N–Cyano Sulfilimine Functional Group as a Nonclassical Amide Bond Bioisostere in the Design of a Potent Analogue to Anthranilic Diamide Insecticide

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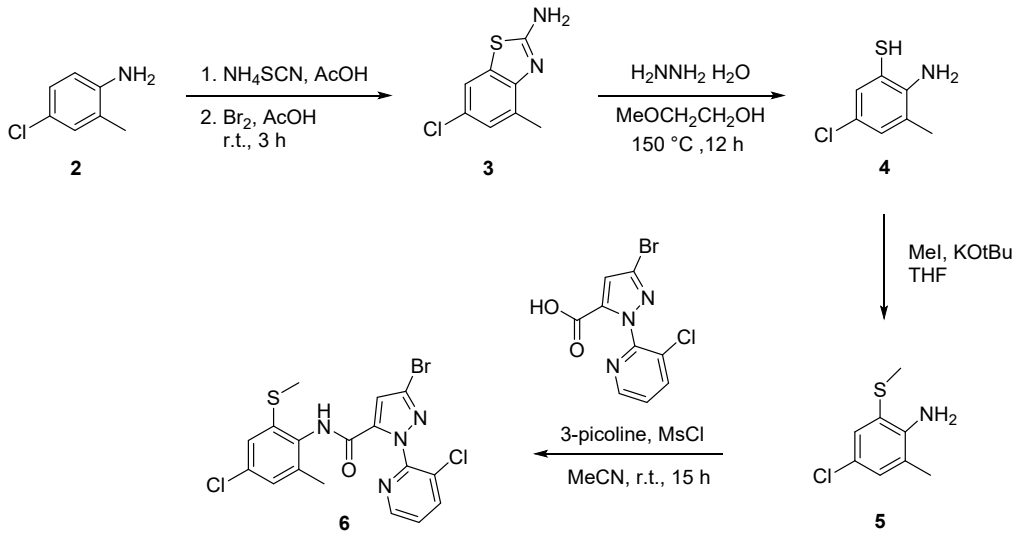
Supporting information

General methods

Analytical thin layer chromatography (TLC) was performed on Kieselgel 60 F_{254} glass plates precoated with a 0.2 mm thickness of silica gel. The TLC plates were visualized by shortwave (254 nm). Flash chromatography was carried out with Kieselgel 60 (230−400 mesh) silica gel. Melting points: Barnstead / Elecrothermal 9300, measurements were performed in open glass capillaries without corrections. NMR spectra: Bruker AV 300MHz (^{1}H–NMR: 300 MHz, ^{13}C–NMR: 75 MHz), AV 500MHz (^{1}H–NMR: 500 NHz, ^{13}C–NMR: 125 MHz), AV2 500MHz (^{19}F–NMR: 470 MHz), the spectra were recorded in $CDCl_3$, MeOD and DMSO-d_6 using TMS as internal standard and are reported in ppm. ^{1}H NMR data are reported as: (s = singlet, d = doublet, t = triplet, q = quartet, br = broad singlet, quin = quintet, m = multiplet; coupling constant(s) in Hz; integration, proton assignment). IR spectra were recorded using a Bruker FT/IR-300E spectrometer. High resolution mass spectra (HRMS): JEOL JMS-700. All solvents were purified using column filter solvent purification system before use unless otherwise indicated. Reagents were purchased and used without further purification.

Synthetic procedure for synthesis of compound 6



Step 1. Synthesis of 6-chloro-4-methylbenzo[d]thiazol-2-amine (**3)**

4-Chloro-2-methylaniline **2** (50 g, 0.35 mol) and NH_4SCN (53.3 g, 0.70 mol) were dissolved in AcOH (300 mL). The solution was stirred at r.t. for 0.5 h. Bromine (36.0 mL, 0.70 mol) in AcOH (25 mL) was added dropwise to above the solution at 20 ℃ for 1 d. The reaction mixture was quenched with water (300 mL) and additionally stirred for 1 h at r.t. The resulting precipitate was filtered, washed with water, and dried under air. The crude product was used to the next step without further purification (75 g, pale yellow solid).

^{1}H NMR (300 MHz, $CDCl_3$) δ 7.40 (d, J = 1.7 Hz, 1H), 7.11 (d, J = 1.3 Hz, 1H), 5.35 (s, 2H), 2.52 (s, 3H).

Step 2. Synthesis of 2-amino-5-chloro-3-methylbenzenethiol (**4)**

The benzothiazole **3** (70 g, 0.35 mol) was dissolved in 2-methoxyethanol (200 mL) and hydrazine monohydrate (262 mL, 5.2 mol). The resulting solution was heated to 150 ℃ for 2 d. After cooling, the mixture was filtered to remove solid impurities, and then the organic layer was diluted with water and acidified to pH 6 using 2 N HCl. The crude product was extracted with EtOAc, dried over $MgSO_4$, and evaporated. The crude product was used to the next step without further purification (31.9 g, pale yellow solid).

^{1}H NMR (300 MHz, $CDCl_3$) δ 7.06 (d, J = 1.8 Hz, 1H), 7.02 (d, J = 2.4 Hz, 1H), 4.28 (s, 2H), 2.15 (s, 4H).

Step 3. Synthesis of 4-chloro-2-methyl-6-(methylthio)aniline (**5)**

To a stirred solution of the thiol **4** (31.9 g, 0.184 mol) in THF (200 mL) was added *t*-BuOK (23 g, 0.202 mol) in portions at 0 ℃ under N_2 atmosphere. After 1 h stirring at r.t., MeI (10.9 ml, 0.175 mol) in THF (50 mL) was added dropwise to the mixture at 0 ℃. The resulting solution was stirred at r.t. for 2 h. The reaction was quenched with water and the reaction mixture was extracted with EtOAc. The combined organic layer was washed with brine, dried over $MgSO_4$, and evaporated. The crude product was used to the next step without further purification (33.9 g, pale brown oil).

^{1}H NMR (300 MHz, $CDCl_3$) δ 7.20 (d, *J* = 2.3 Hz, 1H), 6.95 (d, *J* = 1.9 Hz, 1H), 4.21 (s, 2H), 2.35 (s, 3H), 2.14 (s, 3H).

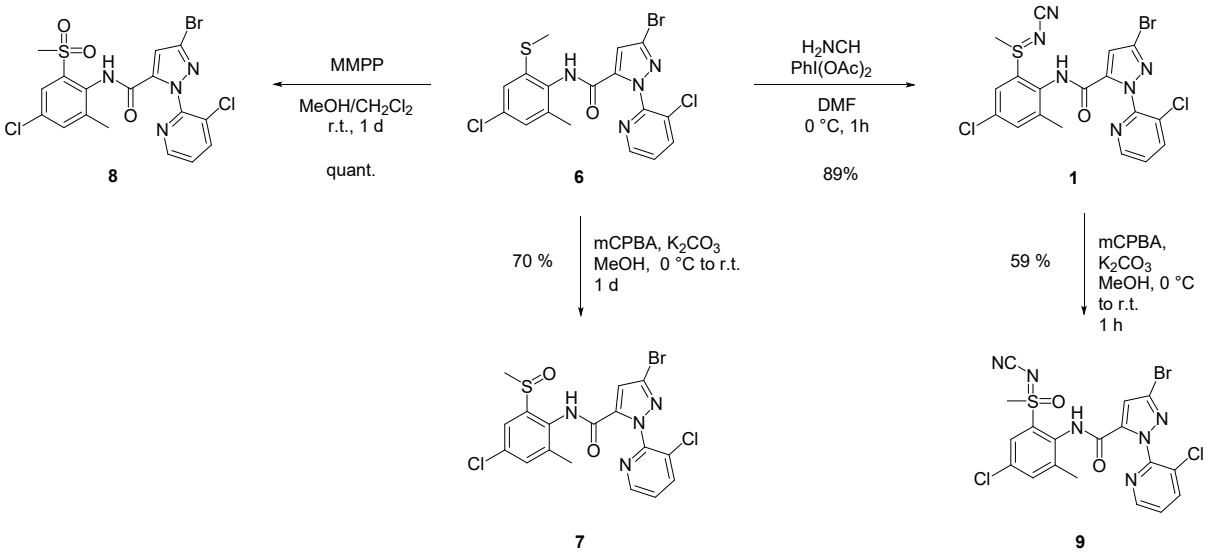
Step 4. Synthesis of 3-bromo-*N*-(4-chloro-2-methyl-6-(methylthio)phenyl)-1-(3-chloropyridin-2-yl)-1H-pyrazole-5-carboxamide (**6)**

Aniline **5** (33.0 g, 0.176 mol), carboxylic acid[1] (58.6 g, 0.194 mol), and 3-picoline (32 ml, 0.35 mol) were dissolved in anhydrous MeCN (300 mL). To the mixture, MsCl (21 ml, 0.26 mol) was added dropwise at 0 ℃ under N_2 atmosphere. After 24 h stirring at 30 ℃, the reaction was quenched with water and the reaction mixture was extracted with EtOAc. The combined organic layer was washed with sat. $NaHCO_3$(aq), dried over $MgSO_4$, and evaporated. The crude solid was tritulated with Hex. and small amount of EtOAc to give pure product (68.5 g, 41% for 4 steps, pale brown solid).

m.p. 157–158 ℃; ^{1}H NMR (300 MHz, $CDCl_3$) *δ* 8.45 (dd, *J* = 4.7, 1.6 Hz, 1H), 7.86 (dd, *J* = 8.1, 1.6 Hz, 1H), 7.50 (s, 1H), 7.38 (dd, *J* = 8.0, 4.7 Hz, 1H), 7.00 (d, *J* = 1.9 Hz, 2H), 6.97 (s, 1H), 2.40 (s, 3H), 2.17 (s, 3H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 155.98, 148.63, 146.86, 139.27, 138.89, 138.65, 138.34, 133.96, 129.36, 128.98, 128.13, 127.18, 125.83, 122.92, 110.56, 18.42, 15.43. IR (neat) 3437, 3257, 3134, 2975, 2923, 1685, 1572, 1523, 1490, 1460, 1346, 1287, 1250, 1182, 1072, 1043, 1024, 960, 839, 805 cm^{-1}. HRMS (EI) calcd for $C_{17}H_{13}BrCl_2N_4OS$ $[M]^+$ 469.9370, found 469.9353.

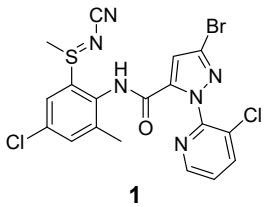
[1] (a) X. Hua, W. Mao, Z. Fan, X. Ji, F. Li, G. Zong, H. Song, J. Li, L. Zhou, L. Zhou, X. Liang, G. Wang, X. Chen, *Aust. J. Chem.* **2014**, *67*, 1491. (b) C. Gnamm, A. Jeanguenat, A. C. Dutton, C. Grimm, D. P. Kloer, *Bioorg. Med. Chem. Lett.* **2012**, *22*, 3800. (c) J. Zhang, J. Xu, B. Wang, Y. Li, L. Xiong, Y. Li, Y. Ma, Z. Li, *J. Agric. Food Chem.* **2012**, *60*, 7565. (d) G. P. Lahm, T. M. Stevenson, T. P. Selby, J. H. Freudenberger, D. Cordova, L. Flexner, C. A. Bellin, C. M. Dubas, B. K. Smith, K. A. Hughes, J. G. Hollingshaus, C. E. Clark, E. A. Benner, *Bioorg. Med. Chem. Lett.* **2007**, *17*, 6274.

Synthetic procedure for Imination and Oxidation



Synthesis of 3-bromo-*N*-(4-chloro-2-(*N*-cyano-S-methylsulfinimidoyl)-6-methylphenyl)-1-(3-chloropyridin-2-yl)-1H-pyrazole-5-carboxamide (**1**)

To a stirred solution of the sulfide **6** (12.1 g, 25.6 mmol) in DMF (50 mL) was added H_2NCN (1.18 g, 28.2 mmol) and $PhI(OAc)_2$ (9.08 mg, 28.2 mmol). The resulting mixture was stirred at 0 °C. The mixture was diluted with water, and the reaction mixture was extracted with EtOAc, dried over Na_2SO_4 and evaporated. The crude solid was recrystallized with CH_3CN/diethyl ether to give pure product **1** (12.5 g, 95%).



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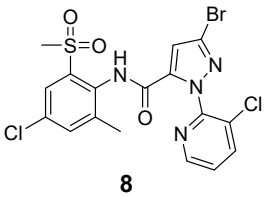
m.p. 151–152 °C. ^{1}H NMR (400 MHz, $CDCl_3$) δ 10.42 (s, 1H), 8.42 (dd, J = 4.7, 1.6 Hz, 1H), 7.84 (dd, J = 8.0, 1.6 Hz, 1H), 7.73 (d, J = 2.3 Hz, 1H), 7.43 (d, J = 2.3 Hz, 1H), 7.39 (s, 1H), 7.37 (dd, J = 8.0, 4.7 Hz, 1H), 2.75 (s, 3H), 2.26 (s, 3H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 157.66, 149.22, 146.77, 140.00, 138.86, 137.44, 136.42, 135.27, 135.16, 131.37, 129.08, 128.43, 125.79, 122.81, 121.17, 112.14, 38.18, 18.03. IR (neat) 3444(br), 3135, 2153, 1676, 1574, 1529, 1463, 1353, 1297, 1175, 1074, 1022, 961, 805, 760 cm^{-1}. HRMS (FAB) calcd for $C_{18}H_{14}BrCl_2N_6OS$ $[M+H]^+$ 510.9510, found 510.9511.

Synthesis of 3-bromo-*N*-(4-chloro-2-methyl-6-(methylsulfonyl)phenyl)-1-(3-chloropyridin-2-yl)-1H-pyrazole-5-carboxamide (**8**)

To a stirred solution of the sulfide **6** (7.6 g, 0.016 mol) in CH_2Cl_2/MeOH (1:1, 10 mL) was added MMPP (Magnesium monoperoxyphthalate $6H_2O$) (18.5 g, 0.048 mol). The resulting mixture was stirred at r.t. for 1 d. The reaction mixture was diluted with water and extracted with EtOAc. The combined organic layers were washed with sat. $NaHCO_3$ and brine. The organic layer was dried over $MgSO_4$, filtered and evaporated. The crude solid was recrystallized with EtOAc (quantitative) **8.**



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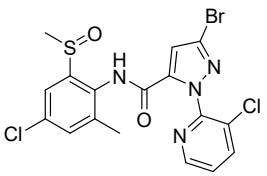
m.p. 197–198 °C. ^{1}H NMR (300 MHz, $CDCl_3$) δ 8.93 (s, 1H), 8.40 (dd, J = 4.7, 1.6 Hz, 1H), 7.90 (dd, J = 8.1, 1.6 Hz, 1H), 7.85 (dd, J = 2.5, 0.6 Hz, 1H), 7.51 (d, J = 2.4 Hz, 1H), 7.40 (dd, J = 8.1, 4.7 Hz, 1H), 7.05 (s, 1H), 3.05 (s, 3H), 2.25 (s, 3H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 155.38, 148.56, 146.78, 140.58, 139.34, 138.07, 136.78, 136.06, 133.54, 131.01, 128.75, 128.45, 127.11, 125.95, 111.18, 43.62, 18.87. IR (neat) 3326, 3062, 2927, 2855, 1688, 1572, 1528, 1497, 1465, 1357, 1300, 1236, 1193, 1134, 960, 880, 812, 783 cm^{-1}. HRMS (FAB) calcd for $C_{17}H_{14}BrCl_2N_4O_3S$ $[M+H]^+$ 502.9347, found 502.9339.

Synthesis of 3-bromo-*N*-(4-chloro-2-methyl-6-(methylsulfinyl)phenyl)-1-(3-chloropyridin-2-yl)-1H-pyrazole-5-carboxamide (**7**) and 3-bromo-*N*-(4-chloro-2-(*N*-cyano-S-methylsulfonimidoyl)-6-methylphenyl)-1-(3-chloropyridin-2-yl)-1H-pyrazole-5-carboxamide (**9**)

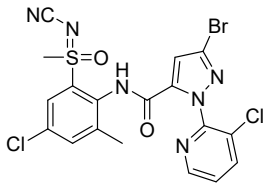
To a solution of sulfide **6** or sulfilimine **1** in MeOH was added K_2CO_3 (2.0-6.0 eq.) at 0 °C. After 1 h, *m*CPBA (1.5–4.5 eq) was added and the reaction mixture was stirred at room temperature. The reaction mixture was quenched with 1 N HCl (aq.) at 0 °C and extracted with EtOAc. The combined organic layer was dried over Na_2SO_4 and evaporated. The crude product was purified by column to obtain oxidation compound.



7

m.p. 218–219 °C. ^{1}H NMR (300 MHz, $CDCl_3$) δ 9.78 (s, 1H), 8.44 (dd, J = 4.7, 1.6 Hz, 1H), 7.85 (dd, J = 8.0, 1.6 Hz, 1H), 7.38 (dd, J = 8.0, 4.7 Hz, 1H), 7.31 (d, J = 2.4 Hz, 1H), 7.25–7.22 (m, 2H), 2.72 (s, 3H), 2.18 (s, 3H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 156.86, 149.12, 146.84, 139.44, 138.85, 137.78,

134.38, 133.68, 130.33, 129.05, 128.38, 125.81, 121.64, 111.30, 41.95, 17.89. IR (neat) 3433, 3168, 3058, 2923, 2853, 1674, 1575, 1531, 1492, 1467, 1414, 1357, 1295, 1177, 1074, 1029, 960, 873, 828, 800, 761 cm^{-1}. HRMS (EI) calcd for $C_{17}H_{13}BrCl_2N_4O_2S$ $[M]^+$ 485.9320, found 485.9313.



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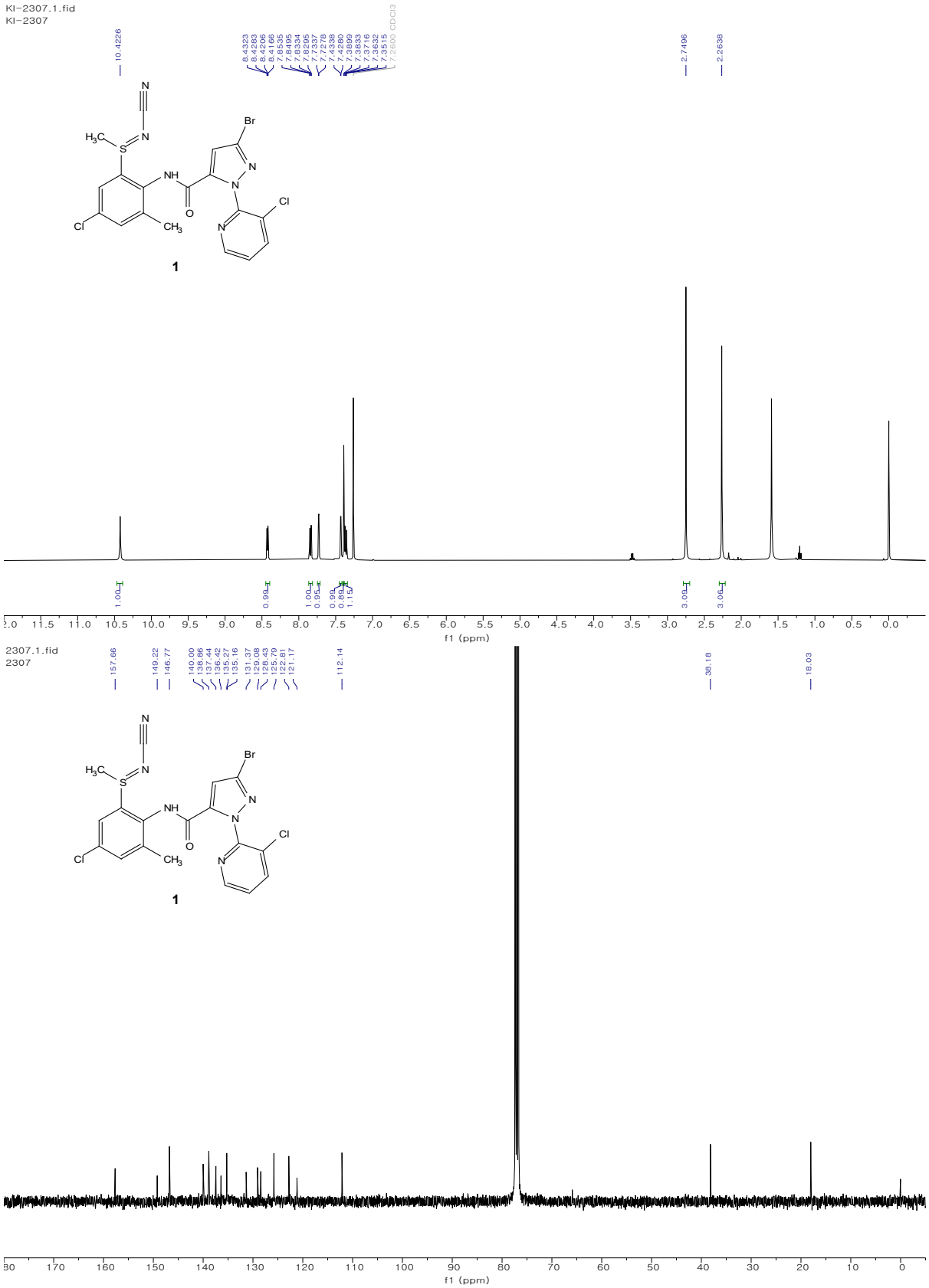
m.p. 179–180 °C. ^1H NMR (400 MHz, $CDCl_3$) δ 8.99 (s, 1H), 8.40 (dd, J = 4.6, 1.6 Hz, 1H), 7.92–7.86 (m, 2H), 7.62 (d, J = 2.5 Hz, 1H), 7.39 (dd, J = 8.0, 4.7 Hz, 1H), 7.15 (s, 1H), 3.30 (s, 3H), 2.27 (s, 3H). ^{13}C NMR (100 MHz, MeOD) δ 157.65, 148.50, 146.71, 143.06, 139.59, 138.58, 137.29, 136.06, 134.38, 128.75, 127.68, 127.63, 126.41, 111.55, 111.27, 42.13, 16.77. IR (neat) (br) 3193, 3075, 3011, 2930, 2202, 1688, 1528, 1495, 1464, 1349, 1292, 1251, 1200, 1180, 983, 961, 882, 828, 806 cm^{-1}. HRMS (FAB) calcd for $C_{18}H_{14}BrCl_2N_6O_2S$ $[M+H]^+$ 526.9459, found 526.9453.

^{1}H and ^{13}C NMR of compound 1



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^{1}H and ^{13}C NMR of compound 6

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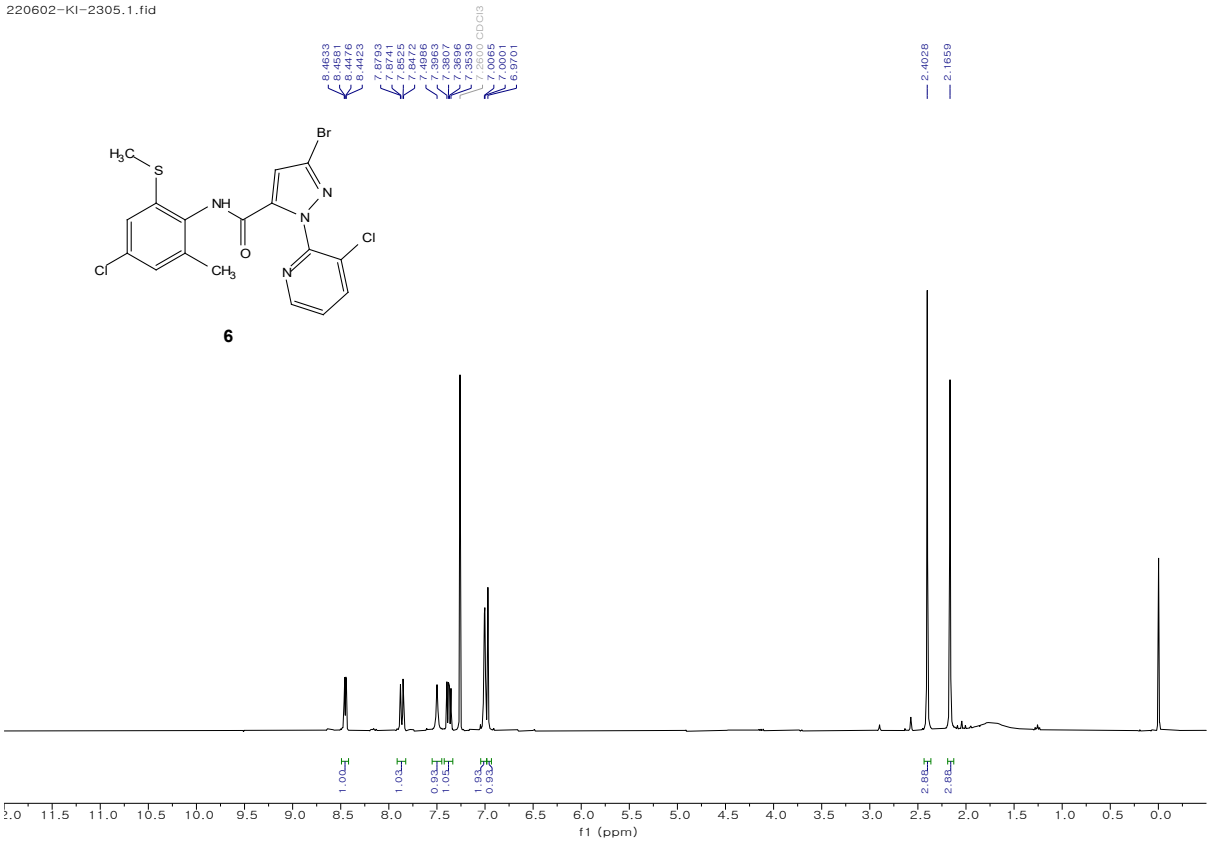

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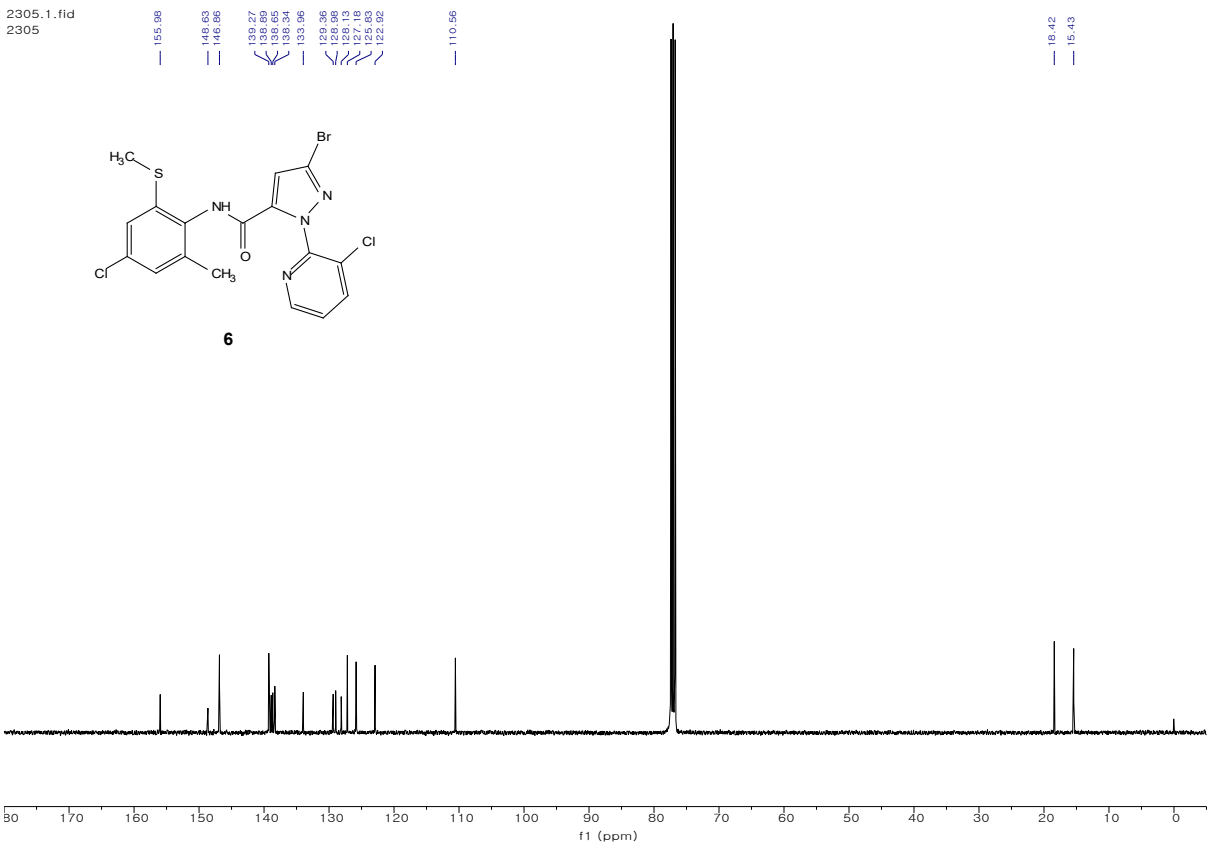

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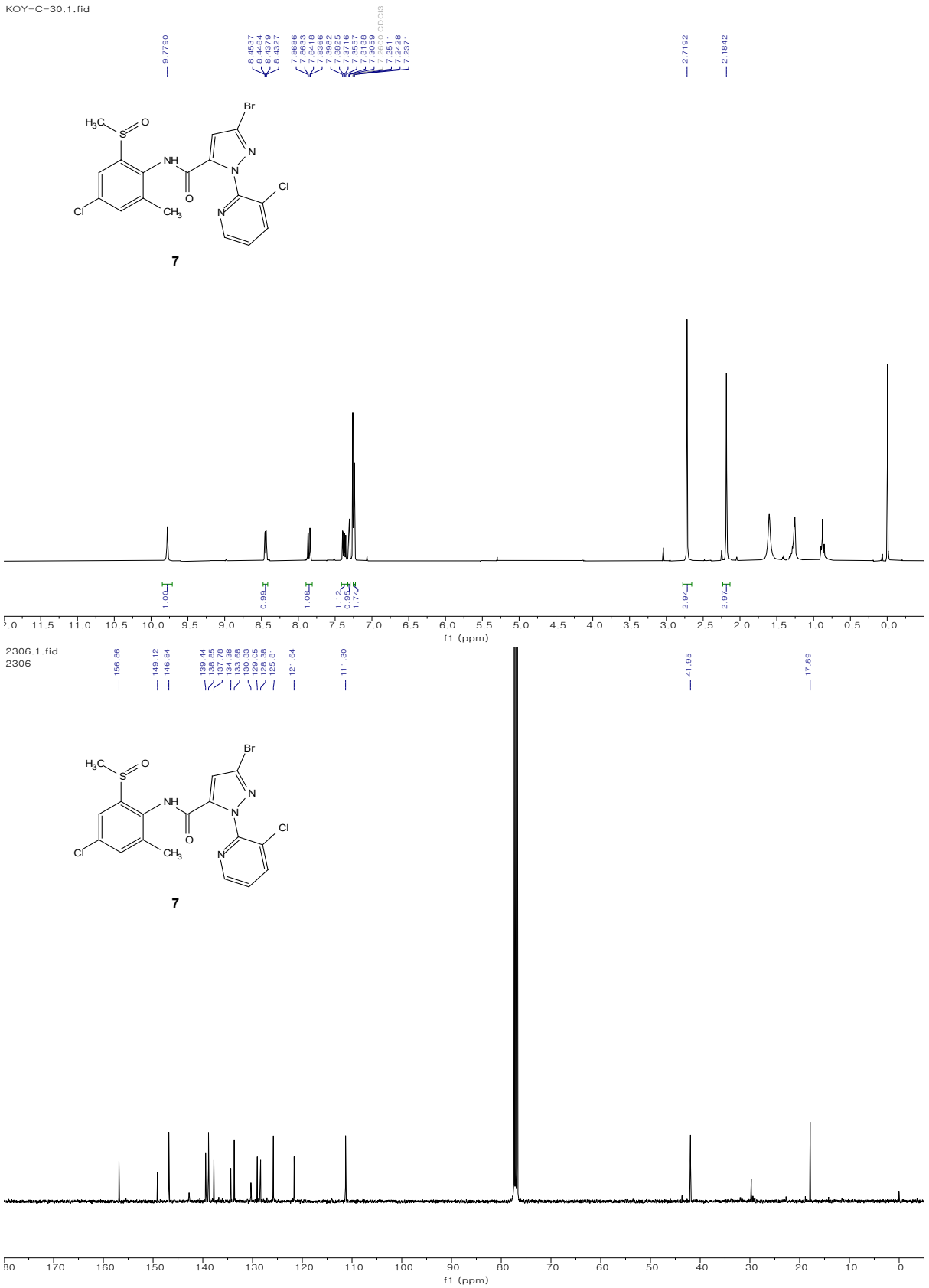
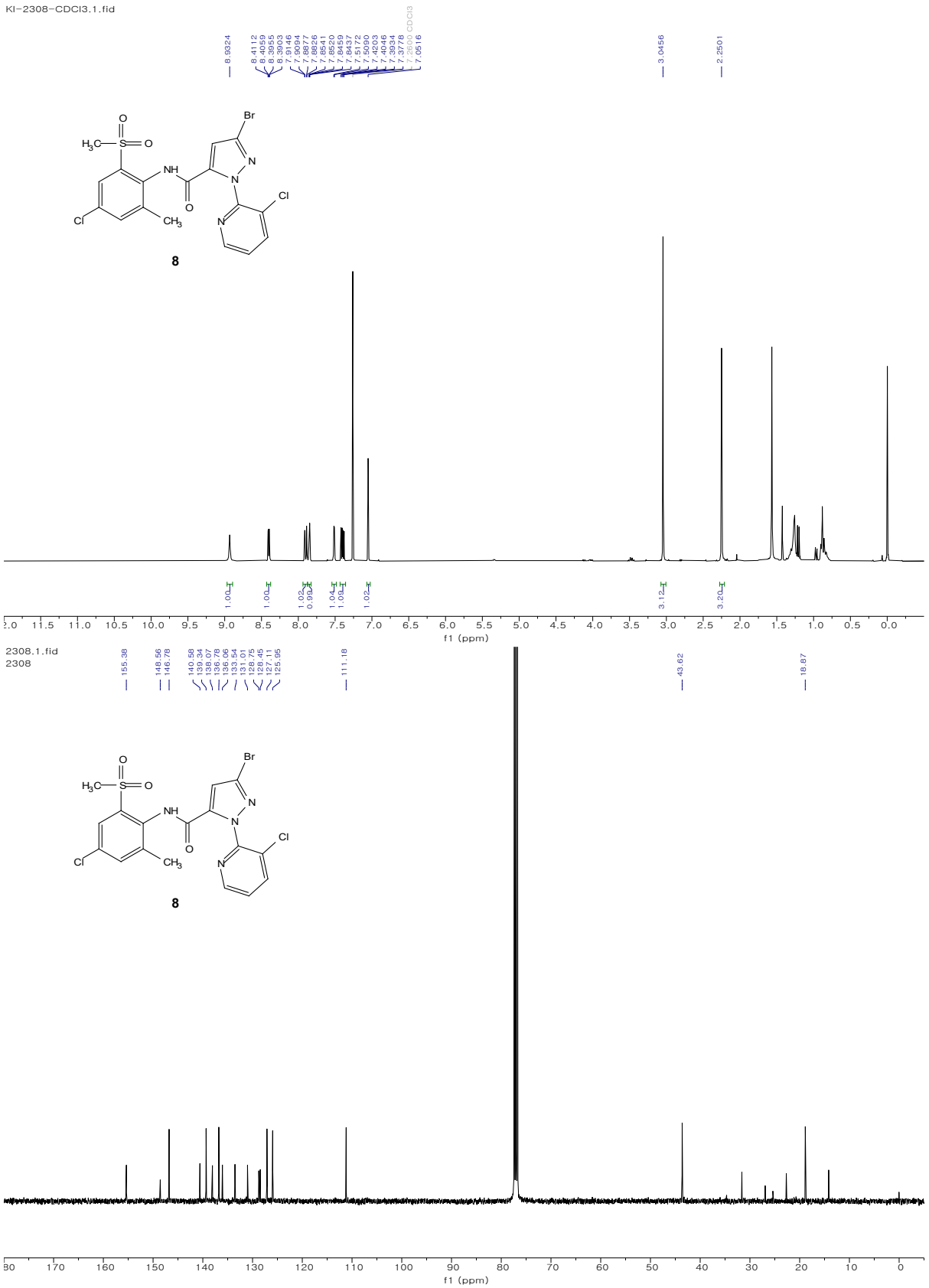
^{1}H and ^{13}C NMR of compound 7



^{1}H and ^{13}C NMR of compound 8



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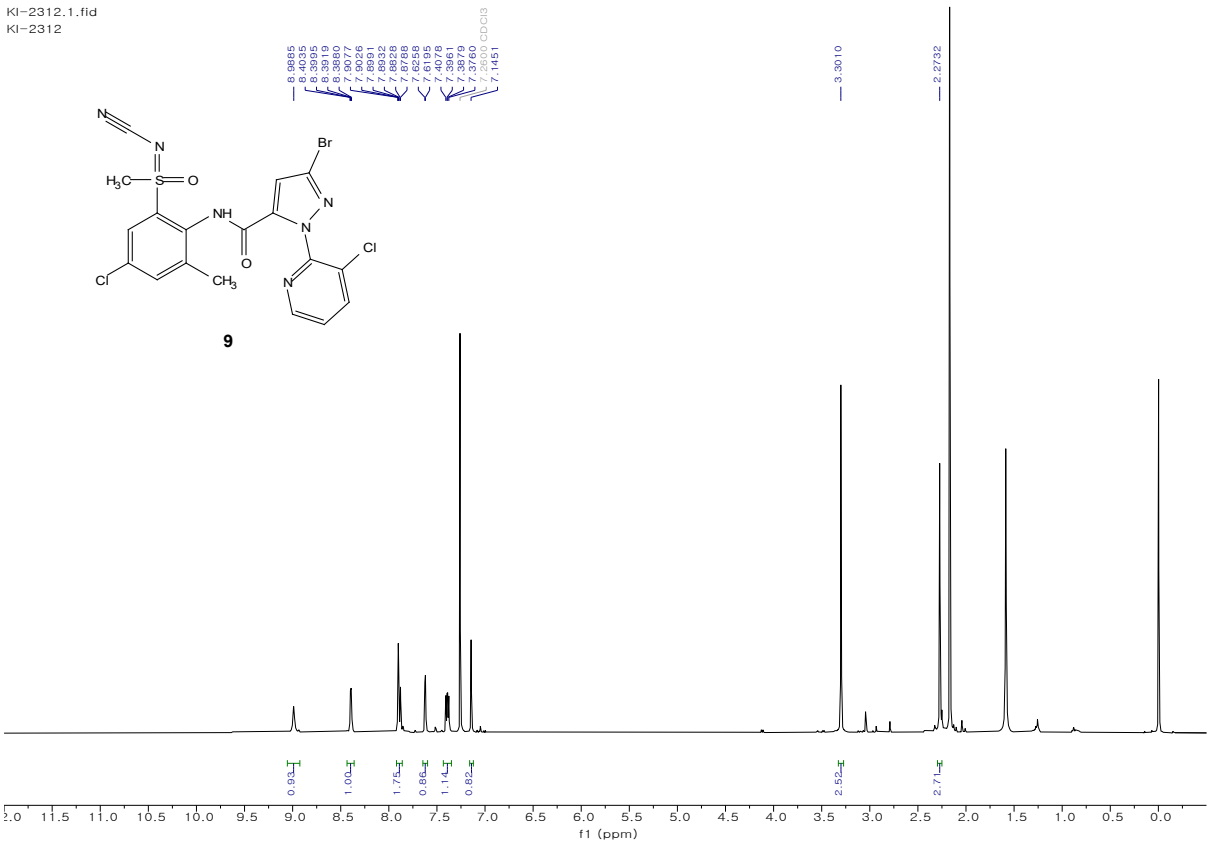
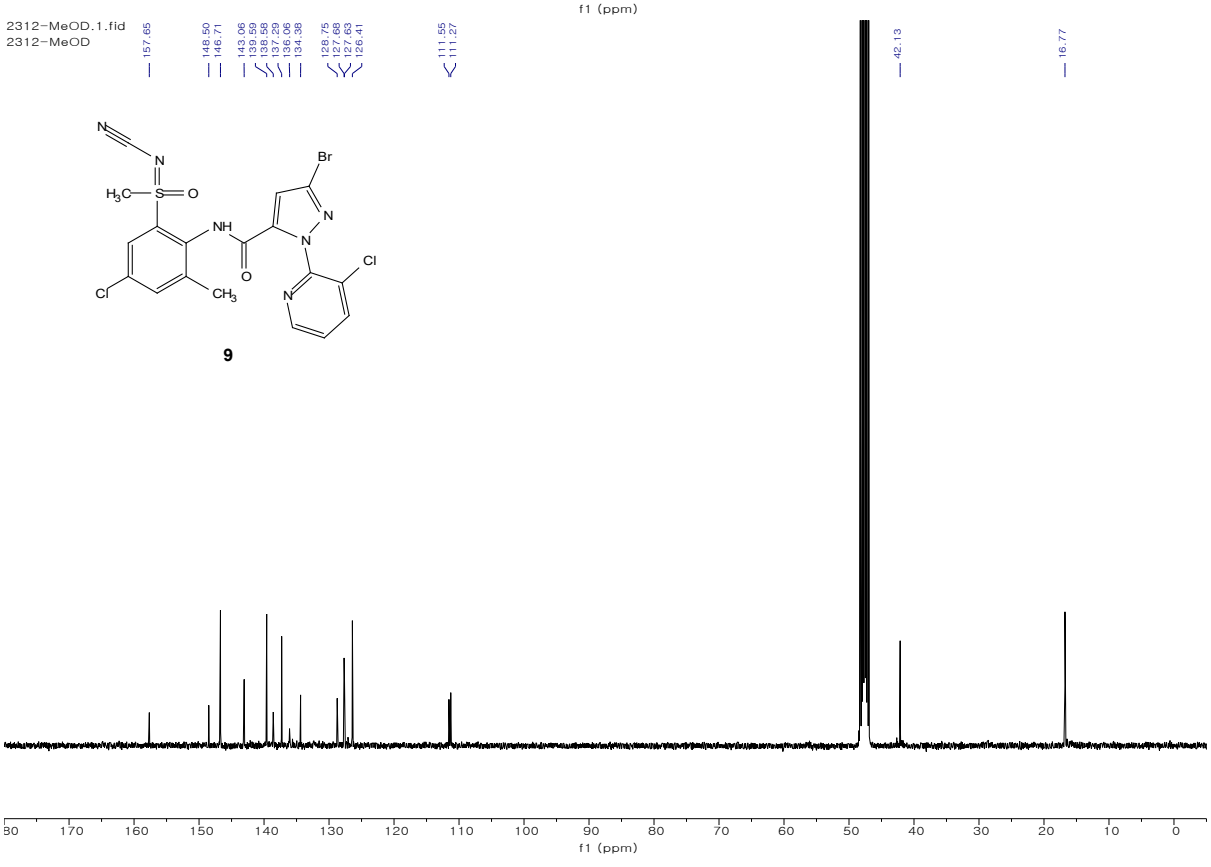
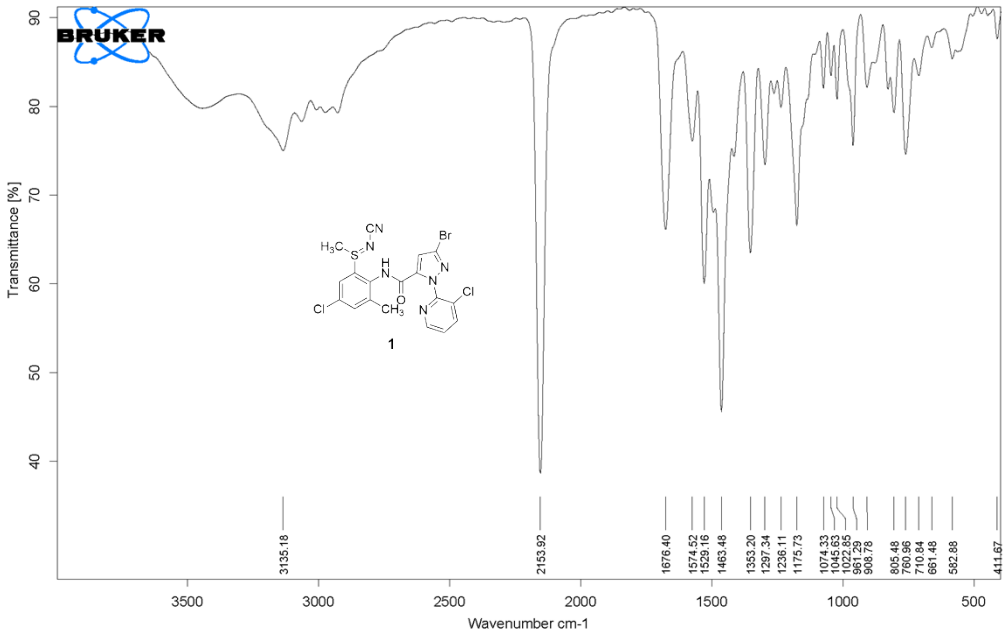




IR spectrum of organosulfur compounds



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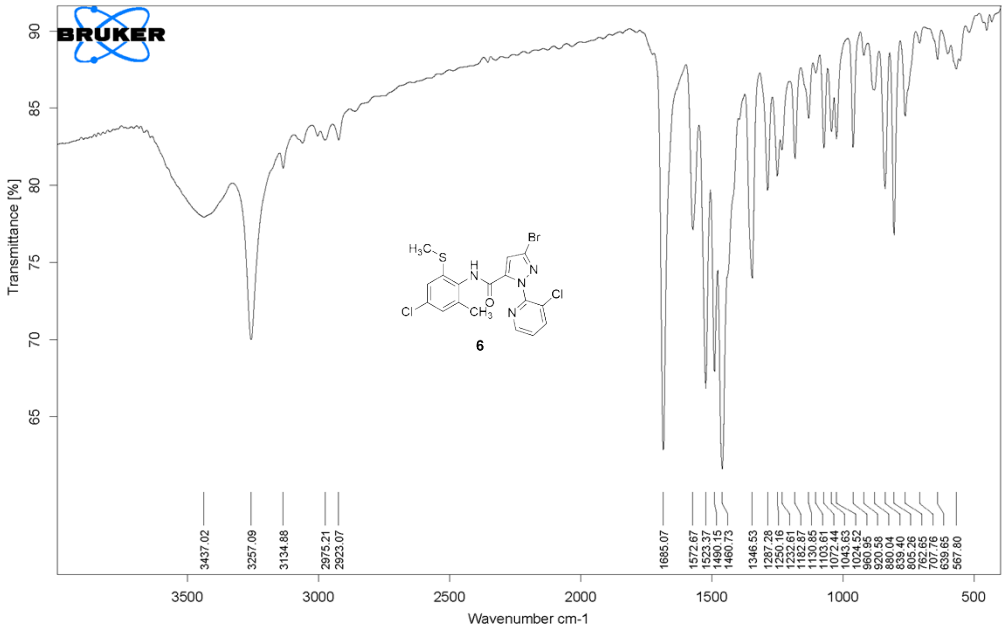

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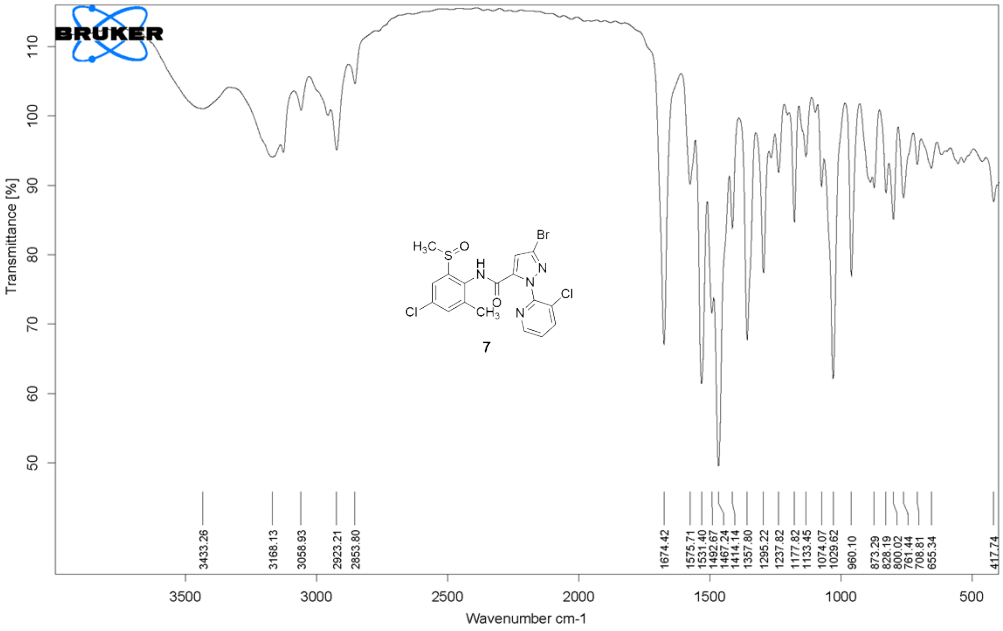
IR spectrum of organosulfur compounds



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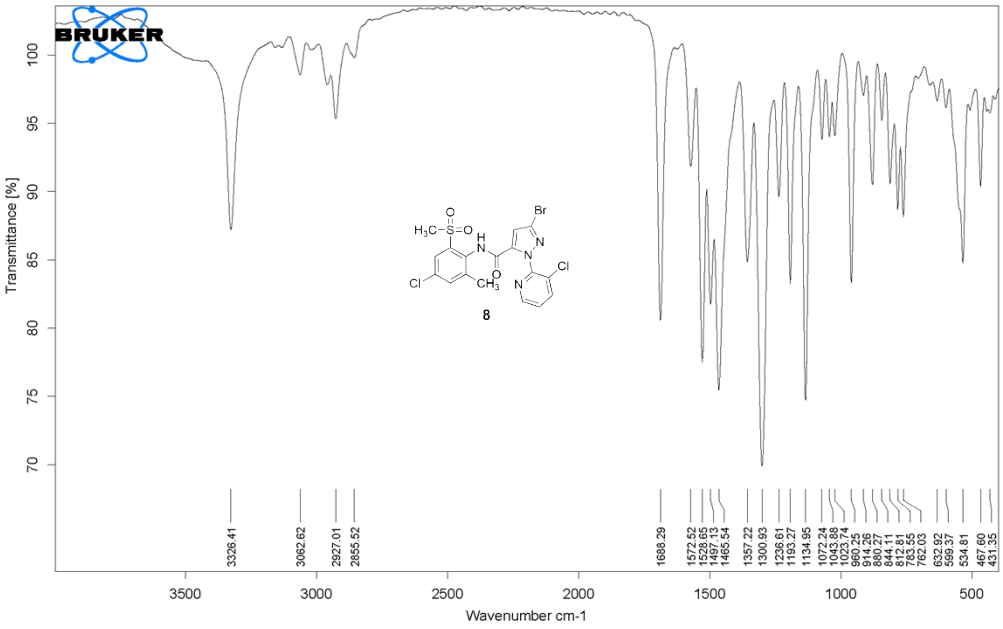

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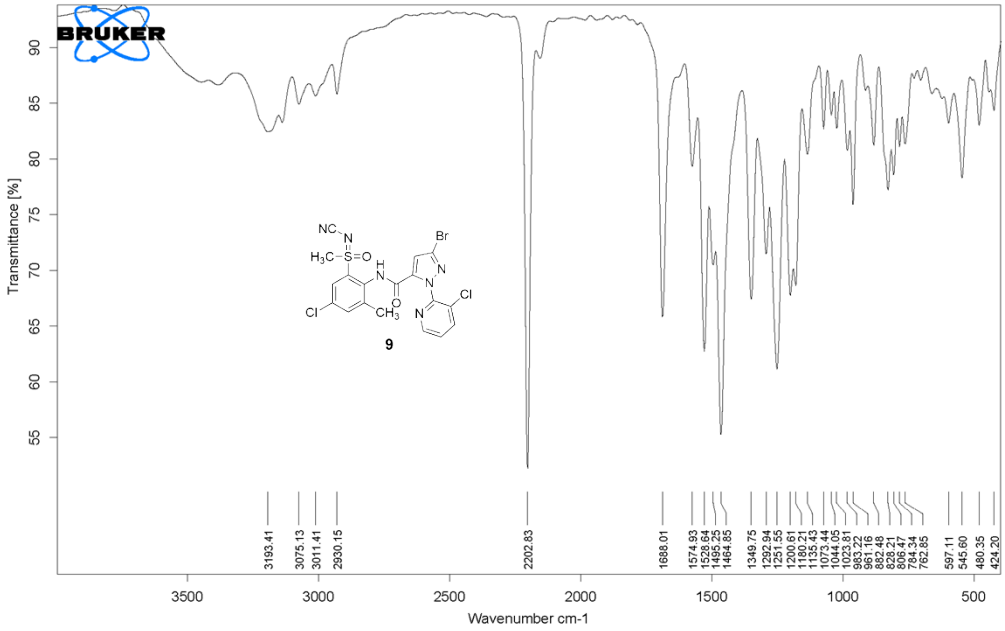
IR spectrum of organosulfur compounds



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Physicochemical properties organosulfur compounds

Table S1. Physicochemical properties of compounds and Chlorantraniliprole

Entry	Compd	Solubility[a,b]	pKa	Log P[c,d]	Permeability[e]
1	**1** (*N*-Cyano sulfilimine)	232.3 ± 3.53 µM (119.0 ± 1.81µg/mL)	8.44	3.37	-4.15 ± 0.013
2	**7** (Sulfoxide)	126.0 ± 19.7 µM (61.5 ± 9.63 µg/mL)	8.90	3.60	- 4.163 ± 0.071
3	**8** (Sulfone)	>495 µM (>250 µg/mL)	8.95	4.34	-4.29 ± 0.167
4	**9** (*N*-Cyano sulfoximine)	> 495 µM (> 261 µg/mL)	8.15	4.01	- 4.227 ± 0.069
5	**Chlorantraniliprole**	21.5 ± 1.59 µM (10.4 ± 0.771 µg/mL)	1.52/10.77	5.25	- 4.3 ± 0.046

[a] Method for determination of equilibrium solubility: µSOL[2]; [b]at 25°C and pH 7.4; [c]Using ACD / Labs T3 method (pH – metric); [d]for graphs, please see the supporting information, [e]Method for determination of permeability: PAMPA[3]

[2] A. Avdeef, C. M. Berger, C. Brownell, pH-Metric Solubility. 2. Correlation Between the Acid-Base Titration and the Saturation Shake-Flask Solubility-pH Methods, *Pharm. Res.*, **2000**, *17*, 85 (Part 2 in pSOL series).
[3] A. Avdeef, P. Artursson, S. Neuhoff, L. Lazarova, J. Gråsjö, S. Tavelin, Caco-2 permeability of weakly basic drugs predicted with the double-sink PAMPA pKaflux Method. *Eur. J. Pharm. Sci.,* **2005**, *24*, 333.

Larvicidal activity against Spodoptera

The lavicidal activities of synthesized compounds were evaluated using the leaf-dip procedure by Kyung Nong Co. Ltd., Korea.[4] The aqueous solution of prepared compounds and chlorantraniliprole in acetone (H_2O : acetone = 95 : 5) were sprayed to a cabbage leave placed on moistened filter paper (disc, diameter 8.8 cm) in petri dishes. After allowing to dry, the dishes were infested with 10 Spodoptera litura (third-instar). After 1, 2, 3, and 4 days, percentage of mortalities was evaluated. The treatments were replicated three times.

Table S2. Larvicidal activity depend on time

Entry	Compd	Funtionality	Concentration (ppm)	Against the 3rd instar larvae of Spodoptera litura				
				Larvicidal activity (%)				Eating area (%)
				24 h	48 h	72 h	96 h	96 h
1	**1**	*N*-Cyano sulfilimine	12.5	3.3	50.0	100	100	0 – 5
			6.25	0.0	43.3	100	100	0 – 5
2	**7**	Sulfoxide	50	3.3	46.7	93.3	100	5 – 10
3	**8**	Sulfone	12.5	0.0	50.7	96.7	100	0 – 5
			6.25	0.0	46.7	96.7	100	0 – 5
4	**9**	*N*-Cyano sulfoximine	50	0.0	3.3	10.0	16.7	10 – 30
5	**Chlorantraniliprole**		12.5	10.0	70.0	96.7	100	0 – 5
			6.25	10.0	60.0	90.0	100	0 – 5

[4] (a). Lim, H. J.; Lee, W. H.; Park, S. J. Synthesis, Physicochemical Properties, and Biological Activities of 4-(*S*-Methyl-*N*-(2,2,2-Trifluoroacetyl)Sulfilimidoyl) Anthranilic Diamide. *Molecules* **2019**, *24*, 3451. (b) Park, S. J.; Lim, H. J.; Kim, B. T. Pyrazole carboxamide compound containing organosulfur group and pesticide composition containing pyrazole carboxamide compound. WO Patent WO2019/156425 A1, 2019. (c) Chang, S. Y.; Heo, J. N.; Lee, H.; Lim, H. J.; Kim, B. T.; Kim, J. K.; Kim, J. Diaminoaryl Derivatives Substituted by Carbamate and Pesticidal Composition Containing Same. WO2013/168967 A1, 2013.

Table S3. Picture of eating area

Entry	Compd	Pictures of eating area_ after 96 h (The 3rd instar stage larvae of Spodoptera litura)
1	**1**	 0 – 5 % eating
2	**8**	 0 – 5 % eating
3	**9**	 10 – 30 % eating
2	**Chlorantraniliprole**	 0 – 5 % eating

Entry	Compd	Pictures of eating area_ after 96 h (The 3rd instar stage larvae of Spodoptera litura)
1	**7**	 5 – 10 % eating
2	**Chlorantraniliprole**	 0 – 5 % eating

Field test

Against diamondback moth

The open-field test was conducted with sowing radish (Raphanus sativus, Shindongha) at Ipsil-ri, Oedong-eup, Gyeongju-si, Gyeongsangbuk-do, South Korea. Before the treatment of compound **1**, it was occurred an average of 33.3 larvaes (10 leaves) and mostly 3~4 the 3rd or 4th stage larvaes. It was suitable for the test. Using engine-type power sprayer (ARIMITSU), compound **1** was treated in triplicate in 10 m^2, and it was repeated three times. The spray volume in compound **1** was 1.5 liters per 20 m^2. Compound **1** (10% WP) was diluted 4,000-fold in water and treated at concentrations of 25 ppm. For the reference, chlorantraniliprole 5% WG (Farm Hannong, Altacore) was diluted 2,000 times and treated with 25ppm.

Figure S1. Sowing radish for field test

Before and 3 days and 7 days after compound **1** treatment, live larvaes of diamondback moth were investigated within 20 m^2 by randomly. Larvicidal activity was calculated by the equation: [100 – (average of larvae viability / average of non-treated larvae viability X 100)] (Abbott, 1925).

Table S4. Larvicidal activity against diamondback moth (after 3 days)

Entry	Compd	Concentration (ppm)	Average density (m^2)	Larvae Viability (%)				Larvicidal activity (%)
				1	2	3	average	
1	*N*-Cyano sulfilimine (**1**)	50	31.7	9.7	13.8	8.6	10.7	90.4
2	**Chlorantraniliprole**	25	40.7	7.5	12.1	6.1	8.6	92.3
3	**Non-treated**	-	33.3	106.1	122.6	105.6	111.4	-

Table S5. Larvicidal activity against diamondback moth (after 7 days)

Entry	Compd	Concentration (ppm)	Average density (m^2)	Larvae Viability (%)				Larvicidal activity (%)
				1	2	3	average	
1	*N*-Cyano sulfilimine (**1**)	50	31.7	9.7	13.8	8.6	10.7	90.4
2	**Chlorantraniliprole**	25	40.7	7.5	12.1	6.1	8.6	92.3
3	**Non-treated**	-	33.3	106.1	122.6	105.6	111.4	-

After treatment	The damaged leave
	

Figure S2. Field test against diamondback moth

Against Spodoptera litura

The open-field test was conducted with napa cabbage (large heads with firmly packed leaves) at Sannae-myeon, Geoncheon-eup, Gyeongju-si, Gyeongsangbuk-do, South Korea. For the test, in-house raised 2nd instar larvaes of diamondback moth were released three per week. Before the treatment of compound **1**, the number of live insects was an average of 29.3 larvaes (10 weeks), and it was suitable for the test. Using engine-type power sprayer (ARIMITSU), compound **1** was treated in triplicate in 20 m^2, and it was repeated three times. The spray volume in compound **1** was 3 liters per 20 m^2. Compound **1** (10% WP) was diluted 4,000-fold in water and treated at concentrations of 25 ppm. For the reference, chlorantraniliprole 5% WG (Farm Hannong, Altacore) was diluted 2,000 times and treated with 25ppm.

Figure S3. Napa cabbage for field test

Before and 3 days and 7 days after compound **1** treatment, live larvaes of Spodoptera litura were investigated within 20 m^2 by randomly. Larvicidal activity was calculated by the equation: [100 – (average of larvae viability / average of non-treated larvae viability X 100)] (Abbott, 1925).

Table S6. Larvicidal activity against Spodoptera litura (after 3 days)

Entry	Compd	Concentration (ppm)	Average density (m^2)	Larvae Viability (%)				Larvicidal activity (%)
				1	2	3	average	
1	*N*-Cyano sulfilimine (**1**)	50	31.7	14.3	32.0	22.9	23.1	81.2
2	**Chlorantraniliprole**	25	34.0	22.9	28.1	25.7	25.6	79.2
3	**Non-treated**	-	29.3	121.4	116.1	131.0	122.8	-

Table S7. Larvicidal activity against Spodoptera litura (after 7 days)

Entry	Compd	Concentration (ppm)	Average density (m^2)	Larvae Viability (%)				Larvicidal activity (%)
				1	2	3	average	
1	*N*-Cyano sulfilimine (**1**)	50	31.7	14.3	20.0	17.1	17.1	86.8
2	**Chlorantraniliprole**	25	34.0	22.9	21.9	20.0	21.6	83.3
3	**Non-treated**	-	29.3	128.6	122.6	137.9	129.7	-

Before treatment	The damaged leave
	

Figure S4. Field test against Spodoptera litura

pH-metric pKa of compound 1

pH-metric

Sample name: **KI-02307**
Assay name: **pH-metric pKa**
Assay ID: **21F-16020**
Filename: **D:\Data\Customer\21F-16020_KI-02307_pH-metric pKa.t3r**

Experiment start time: **16/06/2021 21:11:24**
Analyst:
Instrument ID: **T313101**

Overall results

RMSD	0.218
Average ionic strength	0.159 M
Average temperature	25.0°C
Analyte concentration range	1645.3 µM to 1766.7 µM
Total points considered	35 of 48

Warnings and errors

Errors	None
Warnings	Turbidity threshold has been exceeded
	Turbid points included in calculation

Four-Plus parameters

Alpha	0.071	16/06/2021 21:11:24	D:\Data\Customer\21F-16008_Blank standardisation.t3r
S	1.0002	16/06/2021 21:11:24	D:\Data\Customer\21F-16008_Blank standardisation.t3r
jH	0.7	16/06/2021 21:11:24	D:\Data\Customer\21F-16008_Blank standardisation.t3r
jOH	-0.5	16/06/2021 21:11:24	D:\Data\Customer\21F-16008_Blank standardisation.t3r

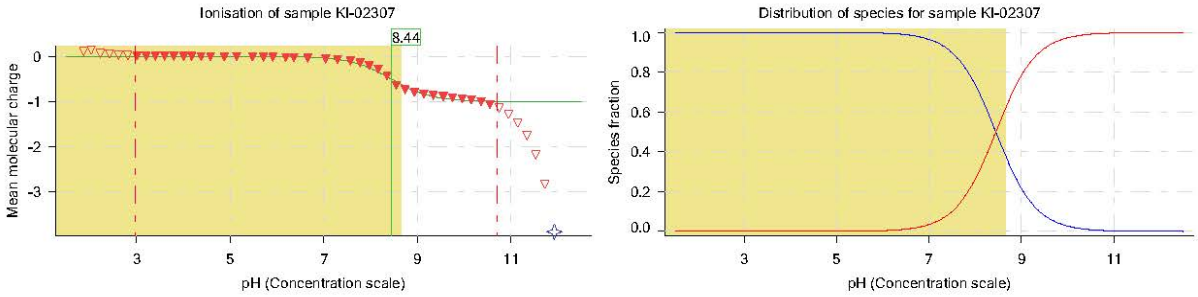
Titrants

0.50 M HCl	0.993077	16/06/2021 21:11:24	D:\Data\Customer\21F-16010_Blank standardisation.t3r
0.50 M KOH	0.993673	16/06/2021 21:11:24	D:\Data\Customer\21E-27008_KHP_Base standardisation using KHP.t3r

Sample

KI-02307 concentration factor	1.078
Acid pKa 1	8.44

Sample graphs



Sample species percents

pH	KI-02307 KI-02307H	KI-02307 KI-02307	Comment
1.000	100.00 %	0.00 %	
1.200	100.00 %	0.00 %	Stomach pH
2.000	100.00 %	0.00 %	
3.000	100.00 %	0.00 %	
4.000	100.00 %	0.00 %	
5.000	99.96 %	0.04 %	
6.000	99.64 %	0.36 %	
6.500	98.87 %	1.13 %	
7.000	96.51 %	3.49 %	
7.400	91.67 %	8.33 %	Blood pH
8.000	73.44 %	26.56 %	
9.000	21.66 %	78.34 %	
10.000	2.69 %	97.31 %	
11.000	0.28 %	99.72 %	
12.000	0.03 %	99.97 %	

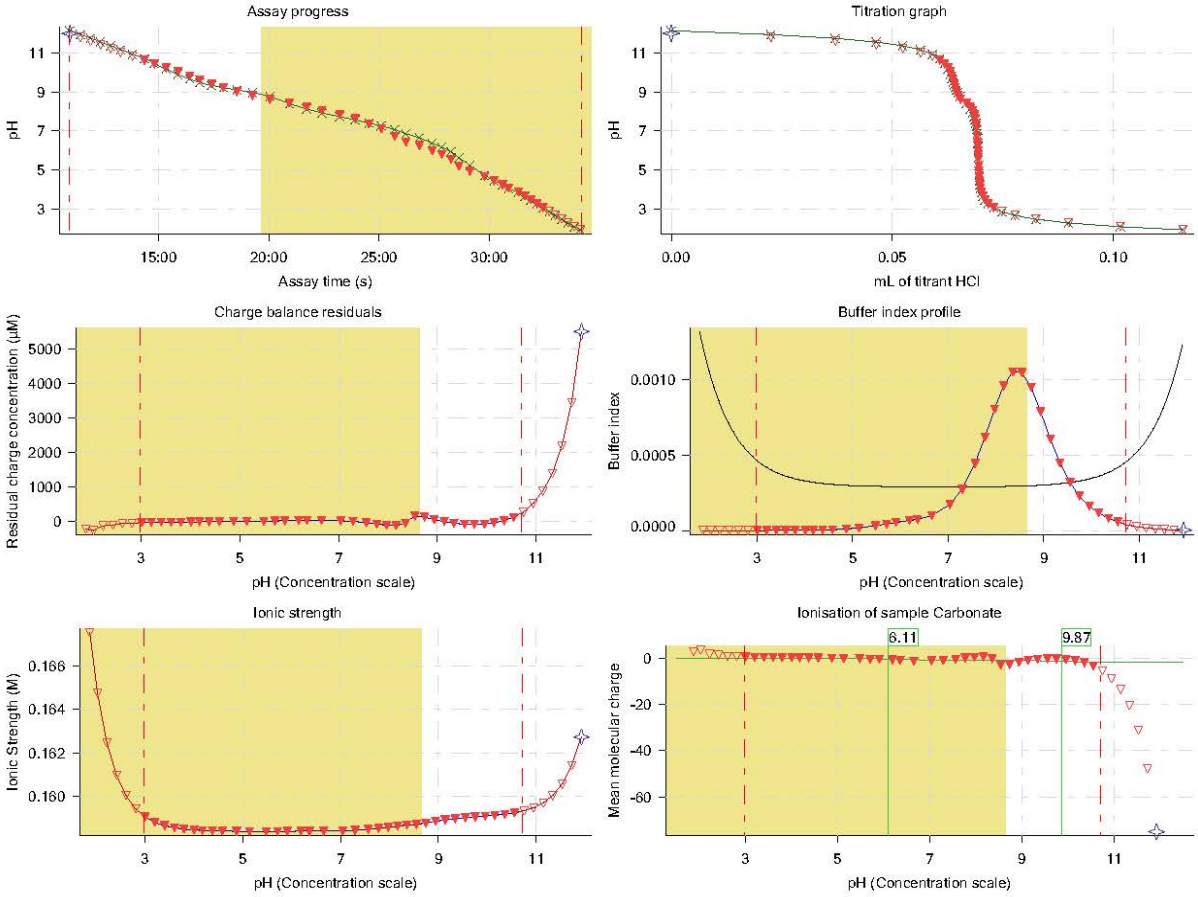
Sample name: **KI-02307**
Assay name: **pH-metric pKa**
Assay ID: **21F-16020**
Filename: **D:\Data\Customer\21F-16020_KI-02307_pH-metric pKa.t3r**

Experiment start time: **16/06/2021 21:11:24**
Analyst:
Instrument ID: **T313101**

Carbonate and acidity

- Carbonate 0.075 mM
- Acidity error -0.103 mM

Other graphs



pH-metric pKa of compound 7

pH-metric

Sample name: **KI-02306**
Assay name: **pH-metric pKa**
Assay ID: **21F-16018**
Filename: **D:\Data\Customer\21F-16018_KI-02306_pH-metric pKa.t3r**

Experiment start time: **16/06/2021 20:02:06**
Analyst:
Instrument ID: **T313101**

Overall results

RMSD	0.127
Average ionic strength	0.158 M
Average temperature	25.0°C
Analyte concentration range	1521.7 µM to 1626.6 µM
Total points considered	35 of 47

Warnings and errors

Errors None
Warnings Sample concentration factor out of range

Four-Plus parameters

Alpha	0.071	16/06/2021	20:02:06	D:\Data\Customer\21F-16008_Blank standardisation.t3r
S	1.0002	16/06/2021	20:02:06	D:\Data\Customer\21F-16008_Blank standardisation.t3r
jH	0.7	16/06/2021	20:02:06	D:\Data\Customer\21F-16008_Blank standardisation.t3r
jOH	-0.5	16/06/2021	20:02:06	D:\Data\Customer\21F-16008_Blank standardisation.t3r

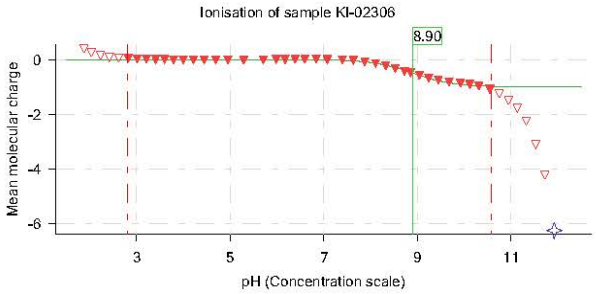
Titrants

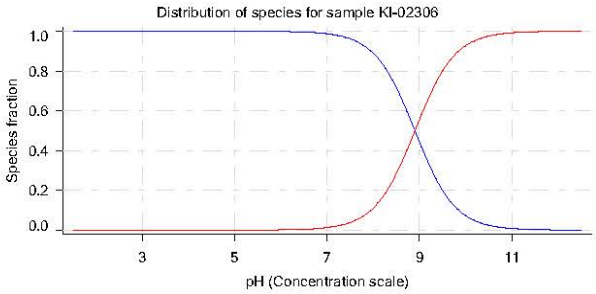
0.50 M HCl	0.993077	16/06/2021	20:02:06	D:\Data\Customer\21F-16010_Blank standardisation.t3r
0.50 M KOH	0.993673	16/06/2021	20:02:06	D:\Data\Customer\21E-27008_KHP_Base standardisation using KHP.t3r

Sample

KI-02306 concentration factor	0.491
Acid pKa 1	8.90

Sample graphs





Sample species percents

pH	KI-02306 KI-02306H	KI-02306 KI-02306	Comment
1.000	100.00 %	0.00 %	
1.200	100.00 %	0.00 %	Stomach pH
2.000	100.00 %	0.00 %	
3.000	100.00 %	0.00 %	
4.000	100.00 %	0.00 %	
5.000	99.99 %	0.01 %	
6.000	99.87 %	0.13 %	
6.500	99.60 %	0.40 %	
7.000	98.75 %	1.25 %	
7.400	96.92 %	3.08 %	Blood pH
8.000	88.78 %	11.22 %	
9.000	44.18 %	55.82 %	
10.000	7.33 %	92.67 %	
11.000	0.79 %	99.21 %	
12.000	0.08 %	99.92 %	

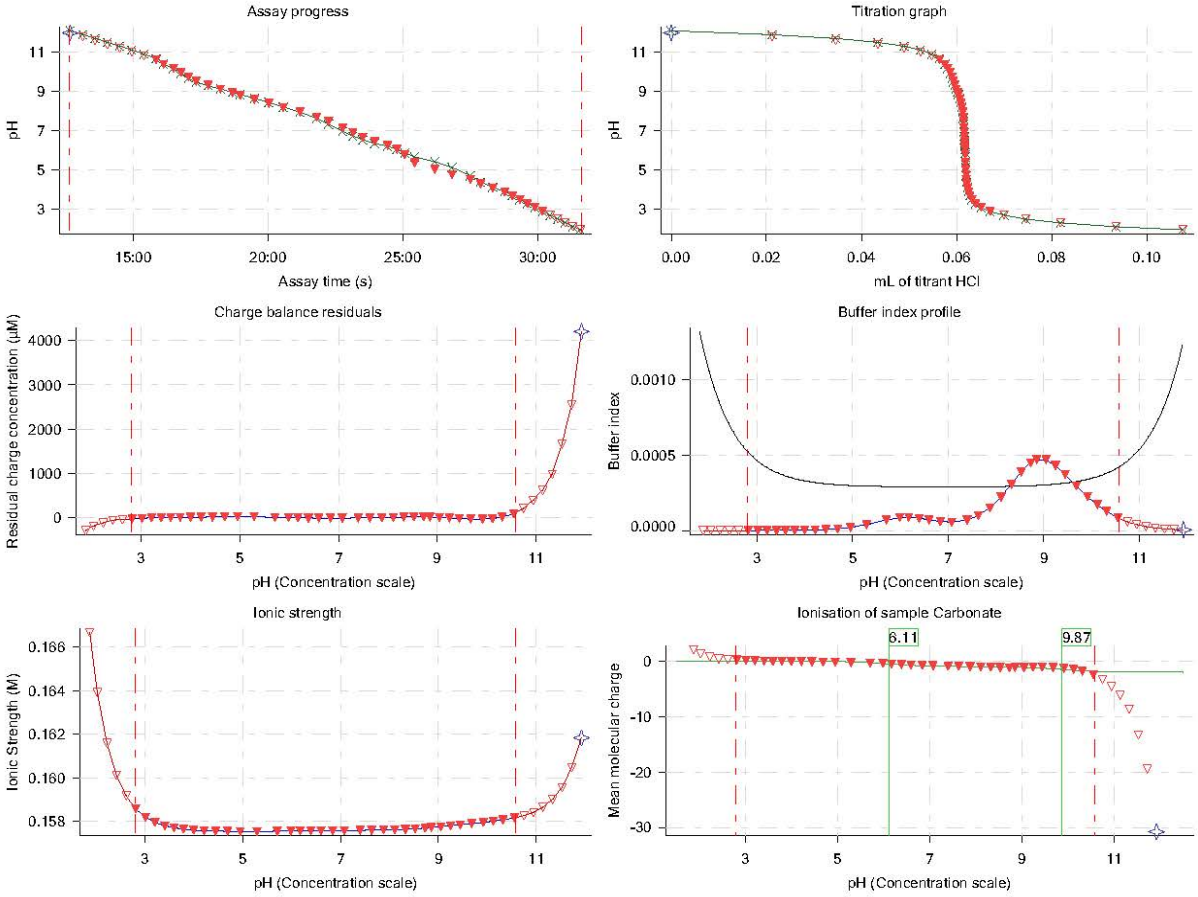
Sample name: **KI-02306**
Assay name: **pH-metric pKa**
Assay ID: **21F-16018**
Filename: **D:\Data\Customer\21F-16018_KI-02306_pH-metric pKa.t3r**

Experiment start time: **16/06/2021 20:02:06**
Analyst:
Instrument ID: **T313101**

Carbonate and acidity

- Carbonate 0.146 mM
- Acidity error -0.114 mM

Other graphs



pH-metric pKa of compound 8

pH-metric

Sample name: **KI-02308**
Assay name: **pH-metric pKa**
Assay ID: **21F-16023**
Filename: **D:\Data\Customer\21F-16023_KI-02308_pH-metric pKa.t3r**
Experiment start time: **16/06/2021 23:01:26**
Analyst:
Instrument ID: **T313101**

Overall results

RMSD	0.177
Average ionic strength	0.159 M
Average temperature	25.0°C
Analyte concentration range	1673.3 µM to 1800.8 µM
Total points considered	33 of 47

Warnings and errors

Errors	None
Warnings	Turbidity threshold has been exceeded
	Sample concentration factor out of range
	Turbid points included in calculation

Four-Plus parameters

Alpha	0.071	16/06/2021 23:01:26	D:\Data\Customer\21F-16008_Blank standardisation.t3r
S	1.0002	16/06/2021 23:01:26	D:\Data\Customer\21F-16008_Blank standardisation.t3r
jH	0.7	16/06/2021 23:01:26	D:\Data\Customer\21F-16008_Blank standardisation.t3r
jOH	-0.5	16/06/2021 23:01:26	D:\Data\Customer\21F-16008_Blank standardisation.t3r

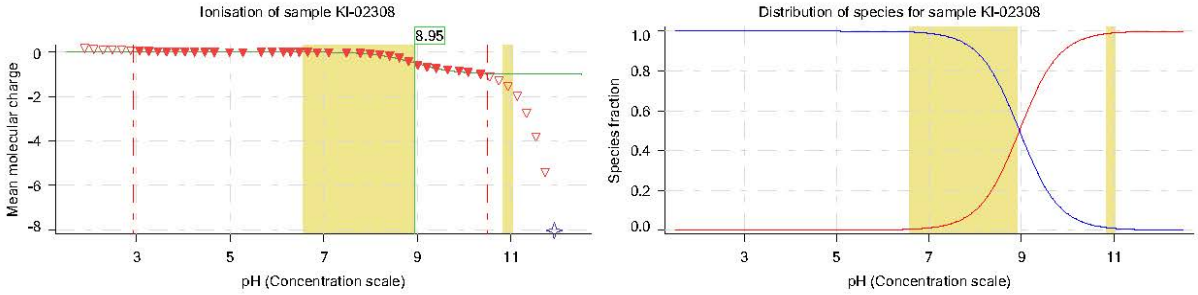
Titrants

0.50 M HCl	0.993077	16/06/2021 23:01:26	D:\Data\Customer\21F-16010_Blank standardisation.t3r
0.50 M KOH	0.993673	16/06/2021 23:01:26	D:\Data\Customer\21E-27008_KHP_Base standardisation using KHP.t3r

Sample

KI-02308 concentration factor	0.621
Acid pKa 1	8.95

Sample graphs



Sample species percents

pH	KI-02308 KI-02308H	KI-02308 KI-02308	Comment
1.000	100.00 %	0.00 %	
1.200	100.00 %	0.00 %	Stomach pH
2.000	100.00 %	0.00 %	
3.000	100.00 %	0.00 %	
4.000	100.00 %	0.00 %	
5.000	99.99 %	0.01 %	
6.000	99.89 %	0.11 %	
6.500	99.65 %	0.35 %	
7.000	98.90 %	1.10 %	
7.400	97.28 %	2.72 %	Blood pH
8.000	89.97 %	10.03 %	
9.000	47.29 %	52.71 %	
10.000	8.23 %	91.77 %	
11.000	0.89 %	99.11 %	
12.000	0.09 %	99.91 %	

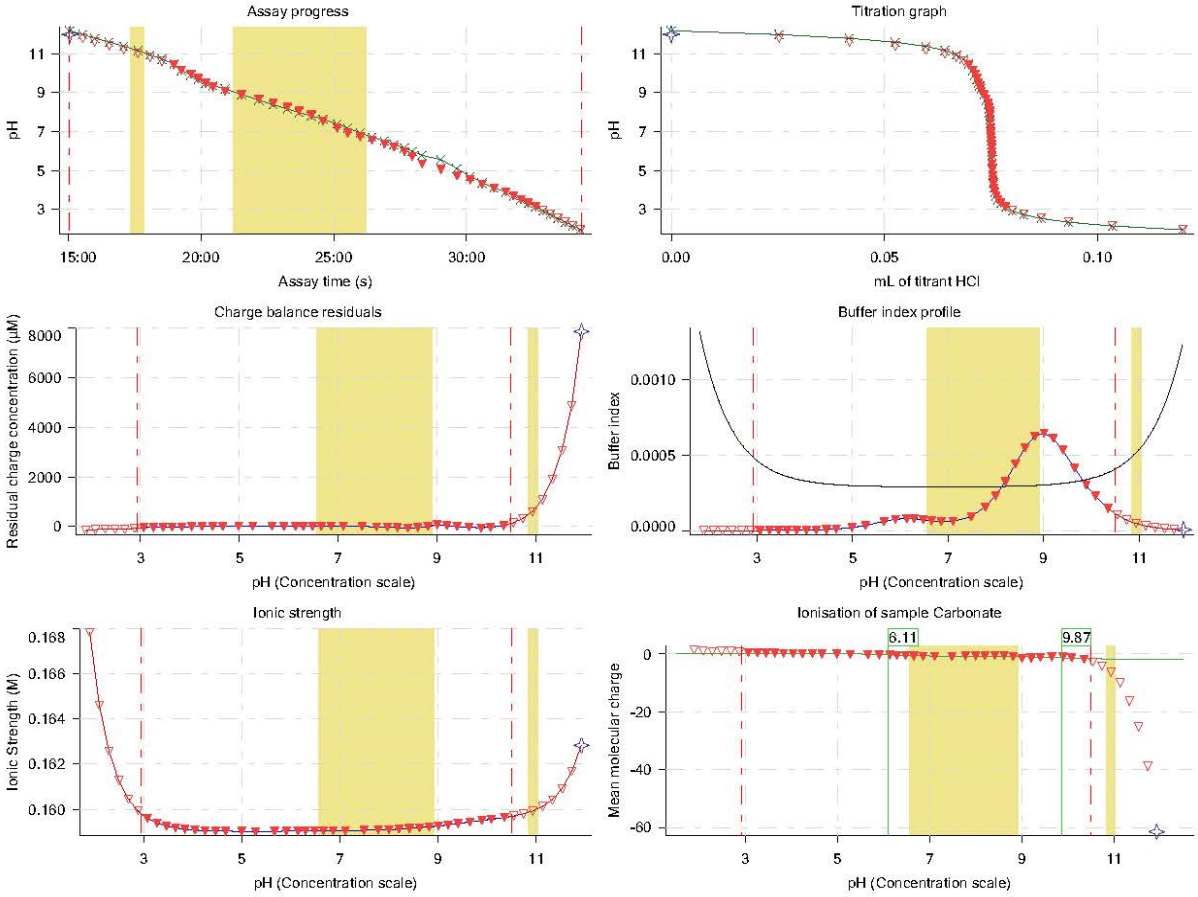
Sample name: **KI-02308**
Assay name: **pH-metric pKa**
Assay ID: **21F-16023**
Filename: **D:\Data\Customer\21F-16023_KI-02308_pH-metric pKa.t3r**

Experiment start time: **16/06/2021 23:01:26**
Analyst:
Instrument ID: **T313101**

Carbonate and acidity

Carbonate 0.132 mM
Acidity error -0.108 mM

Other graphs



pH-metric pKa of compound 9

pH-metric

Sample name:	**KI-2312**	Experiment start time:	**17/06/2021 01:34:36**
Assay name:	**pH-metric pKa**	Analyst:	
Assay ID:	**21F-17003**	Instrument ID:	**T313101**
Filename:	**D:\Data\Customer\21F-17003_KI-2312_pH-metric pKa.t3r**		

Overall results

RMSD	0.173
Average ionic strength	0.159 M
Average temperature	25.0°C
Analyte concentration range	1672.6 µM to 1797.6 µM
Total points considered	35 of 49

Warnings and errors

Errors	None
Warnings	Turbidity threshold has been exceeded
	Turbid points included in calculation

Four-Plus parameters

Alpha	0.071	17/06/2021 01:34:36	D:\Data\Customer\21F-16008_Blank standardisation.t3r
S	1.0002	17/06/2021 01:34:36	D:\Data\Customer\21F-16008_Blank standardisation.t3r
jH	0.7	17/06/2021 01:34:36	D:\Data\Customer\21F-16008_Blank standardisation.t3r
jOH	-0.5	17/06/2021 01:34:36	D:\Data\Customer\21F-16008_Blank standardisation.t3r

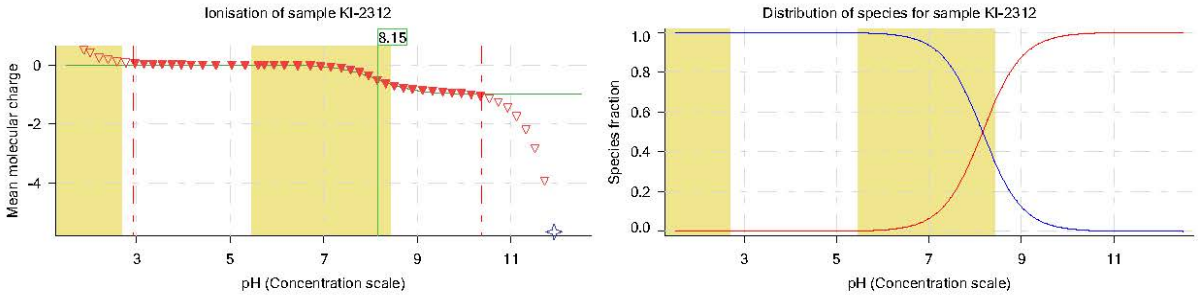
Titrants

0.50 M HCl	0.993077	17/06/2021 01:34:36	D:\Data\Customer\21F-16010_Blank standardisation.t3r
0.50 M KOH	0.993673	17/06/2021 01:34:36	D:\Data\Customer\21E-27008_KHP_Base standardisation using KHP.t3r

Sample

KI-2312 concentration factor	0.742
Acid pKa 1	8.15

Sample graphs



Sample species percents

pH	KI-2312 KI-2312H	KI-2312 KI-2312	Comment
1.000	100.00 %	0.00 %	
1.200	100.00 %	0.00 %	Stomach pH
2.000	100.00 %	0.00 %	
3.000	100.00 %	0.00 %	
4.000	99.99 %	0.01 %	
5.000	99.93 %	0.07 %	
6.000	99.30 %	0.70 %	
6.500	97.83 %	2.17 %	
7.000	93.46 %	6.54 %	
7.400	85.05 %	14.95 %	Blood pH
8.000	58.83 %	41.17 %	
9.000	12.50 %	87.50 %	
10.000	1.41 %	98.59 %	
11.000	0.14 %	99.86 %	
12.000	0.01 %	99.99 %	

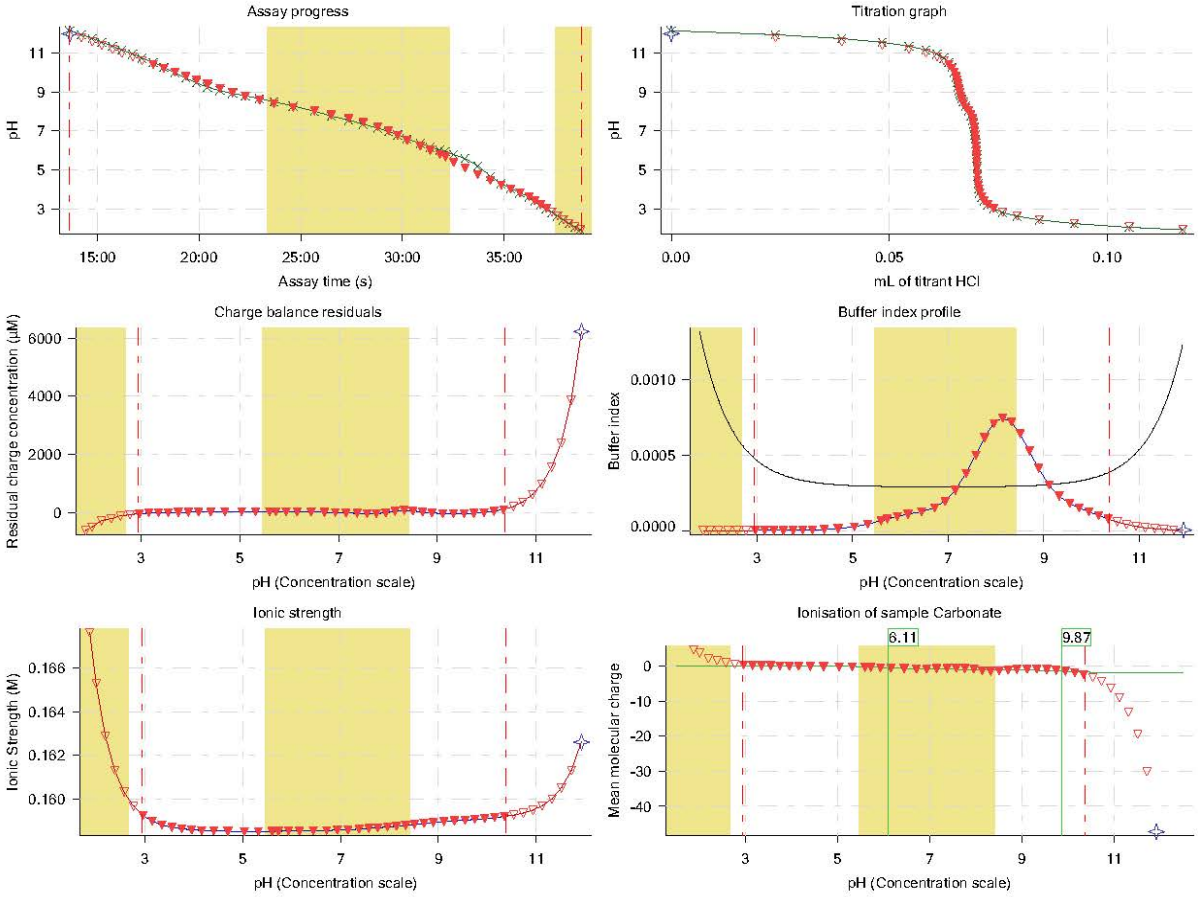
Sample name: **KI-2312**
Assay name: **pH-metric pKa**
Assay ID: **21F-17003**
Filename: **D:\Data\Customer\21F-17003_KI-2312_pH-metric pKa.t3r**

Experiment start time: **17/06/2021 01:34:36**
Analyst:
Instrument ID: **T313101**

Carbonate and acidity

Carbonate 0.137 mM
Acidity error -0.286 mM

Other graphs



pH-metric pKa of Chlorantraniliprole

pH-metric

Sample name:	**Reference 1**	Experiment start time:	**25/08/2021 10:48:28**
Assay name:	**pH-metric pKa**	Analyst:	
Assay ID:	**21H-25007**	Instrument ID:	**T313101**
Filename:	**D:\Data\Customer\21H-25007_Reference 1_pH-metric pKa.t3r**		

Overall results

RMSD	0.052
Average ionic strength	0.157 M
Average temperature	25.0°C
Analyte concentration range	2092.5 µM to 2232.9 µM
Total points considered	26 of 38

Warnings and errors

Errors	None
Warnings	Sample concentration factor out of range

Four-Plus parameters

Alpha	0.080	25/08/2021 10:48:28	D:\Data\Customer\21H-25005_Blank standardisation.t3r
S	0.9949	25/08/2021 10:48:28	D:\Data\Customer\21H-25005_Blank standardisation.t3r
jH	2.2	25/08/2021 10:48:28	D:\Data\Customer\21H-25005_Blank standardisation.t3r
jOH	-0.6	25/08/2021 10:48:28	D:\Data\Customer\21H-25005_Blank standardisation.t3r

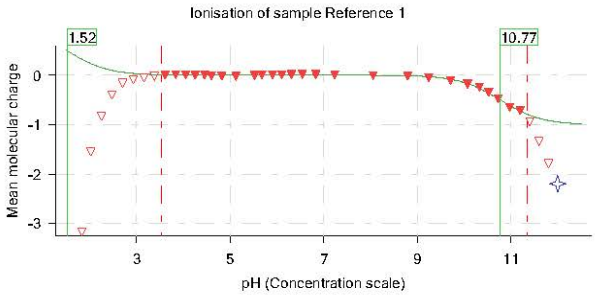
Titrants

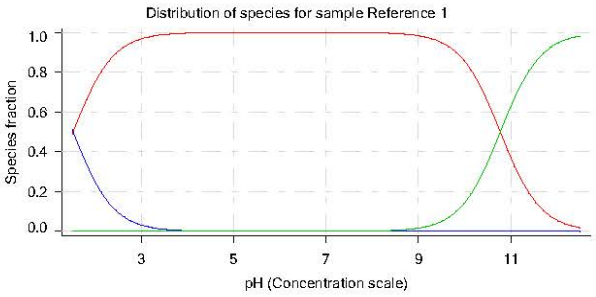
0.50 M HCl	0.978024	25/08/2021 10:48:28	D:\Data\Customer\21H-25005_Blank standardisation.t3r
0.50 M KOH	0.993673	25/08/2021 10:48:28	D:\Data\Customer\21E-27008_KHP_Base standardisation using KHP.t3r

Sample

Reference 1 concentration factor	0.117
Base pKa 1	1.52
Acid pKa 2	10.77

Sample graphs





Sample species percents

pH	Reference 1 Reference 1H2	Reference 1 Reference 1H	Reference 1 Reference 1	Comment
1.000	76.78 %	23.22 %	0.00 %	
1.200	67.60 %	32.40 %	0.00 %	Stomach pH
2.000	24.85 %	75.15 %	0.00 %	
3.000	3.20 %	96.80 %	0.00 %	
4.000	0.33 %	99.67 %	0.00 %	
5.000	0.03 %	99.97 %	0.00 %	
6.000	0.00 %	99.99 %	0.00 %	
6.500	0.00 %	99.99 %	0.01 %	
7.000	0.00 %	99.98 %	0.02 %	
7.400	0.00 %	99.96 %	0.04 %	Blood pH
8.000	0.00 %	99.83 %	0.17 %	
9.000	0.00 %	98.32 %	1.68 %	
10.000	0.00 %	85.43 %	14.57 %	
11.000	0.00 %	36.97 %	63.03 %	
12.000	0.00 %	5.54 %	94.46 %	

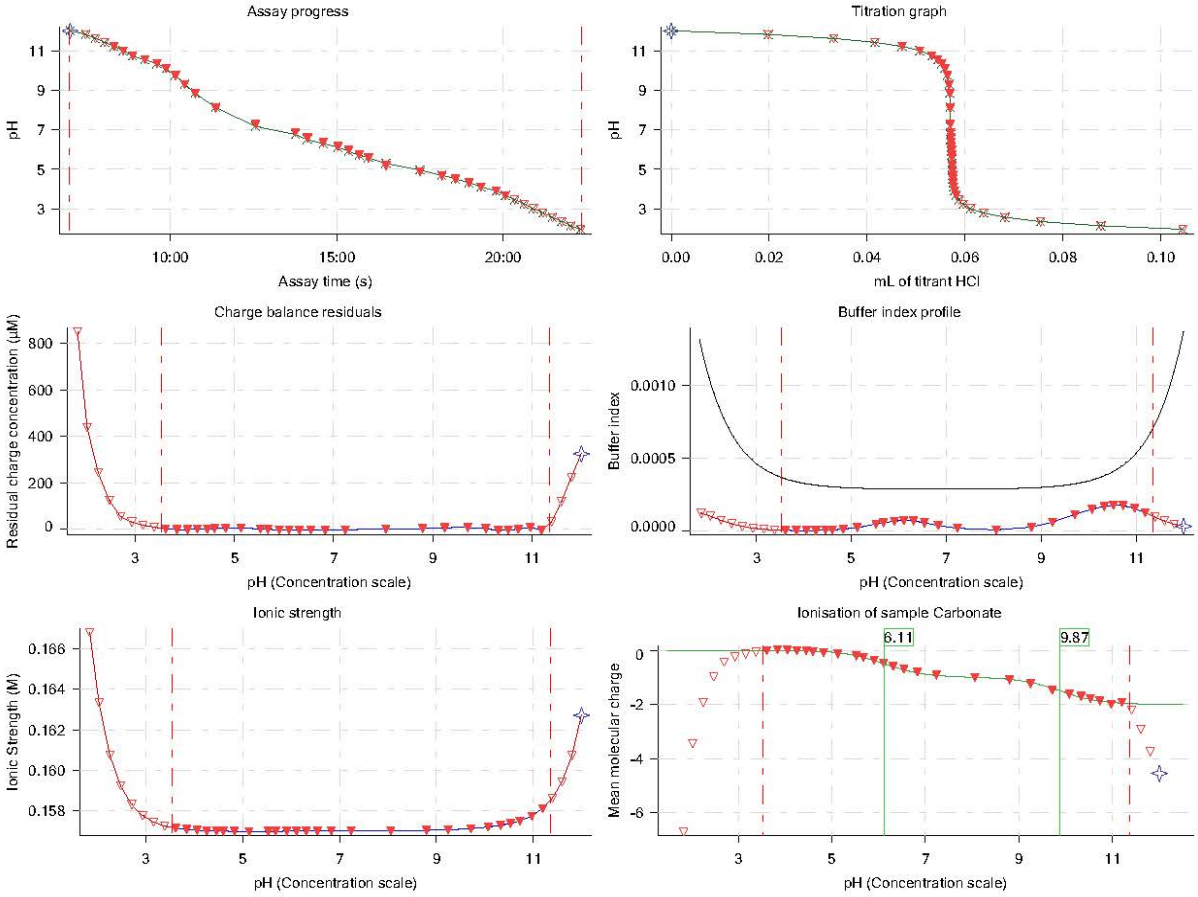
Sample name: **Reference 1**
Assay name: **pH-metric pKa**
Assay ID: **21H-25007**
Filename: **D:\Data\Customer\21H-25007_Reference 1_pH-metric pKa.t3r**

Experiment start time: **25/08/2021 10:48:28**
Analyst:
Instrument ID: **T313101**

Carbonate and acidity

- Carbonate 0.127 mM
- Acidity error 0.232 mM

Other graphs



pH-metric Log P of compound 1

pH-metric

Sample name:	**KI-02307**	Experiment start time:	**12/12/2016 15:40:13**
Assay name:	**pH-metric medium logP**	Analyst:	**KRICT**
Assay ID:	**16L-12013**	Instrument ID:	**T313101**
Filename:	**D:\Data\Customer\16L-12013_KI-02307_pH-metric medium logP.t3r**		

Overall results

RMSD	0.181
Average ionic strength	0.158 M
Average temperature	25.0°C
Partition ratio	0.2805 : 1
Analyte concentration range	2260.7 µM to 2382.0 µM
Total points considered	34 of 43

Warnings and errors

Errors	None
Warnings	Sample concentration factor out of range
	Excessive carbonate concentration present

Four-Plus parameters

Alpha	0.140	12/12/2016 15:40:13	D:\Data\Customer\16L-12010_Blank standardisation.t3r
S	0.9968	12/12/2016 15:40:13	D:\Data\Customer\16L-12010_Blank standardisation.t3r
jH	1.8	12/12/2016 15:40:13	D:\Data\Customer\16L-12010_Blank standardisation.t3r
jOH	-1.4	12/12/2016 15:40:13	D:\Data\Customer\16L-12010_Blank standardisation.t3r

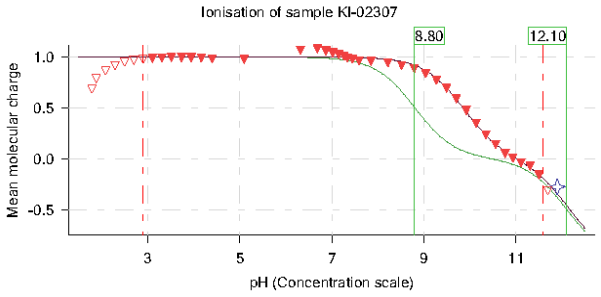
Titrants

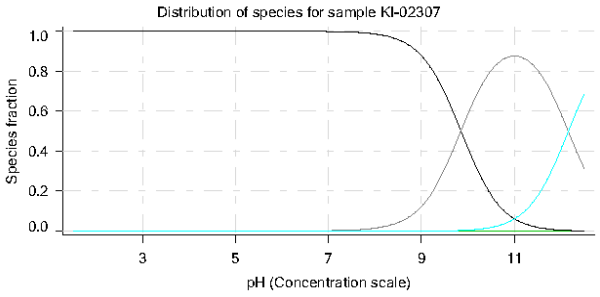
0.50 M HCl	0.985972	12/12/2016 15:40:13	D:\Data\Customer\16L-12010_Blank standardisation.t3r
0.50 M KOH	1.005790	12/12/2016 15:40:13	D:\Data\Customer\16J-20009_KHP_Base standardisation using KHP.t3r

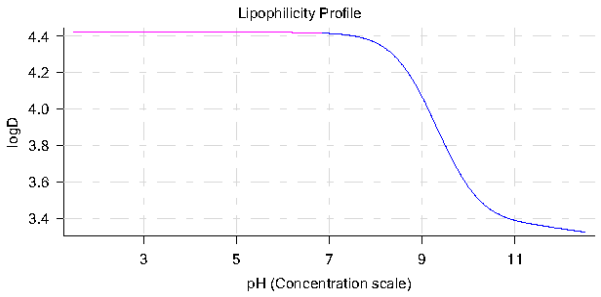
Sample

KI-02307 concentration factor	0.460
Base pKa 1	8.80
Acid pKa 2	12.10
logP (XH2 +)	4.42
logP (neutral XH)	3.37
logP (X -)	3.31

Sample graphs







Sample name: **KI-02307**
Assay name: **pH-metric medium logP**
Assay ID: **16L-12013**
Filename: **D:\Data\Customer\16L-12013_KI-02307_pH-metric medium logP.t3r**

Experiment start time: **12/12/2016 15:40:13**
Analyst: **KRICT**
Instrument ID: **T313101**

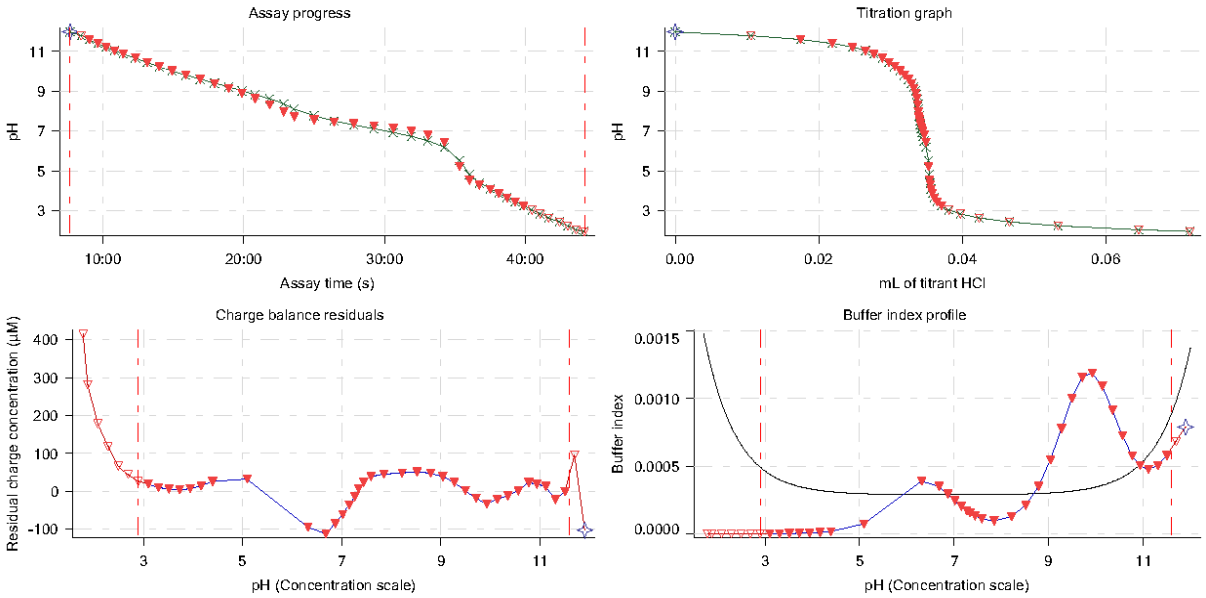
Sample logD and percent species

pH	KI-02307 logD	KI-02307 KI-02307H2	KI-02307 KI-02307H	KI-02307 KI-02307	KI-02307 KI-02307H2*	KI-02307 KI-02307H*	KI-02307 KI-02307*	Comment
1.000	4.42	0.01 %	0.00 %	0.00 %	99.99 %	0.00 %	0.00 %	
1.200	4.42	0.01 %	0.00 %	0.00 %	99.99 %	0.00 %	0.00 %	Stomach pH
2.000	4.42	0.01 %	0.00 %	0.00 %	99.99 %	0.00 %	0.00 %	
3.000	4.42	0.01 %	0.00 %	0.00 %	99.99 %	0.00 %	0.00 %	
4.000	4.42	0.01 %	0.00 %	0.00 %	99.99 %	0.00 %	0.00 %	
5.000	4.42	0.01 %	0.00 %	0.00 %	99.99 %	0.00 %	0.00 %	
6.000	4.42	0.01 %	0.00 %	0.00 %	99.97 %	0.01 %	0.00 %	
6.500	4.42	0.01 %	0.00 %	0.00 %	99.94 %	0.04 %	0.00 %	
7.000	4.41	0.01 %	0.00 %	0.00 %	99.85 %	0.14 %	0.00 %	
7.400	4.40	0.01 %	0.00 %	0.00 %	99.63 %	0.35 %	0.00 %	Blood pH
8.000	4.36	0.01 %	0.00 %	0.00 %	98.60 %	1.39 %	0.00 %	
9.000	4.06	0.01 %	0.02 %	0.00 %	87.62 %	12.34 %	0.01 %	
10.000	3.57	0.01 %	0.09 %	0.00 %	41.31 %	58.19 %	0.40 %	
11.000	3.39	0.00 %	0.13 %	0.01 %	6.22 %	87.60 %	6.04 %	
12.000	3.34	0.00 %	0.09 %	0.07 %	0.42 %	58.85 %	40.57 %	

Carbonate and acidity

Carbonate 0.677 mM
Acidity error 1.954 mM

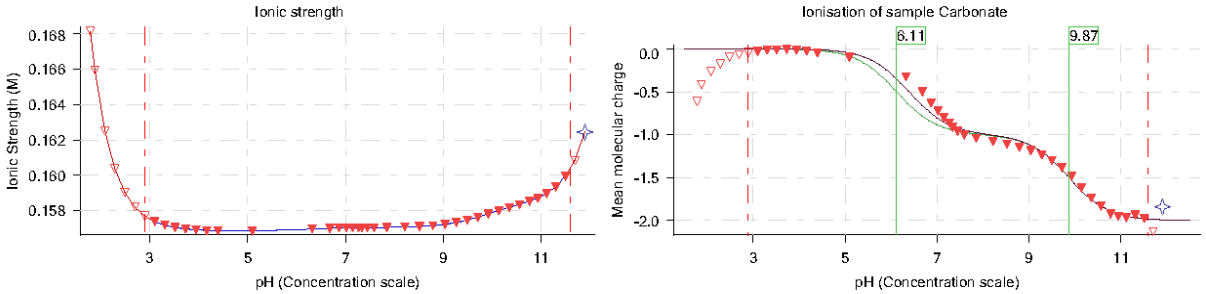
Other graphs



Sample name: **KI-02307**
Assay name: **pH-metric medium logP**
Assay ID: **16L-12013**
Filename: **D:\Data\Customer\16L-12013_KI-02307_pH-metric medium logP.t3r**

Experiment start time: **12/12/2016 15:40:13**
Analyst: **KRICT**
Instrument ID: **T313101**

Other graphs (continued)



pH-metric Log P of compound 7

pH-metric

Sample name:	**KI-02306**	Experiment start time:	**6/1/2022 3:41:53 AM**
Assay name:	**pH-metric medium logP**	Analyst:	
Assay ID:	**22F-01004**	Instrument ID:	**T313101**
Filename:	**D:\data\customer\22F-01004_KI-02306_pH-metric medium logP.t3r**		

Overall results

RMSD	0.348
Average ionic strength	0.158 M
Average temperature	25.0°C
Partition ratio	0.2785 : 1
Analyte concentration range	2216.1 µM to 2341.2 µM
Total points considered	36 of 48

Warnings and errors

Errors	None
Warnings	None

Four-Plus parameters

Alpha	0.182	6/1/2022 3:41:53 AM	D:\data\customer\22E-31003_Blank standardisation.t3r
S	0.9913	6/1/2022 3:41:53 AM	D:\data\customer\22E-31003_Blank standardisation.t3r
jH	0.3	6/1/2022 3:41:53 AM	D:\data\customer\22E-31003_Blank standardisation.t3r
jOH	-0.5	6/1/2022 3:41:53 AM	D:\data\customer\22E-31003_Blank standardisation.t3r

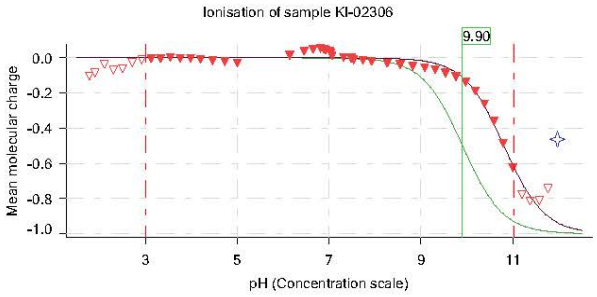
Titrants

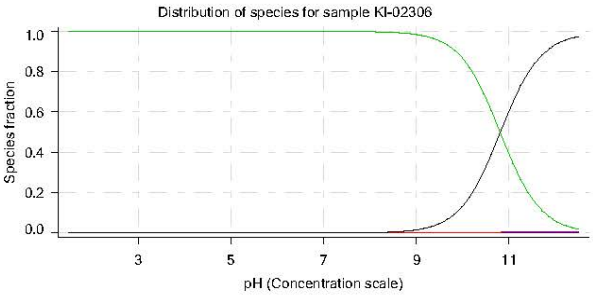
0.50 M HCl	0.990757	6/1/2022 3:41:53 AM	D:\data\customer\22E-31010_Blank standardisation.t3r
0.50 M KOH	1.009850	6/1/2022 3:41:53 AM	D:\data\customer\21C-24006_KHP_Base standardisation using KHP.t3r

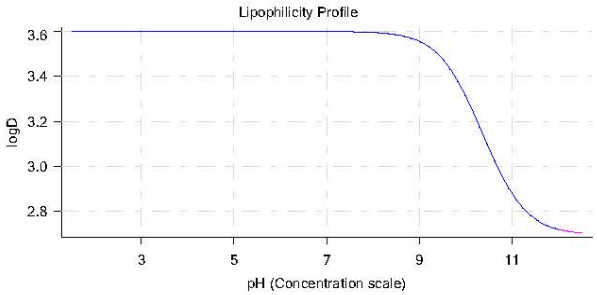
Sample

KI-02306 concentration factor	0.659
Acid pKa 1	9.90
logP (neutral XH)	3.60
logP (X -)	2.70

Sample graphs







Sample name: **KI-02306**
Assay name: **pH-metric medium logP**
Assay ID: **22F-01004**
Filename: **D:\data\customer\22F-01004_KI-02306_pH-metric medium logP.t3r**

Experiment start time: **6/1/2022 3:41:53 AM**
Analyst:
Instrument ID: **T313101**

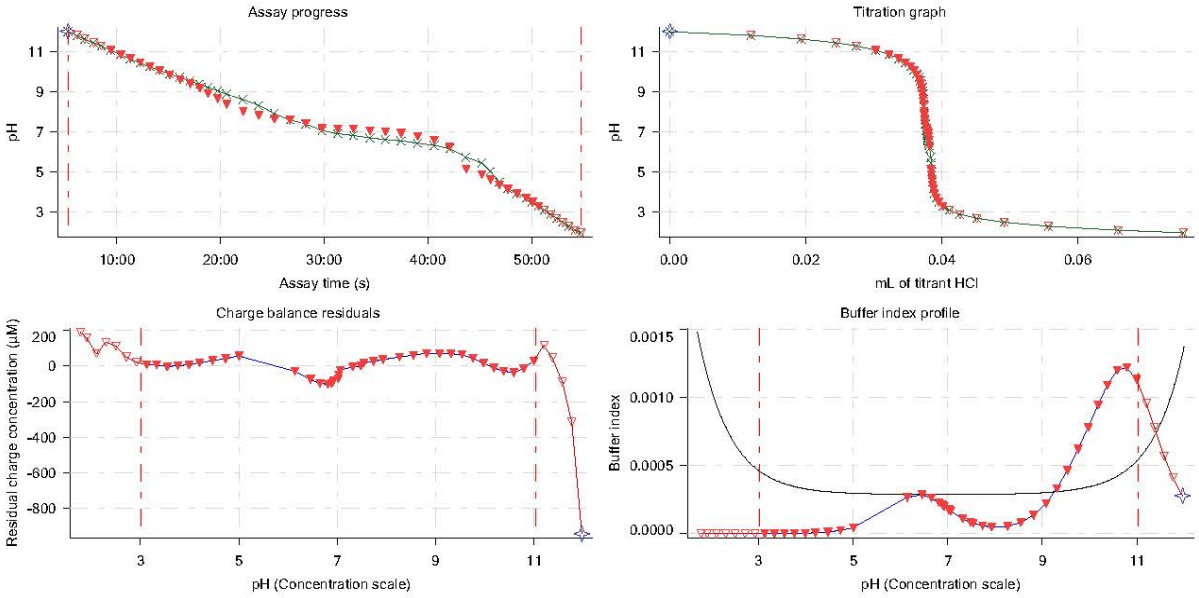
Sample logD and percent species

pH	KI-02306 logD	KI-02306 KI-02306H	KI-02306 KI-02306	KI-02306 KI-02306H*	KI-02306 KI-02306*	Comment
1.000	3.60	0.09 %	0.00 %	99.91 %	0.00 %	
1.200	3.60	0.09 %	0.00 %	99.91 %	0.00 %	Stomach pH
2.000	3.60	0.09 %	0.00 %	99.91 %	0.00 %	
3.000	3.60	0.09 %	0.00 %	99.91 %	0.00 %	
4.000	3.60	0.09 %	0.00 %	99.91 %	0.00 %	
5.000	3.60	0.09 %	0.00 %	99.91 %	0.00 %	
6.000	3.60	0.09 %	0.00 %	99.91 %	0.00 %	
6.500	3.60	0.09 %	0.00 %	99.90 %	0.00 %	
7.000	3.60	0.09 %	0.00 %	99.89 %	0.02 %	
7.400	3.60	0.09 %	0.00 %	99.87 %	0.04 %	Blood pH
8.000	3.60	0.09 %	0.00 %	99.75 %	0.16 %	
9.000	3.56	0.09 %	0.01 %	98.36 %	1.54 %	
10.000	3.31	0.08 %	0.10 %	86.28 %	13.55 %	
11.000	2.88	0.03 %	0.44 %	38.72 %	60.80 %	
12.000	2.72	0.01 %	0.68 %	5.95 %	93.37 %	

Carbonate and acidity

Carbonate 0.500 mM
Acidity error 0.395 mM

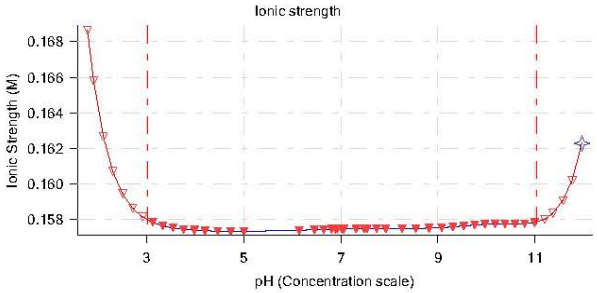
Other graphs

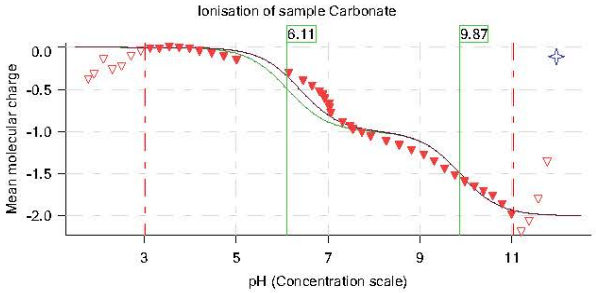


Sample name: **KI-02306**
Assay name: **pH-metric medium logP**
Assay ID: **22F-01004**
Filename: **D:\data\customer\22F-01004_KI-02306_pH-metric medium logP.t3r**

Experiment start time: **6/1/2022 3:41:53 AM**
Analyst:
Instrument ID: **T313101**

Other graphs (continued)





pH-metric Log P of compound 8

pH-metric

Sample name:	**KI-02308**	Experiment start time:	**12/12/2016 10:21:00**
Assay name:	**pH-metric medium logP**	Analyst:	**KRICT**
Assay ID:	**16L-12007**	Instrument ID:	**T313101**
Filename:	**D:\Data\Customer\16L-12007_KI-02308_pH-metric medium logP.t3r**		

Overall results

RMSD	0.492
Average ionic strength	0.158 M
Average temperature	25.0°C
Partition ratio	0.2802 : 1
Analyte concentration range	1831.7 µM to 1928.1 µM
Total points considered	51 of 57

Warnings and errors

Errors	None
Warnings	Excessive carbonate concentration present

Four-Plus parameters

Alpha	0.140	12/12/2016 10:21:00	D:\Data\Customer\16L-12005_Blank standardisation.t3r
S	0.9969	12/12/2016 10:21:00	D:\Data\Customer\16L-12005_Blank standardisation.t3r
jH	2.1	12/12/2016 10:21:00	D:\Data\Customer\16L-12005_Blank standardisation.t3r
jOH	-1.3	12/12/2016 10:21:00	D:\Data\Customer\16L-12005_Blank standardisation.t3r

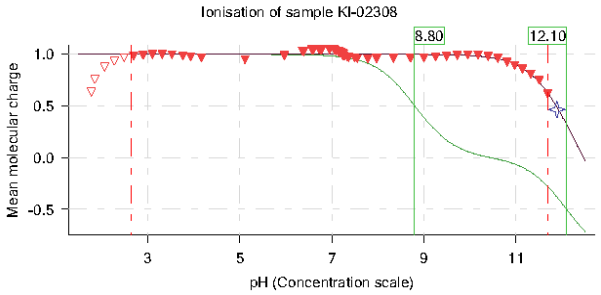
Titrants

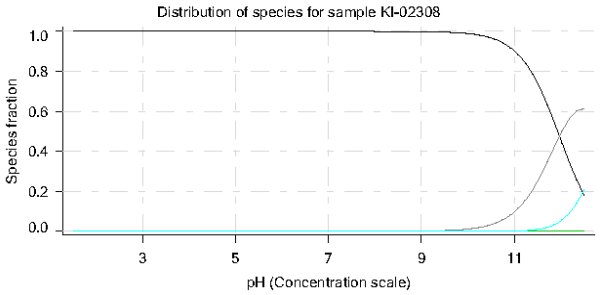
0.50 M HCl	0.992946	12/12/2016 10:21:00	D:\Data\Customer\16L-12005_Blank standardisation.t3r
0.50 M KOH	1.005790	12/12/2016 10:21:00	D:\Data\Customer\16J-20009_KHP_Base standardisation using KHP.t3r

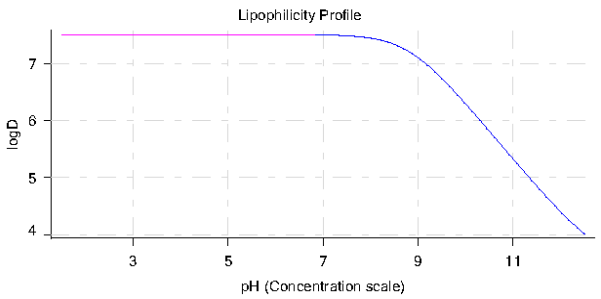
Sample

KI-02308 concentration factor	1.172
Base pKa 1	8.80
Acid pKa 2	12.10
logP (XH2 +)	7.51
logP (neutral XH)	4.34
logP (X -)	3.47

Sample graphs







Sample name: **KI-02308**
Assay name: **pH-metric medium logP**
Assay ID: **16L-12007**
Filename: **D:\Data\Customer\16L-12007_KI-02308_pH-metric medium logP.t3r**

Experiment start time: **12/12/2016 10:21:00**
Analyst: **KRICT**
Instrument ID: **T313101**

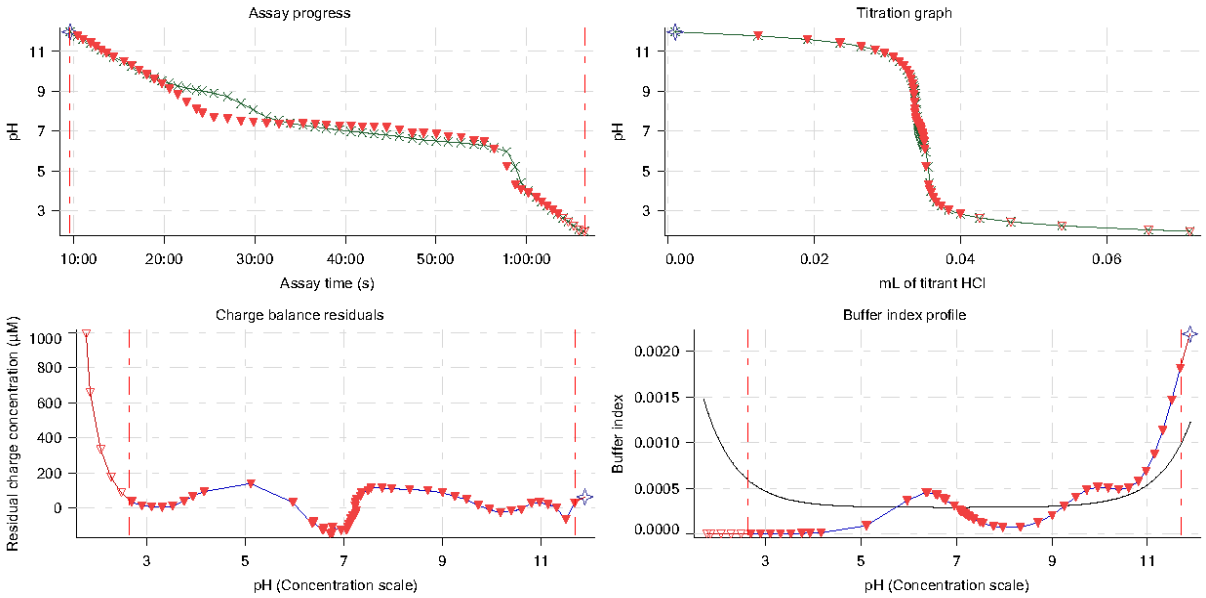
Sample logD and percent species

pH	KI-02308 logD	KI-02308 KI-02308H2	KI-02308 KI-02308H	KI-02308 KI-02308	KI-02308 KI-02308H2*	KI-02308 KI-02308H*	KI-02308 KI-02308*	Comment
1.000	7.51	0.00 %	0.00 %	0.00 %	100.00 %	0.00 %	0.00 %	
1.200	7.51	0.00 %	0.00 %	0.00 %	100.00 %	0.00 %	0.00 %	Stomach pH
2.000	7.51	0.00 %	0.00 %	0.00 %	100.00 %	0.00 %	0.00 %	
3.000	7.51	0.00 %	0.00 %	0.00 %	100.00 %	0.00 %	0.00 %	
4.000	7.51	0.00 %	0.00 %	0.00 %	100.00 %	0.00 %	0.00 %	
5.000	7.51	0.00 %	0.00 %	0.00 %	100.00 %	0.00 %	0.00 %	
6.000	7.51	0.00 %	0.00 %	0.00 %	100.00 %	0.00 %	0.00 %	
6.500	7.51	0.00 %	0.00 %	0.00 %	100.00 %	0.00 %	0.00 %	
7.000	7.50	0.00 %	0.00 %	0.00 %	100.00 %	0.00 %	0.00 %	
7.400	7.49	0.00 %	0.00 %	0.00 %	100.00 %	0.00 %	0.00 %	Blood pH
8.000	7.45	0.00 %	0.00 %	0.00 %	99.99 %	0.01 %	0.00 %	
9.000	7.10	0.00 %	0.00 %	0.00 %	99.89 %	0.11 %	0.00 %	
10.000	6.28	0.00 %	0.00 %	0.00 %	98.94 %	1.06 %	0.00 %	
11.000	5.32	0.00 %	0.00 %	0.00 %	90.22 %	9.67 %	0.10 %	
12.000	4.40	0.00 %	0.01 %	0.01 %	45.73 %	49.04 %	5.21 %	

Carbonate and acidity

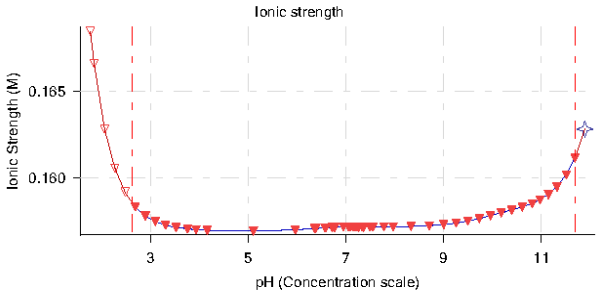
Carbonate 0.784 mM
Acidity error 3.335 mM

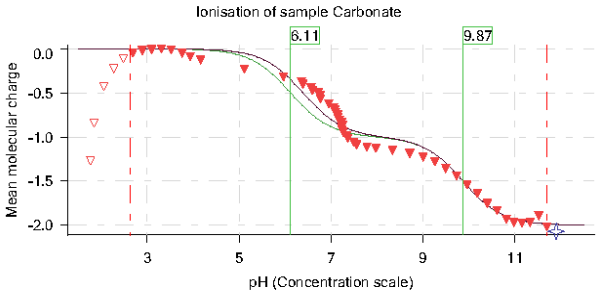
Other graphs



Sample name:	**KI-02308**	Experiment start time:	**12/12/2016 10:21:00**
Assay name:	**pH-metric medium logP**	Analyst:	**KRICT**
Assay ID:	**16L-12007**	Instrument ID:	**T313101**
Filename:	**D:\Data\Customer\16L-12007_KI-02308_pH-metric medium logP.t3r**		

Other graphs (continued)





pH-metric Log P of compound 9

pH-metric

Sample name:	**KI-2312**	Experiment start time:	**6/1/2022 6:45:06 AM**
Assay name:	**pH-metric medium logP**	Analyst:	
Assay ID:	**22F-01007**	Instrument ID:	**T313101**
Filename:	**D:\data\customer\22F-01007_KI-2312_pH-metric medium logP.t3r**		

Overall results

RMSD	0.411
Average ionic strength	0.159 M
Average temperature	25.0°C
Partition ratio	0.2756 : 1
Analyte concentration range	1596.3 µM to 1687.4 µM
Total points considered	33 of 47

Warnings and errors

Errors	None
Warnings	Sample concentration factor out of range

Four-Plus parameters

Alpha	0.182	6/1/2022 6:45:06 AM	D:\data\customer\22E-31003_Blank standardisation.t3r
S	0.9913	6/1/2022 6:45:06 AM	D:\data\customer\22E-31003_Blank standardisation.t3r
jH	0.3	6/1/2022 6:45:06 AM	D:\data\customer\22E-31003_Blank standardisation.t3r
jOH	-0.5	6/1/2022 6:45:06 AM	D:\data\customer\22E-31003_Blank standardisation.t3r

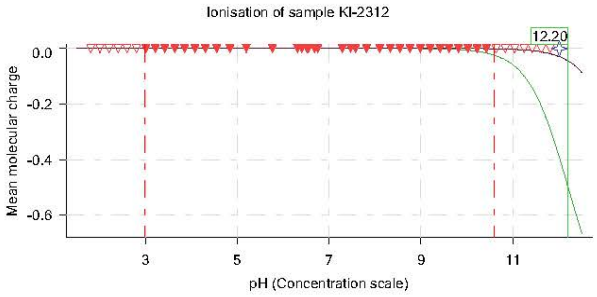
Titrants

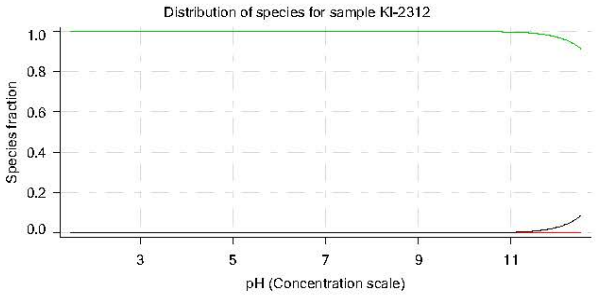
0.50 M HCl	0.990757	6/1/2022 6:45:06 AM	D:\data\customer\22E-31010_Blank standardisation.t3r
0.50 M KOH	1.009850	6/1/2022 6:45:06 AM	D:\data\customer\21C-24006_KHP_Base standardisation using KHP.t3r

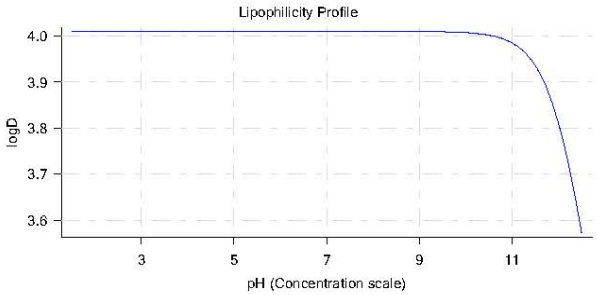
Sample

KI-2312 concentration factor	806.884
Acid pKa 1	12.20
logP (neutral XH)	4.01
logP (X -)	2.68

Sample graphs







Sample name: **KI-2312**
Assay name: **pH-metric medium logP**
Assay ID: **22F-01007**
Filename: **D:\data\customer\22F-01007_KI-2312_pH-metric medium logP.t3r**

Experiment start time: **6/1/2022 6:45:06 AM**
Analyst:
Instrument ID: **T313101**

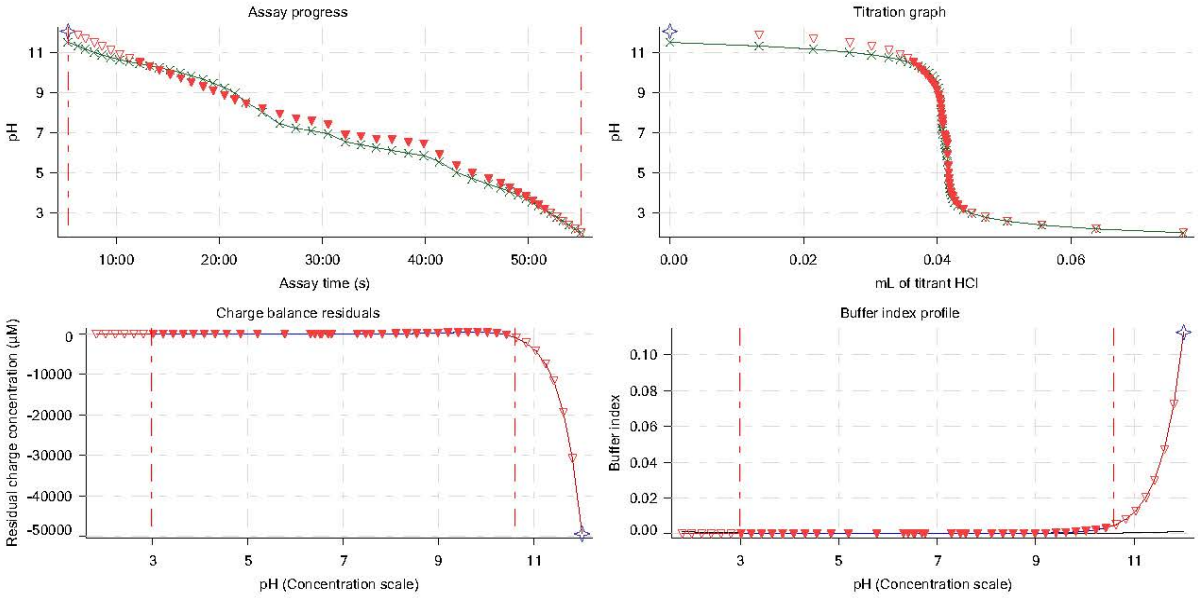
Sample logD and percent species

pH	KI-2312 logD	KI-2312 KI-2312H	KI-2312 KI-2312	KI-2312 KI-2312H*	KI-2312 KI-2312*	Comment
1.000	4.01	0.04 %	0.00 %	99.96 %	0.00 %	
1.200	4.01	0.04 %	0.00 %	99.96 %	0.00 %	Stomach pH
2.000	4.01	0.04 %	0.00 %	99.96 %	0.00 %	
3.000	4.01	0.04 %	0.00 %	99.96 %	0.00 %	
4.000	4.01	0.04 %	0.00 %	99.96 %	0.00 %	
5.000	4.01	0.04 %	0.00 %	99.96 %	0.00 %	
6.000	4.01	0.04 %	0.00 %	99.96 %	0.00 %	
6.500	4.01	0.04 %	0.00 %	99.96 %	0.00 %	
7.000	4.01	0.04 %	0.00 %	99.96 %	0.00 %	
7.400	4.01	0.04 %	0.00 %	99.96 %	0.00 %	Blood pH
8.000	4.01	0.04 %	0.00 %	99.96 %	0.00 %	
9.000	4.01	0.04 %	0.00 %	99.96 %	0.00 %	
10.000	4.01	0.04 %	0.00 %	99.93 %	0.03 %	
11.000	3.98	0.04 %	0.00 %	99.67 %	0.29 %	
12.000	3.81	0.03 %	0.02 %	97.08 %	2.86 %	

Carbonate and acidity

Carbonate 0.500 mM
Acidity error 2.525 mM

Other graphs



Sample name: **KI-2312**
Assay name: **pH-metric medium logP**
Assay ID: **22F-01007**
Filename: **D:\data\customer\22F-01007_KI-2312_pH-metric medium logP.t3r**

Experiment start time: **6/1/2022 6:45:06 AM**
Analyst:
Instrument ID: **T313101**

Other graphs (continued)