-H]^-$: 568.0039, found 568.0054.

6-(3,4-dimethoxybenzyl)-2-(4-iodobenzylthio)-5-iodopyrimidin-4(3H)-one (**6d4**)
Yield: 42%. mp: 207-208°C. ^{1}H NMR(400 MHz, DMSO) δ: 3.70(s, 3H, OCH_3), 3.74(s, 3H, OCH_3) , 4.05(s, 2H, $ArCH_2$), 4.27(s, 2H, SCH_2), 6.74-6.76(m, 1H, ArH), 6.87-6.89(d, 1H, ArH), 6.96-7.01(m, 3H, ArH), 7.51-7.53(d, 2H, ArH, *J* = 8 Hz), 13.01(s, 1H, NH); ^{13}C NMR(100 MHz, DMSO) δ: 33.3, 56.0, 93.6, 112.4, 113.6, 121.4, 130.1, 131.7, 137.5, 138.1, 148.1, 149.1; HRMS (ESI): m/z, calcd. for $C_{20}H_{17}N_2O_3SI_2$ $[M-H]^-$: 618.9049, found 618.9045.

6-(3,4-dimethoxybenzyl)-2-(4-trifluoromethylthio)-5-iodopyrimidin-4(3H)-one (**6d5**)
Yield: 43%. mp: 233-234°C. ^{1}H NMR(400 MHz, DMSO) δ: 3.68(s, 3H, OCH_3), 3.70(s, 3H, OCH_3), 4.06(s, 2H, $ArCH_2$), 4.39(s, 2H, SCH_2), 6.74-6.96(m, 3H, ArH), 7.38-7.40(d, 2H, o-ArH, *J* = 8 Hz), 7.49-7.51(d, 2H, m-ArH, *J* = 8 Hz), 13.06(s, 1H, NH); ^{13}C NMR(100 MHz, DMSO) δ: 33.1, 46.2, 55.8, 112.3, 113.5, 121.3, 125.5, 130.2, 143.4, 148.1, 149.0; HRMS (ESI): m/z, calcd. for $C_{21}H_{17}N_2O_3F_3SI$ $[M-H]^-$: 560.9957, found 560.9944.

6-(3,4-dimethoxybenzyl)-2-(3,5-dimethoxybenzylthio)-5-iodopyrimidin-4(3H)-one (**6d6**)
Yield: 43%. mp: 163-164°C. ^{1}H NMR(400 MHz, DMSO) δ: 3.69-3.72(m, 12H, OCH_3), 4.03-4.06(d, 2H, $ArCH_2$), 4.32-4.47(s, 2H, SCH_2) , 6.40(s, 1H, ArH), 6.50-6.53(m, 2H, ArH), 6.83-6.99(d, 3H, ArH), 13.02(s,

1H, NH); ^{13}C NMR(100 MHz, DMSO) δ: 34.4, 55.6, 56.0, 82.3, 99.6, 107.4, 112.4, 113.4, 121.2, 129.9, 139.8, 148.1, 149.0, 159.4, 160.9, 161.1; HRMS (ESI): m/z, calcd. for $C_{22}H_{22}N_2O_5SI$ [M-H]$^-$: 553.0294, found 553.0294.

6-(3,4-dimethoxybenzyl)-2-(2-(4-methyl-phenoxy)ethylthio)-5-iodopyrimidin-4(3H)-one (**6d7**)
Yield: 57%. mp: 187-188°C. ^{1}H NMR(400 MHz, DMSO) δ: 2.22(s, 3H, $PhCH_3$), 3.41-3.45(t, 2H, SCH_2), 3.66(s, 3H, OCH_3), 3.69(s, 3H, OCH_3), 3.99(t, 4H, OCH_2;$ArCH_2$), 6.75-6.79(m, 4H, ArH), 7.07-7.09(d, 1H, ArH), 7.05-7.07(d, 2H, m-ArH, *J* = 8 Hz) , 13.05(s, 1H, NH); ^{13}C NMR(100 MHz, DMSO) δ: 20.0, 29.2, 55.4, 55.5, 111.7, 112.8, 114.2, 120.8, 129.5, 129.8, 147.6, 148.5, 155.9; HRMS (ESI): m/z, calcd. for $C_{22}H_{22}N_2O_4SI$ [M-H]$^-$: 537.0345, found 537.0335.

6-(3,4-dimethoxybenzyl)-2-(2-(4-bromophenoxy)ethylthio)-5-iodopyrimidin-4(3H)-one (**6d8**)
Yield: 66%. mp: 210-212°C. ^{1}H NMR(400 MHz, DMSO) δ: 3.46-3.49(t, 2H, SCH_2), 3.65(s, 3H, OCH_3), 370(s, 3H, OCH_3), 4.00(s, 2H, $ArCH_2$), 4.18-4.21(t, 2H, OCH_2), 6.76(s, 2H, ArH), 6.93(s, 1H, ArH), 7.04-7.06(d, 2H, o-ArH, *J* = 7.6 Hz), 8.15-8.17(d, 2H, m-ArH, *J* = 8 Hz), 13.05(s, 1H, NH); ^{13}C NMR(100MHz, DMSO) δ: 29.2, 46.2, 55.8, 67.1, 112.2, 113.4, 115.4, 121.2, 126.3, 130.1, 141.5, 148.0, 149.0, 164.0; HRMS (ESI): m/z, calcd. for $C_{21}H_{19}N_2O_4SBrI$ [M-H]$^-$: 600.9293, found 600.9297.

6-(3,4-dimethoxybenzyl)-2-(cycloheptylthio)-5-iodopyrimidin-4(3H)-one (**6d9**)
Yield: 32%. mp: 223-224°C. ^{1}H NMR(400MHz, $CDCl_3$) δ: 1.27-1.86(m, 12H, $SCHCH_{12}$), 3.70(m, 1H, SCH) , 3.84(s, 3H, OCH_3), 3.87(s, 3H, OCH_3) , 4.33(s, 2H, $ArCH_2$), 6.76-7.26(m, 3H, ArH), 11.75(s, 1H, NH); ^{13}C NMR(100 MHz, $CDCl_3$) δ: 25.8, 28.1, 34.6, 46.8, 51.6, 56.0, 56.1, 89.6, 113.3, 118.7, 123.2, 133.6, 148.3, 149.2, 160.6, 161.8, 167.9; HRMS (ESI): m/z, calcd. for $C_{20}H_{24}N_2O_3SI$ [M-H]$^-$: 499.0552, found 499.0564.

6-(3,4-dimethoxybenzyl)-2-(cyclohex-2-en-1-ylthio)-5-iodopyrimidin-4(3H)-one (**6d10**)
Yield: 32%. mp: 194-195°C. 97%. ^{1}H NMR(400MHz, $CDCl_3$) δ: 1.67-2.07(m, 6H, CH_2), 3.88(s, 6H, OCH_3), 4.06-4.12(m, 2H, $ArCH_2$) , 4.52(s, 1H, CH), 5.71-5.90(m, 2H, CH), 6.80-6.95(m, 3H, ArH), 11.97(s, 1H, NH); ^{13}C NMR(100 MHz, $CDCl_3$) δ: 19.6, 24.8, 29.0, 42.4, 46.7, 55.9, 84.8, 111.2, 112.7, 121.5, 125.1, 129.7, 132.4, 148.0, 148.8, 160.2, 162.1, 168.9; HRMS (ESI): m/z, calcd. for $C_{19}H_{20}N_2O_3SI$ [M-H]$^-$: 483.0239, found 483.0239.

6-(3,4-dimethoxybenzyl)-2-(2-nitrobenzylthio)-5-iodopyrimidin-4(3H)-one (**6d11**)
Yield：34%. mp: 194-195°C. ^{1}H NMR(400 MHz, DMSO) δ: 3.72(s, 3H, OCH_3), 3.73(s, 3H, OCH_3), 4.07(s, 2H, $ArCH_2$), 4.61(s, 2H, SCH_2), 6.81-6.99(m, 3H, ArH), 7.22-7.24(d, 1H, ArH), 7.44-7.53(m, 2H, ArH), 8.02-8.04(d, 1H, ArH), 13.04(s, 1H, NH); ^{13}C NMR(100 MHz, DMSO) δ: 30.7, 45.7, 55.4, 55.5, 111.9, 113.0, 121.0, 124.9, 129.0, 129.8, 132.1, 133.1, 147.7, 148.6; HRMS (ESI): m/z, calcd. for $C_{20}H_{17}N_3O_5SI$ [M-H]$^-$: 537.9934, found 537.9940.

6-(3,4-dimethoxybenzyl)-2-(3-chlorobenzyl)-5-iodopyrimidin-4(3H)-one (**6d12**)
Yield: 67%. mp: 175-176°C. ^{1}H NMR(400MHz, $CDCl_3$) δ: 3.84(s, 3H, OCH_3), 3.87(s, 3H, OCH_3), 4.15(s, 2H, $ArCH_2$), 4.32(s, 2H, SCH_2) , 6.80-6.93(m, 3H, ArH), 7.08-7.28(m, 4H, ArH) , 12.56(s, 1H, NH); ^{13}C NMR(100 MHz, $CDCl_3$) δ: 34.2, 46.7, 55.9, 56.0, 85.6, 111.3, 112.5, 121.4, 127.1, 127.9, 129.1, 129.8, 134.3, 138.5, 148.1, 148.9, 159.4, 162.4, 168.9; HRMS (ESI): m/z, calcd. for $C_{20}H_{17}N_2O_3SClI$ [M-H]$^-$: 526.9693, found 526.9697.

6-(3,4-dimethoxybenzyl)-2-(3-methoxylbenzyl)-5-iodopyrimidin-4(3H)-one (**6d13**)
Yield: 53%. mp: 169-170°C. ^{1}H NMR(400 MHz, $CDCl_3$) δ: 3.78(s, 3H, OCH_3), 3.84(s, 3H, OCH_3), 3.87(s, 3H, OCH_3), 4.15(s, 2H, SCH_2), 4.37(s, 2H, $ArCH_2$), 6.79-6.96(m, 6H, ArH), 7.17(t, 1H, ArH), 12.35(s, 1H, NH); ^{13}C NMR(100MHz, $CDCl_3$) δ: 35.0, 46.7, 55.2, 55.8, 55.9, 85.3, 111.2, 112.5, 113.1, 114.7, 121.4, 129.7, 137.6, 148.0, 148.9, 159.8, 160.0, 162.3, 168.9; HRMS (ESI): m/z, calcd. for $C_{21}H_{20}N_2O_4SI$ [M-H]$^-$: 523.0188, found 523.0186.

6-(benzo[d]triazol-1-yl)methyl-2-(4-nitrobenzylthio)-5-iodopyrimidin-4(3H)-one (**6e1**)
Yield: 49%. mp: 238-239°C. ^{1}H NMR(400 MHz, DMSO) δ: 3.76(s, 2H, $ArCH_2$), 6.01(s, 2H, SCH_2), 6.93-6.95(d, 2H, o-ArH, *J* = 8 Hz), 7.30-7.34(t, 1H, ArH), 7.47-7.51(t, 1H, ArH), 7.79-7.81(d, 1H, ArH), 7.87-7.90(d, 2H, ArH), 7.95-7.98(d, 1H, ArH), 13.28(s, 1H, ArH); ^{13}C NMR(100 MHz, DMSO) δ: 32.4, 55.4, 111.4, 119.5, 123.6, 124.3, 127.9, 129.8, 134.4, 145.5, 145.6, 146.8; HRMS (ESI): m/z, calcd. for $C_{18}H_{12}N_6O_3SI$ [M-H]$^-$: 518.9736, found 518.9734.

6-(benzo[d]triazol-1-yl)methyl-2-(4-cyanobenzylthio)-5-iodopyrimidin-4(3H)-one (**6e2**)
Yield: 33%. mp: 186-187°C. ^{1}H NMR(400 MHz, DMSO) δ: 3.67(s, 2H, $ArCH_2$), 6.01(s, 2H, SCH_2), 6.86-6.88(d, 2H, o-ArH, *J* = 8 Hz), 7.32-7.36(t, 1H, ArH), 7.50-7.52(m, 3H, ArH), 7.79-7.82(d, 1H, ArH), 7.98-8.00(d, 1H, ArH), 13.25(s, 1H, NH) ; ^{13}C NMR(100 MHz, DMSO) δ: 32.7, 55.4, 110.3, 111.4, 119.1, 119.5, 124.3, 127.9, 129.6, 132.5, 134.3, 143.4, 145.5; HRMS (ESI): m/z, calcd. for $C_{19}H_{12}N_6OSI$ $[M-H]^-$: 498.9838, found 498.9839.

6-(benzo[d]triazol-1-yl)methyl-2-(2-(4-nitrophenoxy)ethylthio)-5-iodopyrimidin-4(3H)-one (**6e3**)
Yield: 38%. mp: 236-237°C. ^{1}H NMR(400 MHz, DMSO) δ: 2.67(t, 2H, $ArCH_2$), 3.62-3.65(t, 2H, OCH_2), 5.96(s, 2H, SCH_2), 6.87-6.89(d, 2H, o-ArH, *J* = 8.8 Hz), 7.38(t, 1H, ArH), 7.55(t, 1H, ArH), 7.84-7.86(d, 1H, ArH), 8.03-8.05(d, 1H, ArH), 8.19-8.21(d, 2H, m-ArH, *J* = 8.8 Hz), 13.22(s, 1H, NH); ^{13}C NMR(100 MHz, DMSO) δ: 29.1, 55.3, 111.5, 115.3, 119.6, 124.3, 126.3, 127.9, 134.6, 141.0, 145.4, 163.6; HRMS (ESI): m/z, calcd. for $C_{19}H_{14}N_6O_4SI$ $[M-H]^-$: 548.9842, found 548.9845.

6-(benzo[d]triazol-1-yl)methyl-2-(4-iodobenzylthio)-5-iodopyrimidin-4(3H)-one (**6e4**)
Yield: 37%. mp: 205-206°C. ^{1}H NMR(400 MHz, DMSO) δ: 3.52(s, 2H, $ArCH_2$), 6.02(s, 2H, SCH_2), 6.47-6.49(d, 2H, o-ArH, *J* = 8 Hz), 7.40-7.55(m, 4H, ArH), 7.28-7.85(d, 1H, ArH), 8.01-8.03(d, 1H, ArH), 13.21(s, 1H, NH); ^{13}C NMR(100 MHz, DMSO) δ: 32.2, 54.9, 93.2, 111.0, 119.0, 123.9, 127.4, 130.6, 134.0, 136.9, 145.0, 160.9; HRMS (ESI): m/z, calcd. for $C_{18}H_{12}N_5OSI_2$ $[M-H]^-$: 599.8852, found 599.8866.

6-(benzo[d]triazol-1-yl)methyl-2-(4-trifluoromethylthio)-5-iodopyrimidin-4(3H)-one (**6e5**)
Yield: 42%. mp: 231-233°C. ^{1}H NMR(400 MHz, DMSO) δ: 3.69(s, 2H, $ArCH_2$), 6.03(s, 2H, SCH_2) , 6.87-6.89(d, 2H, o-ArH, *J* = 8 Hz), 7.38-7.52(m, 4H, ArH), 7.82-7.85(d, 1H, ArH), 7.98-8.00(d, 1H, ArH), 13.29(s, 1H, NH); ^{13}C NMR(100 MHz, DMSO) δ: 32.0, 53.9, 110.9, 119.0, 123.8, 124.9, 124.9, 127.4, 129.0, 134.0, 142.0, 145.0; HRMS (ESI): m/z, calcd. for $C_{19}H_{12}N_5OF_3SI$ $[M-H]^-$: 541.9759, found 541.9761.

6-(benzo[d]triazol-1-yl)methyl-2-(3,5-dimethoxybenzylthio)-5-iodopyrimidin-4(3H)-one (**6e6**)
Yield: 48%. mp: 243-244°C. ^{1}H NMR(400 MHz, DMSO) δ: 3.39(s, 2H, $ArCH_2$), 3.68(s, 6H, OCH_3), 6.00(s, 2H, SCH_2), 6.09(s, 2H, ArH), 6.32(s, 1H, ArH), 7.33-7.36(t, 1H, ArH), 7.45-7.52(t, 1H, ArH), 7.81-7.83(d, 1H, ArH), 7.99-8.01(d, 1H, ArH), 13.11(s, 1H, NH); ^{13}C NMR(100 MHz, DMSO) δ: 34.1, 51.6, 55.6, 99.7, 107.2, 111.4, 119.7, 124.5, 128.0, 134.0, 145.6, 160.9; HRMS (ESI): m/z, calcd. for $C_{20}H_{17}N_5O_3SI$ $[M-H]^-$: 534.0097, found 534.0099.

6-(benzo[d]triazol-1-yl)methyl-2-(2-(4-methyl-phenoxy)ethylthio)-5-iodopyrimidin-4(3H)-one (**6e7**)
Yield: 40%. mp: 199-200°C. ^{1}H NMR(400 MHz, DMSO) δ: 2.23(s, 3H, $PhCH_3$), 2.61(t, 2H, SCH_2), 3.12(t, 2H, OCH_2), 5.98(s, 2H, $ArCH_2$), 6.52-6.54(d, 2H,o-ArH, *J* = 7.6 Hz), 7.05-7.07(d, 2H, m-ArH, *J* = 7.6 Hz), 7.40-7.44(t, 1H, ArH), 7.55-7.58(t, 1H, ArH), 7.86-7.88(d, 1H, ArH), 8.07-8.09(d, 1H, ArH), 13.09(s, 1H, NH); ^{13}C NMR(100 MHz, DMSO) δ: 20.5, 29.9, 55.2, 111.5, 114.5, 119.6, 124.4, 127.9, 130.2, 134.7, 145.5, 156.2; HRMS (ESI): m/z, calcd. for $C_{20}H_{17}N_5O_2SI$ $[M-H]^-$: 518.0148, found 518.0140.

6-(benzo[d]triazol-1-yl)methyl-2-(2-(4-bromophenoxy) ethylthio)-5-iodopyrimidin-4(3H)-one (**6e8**)
Yield: 33%. mp: 308°C. ^{1}H NMR(400 MHz, DMSO) δ: 2.62(t, 2H, $ArCH_2$), 3.15(t, 2H, OCH_2), 5.99(s, 2H, SCH_2) , 6.60-6.62(d, 2H, o-ArH, *J* = 8.4 Hz), 7.40-7.45(m, 3H, ArH), 7.55-7.58(t, 1H, ArH), 7.85-7.87(d, 1H, ArH) , 8.06-8.08(d, 1H, ArH), 13.20(s, 1H, NH); ^{13}C NMR(100 MHz, DMSO) δ: 29.6, 55.2, 111.5, 112.7, 117.0, 119.6, 124.4, 127.9, 132.6, 134.6, 145.5, 157.6; HRMS (ESI): m/z, calcd. for $C_{19}H_{14}N_5O_2SBrI$ $[M-H]^-$: 581.9096, found 581.9103.