

Potential application value of hydroxychalcones based on isoliquiritigenin in agricultural plant diseases

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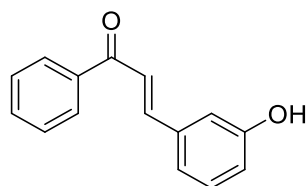
Table S1 The EC₅₀ values of the most active compounds against four phytopathogenic fungi in detail.

Compound	<i>Sclerotinia sclerotiorum</i>		
	Regression equation	R ²	EC ₅₀ (μg/mL)
LH-4	-	-	>20
LH-5	-	-	>20
LH-9	-	-	>20
LH-14	y=4.23x-6.32	0.921	32.18
LH-15	y=3.27x-2.91	0.871	9.12
Isoliquiritigenin	y=1.90x-3.61	0.981	56.68
Azoxystrobin	y=2.53x-2.94	0.989	14.45
Compound	<i>Botrytis cinerea</i>		
	Regression equation	R ²	EC ₅₀ (μg/mL)
LH-4	-	-	>20
LH-5	-	-	>20
LH-9	-	-	>20
LH-14	y=4.14x-4.16	0.971	10.06
LH-15	y=2.90x-2.61	0.990	7.96
Isoliquiritigenin	y=1.73x-2.33	0.999	20.40
Azoxystrobin	-	-	>20
Compound	<i>Fusarium graminearum</i>		
	Regression equation	R ²	EC ₅₀ (μg/mL)
LH-4	-	-	>20
LH-5	-	-	>20
LH-9	-	-	>20
LH-14	-	-	>20
LH-15	y=1.95x-1.88	0.990	9.06

Isoliquiritigenin	$y=3.65x-5.63$	0.980	34.58
Azoxystrobin	-	-	>20
<i>Rhizoctonia solani</i>			
Compound	Regression equation	R ²	EC ₅₀ ($\mu\text{g/mL}$)
LH-4	$y=2.46x-1.76$	0.970	5.96
LH-5	$y=2.95x-2.61$	0.990	8.17
LH-9	$y=2.80x-2.98$	0.985	12.25
LH-14	-	-	>20
LH-15	$y=1.95x-2.03$	0.967	11.62
Isoliquiritigenin	$y=3.06x-4.83$	0.996	36.91
Azoxystrobin	-	-	>20

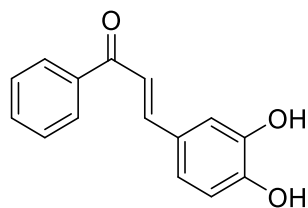
“-” means not test .

2. Physical properties of the target compounds.



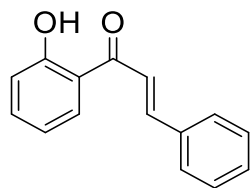
LH-1. (E)-3-(3-hydroxyphenyl)-1-phenylprop-2-en-1-one

White solid, m.p. 163.24-164.64 °C, yield: 40%; ¹H NMR (400 MHz, Methanol-d₄) δ 8.06 (d, $J = 8.7$ Hz, 2H, β -H, ArH), 7.68 (d, $J = 7.5$ Hz, 2H, α -H, ArH), 7.65 – 7.58 (m, 1H, ArH), 7.53 (t, $J = 7.6$ Hz, 2H, ArH), 7.23 (m, $J = 16.3, 7.7$ Hz, 2H, ArH), 7.13 (s, 1H, ArH), 6.86 (d, $J = 6.3$ Hz, 1H, ArH). ¹³C NMR (101 MHz, Methanol-*d*₄) δ 191.08, 157.75, 145.13, 137.98, 136.12, 132.78, 129.69, 128.44, 128.22, 121.52, 119.89, 117.61, 114.43. MS-ESI calcd for C₁₅H₁₂O₂, [M+H]⁺, 224.0837; found, 225.1596.



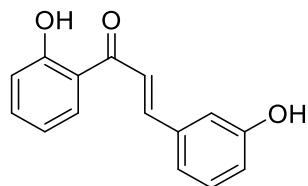
LH-2. (E)-3-(3,4-dihydroxyphenyl)-1-phenylprop-2-en-1-one

Yellow solid, m.p. 200.45-201.95 °C, yield: 30%; ¹H NMR (400 MHz, Methanol-*d*₄) δ 8.01 (d, *J* = 8.7 Hz, 2H, β-H, ArH), 7.67 (d, *J* = 15.5 Hz, 1H, α-H), 7.59 (t, *J* = 7.5 Hz, 1H, ArH), 7.54 – 7.44 (m, 3H, ArH), 7.18 (d, *J* = 2.1 Hz, 1H, ArH), 7.09 (dd, *J* = 8.2, 2.1 Hz, 1H, ArH), 6.81 (d, *J* = 8.2 Hz, 1H, ArH). ¹³C NMR (101 MHz, Methanol-*d*₄) δ 191.34, 148.75, 146.07, 145.50, 138.36, 132.51, 128.37, 128.08, 126.85, 122.37, 118.29, 115.24, 114.35. MS-ESI calcd for C₁₅H₁₂O₃, [M-H]⁺, 240.0786; found, 239.0906.



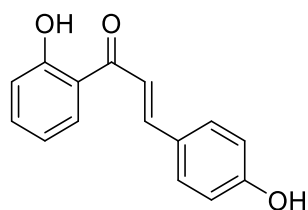
LH-3. (E)-1-(2-hydroxyphenyl)-3-phenylprop-2-en-1-one

Yellow solid, m.p. 140.04-140.14 °C, yield: 48%; ¹H NMR (400 MHz, Methanol-*d*₄) δ 8.12 (d, *J* = 8.0 Hz, 1H, β-H), 7.89 (s, 2H, ArH), 7.76 (dd, *J* = 6.7, 2.9 Hz, 2H, α-H, ArH), 7.54 – 7.48 (m, 1H, ArH), 7.43 (t, *J* = 3.2 Hz, 3H, ArH), 6.97 (dd, *J* = 12.7, 7.9 Hz, 2H, ArH). ¹³C NMR (101 MHz, Methanol-*d*₄) δ 194.09, 163.04, 145.16, 136.05, 134.76, 130.57, 130.04, 128.71, 128.55, 120.29, 118.82, 117.68. MS-ESI calcd for C₁₅H₁₂O₂, [M+H]⁺, 224.0837; found, 225.0834.



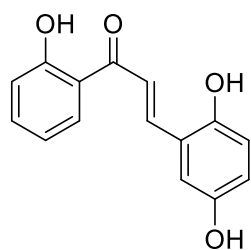
LH-4. (E)-1-(2-hydroxyphenyl)-3-(3-hydroxyphenyl)prop-2-en-1-one

Yellow solid, m.p. 159.11-160.01 °C, yield: 38%; ¹H NMR (400 MHz, Methanol-*d*₄) δ 8.08 (d, *J* = 8.0 Hz, 1H, β-H), 7.81 (s, 2H, ArH), 7.51 (dd, 1H, α-H), 7.29 – 7.19 (m, 2H, ArH), 7.16 – 7.11 (m, 1H, ArH), 7.04 – 6.91 (m, 2H, ArH), 6.87 (m, 1H, ArH). ¹³C NMR (101 MHz, Methanol-*d*₄) δ 194.08, 163.01, 157.76, 145.37, 136.02, 129.96, 129.71, 120.14, 120.07, 118.81, 117.79, 117.69, 114.64. MS-ESI calcd for C₁₅H₁₂O₃, [M+H]⁺, 240.0876; found, 241.1032.



LH-5. (E)-1-(2-hydroxyphenyl)-3-(4-hydroxyphenyl)prop-2-en-1-one

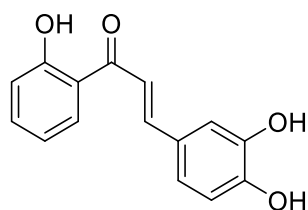
Yellow solid, m.p. 160.27-160.97 °C, yield: 57%; ¹H NMR (400 MHz, Methanol-*d*₄) δ 8.08 (d, *J* = 8.0 Hz, 1H, β-H), 7.85 (d, *J* = 15.3 Hz, 1H, ArH), 7.69 (m, 1H), 7.63 (d, *J* = 8.7 Hz, 2H, α-H, ArH), 7.51 – 7.45 (m, 1H, ArH), 6.99 – 6.91 (m, 2H, ArH), 6.84 (d, *J* = 8.6 Hz, 2H, ArH). ¹³C NMR (101 MHz, Methanol-*d*₄) δ 194.05, 162.99, 160.54, 145.75, 135.70, 130.75, 129.80, 126.24, 118.69, 117.62, 116.67, 115.59. MS-ESI calcd for C₁₅H₁₂O₃, [M+H]⁺, 240.0786; found, 241.1549.



LH-6. (E)-3-(2,5-dihydroxyphenyl)-1-(2-hydroxyphenyl)prop-2-en-1-one

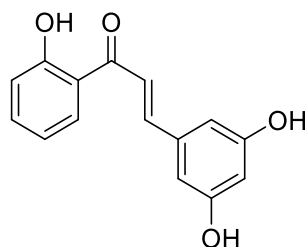
Brown solid, m.p. 193.16-195.86 °C, yield: 37%; ¹H NMR (400 MHz, Methanol-*d*₄) δ 8.16 (d, *J* = 15.5 Hz, 1H, ArH), 8.03 (d, *J* = 7.0 Hz, 1H, β-H), 7.86 (d, *J* = 15.5 Hz, 1H, α-H), 7.49 (t, *J* = 7.8 Hz, 1H, ArH), 7.07 (d, *J* = 2.6 Hz, 1H, ArH), 6.96 (t, *J* = 9.1 Hz, 2H, ArH), 6.75 (m, 2H, ArH). ¹³C NMR (101 MHz, Methanol-*d*₄) δ 194.51, 163.00,

151.07, 150.00, 141.37, 135.78, 129.73, 121.93, 120.18, 119.55, 118.71, 117.68, 116.67, 114.01. MS-ESI calcd for C₁₅H₁₂O₄, [M-H]⁺, 256.0736; found, 255.0975.



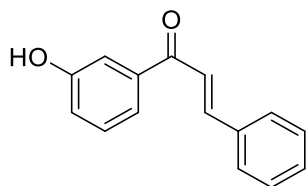
LH-7. (E)-3-(3,4-dihydroxyphenyl)-1-(2-hydroxyphenyl)prop-2-en-1-one

Orange-yellow solid, m.p. 180.33-181.93 °C, yield: 57%; ¹H NMR (400 MHz, Methanol-*d*₄) δ 8.06 (d, *J* = 8.0 Hz, 1H, β-H), 7.79 (d, *J* = 15.2 Hz, 1H, ArH), 7.62 (d, *J* = 15.3 Hz, 1H, α-H), 7.52 – 7.44 (m, 1H, ArH), 7.20 (d, *J* = 2.1 Hz, 1H, ArH), 7.13 (m, 1H, ArH), 6.94 (m, 2H, ArH), 6.82 (d, *J* = 8.2 Hz, 1H, ArH). ¹³C NMR (101 MHz, Methanol-*d*₄) δ 193.99, 162.96, 148.95, 146.18, 145.52, 135.68, 129.71, 126.82, 122.63, 120.15, 118.69, 117.64, 116.63, 115.25, 114.57. MS-ESI calcd for C₁₅H₁₂O₄, [M-H]⁺, 256.0736; found, 255.0874.



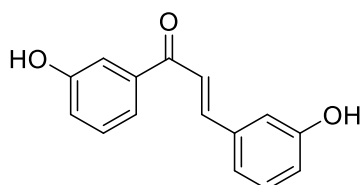
LH-8. (E)-3-(3,5-dihydroxyphenyl)-1-(2-hydroxyphenyl)prop-2-en-1-one

Orange-yellow solid, m.p. 187.59-189.19 °C, yield: 51%; ¹H NMR (400 MHz, Methanol-*d*₄) δ 8.07 (d, *J* = 8.1, 1.6 Hz, 1H, β-H), 7.73 (s, 3H, ArH), 7.54 – 7.48 (d, 1H, α-H), 7.03 – 6.90 (m, 3H, ArH), 6.37 (s, 1H, ArH). ¹³C NMR (101 MHz, Methanol-*d*₄) δ 194.10, 162.99, 158.70, 145.59, 136.33, 136.02, 129.89, 120.07, 120.01, 118.81, 117.69, 105.11. MS-ESI calcd for C₁₅H₁₂O₄, [M+H]⁺, 256.0736; found, 257.1519.



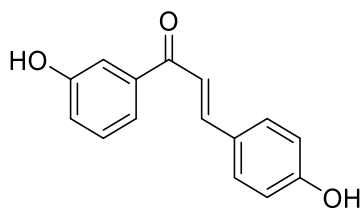
LH-9. (E)-1-(3-hydroxyphenyl)-3-phenylprop-2-en-1-one

Light yellow solid, m.p. 160.05-160.25 °C, yield: 29%; ^1H NMR (400 MHz, Methanol- d_4) δ 7.78 – 7.69 (m, 3H, β -H, ArH), 7.65 (d, J = 15.7 Hz, 1H, ArH), 7.54 (d, J = 7.6 Hz, 1H, α -H), 7.44 – 7.39 (m, 4H, ArH), 7.35 (t, J = 7.9 Hz, 1H, ArH), 7.04 (dd, J = 8.1, 2.7 Hz, 1H, ArH). ^{13}C NMR (101 MHz, Methanol- d_4) δ 190.99, 157.74, 144.71, 139.35, 134.87, 130.35, 129.50, 128.69, 128.29, 121.82, 119.98, 119.60, 114.43. MS-ESI calcd for $\text{C}_{15}\text{H}_{12}\text{O}_2$, $[\text{M}+\text{H}]^+$, 224.0837; found, 225.1267.



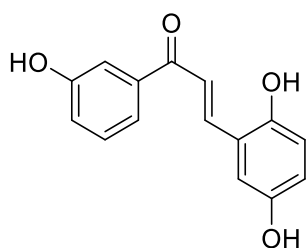
LH-10. (E)-1,3-bis(3-hydroxyphenyl)prop-2-en-1-one

White solid, m.p. 182.80-183.60 °C, yield: 33%; ^1H NMR (400 MHz, Methanol- d_4) δ 7.67 (d, J = 15.7 Hz, 1H, β -H), 7.60 – 7.49 (m, 2H, ArH), 7.41 (t, J = 2.1 Hz, 1H, ArH), 7.35 (t, J = 7.9 Hz, 1H, ArH), 7.24 (t, J = 7.8 Hz, 1H, ArH), 7.18 (d, J = 7.6 Hz, 1H, α -H), 7.11 (t, J = 2.0 Hz, 1H, ArH), 7.04 (dd, J = 8.1, 2.5 Hz, 1H, ArH), 6.86 (dd, J = 7.8, 2.5 Hz, 1H, ArH). ^{13}C NMR (101 MHz, Methanol- d_4) δ 191.10, 157.73, 144.96, 139.38, 136.13, 129.69, 129.49, 121.71, 119.94, 119.86, 119.55, 117.58, 114.41, 114.36. MS-ESI calcd for $\text{C}_{15}\text{H}_{12}\text{O}_3$, $[\text{M}+\text{H}]^+$, 240.0786; found, 241.1222.



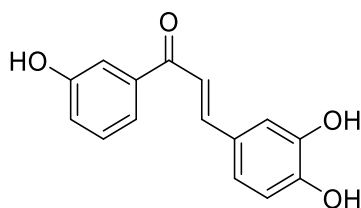
LH-11. (E)-1-(3-hydroxyphenyl)-3-(4-hydroxyphenyl)prop-2-en-1-one

Yellow solid, m.p. 193.74-195.34 °C, yield: 47%; ¹H NMR (400 MHz, Methanol-*d*₄) δ 7.71 (d, *J* = 15.6 Hz, 1H, β-H), 7.62 – 7.56 (d, 2H, α-H, ArH), 7.53 – 7.45 (m, 2H, ArH), 7.40 (t, *J* = 2.1 Hz, 1H, ArH), 7.33 (t, *J* = 7.9 Hz, 1H, ArH), 7.02 (dd, *J* = 8.2, 2.6 Hz, 1H, ArH), 6.84 (d, *J* = 8.6 Hz, 2H, ArH). ¹³C NMR (101 MHz, Methanol-*d*₄) δ 191.30, 160.33, 157.66, 145.44, 139.73, 130.45, 129.41, 126.28, 119.67, 119.45, 118.45, 115.55, 114.34. MS-ESI calcd for C₁₅H₁₂O₃, [M+H]⁺, 240.0786; found, 241.1222.



LH-12. (E)-3-(2,5-dihydroxyphenyl)-1-(3-hydroxyphenyl)prop-2-en-1-one

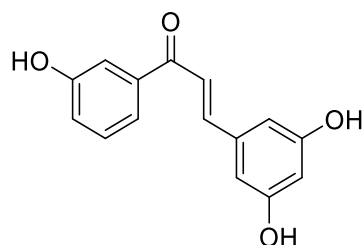
Brown solid, m.p. 190.04-191.14 °C, yield: 42%; ¹H NMR (400 MHz, Methanol-*d*₄) δ 8.02 (d, *J* = 15.8 Hz, 1H, β-H), 7.64 (d, *J* = 15.8 Hz, 1H, ArH), 7.51 – 7.46 (d, 1H, α-H), 7.40 (t, *J* = 2.1 Hz, 1H, ArH), 7.34 (t, *J* = 7.9 Hz, 1H, ArH), 7.03 (m, 2H, ArH), 6.74 (m, 2H, ArH). ¹³C NMR (101 MHz, Methanol-*d*₄) δ 191.84, 157.66, 150.86, 149.97, 141.10, 139.72, 129.43, 121.99, 121.30, 119.71, 119.45, 119.29, 116.62, 114.39, 113.72. MS-ESI calcd for C₁₅H₁₂O₄, [M+H]⁺, 256.0736; found, 257.1155.



LH-13. (E)-3-(3,4-dihydroxyphenyl)-1-(3-hydroxyphenyl)prop-2-en-1-one

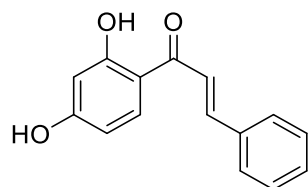
Yellow solid, m.p. 197.29-199.79 °C, yield: 35%; ¹H NMR (400 MHz, Methanol-*d*₄) δ 7.65 (d, *J* = 15.5 Hz, 1H, β-H), 7.49 (d, *J* = 7.7 Hz, 1H, α-H), 7.43 – 7.37 (m, 2H, ArH), 7.33 (t, *J* = 7.9 Hz, 1H, ArH), 7.17 (d, *J* = 2.1 Hz, 1H, ArH), 7.08 (dd, *J* = 8.2, 2.1 Hz, 1H, ArH), 7.02 (dd, *J* = 8.0, 2.6 Hz, 1H, ArH), 6.81 (d, *J* = 8.2 Hz, 1H, ArH). ¹³C NMR

(101 MHz, Methanol- d_4) δ 191.35, 157.65, 148.71, 145.92, 145.49, 139.76, 129.42, 126.84, 122.34, 119.65, 119.40, 118.44, 115.22, 114.33, 114.25. MS-ESI calcd for $C_{15}H_{12}O_4$, $[M+H]^+$, 256.0736; found, 257.1185.



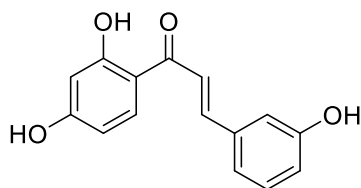
LH-14. (E)-3-(3,5-dihydroxyphenyl)-1-(3-hydroxyphenyl)prop-2-en-1-one

Brown solid, m.p. 160.03-160.23 °C, yield: 34%; 1H NMR (400 MHz, Methanol- d_4) δ 7.58 (d, J = 15.6 Hz, 1H, β -H), 7.51 (s, 1H, ArH), 7.48 (d, J = 6.8 Hz, 1H, α -H), 7.46 – 7.28 (m, 3H, ArH), 7.04 (dd, J = 8.1, 2.5 Hz, 1H, ArH), 6.62 (d, J = 2.2 Hz, 1H, ArH), 6.35 (s, 1H, ArH). ^{13}C NMR (101 MHz, Methanol- d_4) δ 191.16, 158.74, 158.68, 157.72, 145.21, 139.38, 129.50, 121.56, 119.93, 119.51, 114.37, 106.52, 104.87. MS-ESI calcd for $C_{15}H_{12}O_4$, $[M+H]^+$, 256.0736; found, 257.1162.



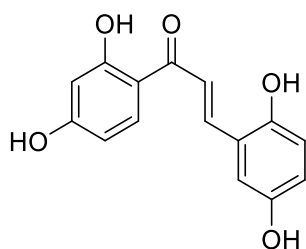
LH-15. (E)-1-(2,4-dihydroxyphenyl)-3-phenylprop-2-en-1-one

Yellow solid, m.p. 180.03-180.93 °C, yield: 54%; 1H NMR (400 MHz, Methanol- d_4) δ 7.98 (d, J = 8.9 Hz, 1H, β -H), 7.80 (d, J = 5.0 Hz, 2H, α -H, ArH), 7.77 – 7.70 (m, 2H, ArH), 7.41 (m, 3H, ArH), 6.42 (dd, J = 8.9, 2.4 Hz, 1H, ArH), 6.29 (d, J = 2.4 Hz, 1H, ArH). ^{13}C NMR (101 MHz, Methanol- d_4) δ 191.95, 166.27, 165.28, 143.74, 134.97, 132.20, 130.22, 128.65, 128.33, 120.47, 113.29, 107.90, 102.44. MS-ESI calcd for $C_{15}H_{12}O_3$, $[M-H]^+$, 240.0786; found, 239.1013.



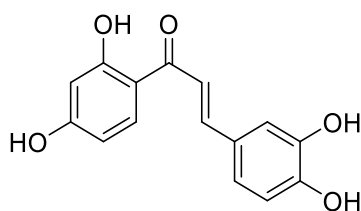
LH-16. (E)-1-(2,4-dihydroxyphenyl)-3-(3-hydroxyphenyl)prop-2-en-1-one

Yellow solid, m.p. 222.74-224.54 °C, yield: 47%; ^1H NMR (400 MHz, Methanol- d_4) δ 7.95 (d, $J = 8.9, 1.3$ Hz, 1H, β -H), 7.77 – 7.72 (dd, 2H, α -H, ArH), 7.28 – 7.17 (m, 2H, ArH), 7.11 (s, 1H, ArH), 6.85 (dd, $J = 7.8, 2.3$ Hz, 1H, ArH), 6.42 (m, 1H, ArH), 6.33 – 6.26 (m, 1H, ArH). ^{13}C NMR (101 MHz, Methanol- d_4) δ 191.97, 166.25, 165.25, 157.69, 143.94, 136.26, 132.13, 129.66, 120.32, 119.85, 117.43, 114.48, 113.28, 107.89, 102.45. MS-ESI calcd for $\text{C}_{15}\text{H}_{12}\text{O}_4$, $[\text{M}+\text{H}]^+$, 256.0736; found, 257.0987.



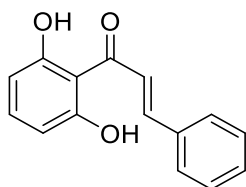
LH-17. (E)-1-(2,4-dihydroxyphenyl)-3-(2,5-dihydroxyphenyl)prop-2-en-1-one

Brown solid, m.p. 282.71-284.04 °C, yield: 47%; ^1H NMR (400 MHz, Methanol- d_4) δ 8.08 (d, $J = 15.5$ Hz, 1H, β -H), 7.90 (d, $J = 8.9$ Hz, 1H, ArH), 7.77 (d, $J = 15.6$ Hz, 1H, α -H), 7.05 (t, $J = 1.7$ Hz, 1H, ArH), 6.73 (d, $J = 1.8$ Hz, 2H, ArH), 6.41 (dd, $J = 8.9, 2.4$ Hz, 1H, ArH), 6.29 (d, $J = 2.3$ Hz, 1H, ArH). ^{13}C NMR (101 MHz, Methanol- d_4) δ 192.53, 166.16, 165.02, 150.77, 149.97, 139.90, 131.89, 122.17, 119.81, 119.09, 116.60, 113.87, 113.38, 107.75, 102.44. MS-ESI calcd for $\text{C}_{15}\text{H}_{12}\text{O}_5$, $[\text{M}-\text{H}]^+$, 272.0685; found, 271.0979.

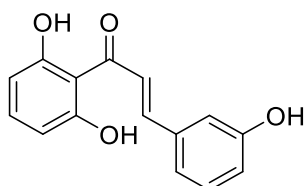


LH-18. (E)-1-(2,4-dihydroxyphenyl)-3-(3,4-dihydroxyphenyl)prop-2-en-1-one

Orange-yellow solid, m.p. 282.71-284.04 °C; yield: 70%; ¹H NMR (400 MHz, Methanol-*d*₄) δ 7.93 (d, *J* = 8.9 Hz, 1H, β-H), 7.75 – 7.67 (m, 1H, ArH), 7.53 (d, *J* = 15.3 Hz, 1H, α-H), 7.17 (d, *J* = 2.0 Hz, 1H, ArH), 7.10 (dd, *J* = 8.3, 2.1 Hz, 1H, ArH), 6.82 – 6.77 (t, 1H, ArH), 6.41 (dd, *J* = 8.8, 2.4 Hz, 1H, ArH), 6.28 (d, *J* = 2.4 Hz, 1H, ArH). ¹³C NMR (101 MHz, Methanol-*d*₄) δ 192.09, 166.10, 164.94, 148.53, 145.44, 144.69, 131.89, 127.04, 122.21, 116.90, 115.21, 114.43, 113.33, 107.74, 102.43. MS-ESI calcd for C₁₅H₁₂O₅, [M+H]⁺, 272.0685; found, 273.0497.

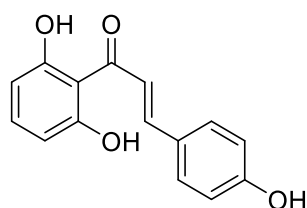
**LH-19. (E)-1-(2,6-dihydroxyphenyl)-3-phenylprop-2-en-1-one**

Orange solid, m.p. 169.45-172.05 °C, yield: 54%; ¹H NMR (400 MHz, Methanol-*d*₄) δ 8.14 (d, *J* = 15.6 Hz, 1H, β-H), 7.78 (d, *J* = 15.7 Hz, 1H, α-H), 7.66 – 7.62 (m, 2H, ArH), 7.41 (m, 3H, ArH), 7.23 (t, *J* = 8.2 Hz, 1H, ArH), 6.39 (d, *J* = 8.2 Hz, 2H, ArH). ¹³C NMR (101 MHz, Methanol-*d*₄) δ 194.86, 161.91, 142.65, 135.62, 135.36, 130.01, 128.63, 128.10, 127.43, 110.81, 107.12. MS-ESI calcd for C₁₅H₁₂O₃, [M-H]⁺, 240.0786; found, 239.0975.

**LH-20. (E)-1-(2,6-dihydroxyphenyl)-3-(3-hydroxyphenyl)prop-2-en-1-one**

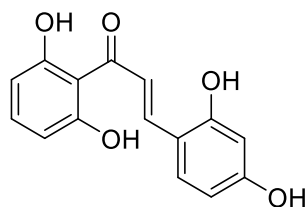
Orange solid, m.p. 169.96-171.46 °C, yield: 44%; ¹H NMR (400 MHz, Methanol-*d*₄) δ 8.09 (d, *J* = 15.6 Hz, 1H, β-H), 7.71 (d, *J* = 15.6 Hz, 1H, α-H), 7.23 (m, 2H, ArH), 7.12 – 7.06 (m, 2H, ArH), 6.84 (dd, *J* = 8.1, 2.5 Hz, 1H, ArH), 6.39 (d, *J* = 8.2 Hz, 2H, ArH). ¹³C NMR (101 MHz, Methanol-*d*₄) δ 194.88, 161.92, 157.66, 142.93, 136.65, 135.60,

129.61, 127.27, 119.93, 117.26, 114.05, 110.79, 107.12. MS-ESI calcd for C₁₅H₁₂O₄, [M+H]⁺, 256.0736; found, 257.0998.



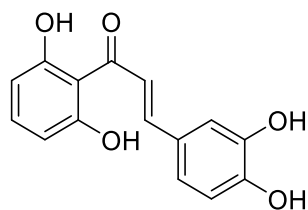
LH-21. (E)-1-(2,6-dihydroxyphenyl)-3-(4-hydroxyphenyl)prop-2-en-1-one

Orange-red solid, m.p. 150.85-153.15 °C, yield: 57%; ¹H NMR (400 MHz, Methanol-*d*₄) δ 8.00 (d, *J* = 15.6 Hz, 1H, β-H), 7.76 (d, *J* = 15.6 Hz, 1H, α-H), 7.52 (d, *J* = 8.6 Hz, 2H, ArH), 7.21 (t, *J* = 8.2 Hz, 1H, ArH), 6.84 (m, 1H, ArH), 6.81 (s, 1H, ArH), 6.39 (s, 1H, ArH), 6.37 (s, 1H, ArH). ¹³C NMR (101 MHz, Methanol-*d*₄) δ 194.86, 161.76, 160.00, 143.57, 135.19, 130.21, 127.68, 126.80, 124.10, 115.51, 107.11. MS-ESI calcd for C₁₅H₁₂O₄, [M+H]⁺, 256.0736; found, 257.1537.



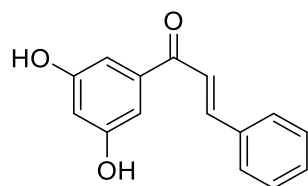
LH-22. (E)-1-(2,6-dihydroxyphenyl)-3-(2,4-dihydroxyphenyl)prop-2-en-1-one

Brown solid, m.p. 290.05-290.15 °C; yield: 39%; ¹H NMR (400 MHz, Methanol-*d*₄) δ 7.37 (t, *J* = 8.3 Hz, 1H, ArH), 7.24 (d, *J* = 8.1 Hz, 1H, β-H), 6.56 – 6.39 (m, 3H, α-H, ArH), 6.33 (m, 2H, ArH), 5.66 (dd, *J* = 13.3, 2.9 Hz, 1H, ArH). ¹³C NMR (101 MHz, Methanol-*d*₄) δ 199.62, 162.42, 161.87, 158.45, 155.46, 137.74, 127.51, 116.29, 108.31, 107.72, 107.17, 106.38, 102.03. MS-ESI calcd for C₁₅H₁₂O₅, [M-H]⁺, 272.0685; found, 271.0946.



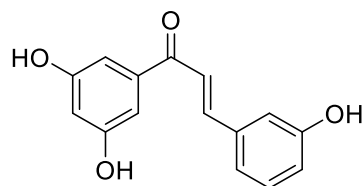
LH-23. (E)-1-(2,6-dihydroxyphenyl)-3-(3,4-dihydroxyphenyl)prop-2-en-1-one

Brown solid, m.p. 176.34-178.44 °C, yield: 37%; ¹H NMR (400 MHz, Methanol-*d*₄) δ 7.95 (d, *J* = 15.5 Hz, 1H, β-H), 7.69 (d, *J* = 15.5 Hz, 1H, α-H), 7.19 (t, *J* = 8.2 Hz, 1H, ArH), 7.12 (d, *J* = 2.1 Hz, 1H, ArH), 7.00 (dd, *J* = 8.2, 2.1 Hz, 1H, ArH), 6.79 (d, *J* = 8.0 Hz, 1H, ArH), 6.38 (s, 1H, ArH), 6.36 (s, 1H, ArH). ¹³C NMR (101 MHz, Methanol-*d*₄) δ 194.81, 161.77, 148.40, 145.45, 144.07, 135.17, 127.41, 124.05, 122.29, 115.15, 114.02, 110.88, 107.10. MS-ESI calcd for C₁₅H₁₂O₅, [M-H]⁺, 272.0685; found, 271.0786.



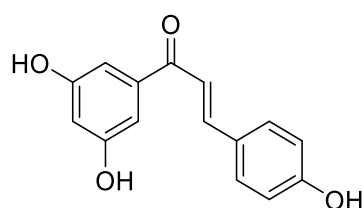
LH-24. (E)-1-(3,5-dihydroxyphenyl)-3-phenylprop-2-en-1-one

Yellow solid, m.p. 152.98-155.48 °C, yield: 61%; ¹H NMR (400 MHz, Methanol-*d*₄) δ 7.78 – 7.68 (m, 3H, β-H, ArH), 7.58 (d, *J* = 15.8 Hz, 1H, α-H), 7.43 (m, 3H, ArH), 6.95 (s, 1H, ArH), 6.95 (s, 1H, ArH), 6.52 (t, *J* = 2.3 Hz, 1H, ArH). ¹³C NMR (101 MHz, Methanol-*d*₄) δ 191.11, 158.73, 144.63, 139.97, 134.87, 130.33, 128.70, 128.23, 121.95, 106.94, 106.52. MS-ESI calcd for C₁₅H₁₂O₃, [M+H]⁺, 240.0786; found, 241.1564.



LH-25. (E)-1-(3,5-dihydroxyphenyl)-3-(3-hydroxyphenyl)prop-2-en-1-one

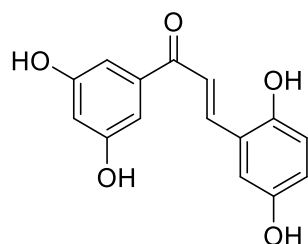
Brown solid, m.p. 214.78-215.78 °C, yield: 58%; ^1H NMR (400 MHz, Methanol- d_4) δ 7.65 (d, $J = 15.7$ Hz, 1H, β -H), 7.48 (d, $J = 15.7$ Hz, 1H, α -H), 7.24 (t, $J = 7.8$ Hz, 1H, ArH), 7.16 (d, $J = 7.6$ Hz, 1H, ArH), 7.10 (t, $J = 2.0$ Hz, 1H, ArH), 6.92 (d, $J = 2.2$ Hz, 2H, ArH), 6.86 (dd, $J = 8.0, 2.5$ Hz, 1H, ArH), 6.51 (t, $J = 2.2$ Hz, 1H, ArH). ^{13}C NMR (101 MHz, Methanol- d_4) δ 191.23, 158.71, 157.73, 144.89, 140.00, 136.13, 129.70, 121.84, 119.82, 117.56, 114.29, 106.92, 106.50. MS-ESI calcd for $\text{C}_{15}\text{H}_{12}\text{O}_4$, $[\text{M}+\text{H}]^+$, 256.0736; found, 257.0975.



LH-26. (E)-1-(3,5-dihydroxyphenyl)-3-(4-hydroxyphenyl)prop-2-en-1-one

Grayish-yellow solid, m.p. 230.64-230.94 °C, yield: 28%;

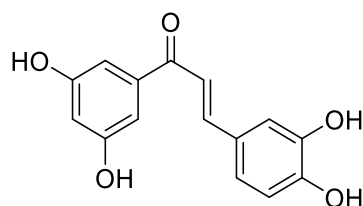
^1H NMR (400 MHz, Methanol- d_4) δ 7.69 (d, $J = 15.6$ Hz, 1H, β -H), 7.57 (d, $J = 8.7$ Hz, 2H, α -H, ArH), 7.38 (d, $J = 15.6$ Hz, 1H, ArH), 6.91 (d, $J = 2.2$ Hz, 2H, ArH), 6.83 (d, $J = 8.5$ Hz, 2H, ArH), 6.50 (t, $J = 2.2$ Hz, 1H, ArH). ^{13}C NMR (101 MHz, Methanol- d_4) δ 191.50, 160.28, 158.63, 145.38, 140.39, 130.37, 126.29, 118.63, 115.57, 106.67, 106.43. MS-ESI calcd for $\text{C}_{15}\text{H}_{12}\text{O}_4$, $[\text{M}+\text{H}]^+$, 256.0736; found, 257.1520.



LH-27. (E)-1-(3,5-dihydroxyphenyl)-3-(2,5-dihydroxyphenyl)prop-2-en-1-one

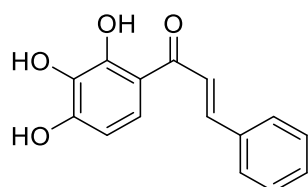
Brown solid, m.p. 160.04-160.14 °C, yield: 59%; ^1H NMR (400 MHz, Methanol- d_4) δ 7.98 (d, $J = 15.8$ Hz, 1H, β -H), 7.58 (d, $J = 15.8$ Hz, 1H, α -H), 7.01 (d, $J = 2.3$ Hz, 1H, ArH), 6.91 (d, $J = 2.3$ Hz, 2H, ArH), 6.73 (m, 2H, ArH), 6.49 (t, $J = 2.2$ Hz, 1H, ArH). ^{13}C NMR (101 MHz, Methanol- d_4) δ 191.92, 158.65, 150.84, 149.96, 141.05, 140.38,

122.01, 121.53, 119.21, 116.62, 113.87, 106.71, 106.45. MS-ESI calcd for C₁₅H₁₂O₅, [M+H]⁺, 272.0685; found, 273.0932.



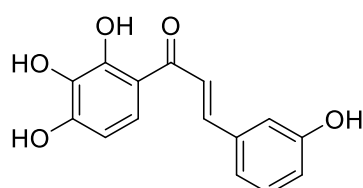
LH-28. (E)-1-(3,5-dihydroxyphenyl)-3-(3,4-dihydroxyphenyl)prop-2-en-1-one

Brown solid, m.p. 226.75-227.75 °C, yield: 43%; ¹H NMR (400 MHz, Methanol-*d*₄) δ 7.59 (d, *J* = 15.6 Hz, 1H, β-H), 7.27 (d, *J* = 15.6 Hz, 1H, α-H), 7.11 (d, *J* = 2.1 Hz, 1H, ArH), 7.03 (dd, *J* = 8.2, 2.1 Hz, 1H, ArH), 6.86 (d, *J* = 2.2 Hz, 2H, ArH), 6.77 (d, *J* = 8.2 Hz, 1H, ArH), 6.45 (t, *J* = 2.2 Hz, 1H, ArH). ¹³C NMR (101 MHz, Methanol-*d*₄) δ 191.53, 158.64, 148.68, 145.84, 145.50, 140.43, 126.85, 122.27, 118.62, 115.23, 114.19, 106.63, 106.39. MS-ESI calcd for C₁₅H₁₂O₅, [M+H]⁺, 272.0685; found, 273.0945.



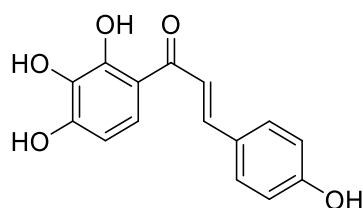
LH-29. (E)-1-(2,3,4-trihydroxyphenyl)-3-phenylprop-2-en-1-one

Orange-yellow solid, m.p. 164.67-166.47 °C, yield: 39%; ¹H NMR (400 MHz, Methanol-*d*₄) δ 7.80 (d, *J* = 6.6 Hz, 2H, β-H, ArH), 7.75 – 7.70 (m, 2H, ArH), 7.57 (d, *J* = 8.9 Hz, 1H, α-H), 7.42 (m, 3H, ArH), 6.47 (d, *J* = 8.9 Hz, 1H, ArH). ¹³C NMR (101 MHz, Methanol-*d*₄) δ 192.56, 153.11, 152.27, 143.65, 134.97, 132.39, 130.22, 128.66, 128.32, 122.15, 120.53, 113.71, 107.31. MS-ESI calcd for C₁₅H₁₂O₄, [M+H]⁺, 256.0736; found, 257.1540.



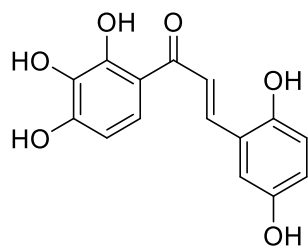
LH-30. (E)- 1-(2,3,4-trihydroxyphenyl)-3-(3-hydroxyphenyl)prop-2-en-1-one

Orange-yellow solid, m.p. 220.35-222.55 °C, yield: 46%; ¹H NMR (400 MHz, Methanol-*d*₄) δ 7.78 – 7.66 (q, 2H, β-H, ArH), 7.54 (d, *J* = 8.9 Hz, 1H, α-H), 7.22 (m, 2H, ArH), 7.12 (t, *J* = 2.0 Hz, 1H, ArH), 6.85 (dd, *J* = 7.8, 2.0 Hz, 1H, ArH), 6.47 (d, *J* = 8.9 Hz, 1H, ArH). ¹³C NMR (101 MHz, Methanol-*d*₄) δ 192.57, 157.69, 153.09, 152.24, 143.85, 136.25, 132.39, 129.66, 122.07, 120.38, 119.87, 117.44, 114.45, 113.70, 107.30. MS-ESI calcd for C₁₅H₁₂O₅, [M+H]⁺, 272.0685; found, 273.1506.



LH-31. (E)- 1-(2,3,4-trihydroxyphenyl)-3-(4-hydroxyphenyl) prop-2-en-1-one

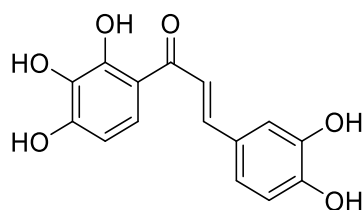
Orange solid, m.p. 219.20-220.30 °C, yield: 36%; ¹H NMR (400 MHz, Methanol-*d*₄) δ 7.78 (d, *J* = 15.4 Hz, 1H, β-H), 7.63 – 7.57 (m, 3H, ArH), 7.54 (d, *J* = 9.0 Hz, 1H, α-H), 6.83 (d, *J* = 8.5 Hz, 2H, ArH), 6.46 (d, *J* = 8.9 Hz, 1H, ArH). ¹³C NMR (101 MHz, Methanol-*d*₄) δ 192.75, 160.17, 153.03, 151.90, 144.18, 132.35, 130.44, 126.45, 121.90, 117.03, 115.54, 113.76, 107.15. MS-ESI calcd for C₁₅H₁₂O₅, [M+H]⁺, 272.0685; found, 273.1519.



LH-32. (E)-1-(2,3,4-trihydroxyphenyl)-3-(2,5-dihydroxyphenyl)prop-2-en-1-one

Orange-red solid, m.p. 174.05-176.55 °C, yield: 66%; ¹H NMR (400 MHz, Methanol-*d*₄) δ 8.09 (d, *J* = 15.6 Hz, 1H, β-H), 7.77 (d, *J* = 15.6 Hz, 1H, ArH), 7.49 (d, *J* = 8.9 Hz, 1H, α-H), 7.05 (s, 1H, ArH), 6.73 (d, *J* = 1.8 Hz, 2H, ArH), 6.46 (d, *J* = 8.9 Hz, 1H, ArH). ¹³C NMR (101 MHz, Methanol-*d*₄) δ 193.13, 153.06, 151.97, 150.78, 149.96,

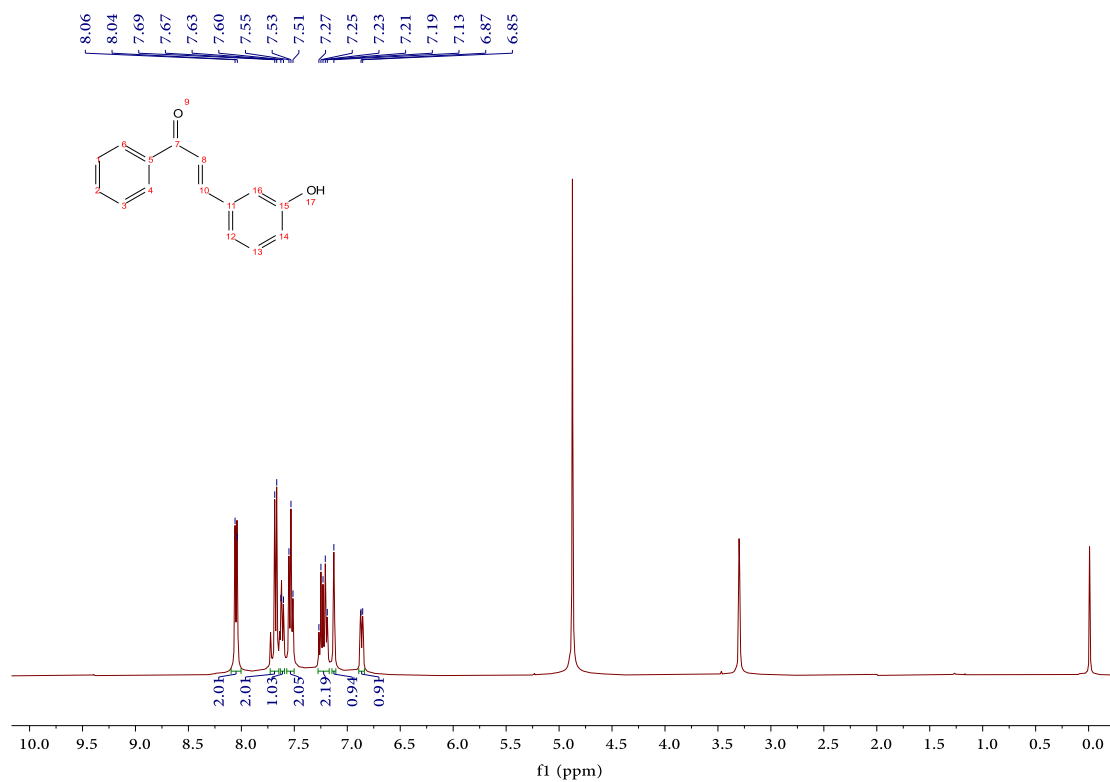
139.80, 132.39, 122.17, 121.83, 119.89, 119.12, 116.63, 113.87, 113.81, 107.17. MS-ESI calcd for C₁₅H₁₂O₆, [M+H]⁺, 288.0634; found, 289.0890.



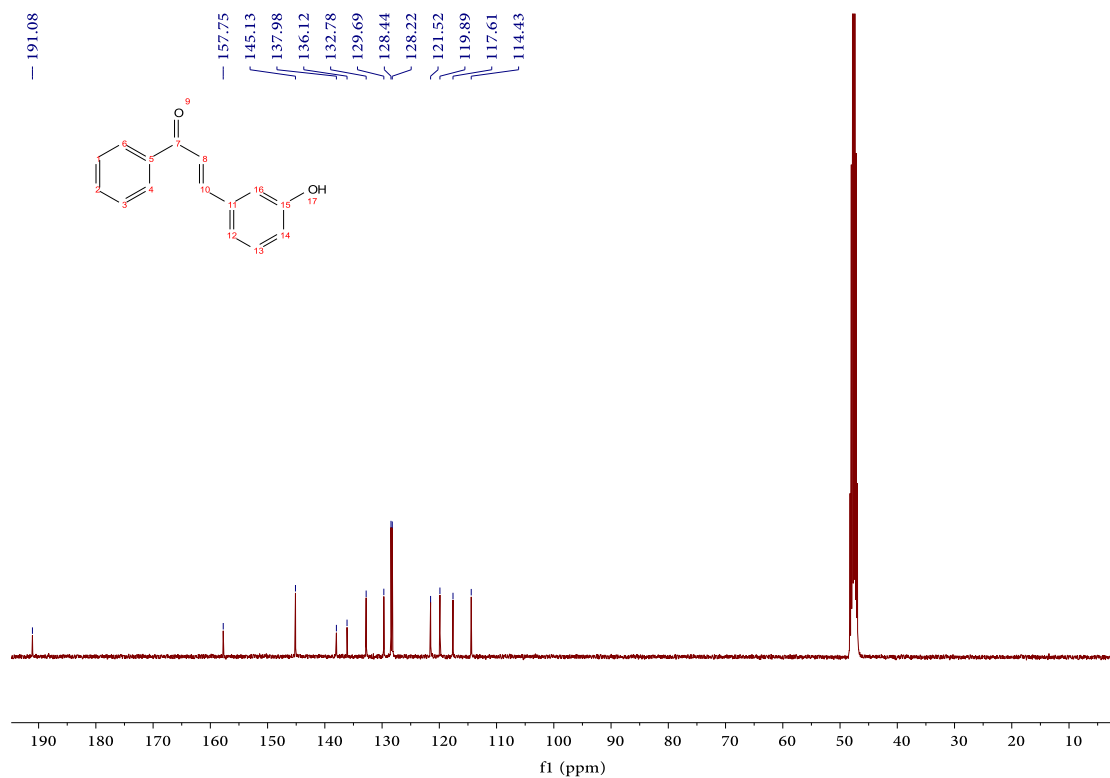
LH-33. (E)-1-(2,3,4-trihydroxyphenyl)-3-(3,4-dihydroxyphenyl)prop-2-en-1-one

Orange-yellow solid, m.p. 242.04-245.74 °C; yield: 53%; ¹H NMR (400 MHz, Methanol-*d*₄) δ 7.71 (d, *J* = 15.3 Hz, 1H, β-H), 7.53 (d, *J* = 5.4 Hz, 1H, α-H), 7.50 (s, 1H, ArH), 7.17 (d, *J* = 2.1 Hz, 1H, ArH), 7.09 (dd, *J* = 8.2, 2.1 Hz, 1H, ArH), 6.81 (d, *J* = 8.1 Hz, 1H, ArH), 6.46 (d, *J* = 8.9 Hz, 1H, ArH). ¹³C NMR (101 MHz, Methanol-*d*₄) δ 192.69, 153.02, 151.88, 148.54, 145.45, 144.60, 132.36, 127.03, 122.24, 121.79, 116.98, 115.23, 114.39, 113.76, 107.15. MS-ESI calcd for C₁₅H₁₂O₆, [M-H]⁺, 288.0634; found, 287.0929.

3. Spectrums of the representative compounds.



¹H NMR spectrum of compound LH-1



¹³C NMR spectrum of compound LH-1

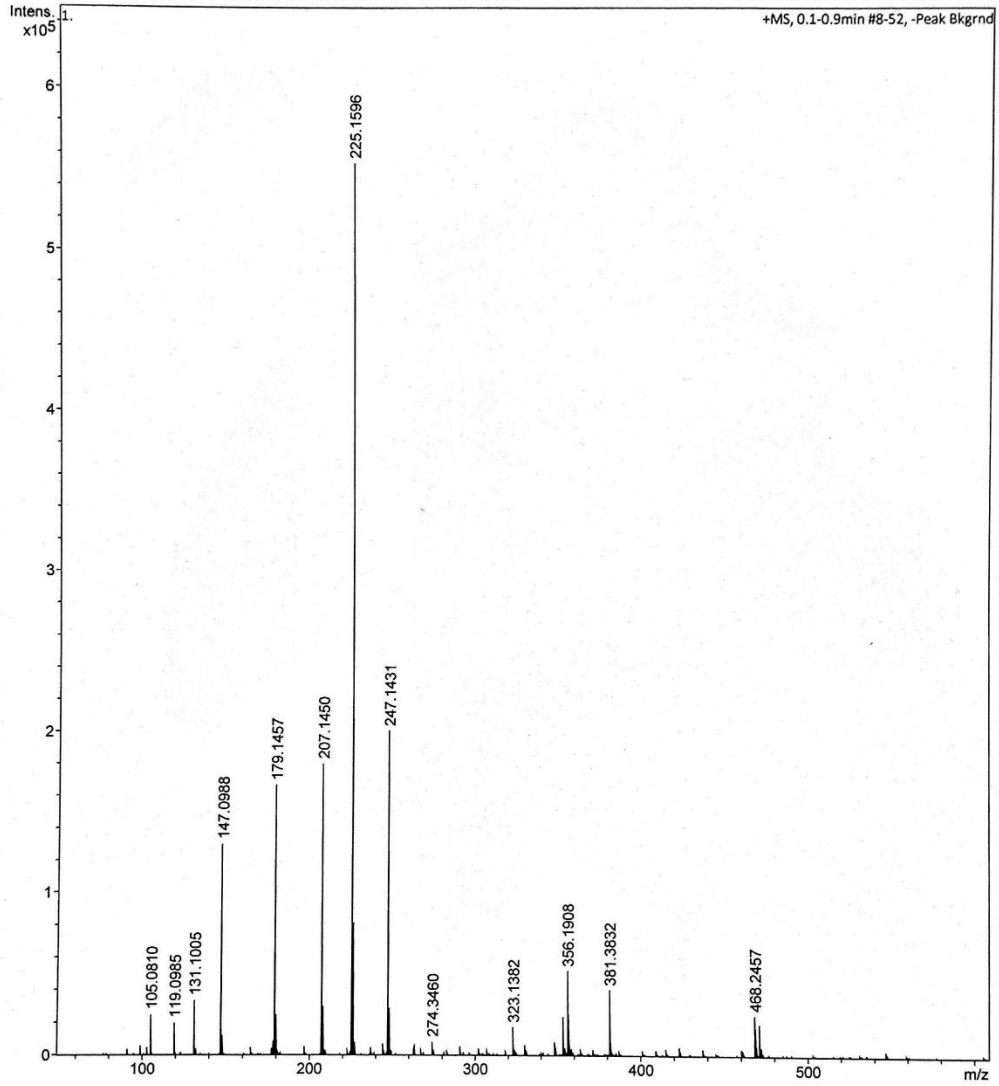
Generic Display Report

Analysis Info

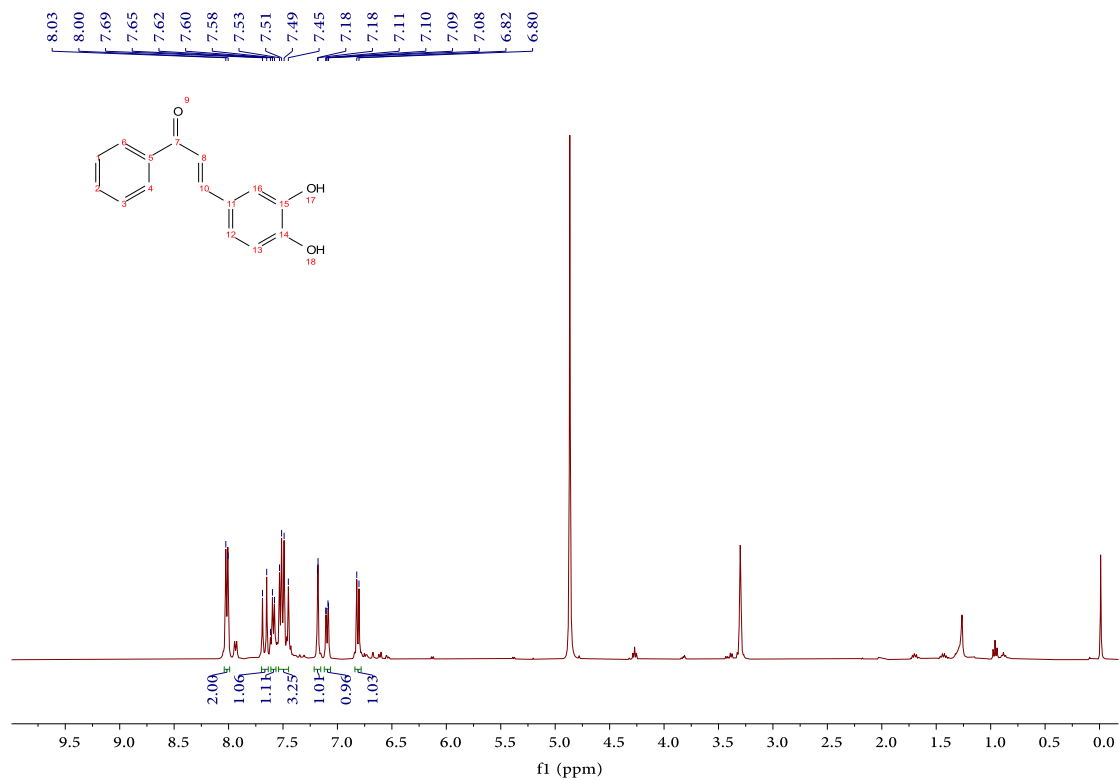
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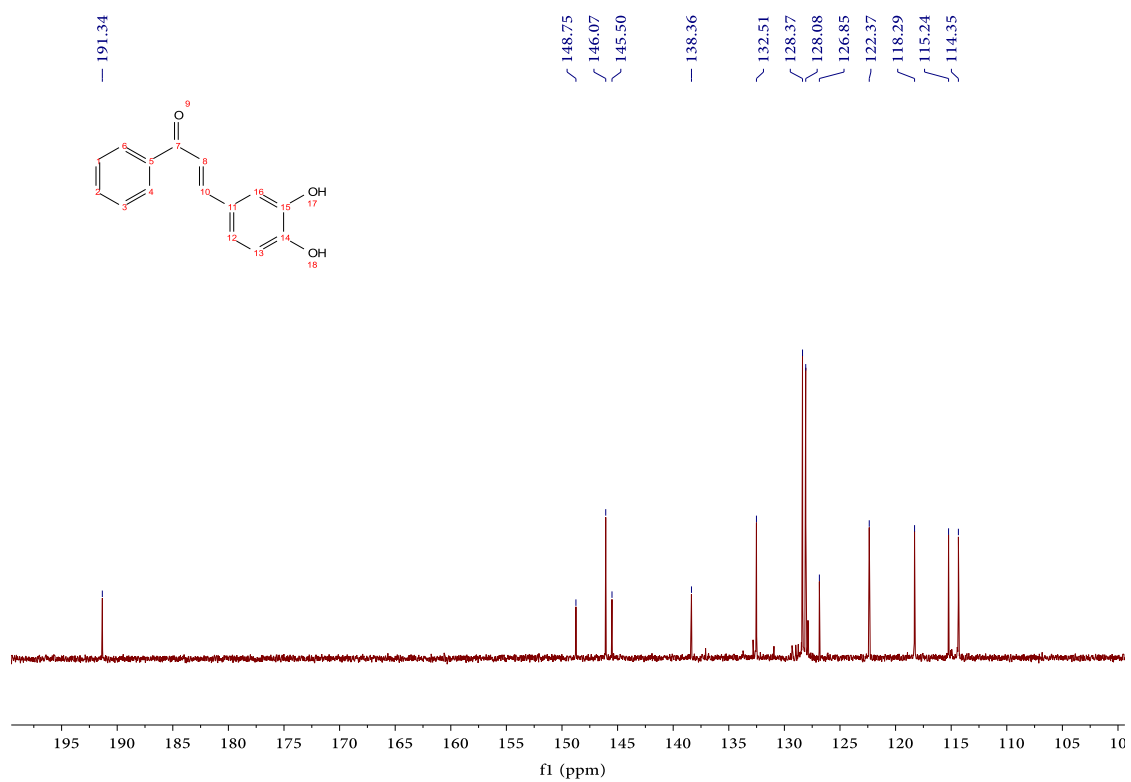
Operator LZU
Instrument micrOTOF



MS (ESI) spectrum of compound **LH-1**



¹H NMR spectrum of compound LH-2



¹³C NMR spectrum of compound LH-2

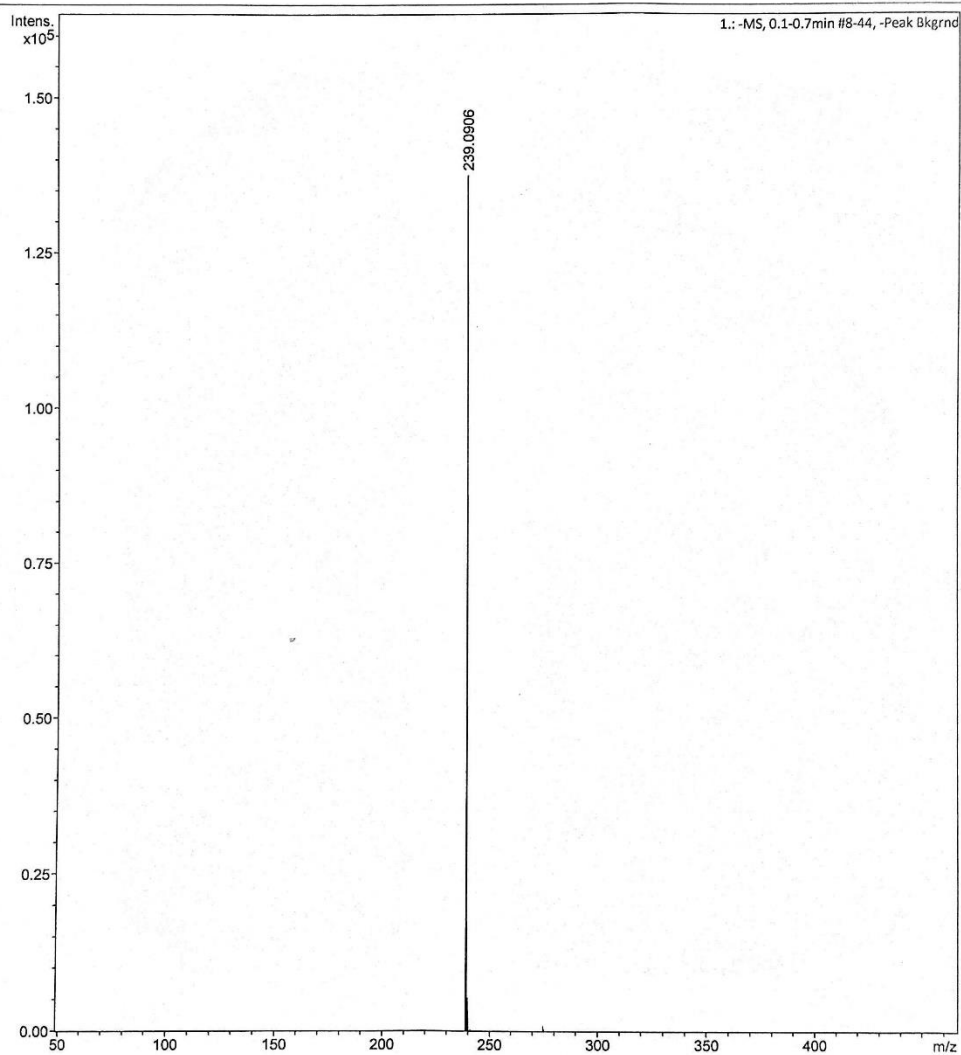
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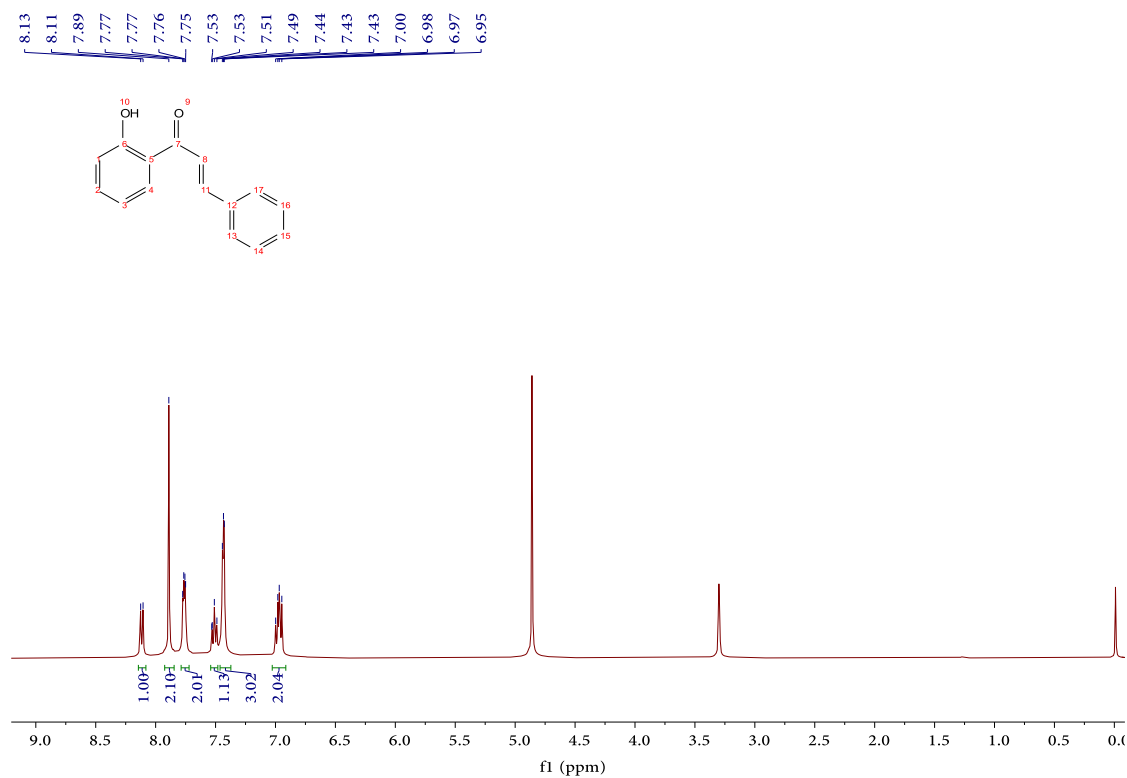
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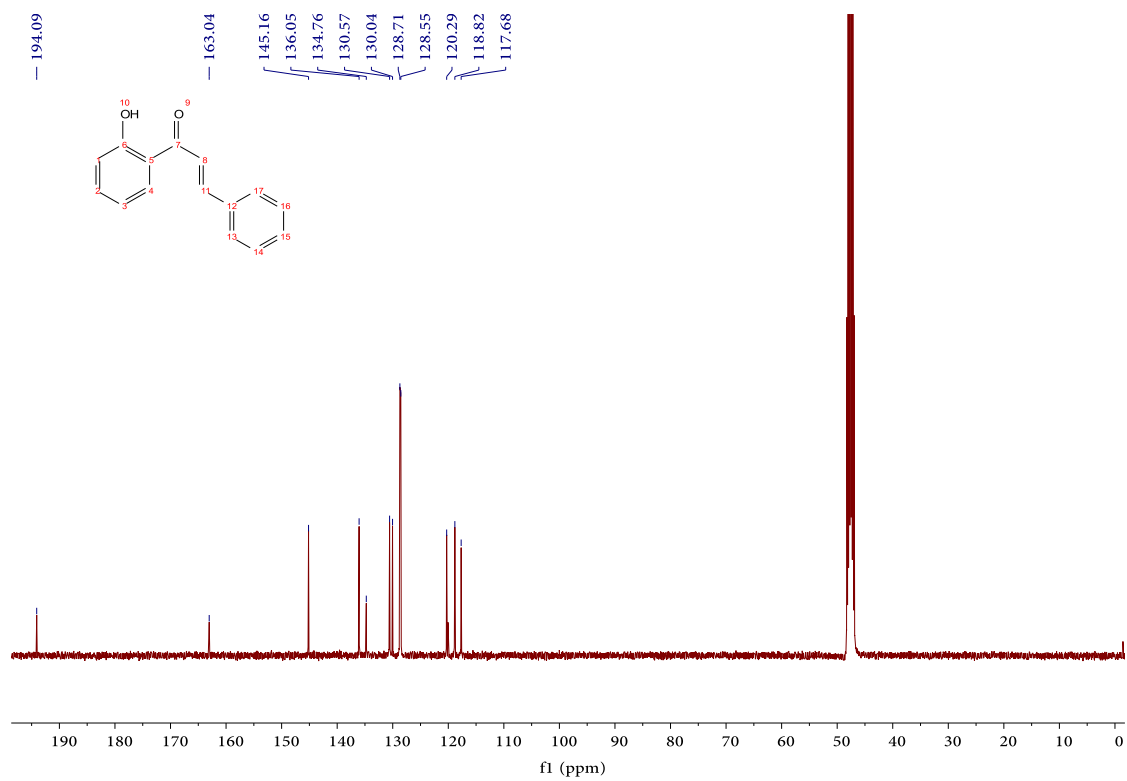
Operator LZU
Instrument micrOTOF



MS (ESI) spectrum of compound **LH-2**



¹H NMR spectrum of compound **LH-3**



¹³C NMR spectrum of compound **LH-3**

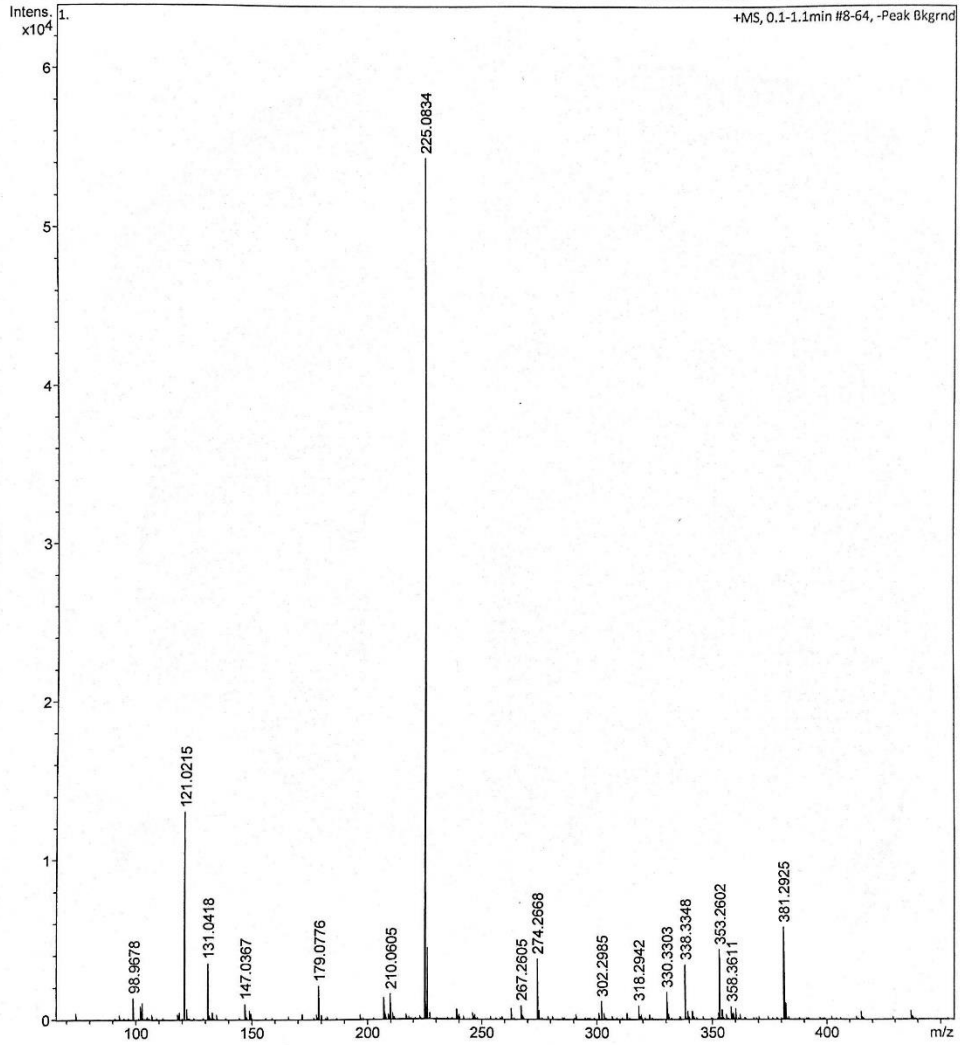
Generic Display Report

Analysis Info

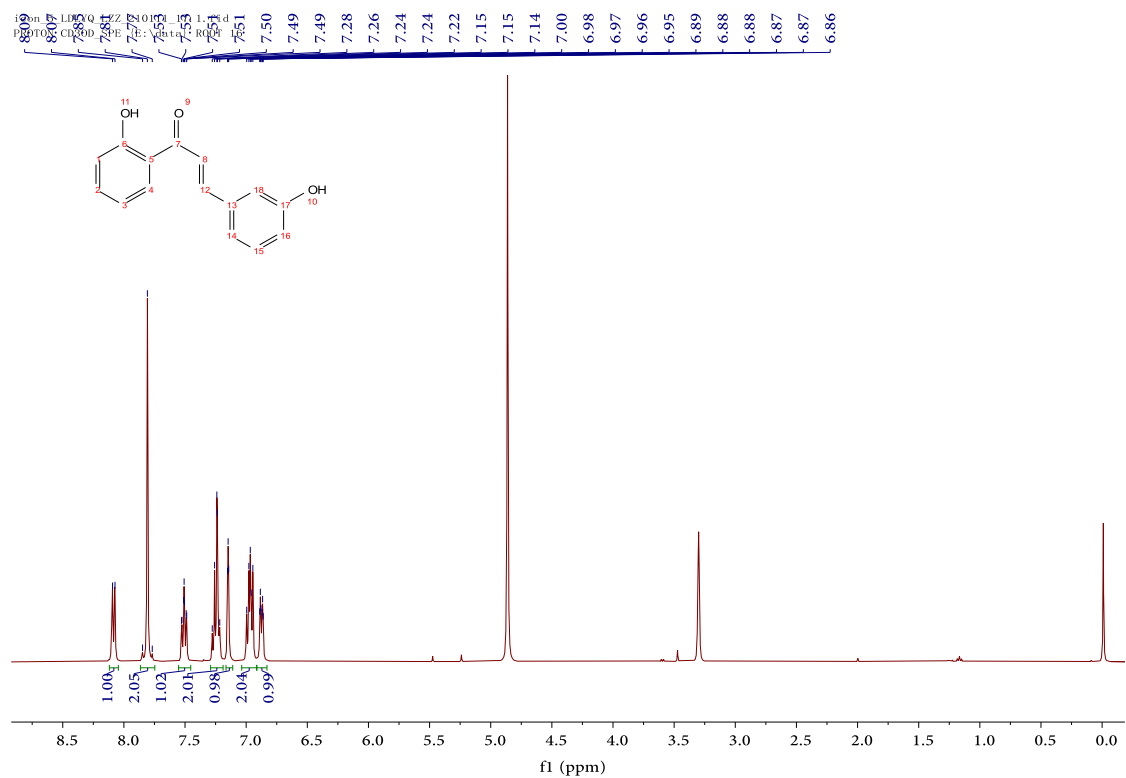
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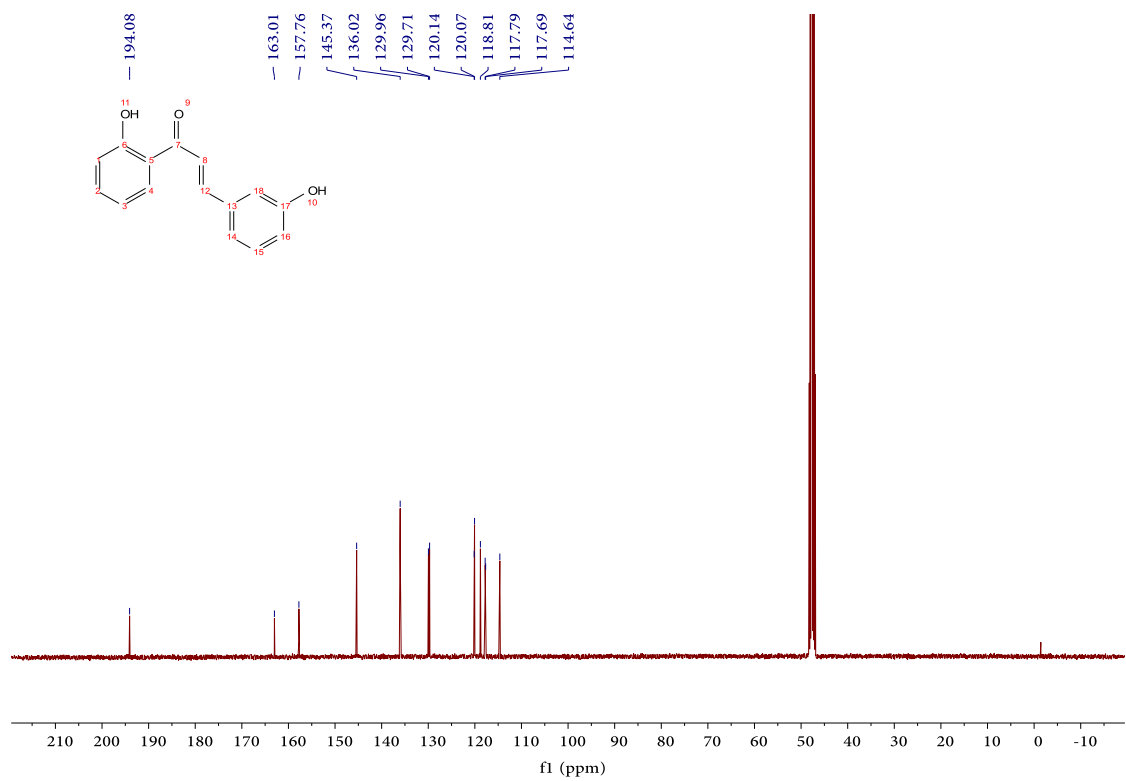
Operator LZU
Instrument micrOTOF



MS (ESI) spectrum of compound **LH-3**



¹H NMR spectrum of compound LH-4



¹³C NMR spectrum of compound LH-4

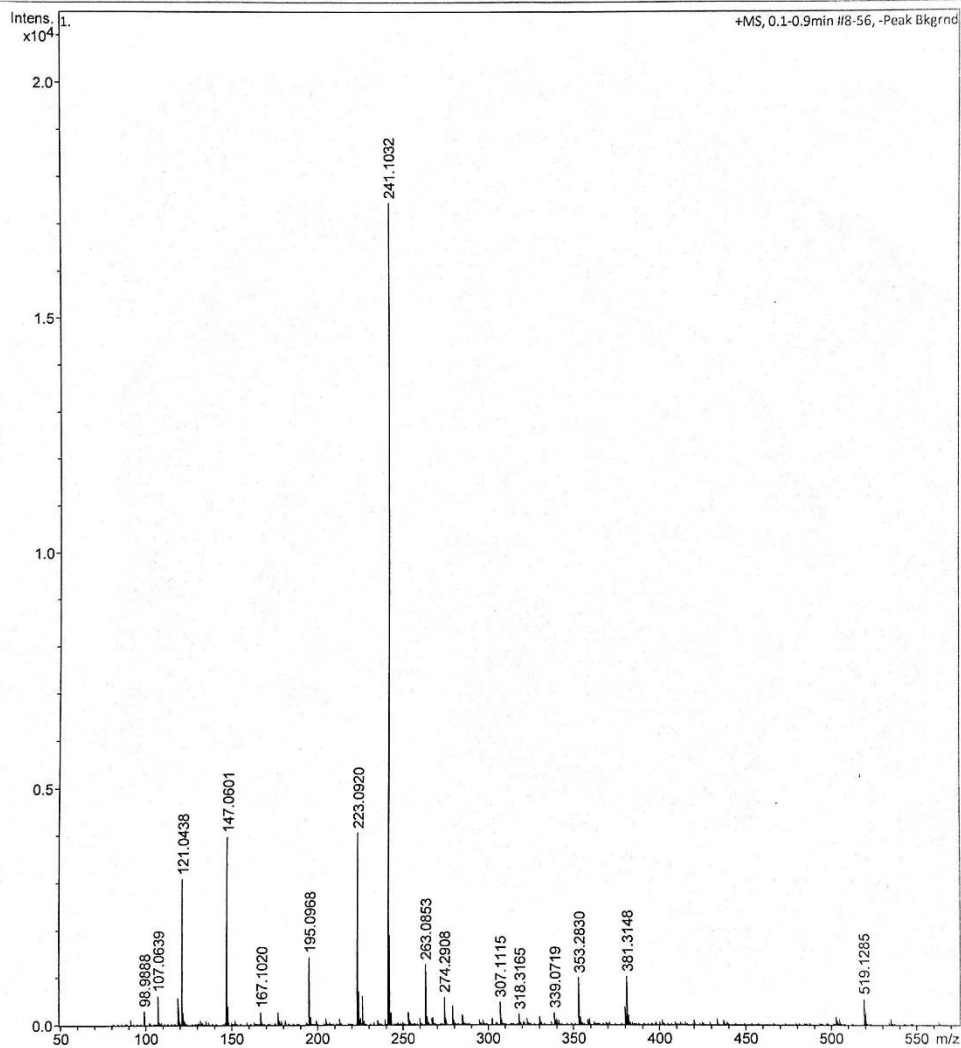
Generic Display Report

Analysis Info

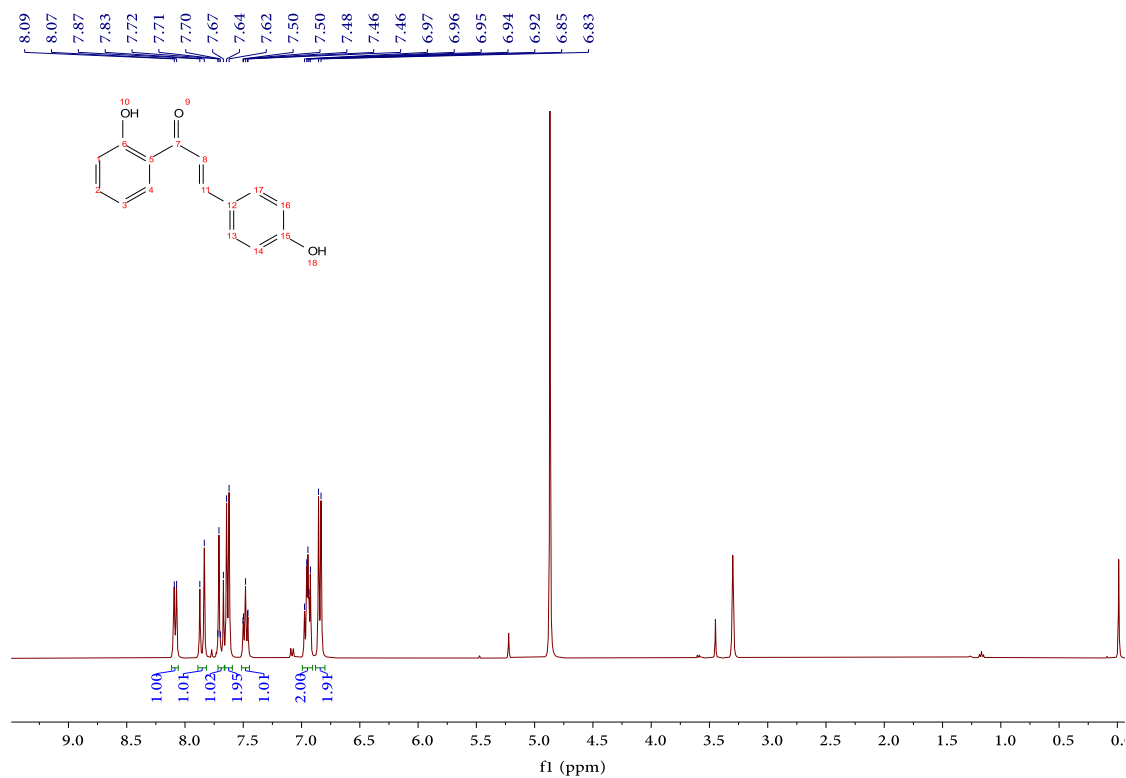
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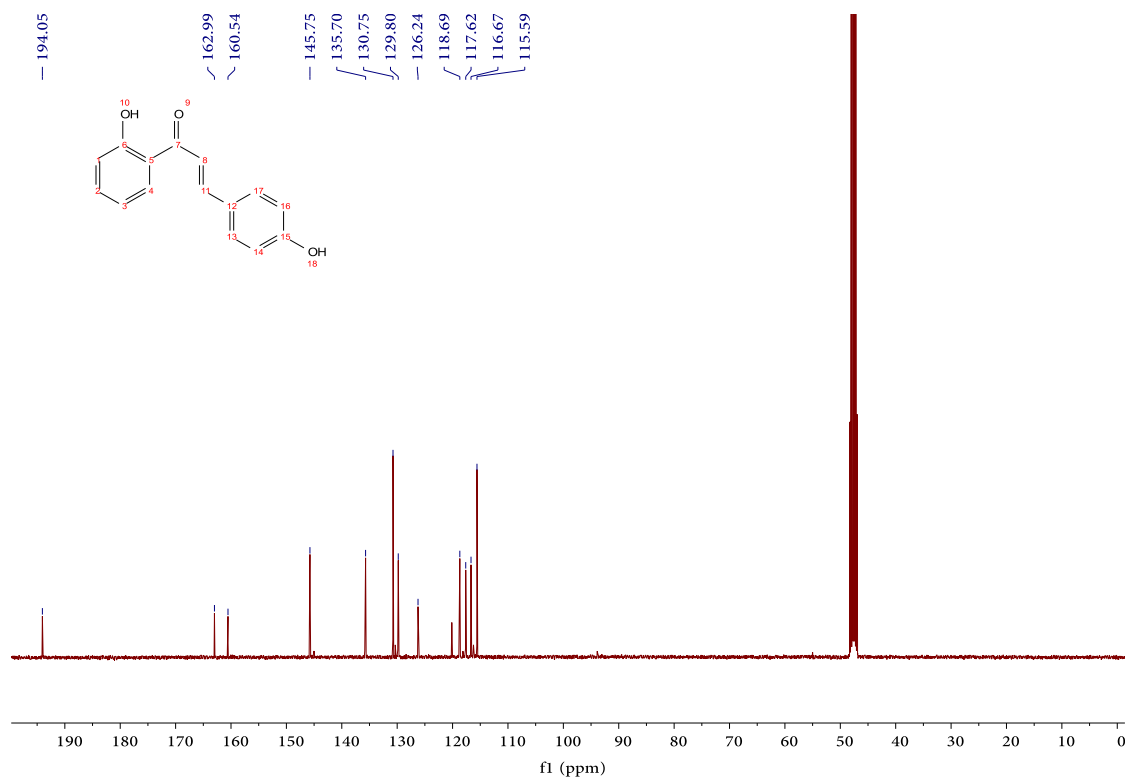
Operator LZU
Instrument micrOTOF



MS (ESI) spectrum of compound **LH-4**



¹H NMR spectrum of compound **LH-5**



¹³C NMR spectrum of compound **LH-5**

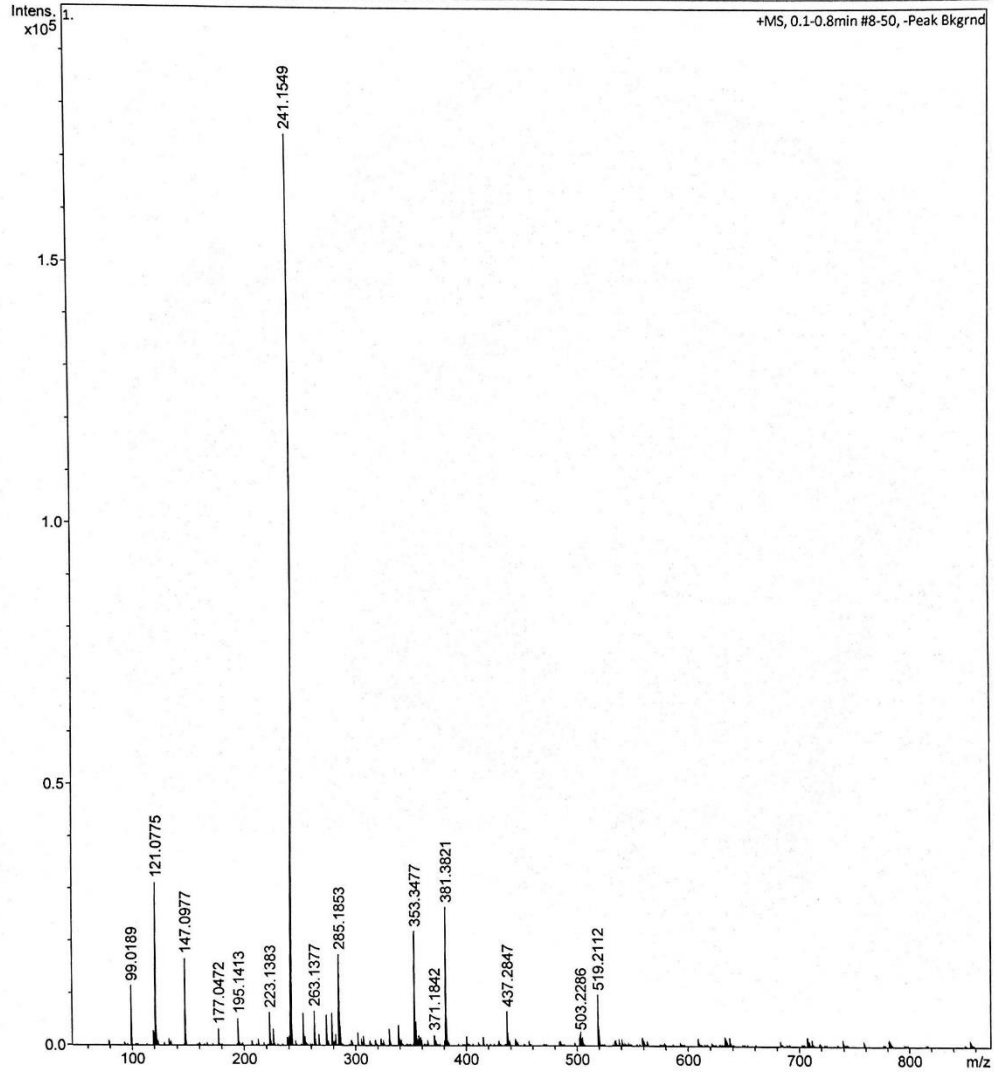
Generic Display Report

Analysis Info

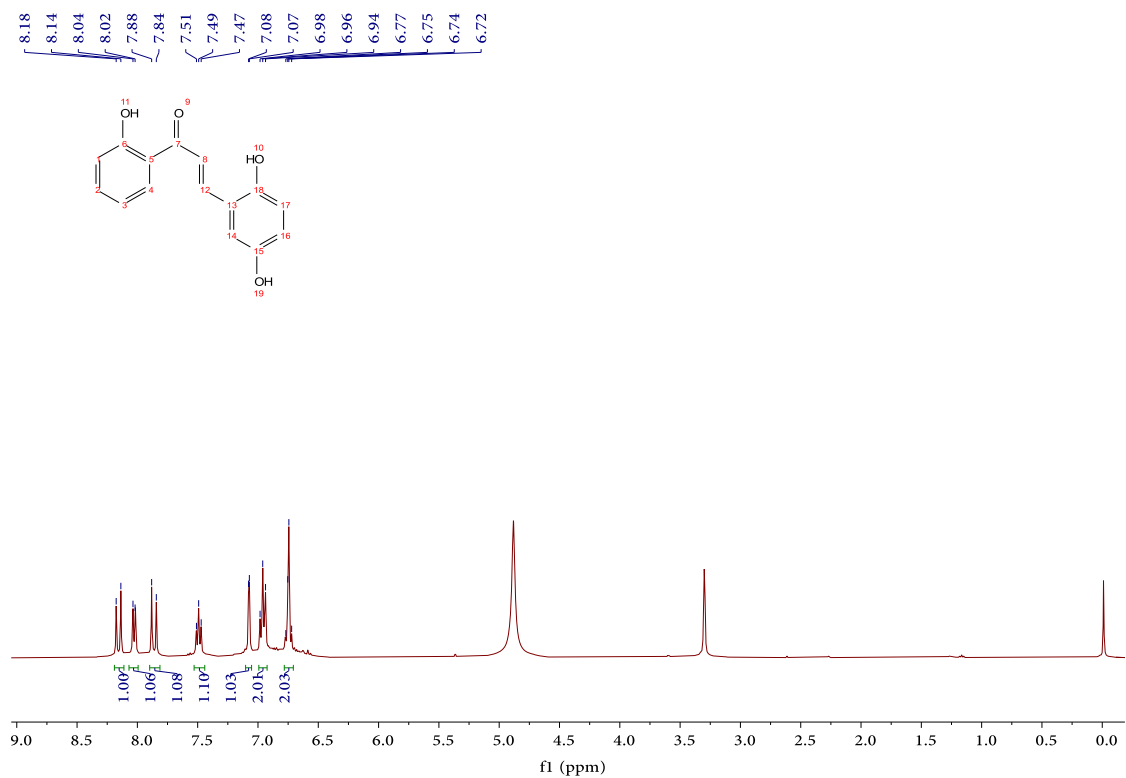
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Method POS_100-1200_For LC.m
Sample Name LIHU210112_8
Comment

Acquisition Date 1/12/2021 12:49:26 PM

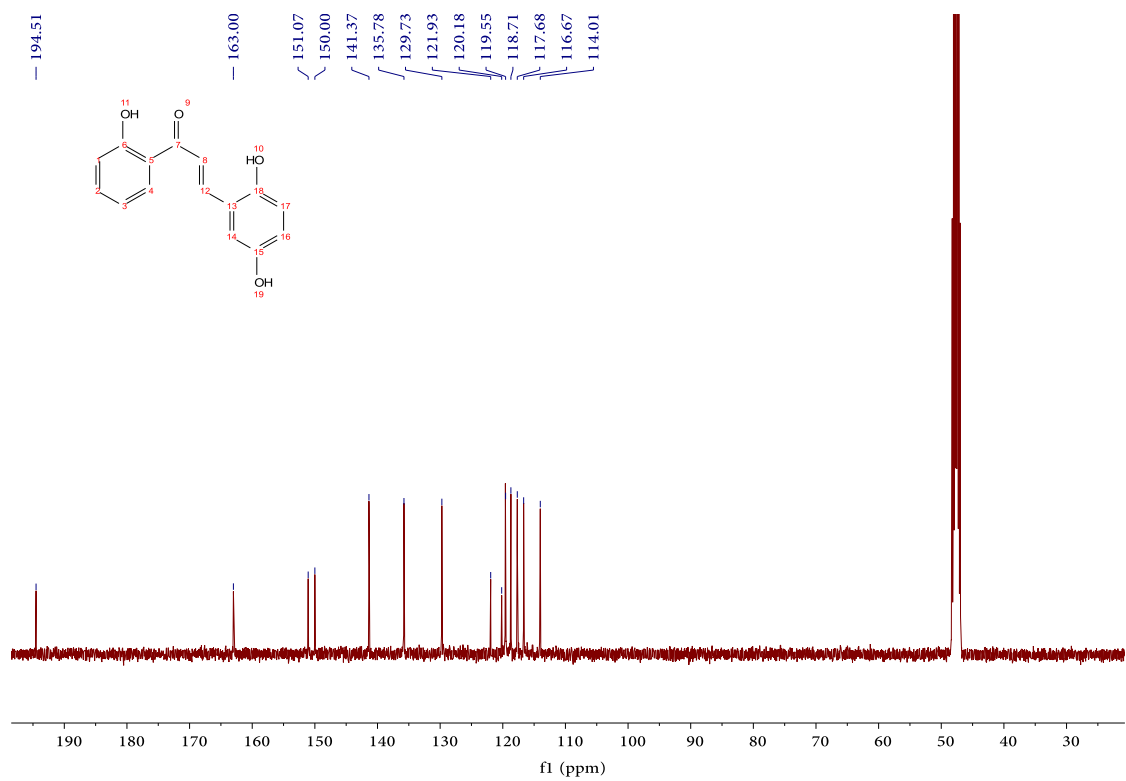
Operator LZU
Instrument micrOTOF



MS (ESI) spectrum of compound **LH-5**



¹H NMR spectrum of compound LH-6



¹³C NMR spectrum of compound LH-6

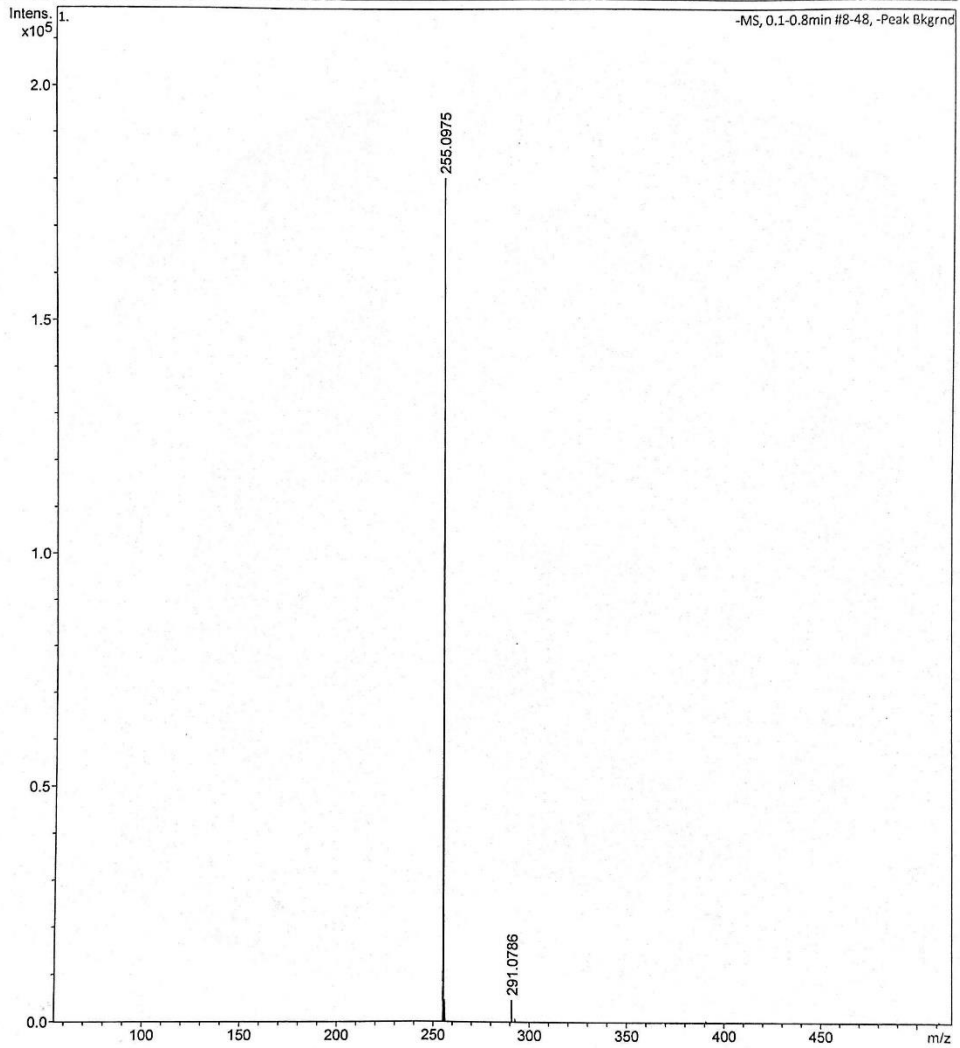
Generic Display Report

Analysis Info

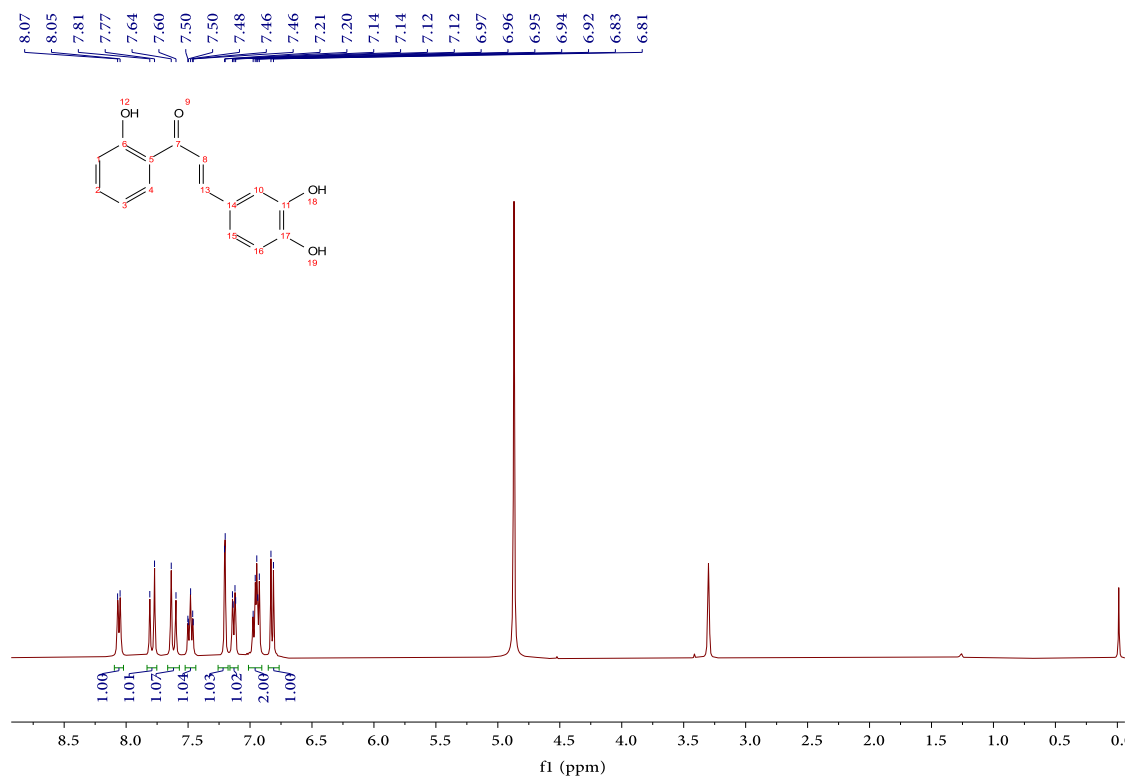
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Method NEG_100-1200_For LC.m
Sample Name LIHU200914_2
Comment

Acquisition Date 9/14/2020 2:08:01 PM

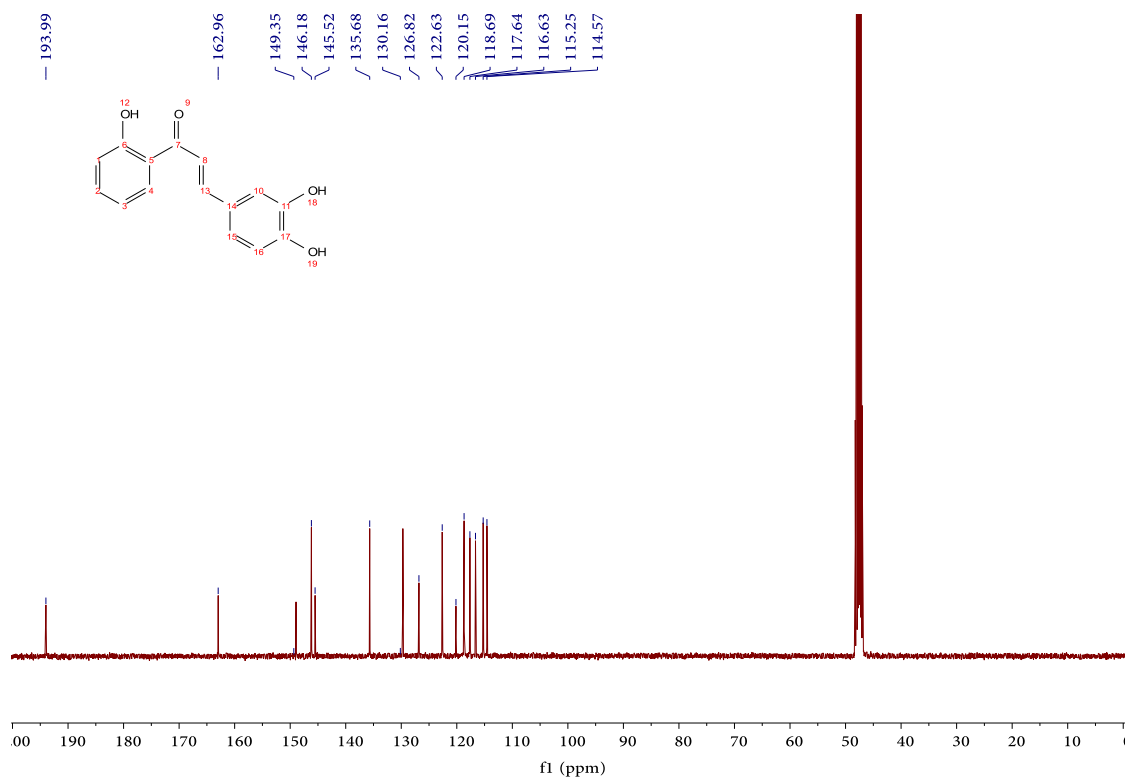
Operator LZU
Instrument micrOTOF



MS (ESI) spectrum of compound **LH-6**



¹H NMR spectrum of compound LH-7



¹³C NMR spectrum of compound LH-7

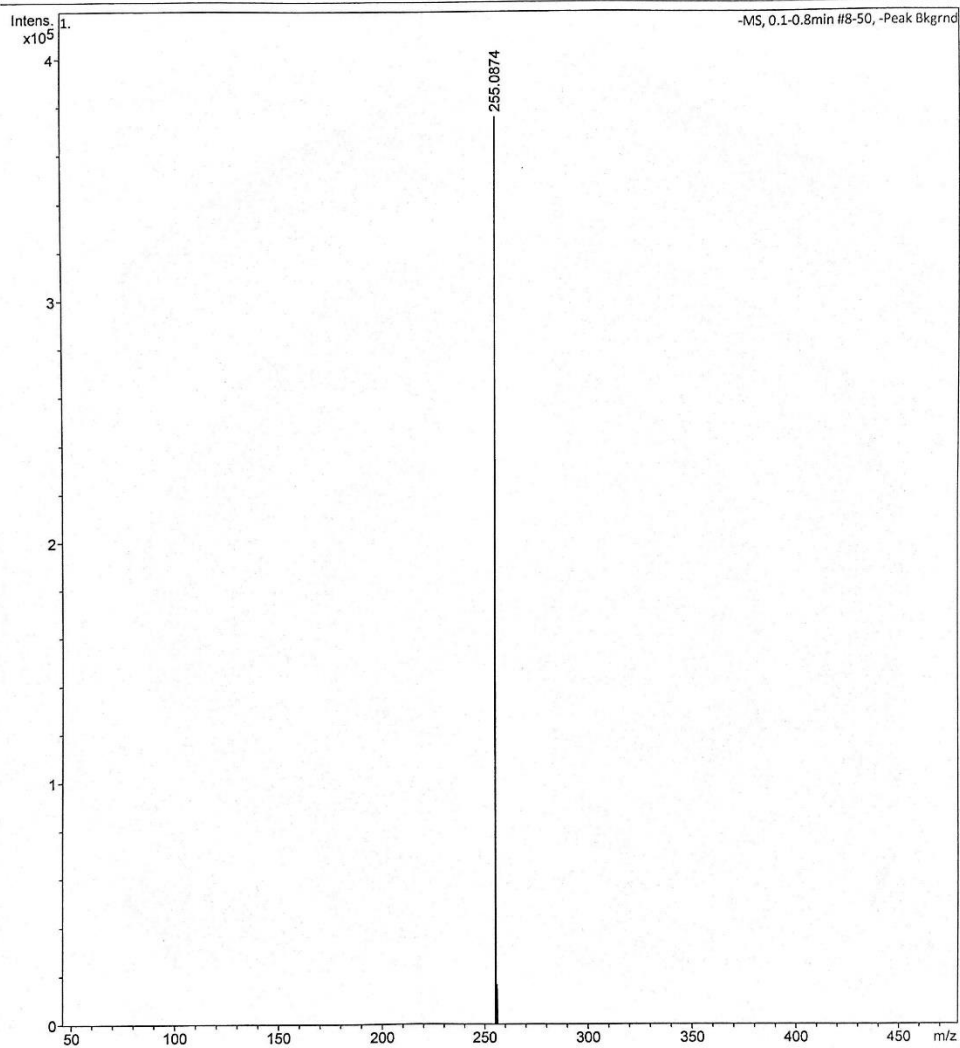
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Analysis Info

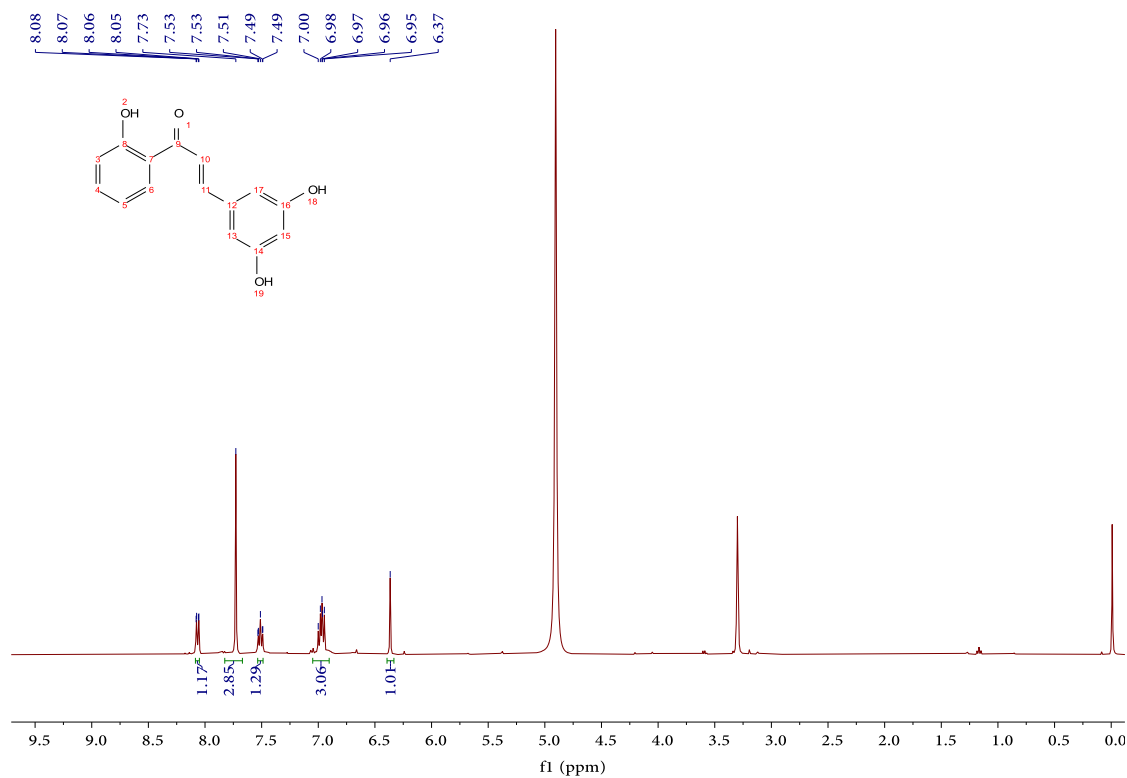
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Method NEG_100-1200_For LC.m
Sample Name LIHU200915_3
Comment

Acquisition Date 9/15/2020 2:10:50 PM

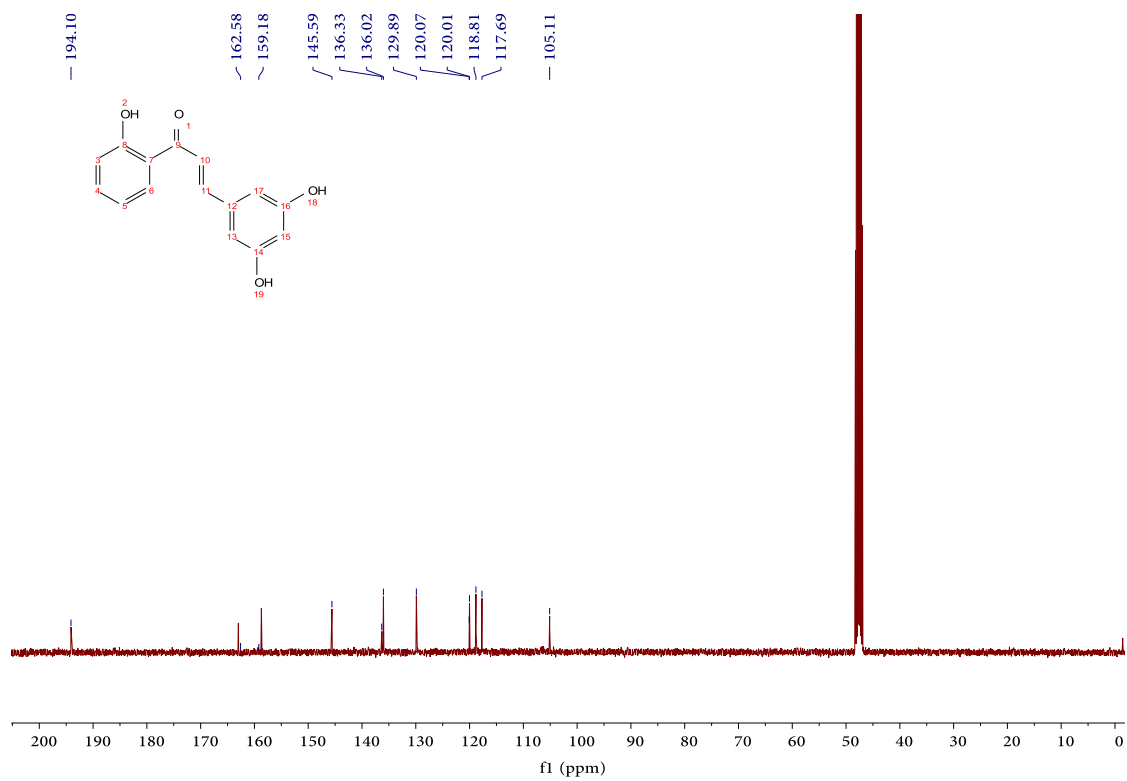
Operator LZU
Instrument micrOTOF



MS (ESI) spectrum of compound **LH-7**



¹H NMR spectrum of compound LH-8



¹³C NMR spectrum of compound LH-8

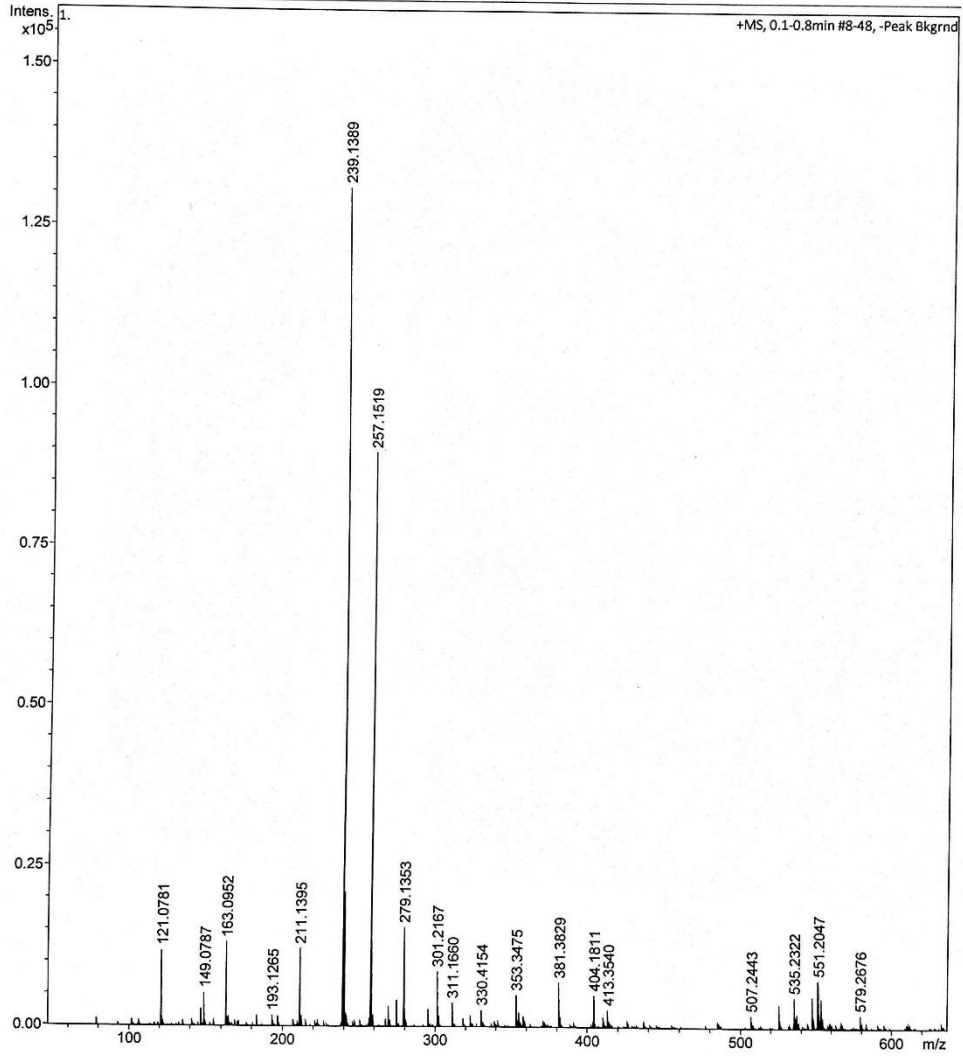
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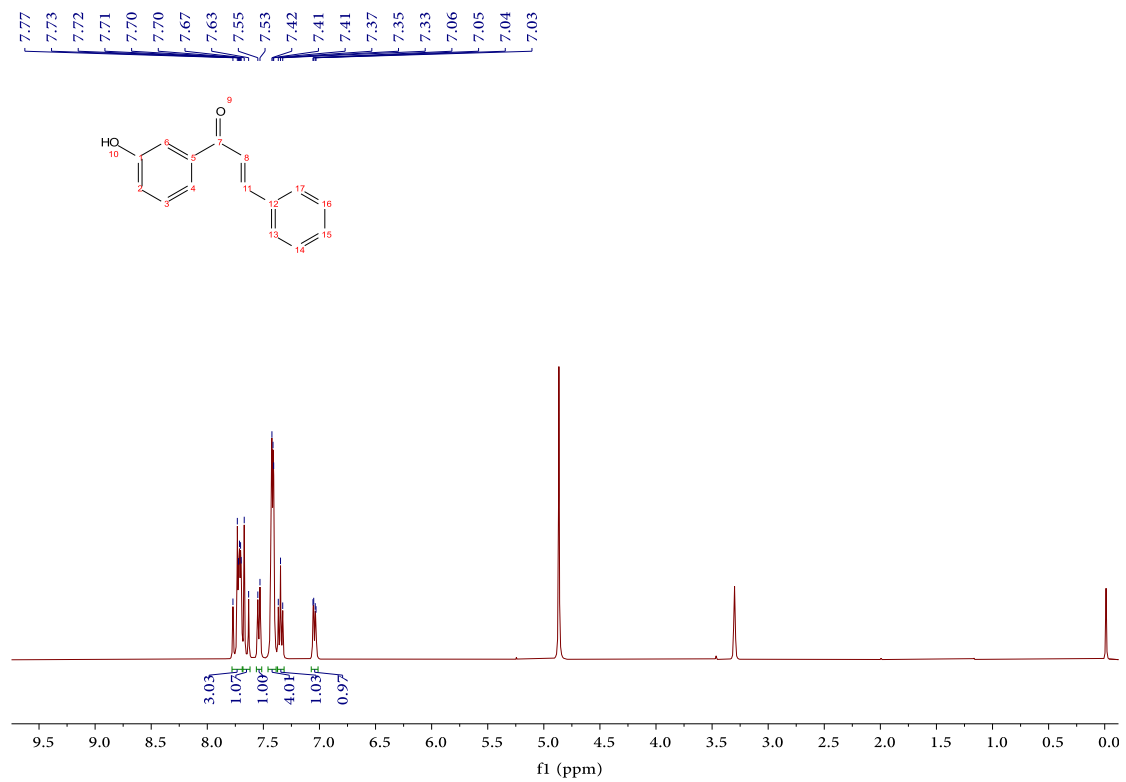
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Method POS_100-1200_For LC.m
Sample Name LIHU210112_9
Comment

Acquisition Date 1/12/2021 12:52:32 PM

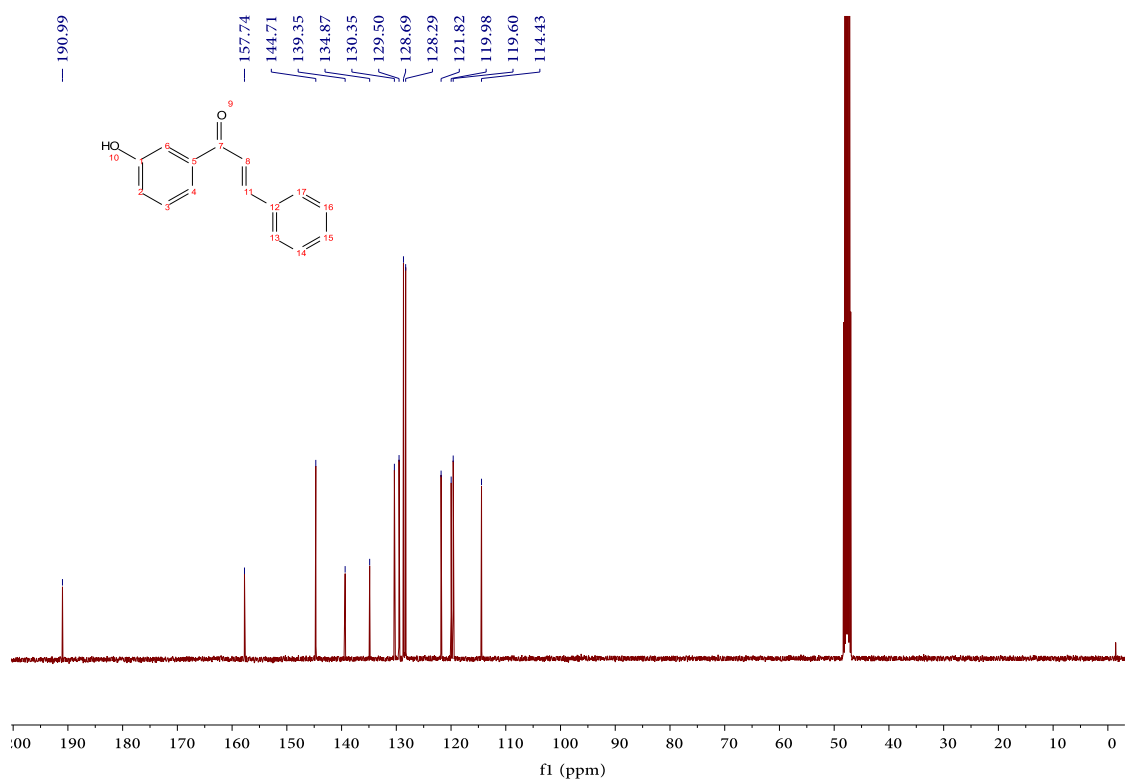
Operator LZU
Instrument micrOTOF



MS (ESI) spectrum of compound **LH-8**



¹H NMR spectrum of compound **LH-9**



¹³C NMR spectrum of compound **LH-9**

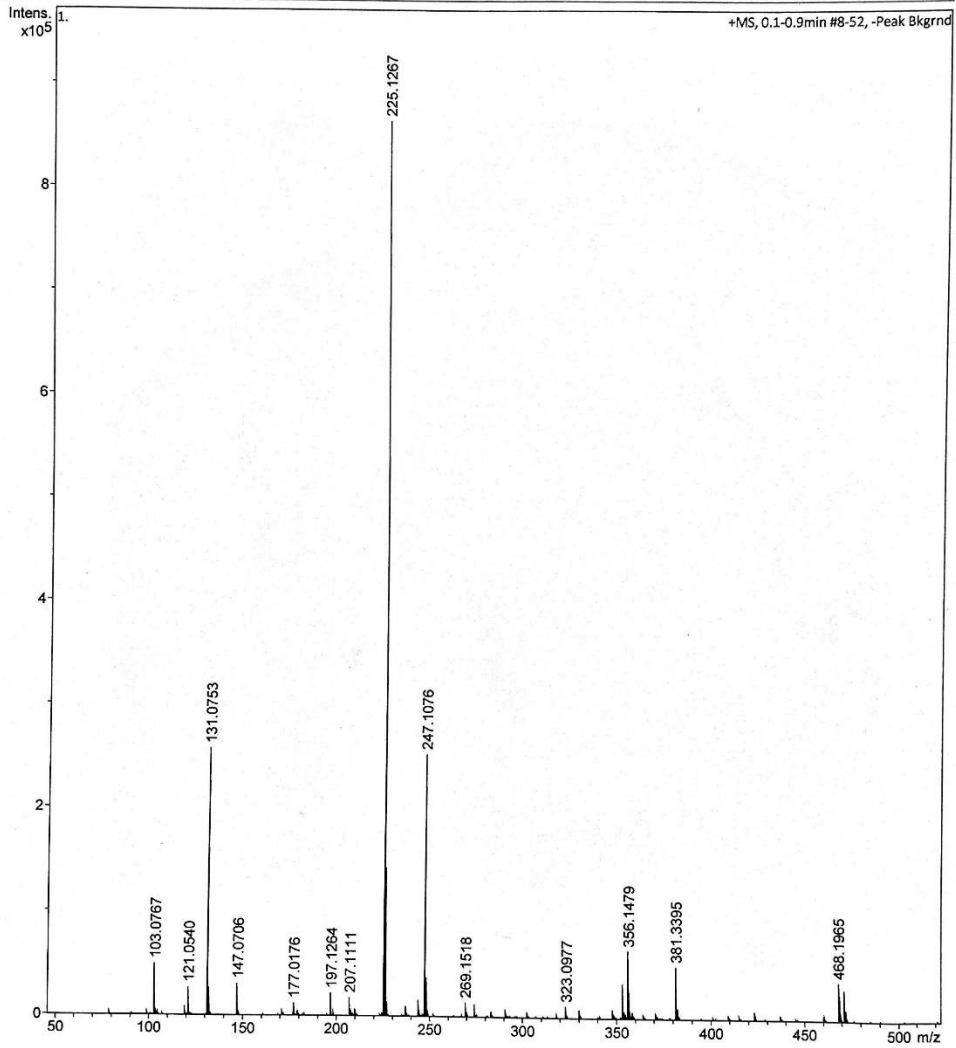
Generic Display Report

Analysis Info

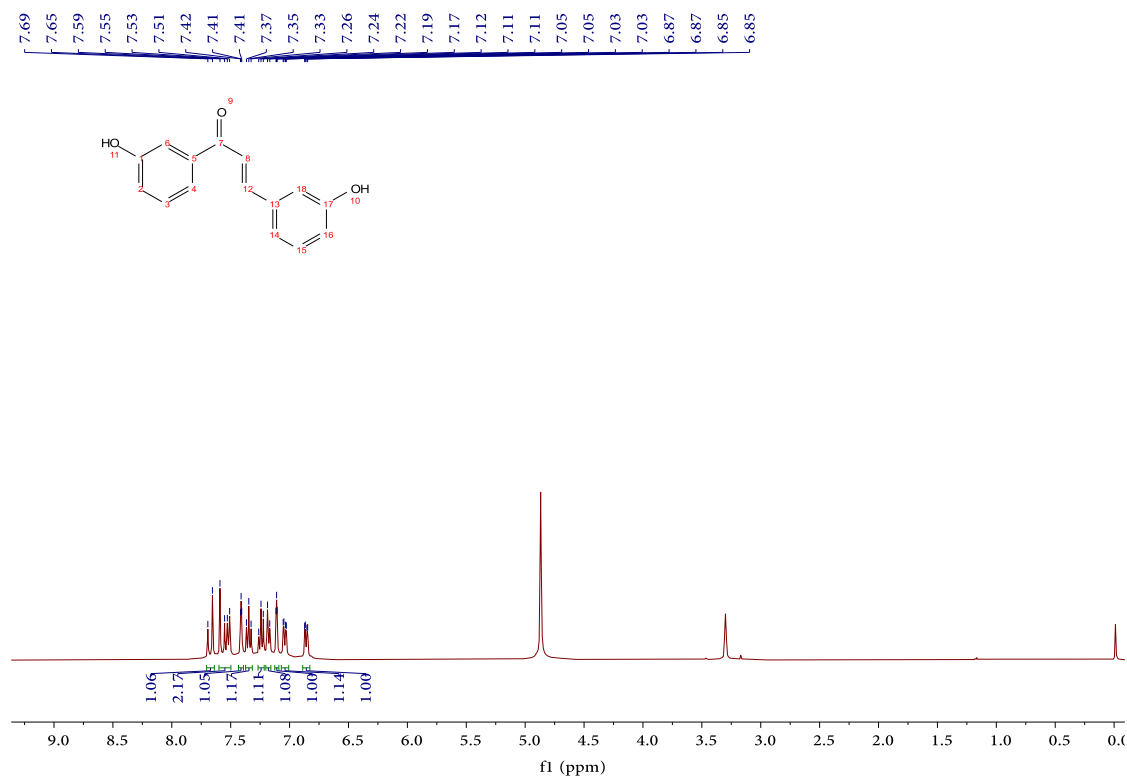
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Sample Name LIHU210111_1
Comment

Acquisition Date 1/11/2021 12:51:46 PM

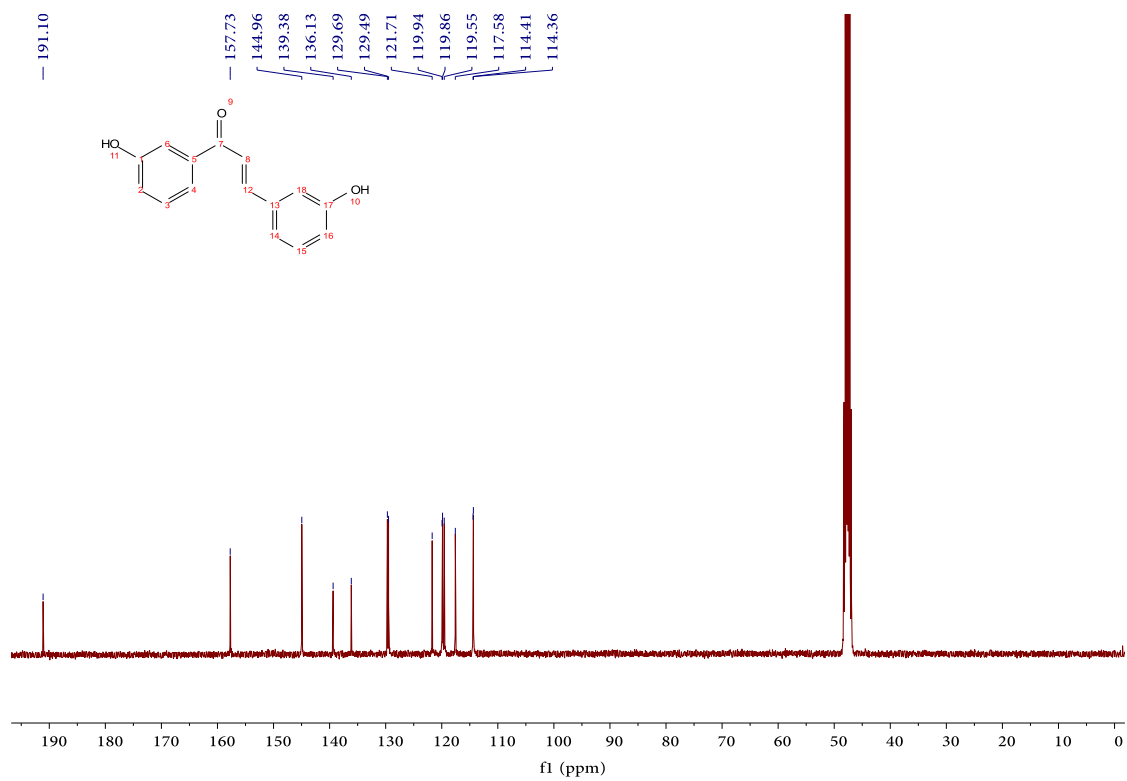
Operator LZU
Instrument micrOTOF



MS (ESI) spectrum of compound **LH-9**



$^1\text{H NMR}$ spectrum of compound LH-10



$^{13}\text{C NMR}$ spectrum of compound LH-10

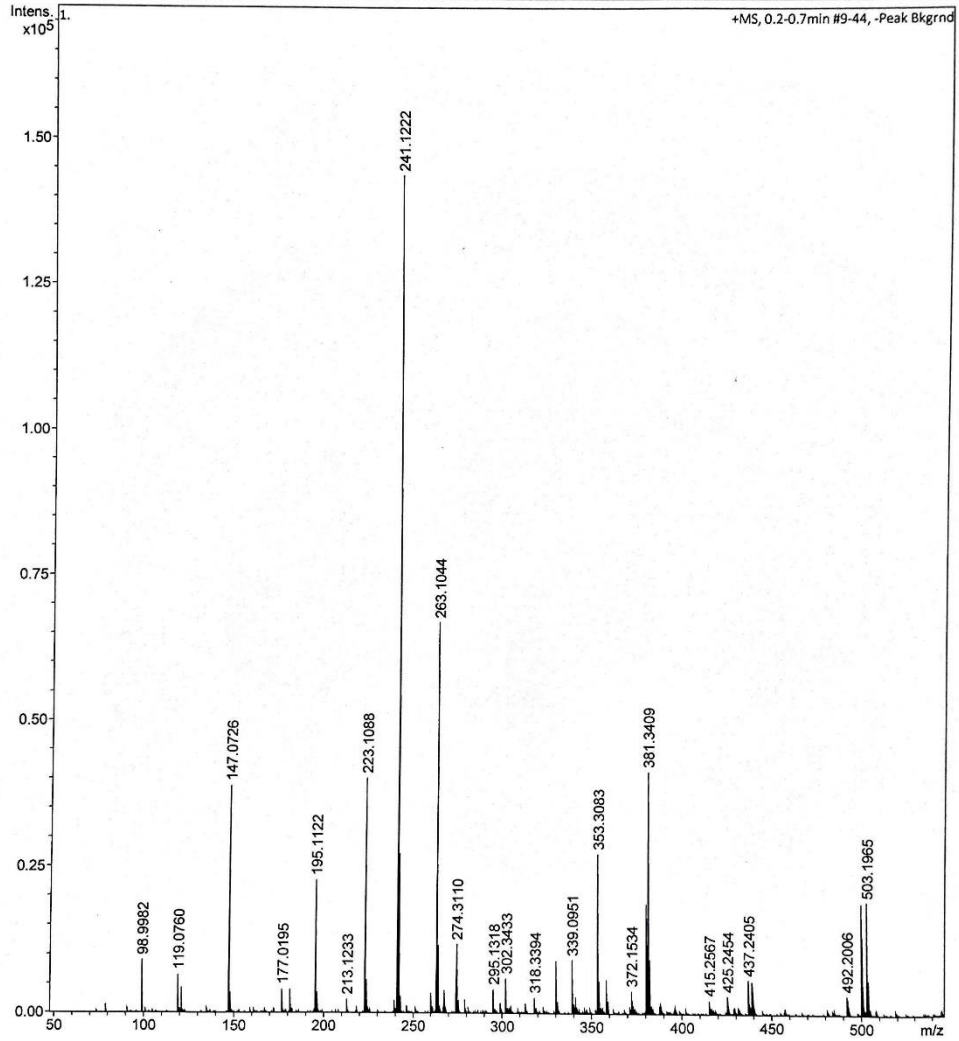
Generic Display Report

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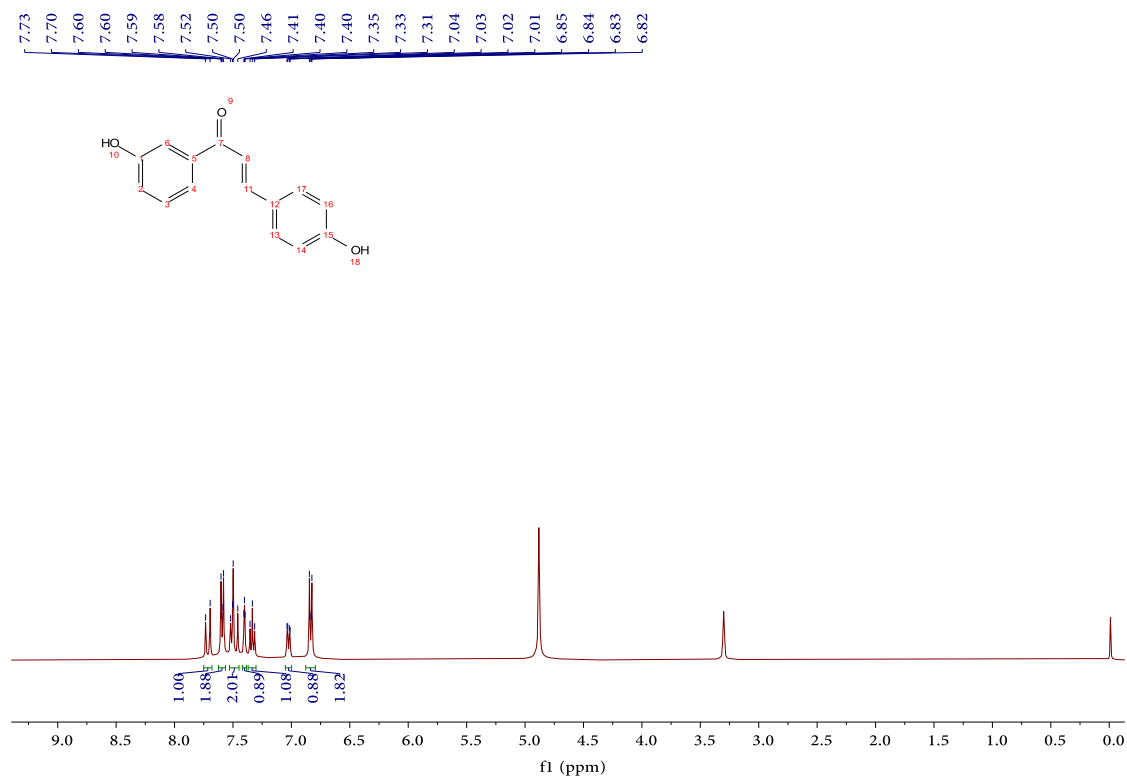
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Method POS_100-1200_For LC.m
Sample Name LIHU210111_6
Comment

Acquisition Date 1/11/2021 1:07:13 PM

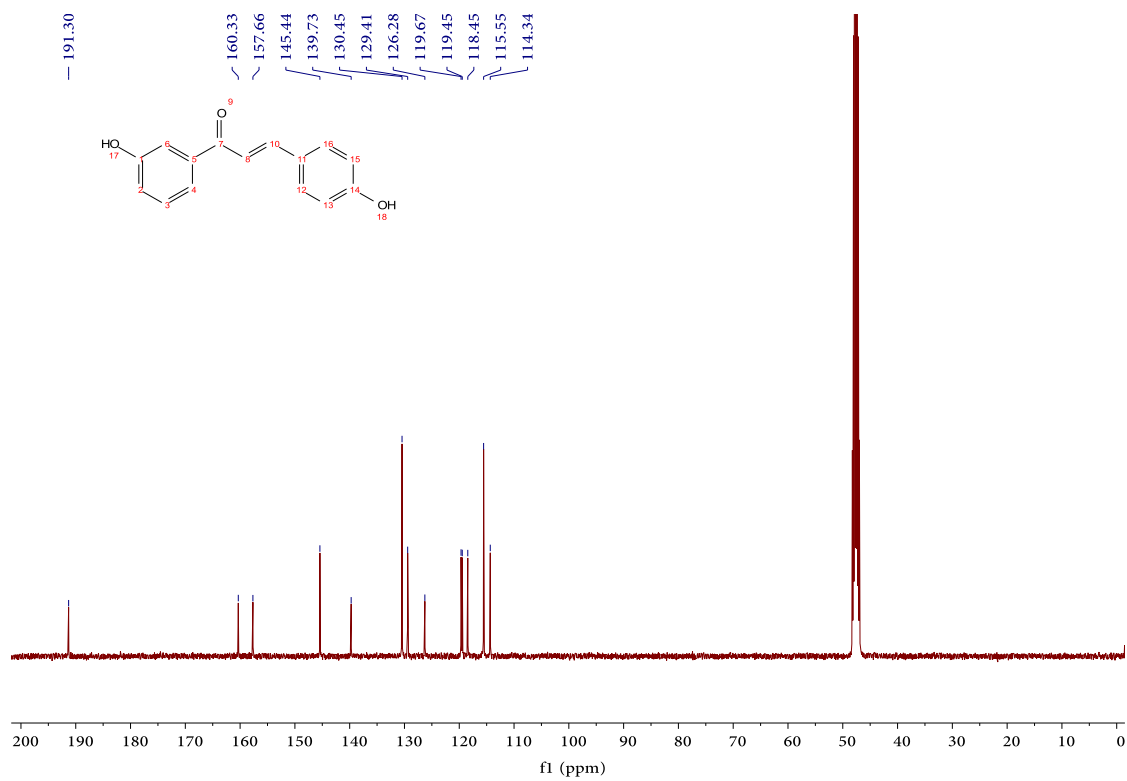
Operator LZU
Instrument micrOTOF



MS (ESI) spectrum of compound **LH-10**



¹H NMR spectrum of compound LH-11



¹³C NMR spectrum of compound LH-11

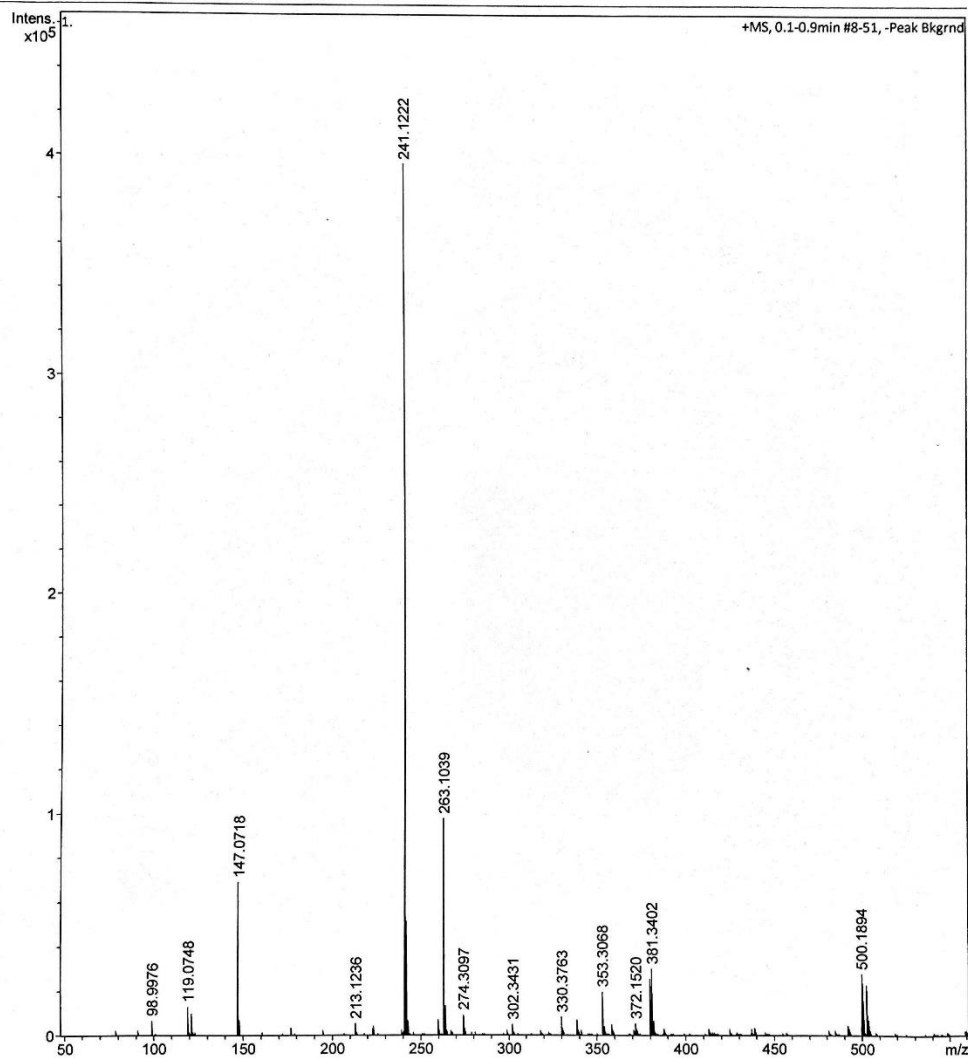
Generic Display Report

Analysis Info

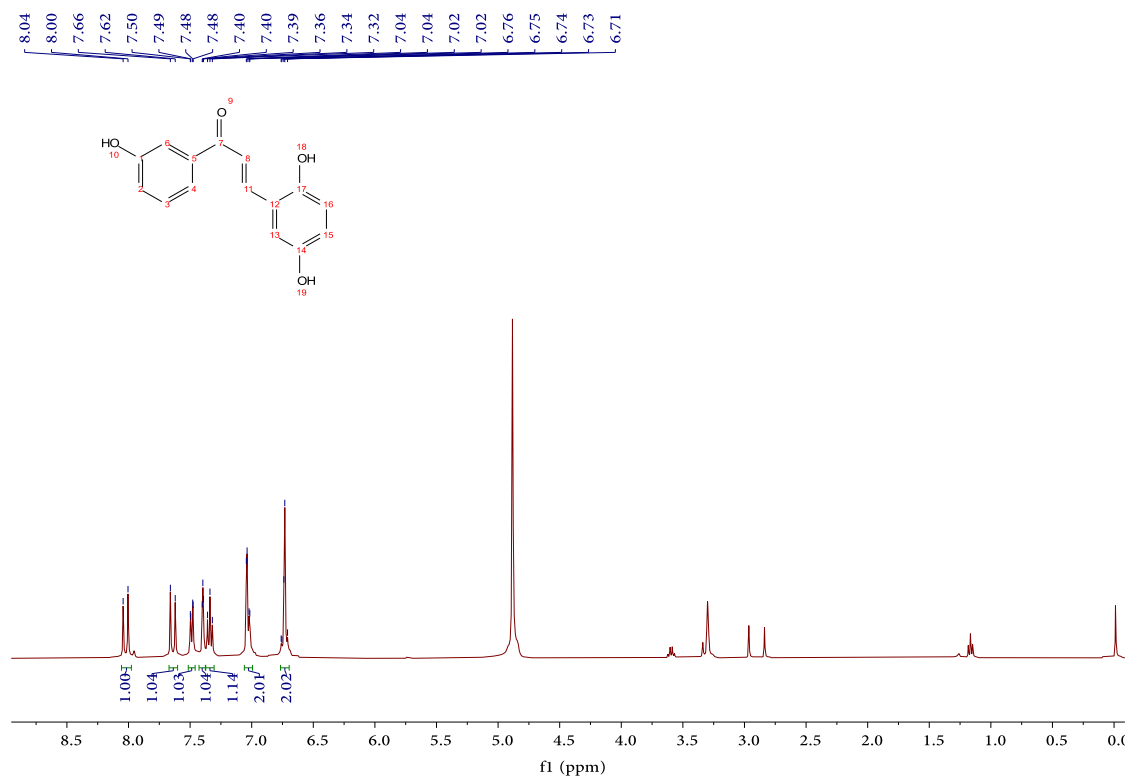
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Method POS_100-1200_For LC.m
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Comment

Acquisition Date 1/11/2021 1:01:02 PM

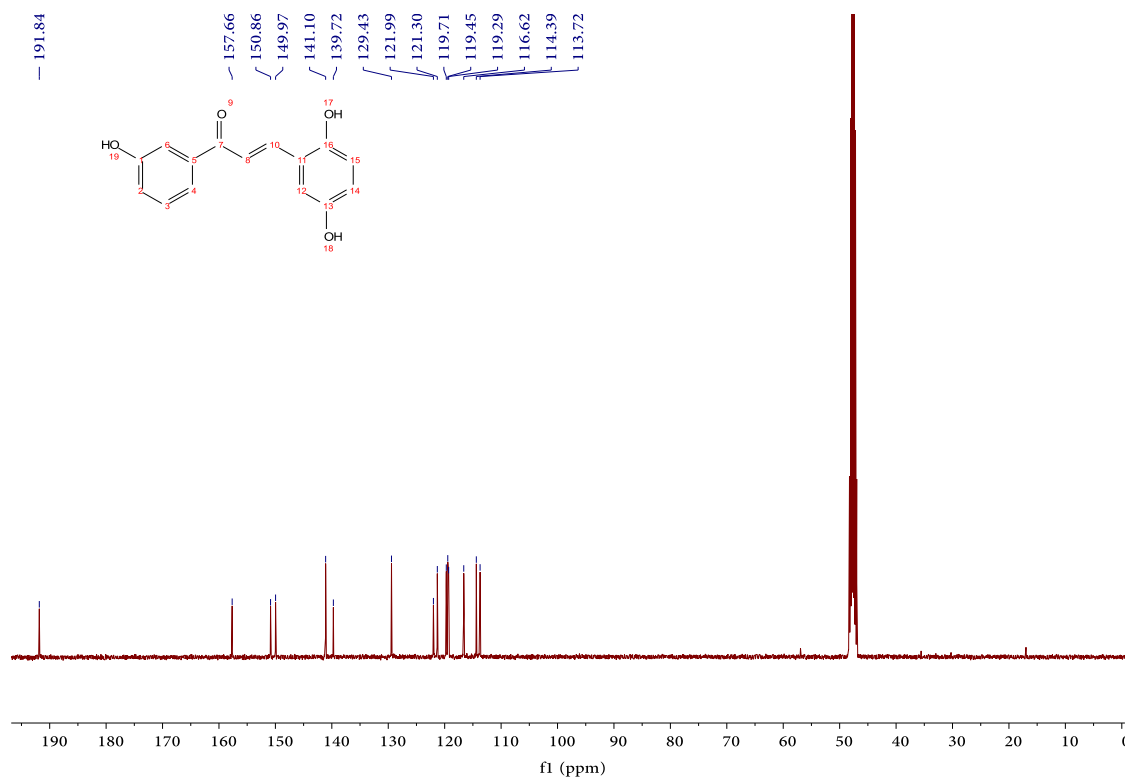
Operator LZU
Instrument micrOTOF



MS (ESI) spectrum of compound **LH-11**



¹H NMR spectrum of compound LH-12



¹³C NMR spectrum of compound LH-12

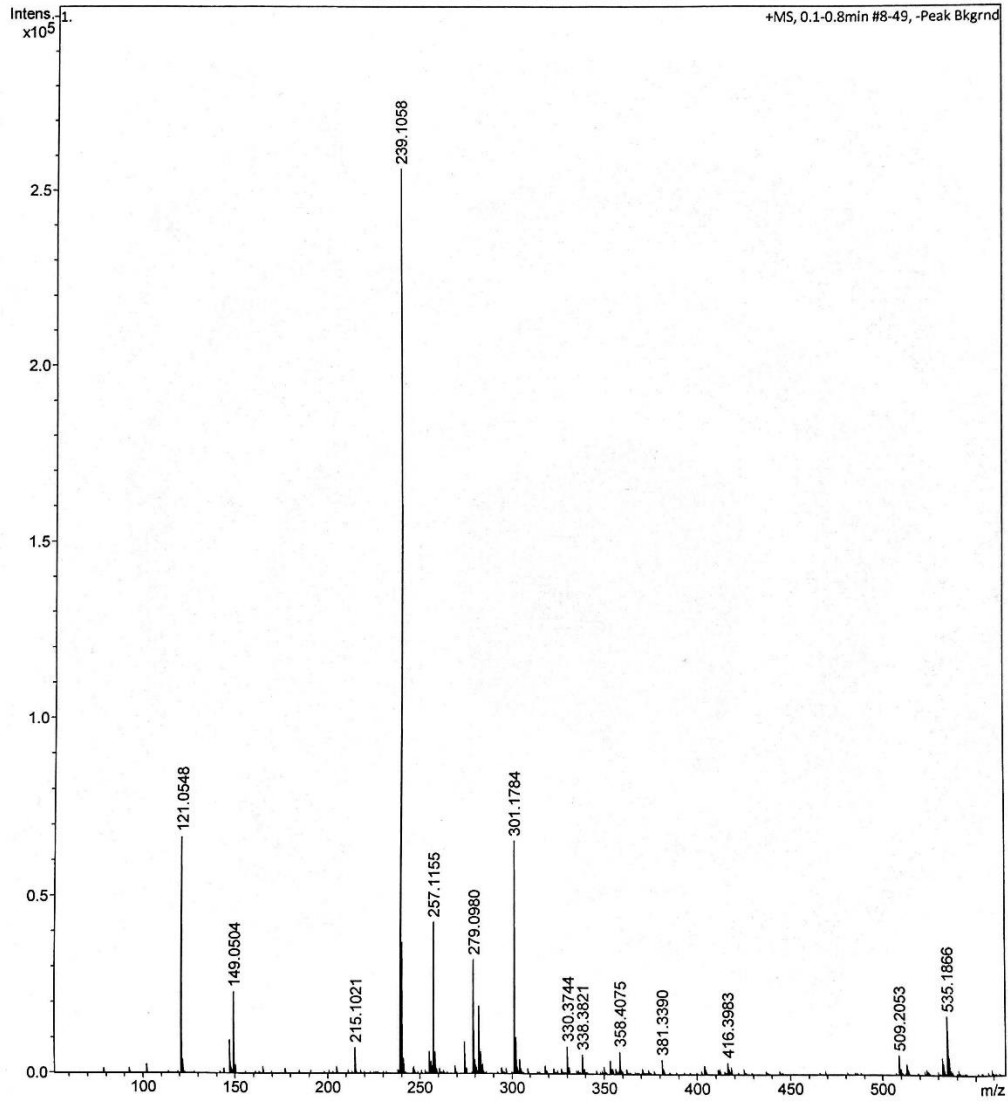
Generic Display Report

Analysis Info

Analysis Name D:\Data\yangy\new\LIHU210111_2_20_01_36749.d
Method POS_100-1200_For LC.m
Sample Name LIHU210111_2
Comment

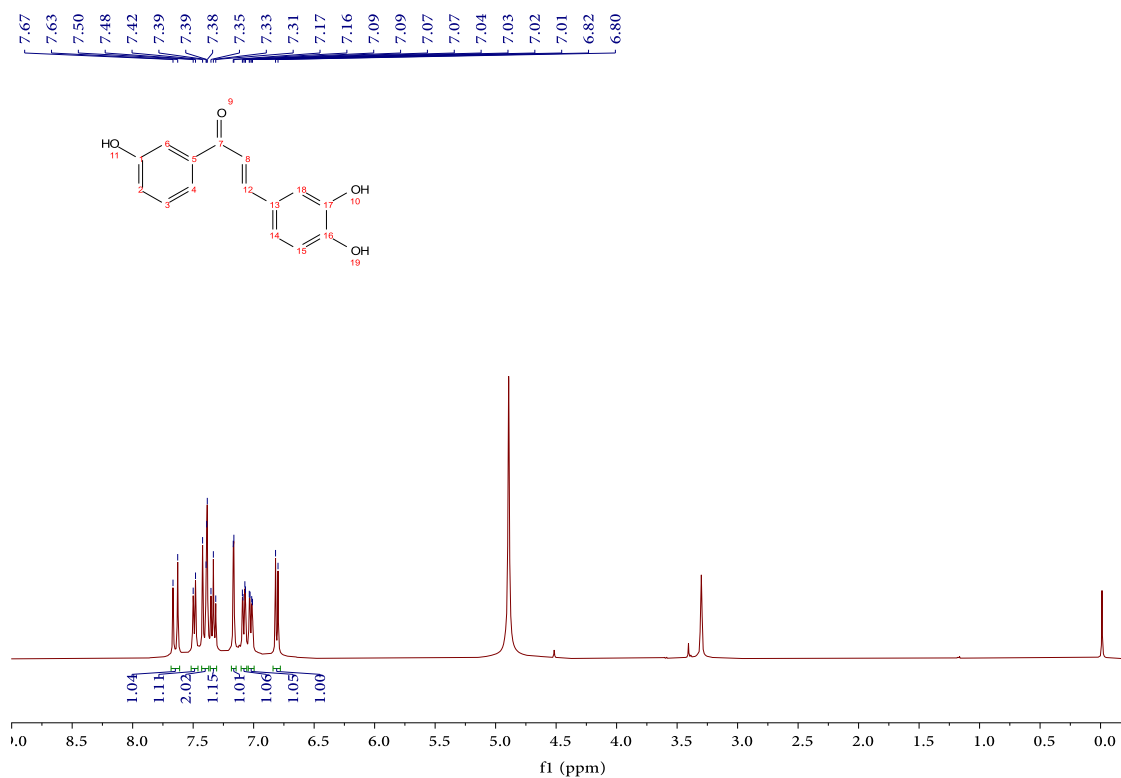
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Operator LZU
Instrument micrOTOF

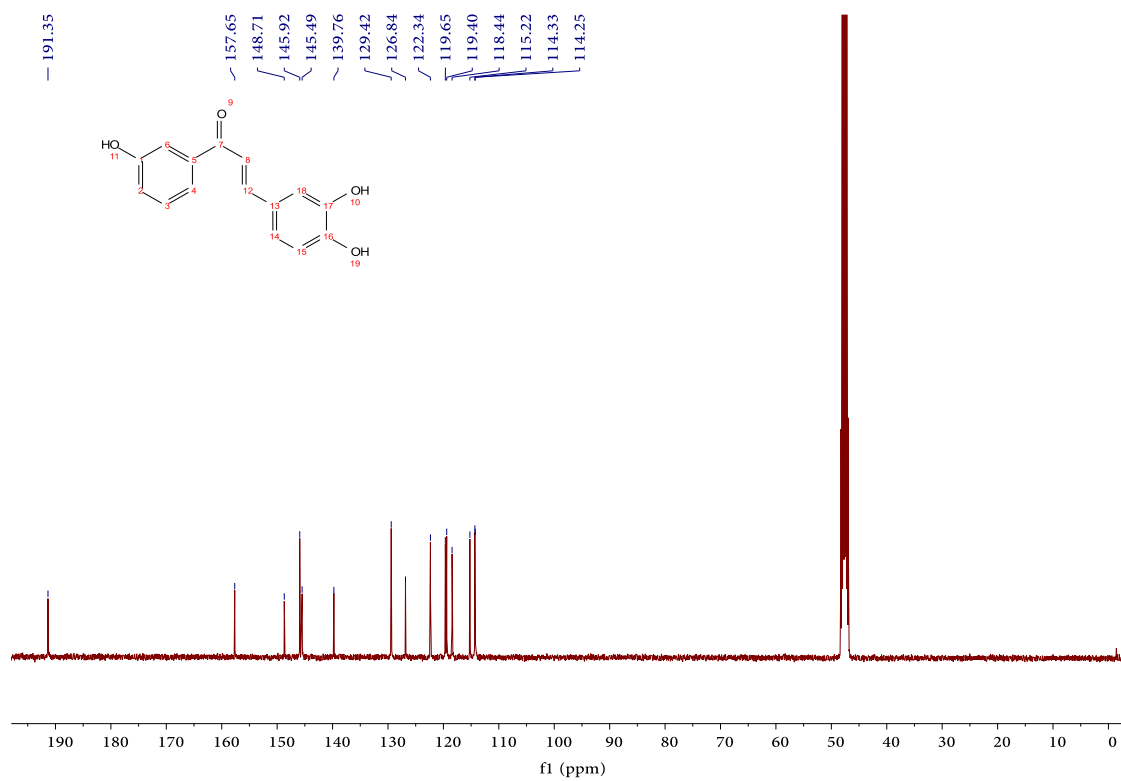


MS (ESI) spectrum of **LH-12**

compound



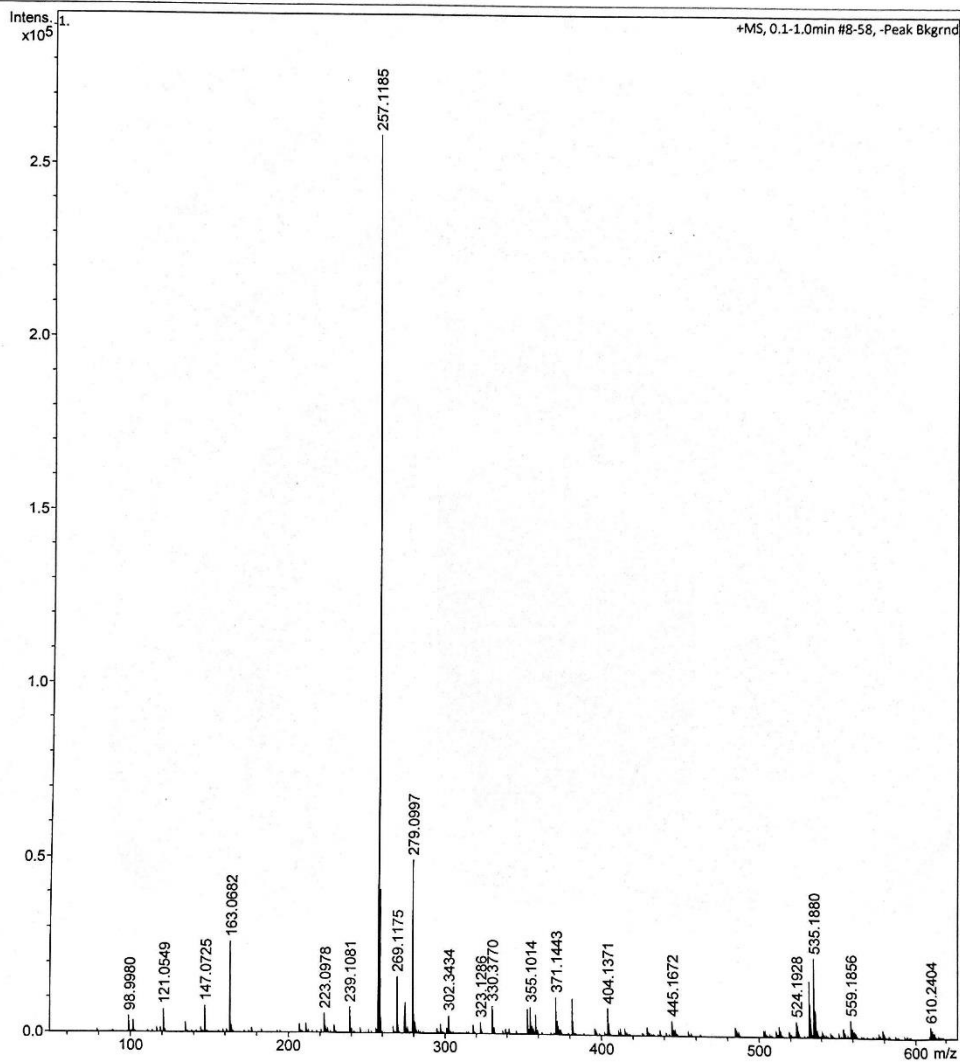
¹H NMR spectrum of compound LH-13



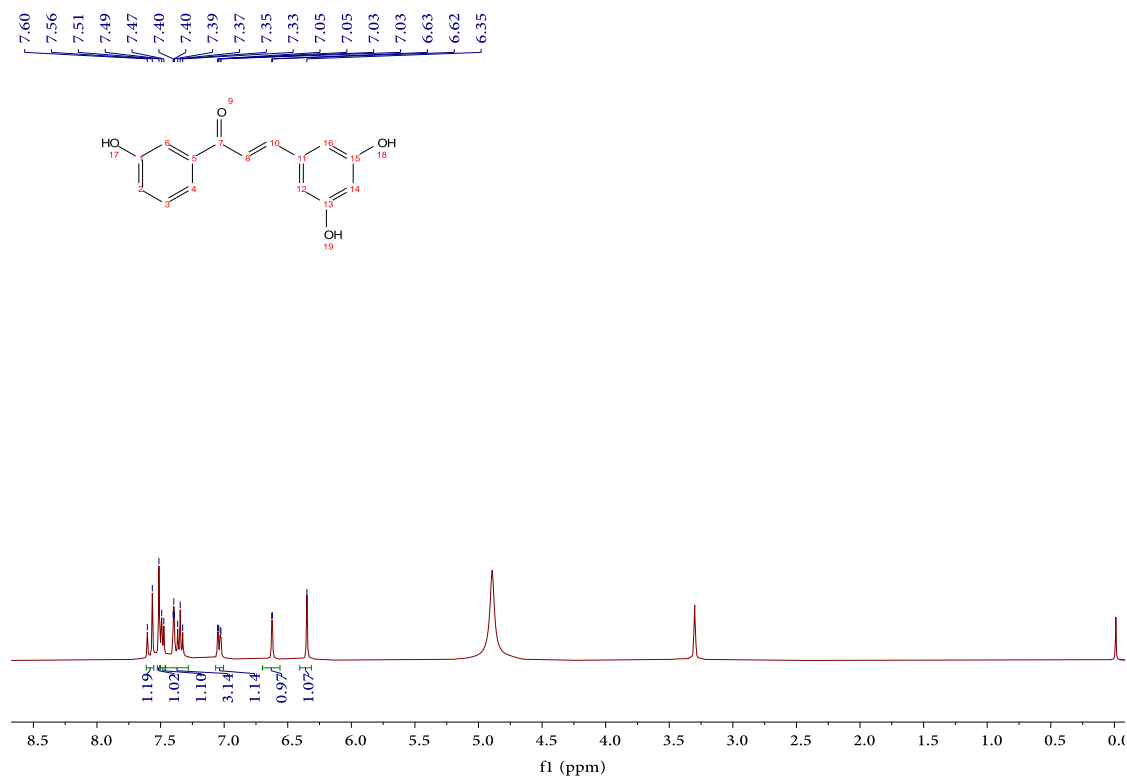
¹³C NMR spectrum of compound **LH-13**

Generic Display Report

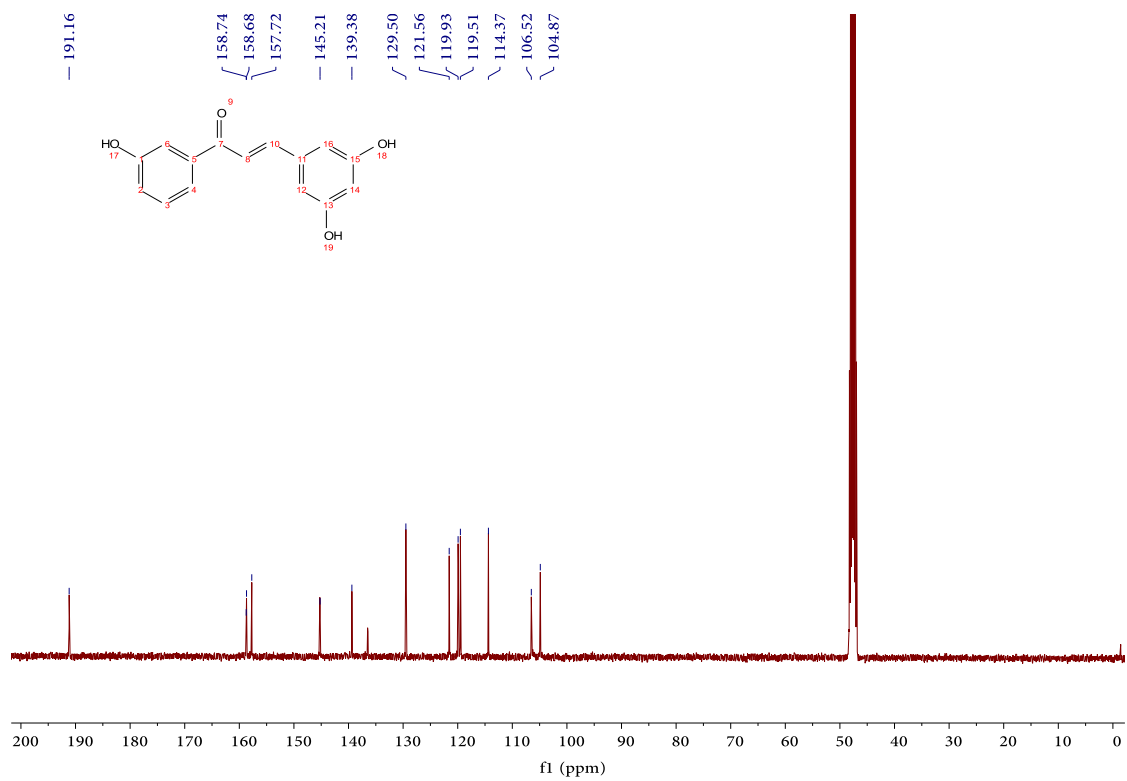
Analysis Info		Acquisition Date	1/11/2021 1:04:07 PM
Analysis Name	D:\Data\yangy\new\LIHU210111_5_23_01_36752.d	Operator	LZU
Method	POS_100-1200_For LC.m	Instrument	micrOTOF
Sample Name	LIHU210111_5		
Comment			



MS (ESI) spectrum of compound **LH-13**



¹H NMR spectrum of compound LH-14



¹³C NMR spectrum of compound LH-14

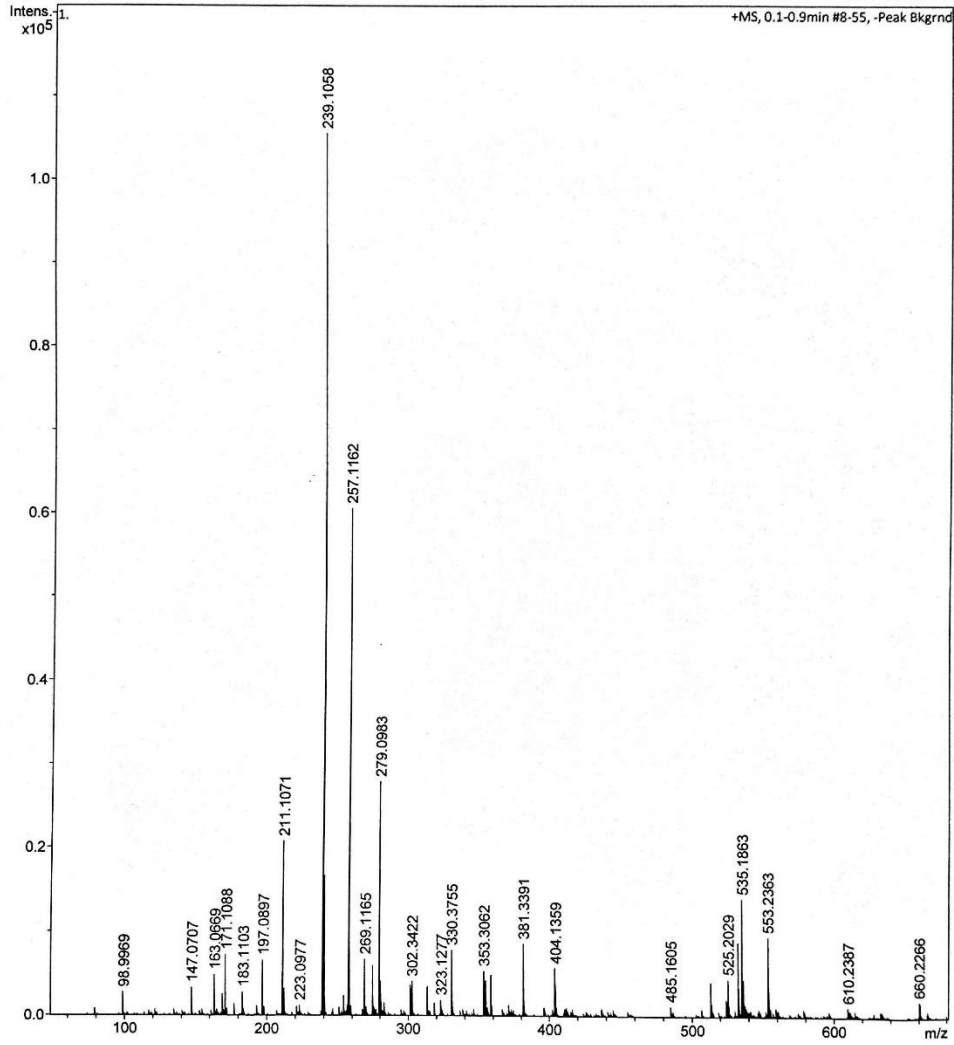
Generic Display Report

Analysis Info

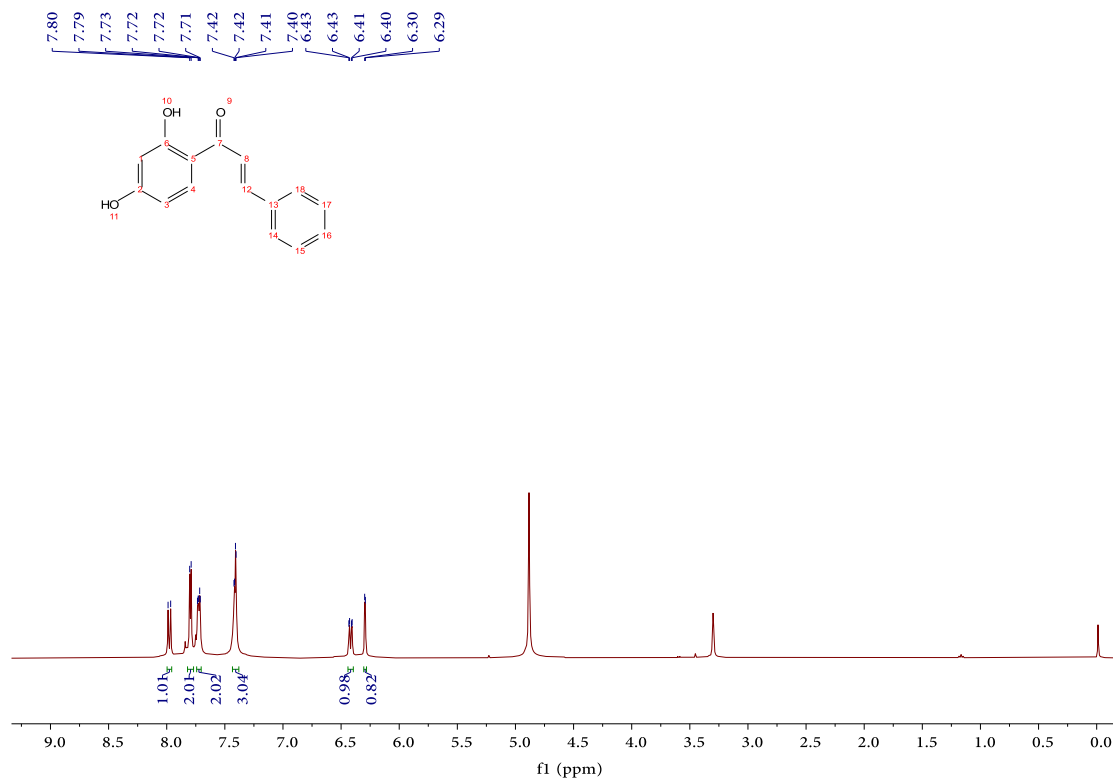
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Method POS_100-1200_For LC.m
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Comment

Acquisition Date 1/11/2021 12:57:59 PM

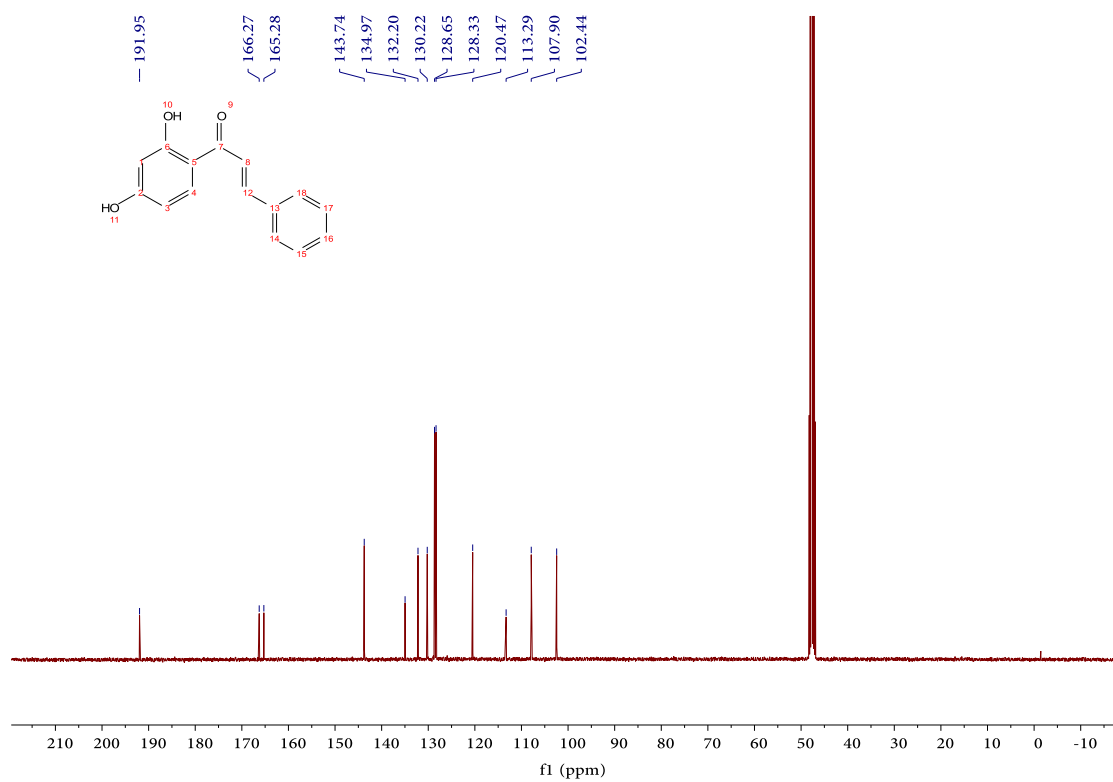
Operator LZU
Instrument micrOTOF



MS (ESI) spectrum of compound **LH-14**



¹H NMR spectrum of compound LH-15



¹³C NMR spectrum of compound LH-15

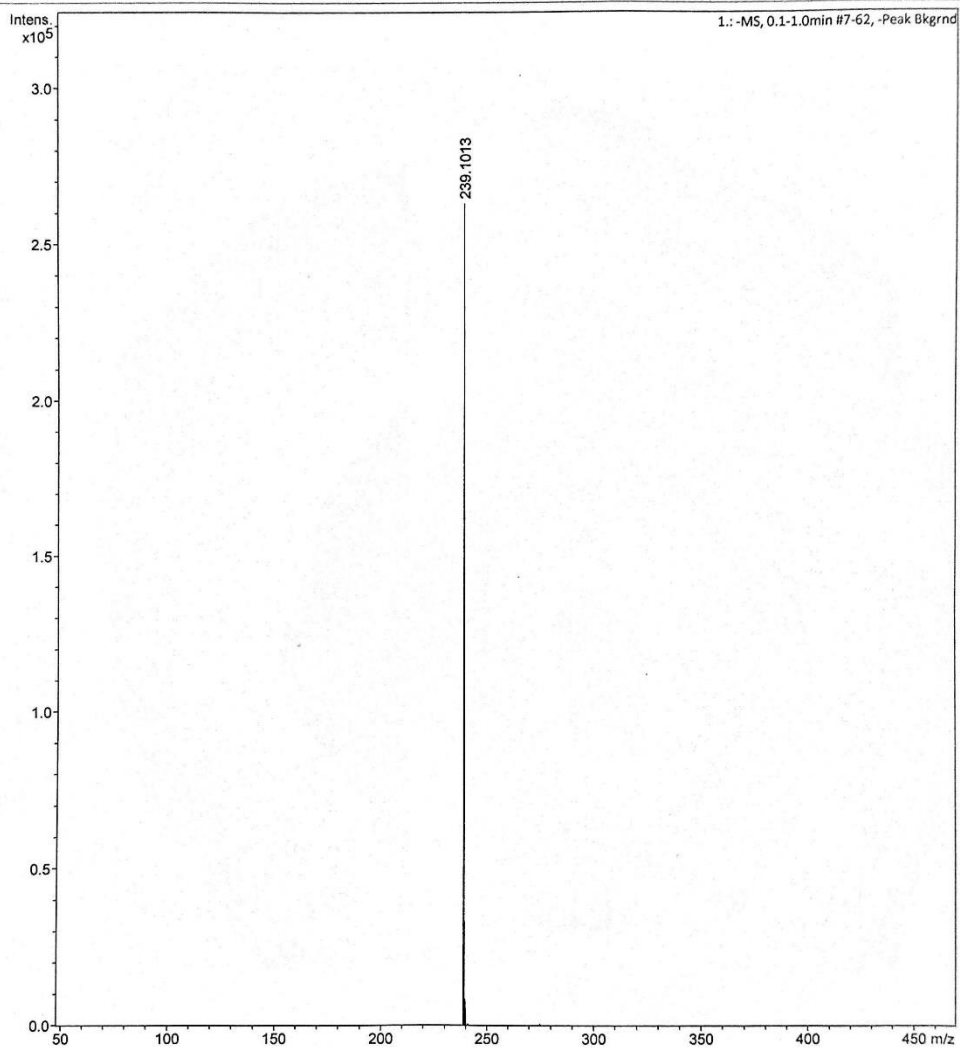
Generic Display Report

Analysis Info

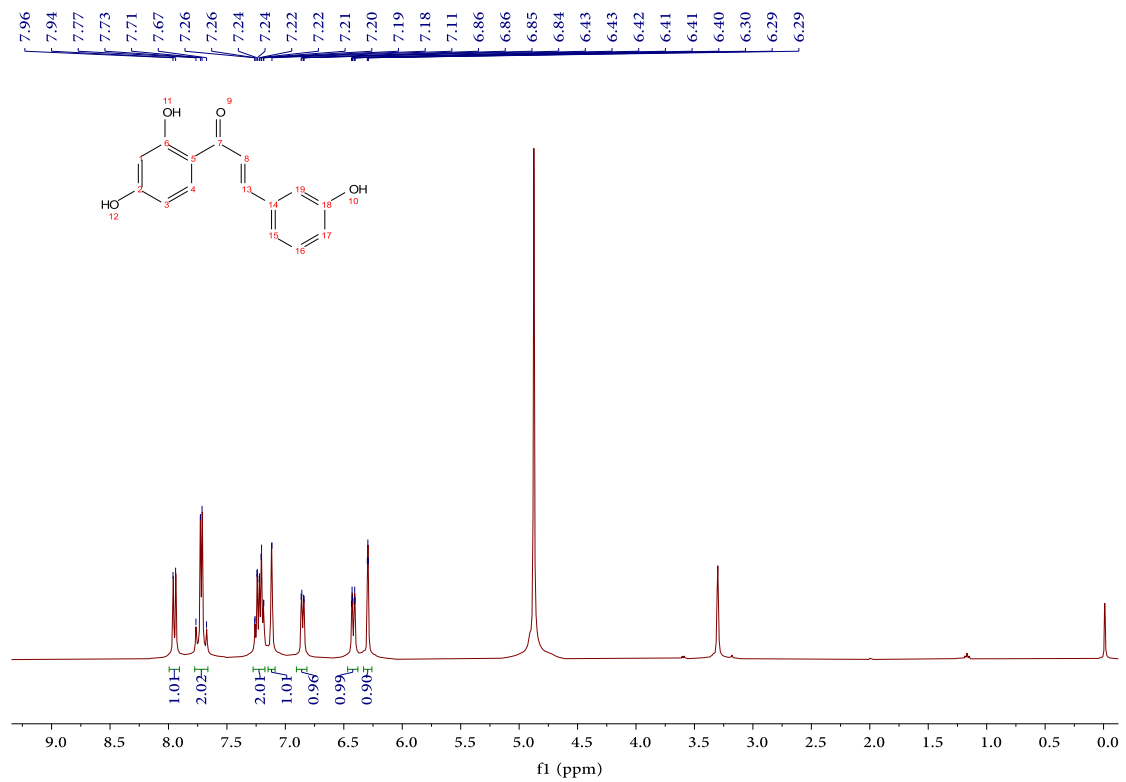
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Comment

Acquisition Date 9/21/2020 1:51:18 PM

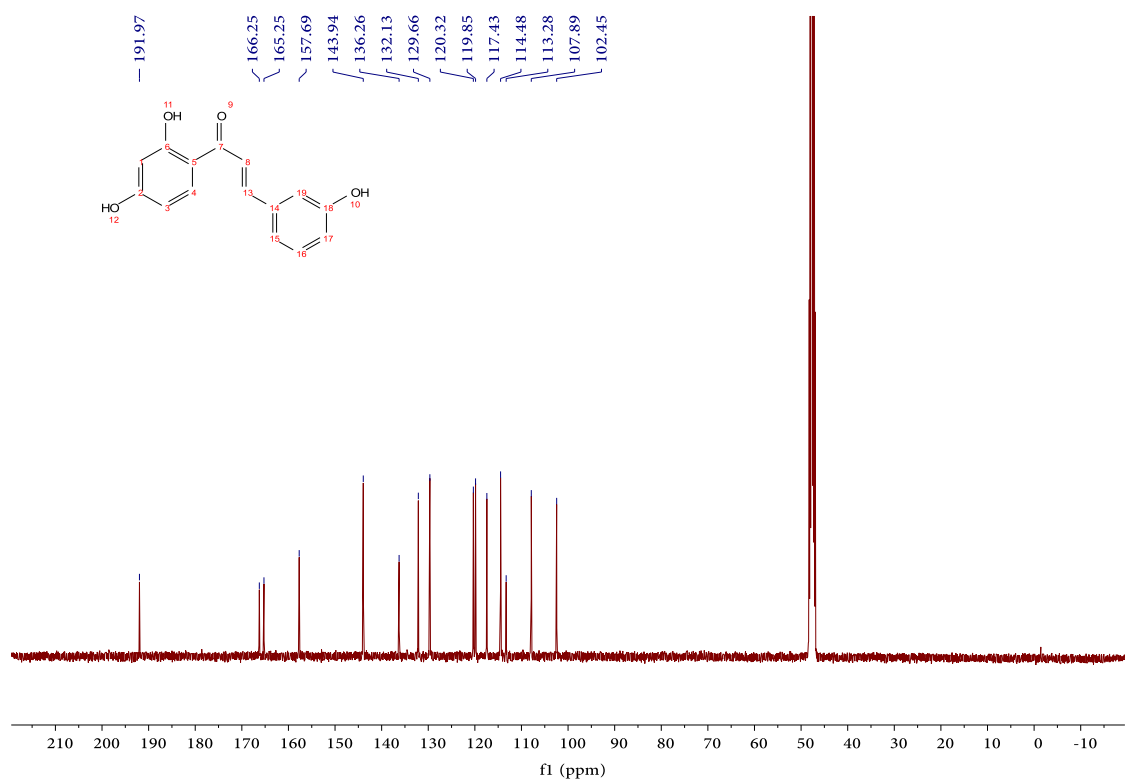
Operator LZU
Instrument micrOTOF



MS (ESI) spectrum of compound **LH-15**



¹H NMR spectrum of compound LH-16



¹³C NMR spectrum of compound LH-16

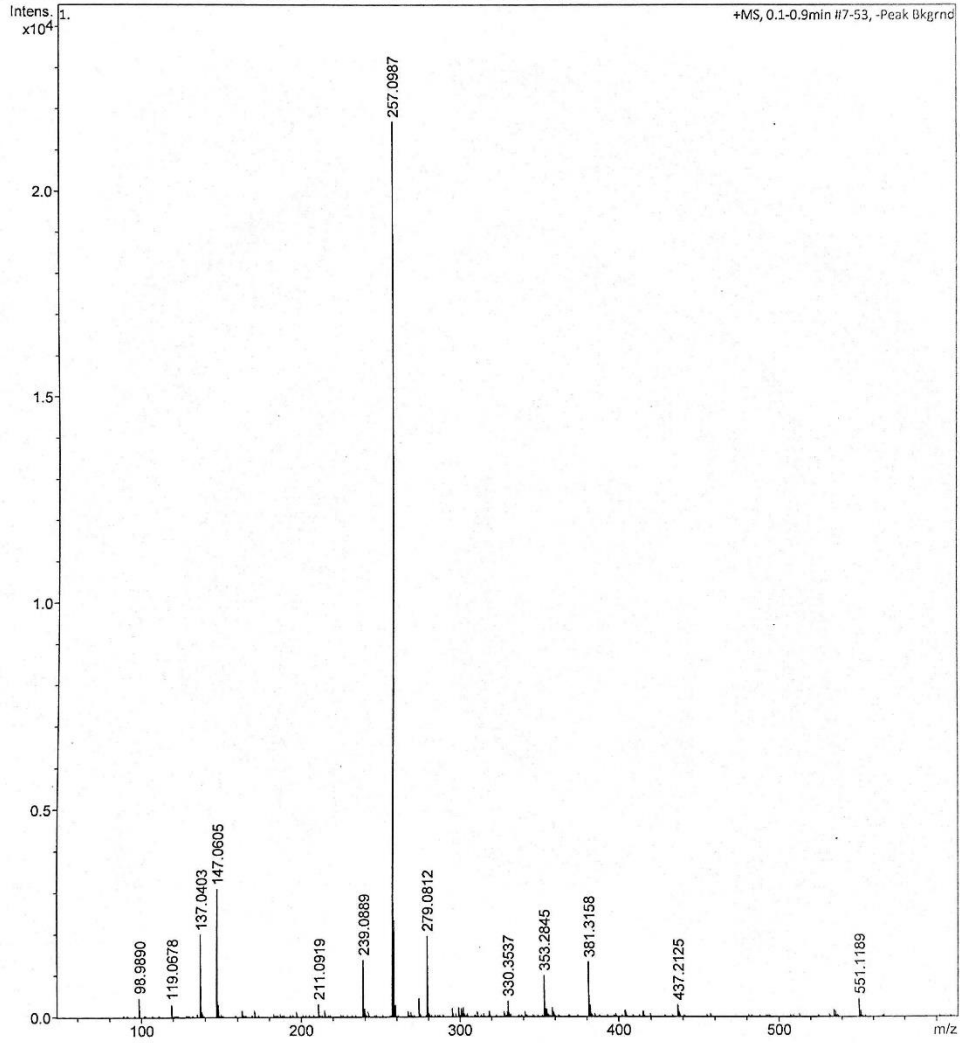
Generic Display Report

Analysis Info

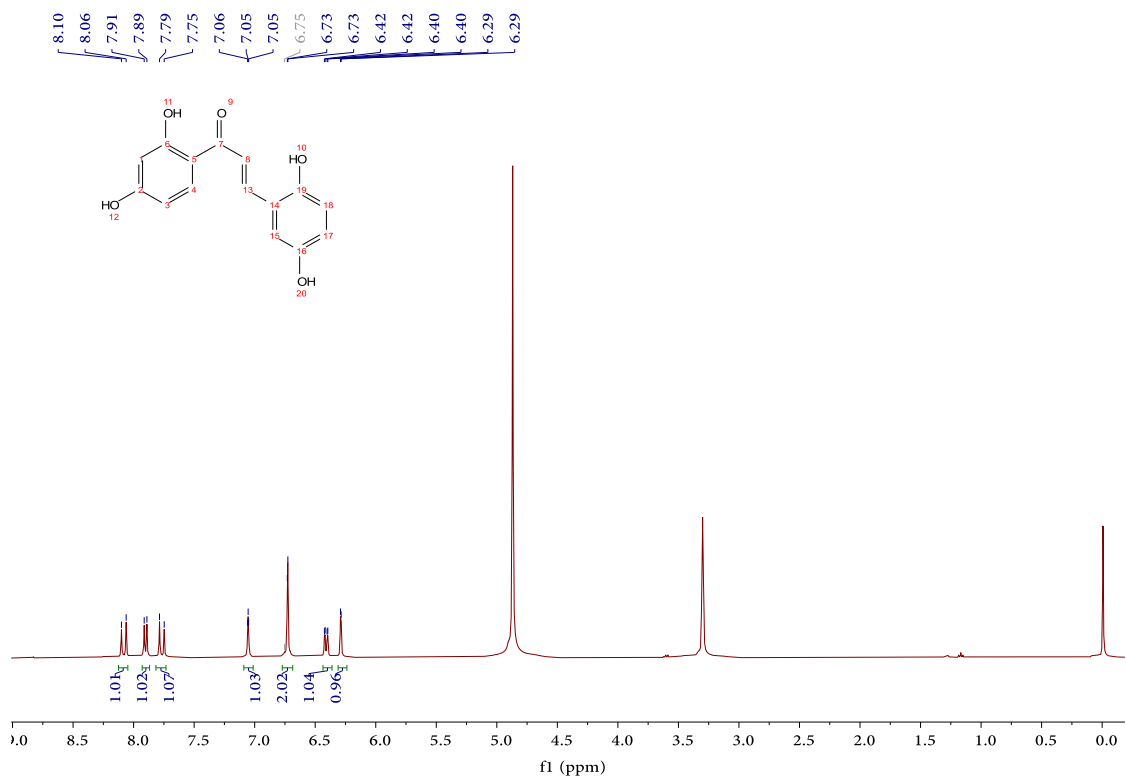
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Acquisition Date 12/31/2020 12:47:33 PM

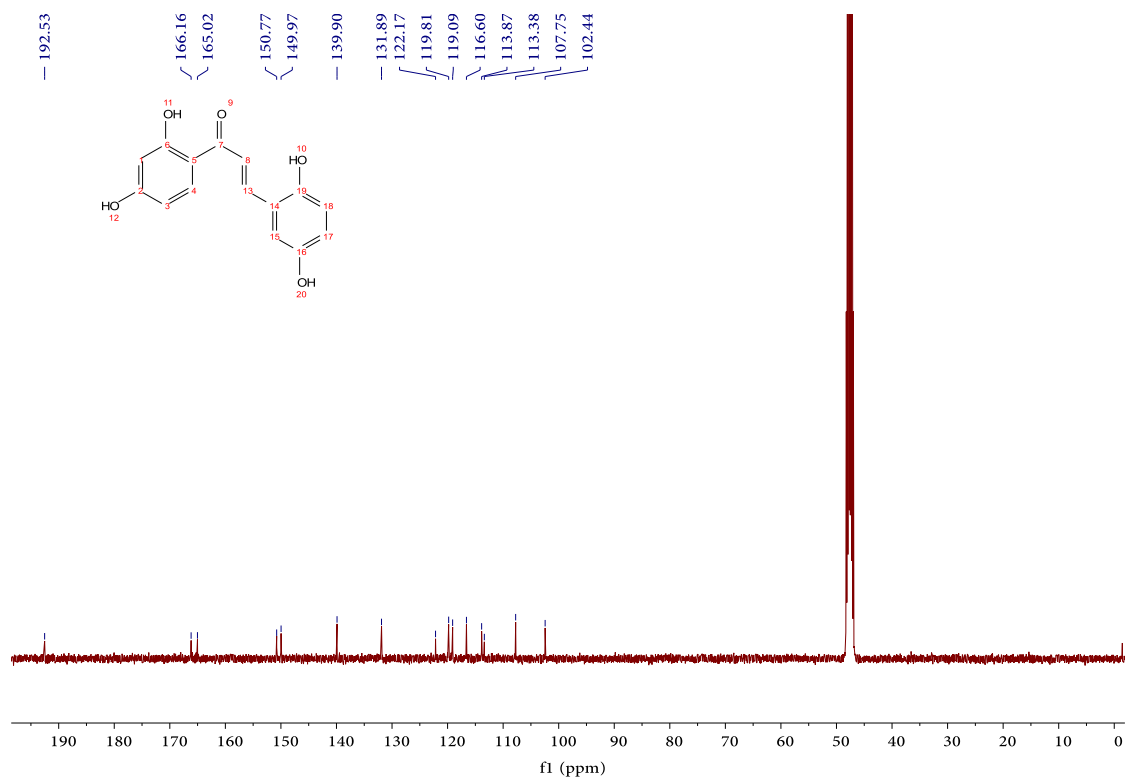
Operator LZU
Instrument micrOTOF



MS (ESI) spectrum of compound **LH-16**



¹H NMR spectrum of compound LH-17



¹³C NMR spectrum of compound LH-17

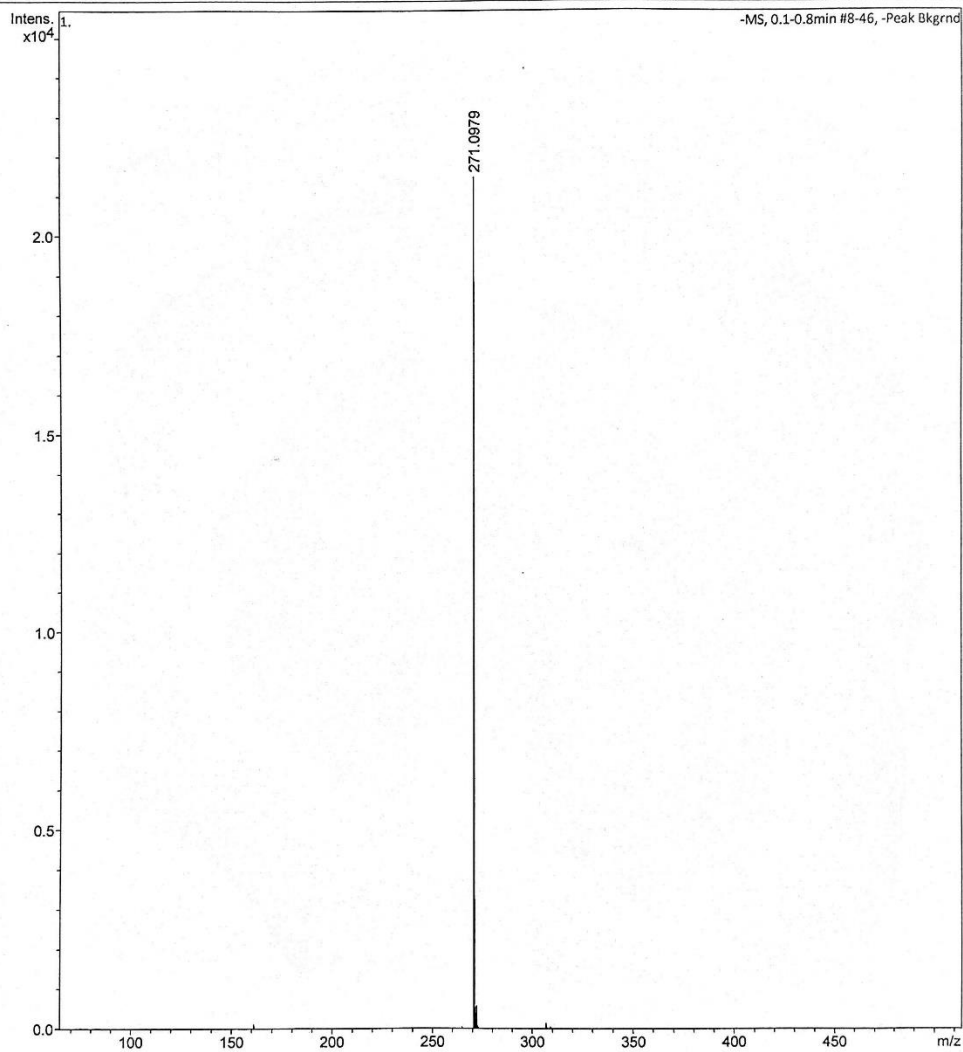
Generic Display Report

Analysis Info

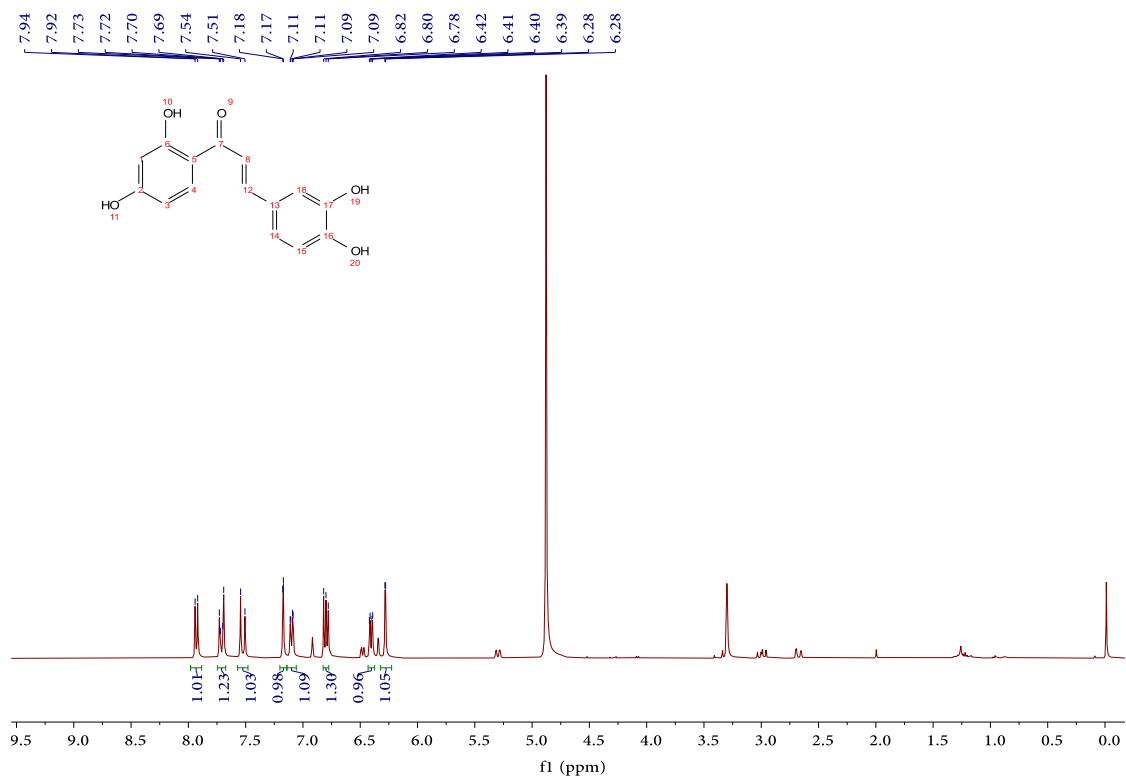
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Sample Name LIHU200907_2
Comment

Acquisition Date 9/7/2020 4:04:45 PM

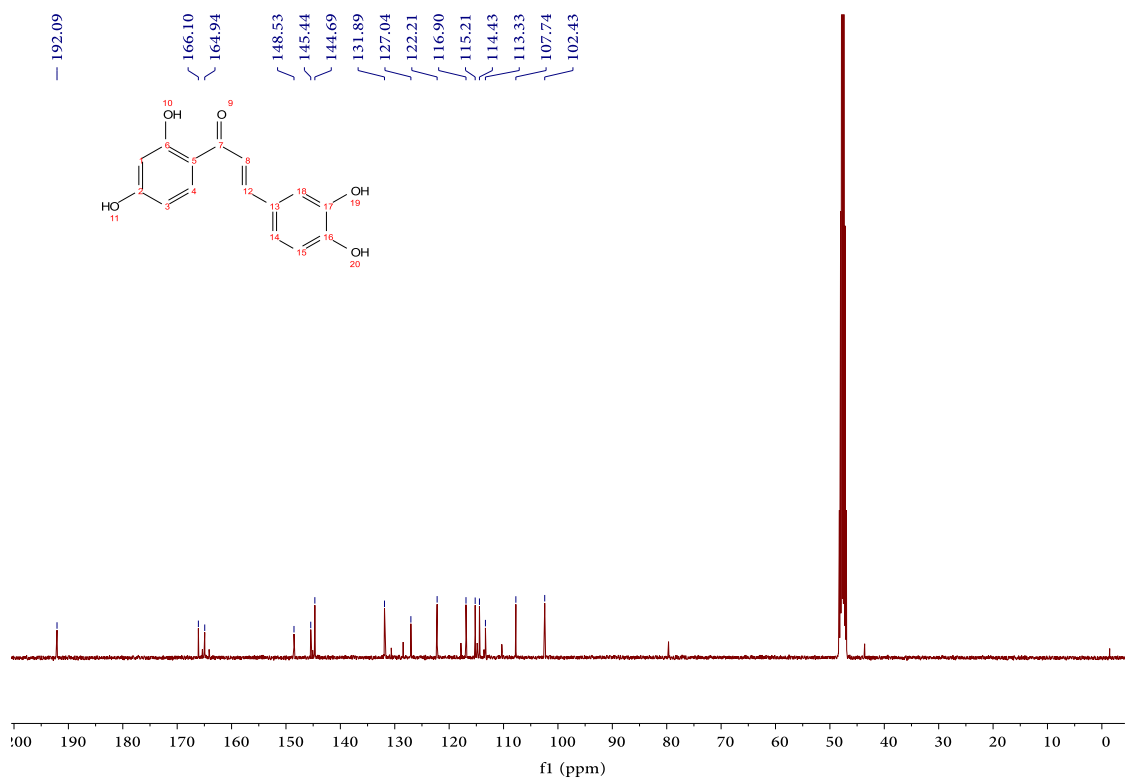
Operator LZU
Instrument micrOTOF



MS (ESI) spectrum of compound **LH-17**



$^1\text{H NMR}$ spectrum of compound LH-18



$^{13}\text{C NMR}$ spectrum of compound LH-18

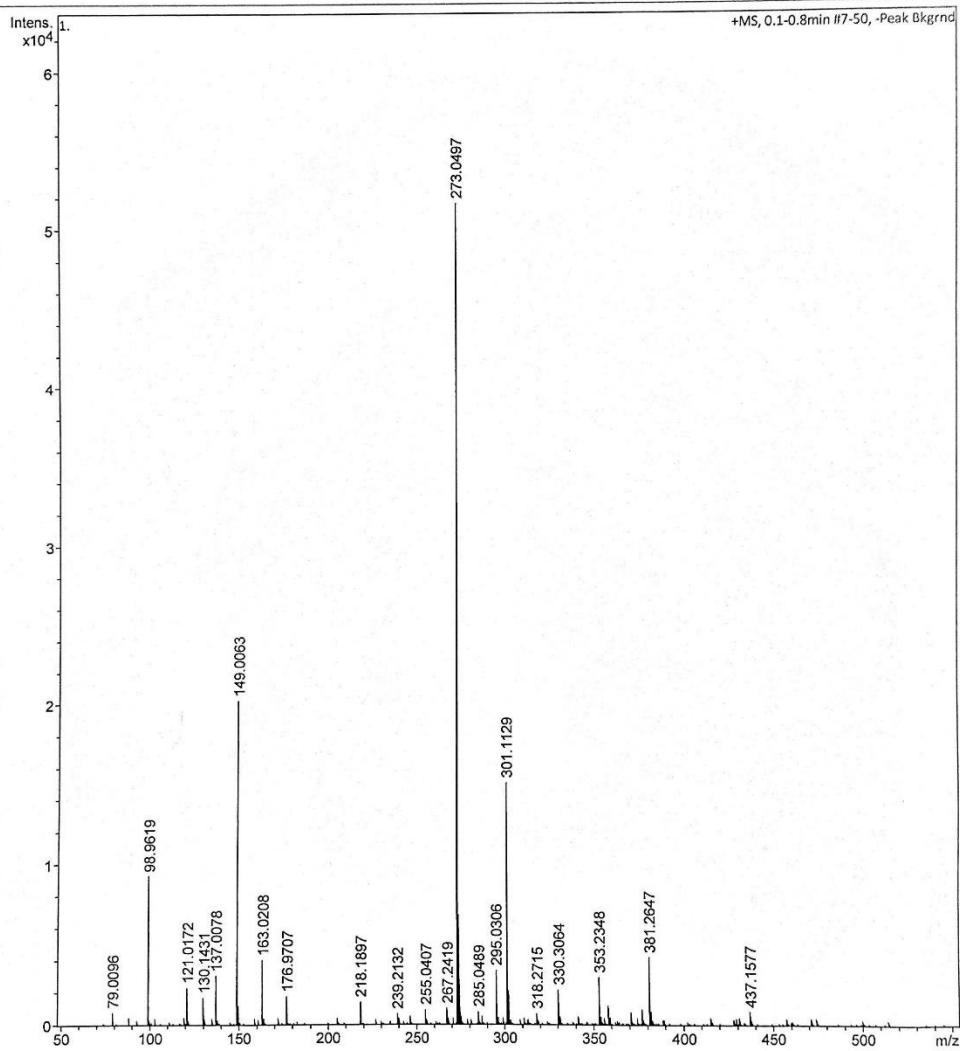
Generic Display Report

Analysis Info

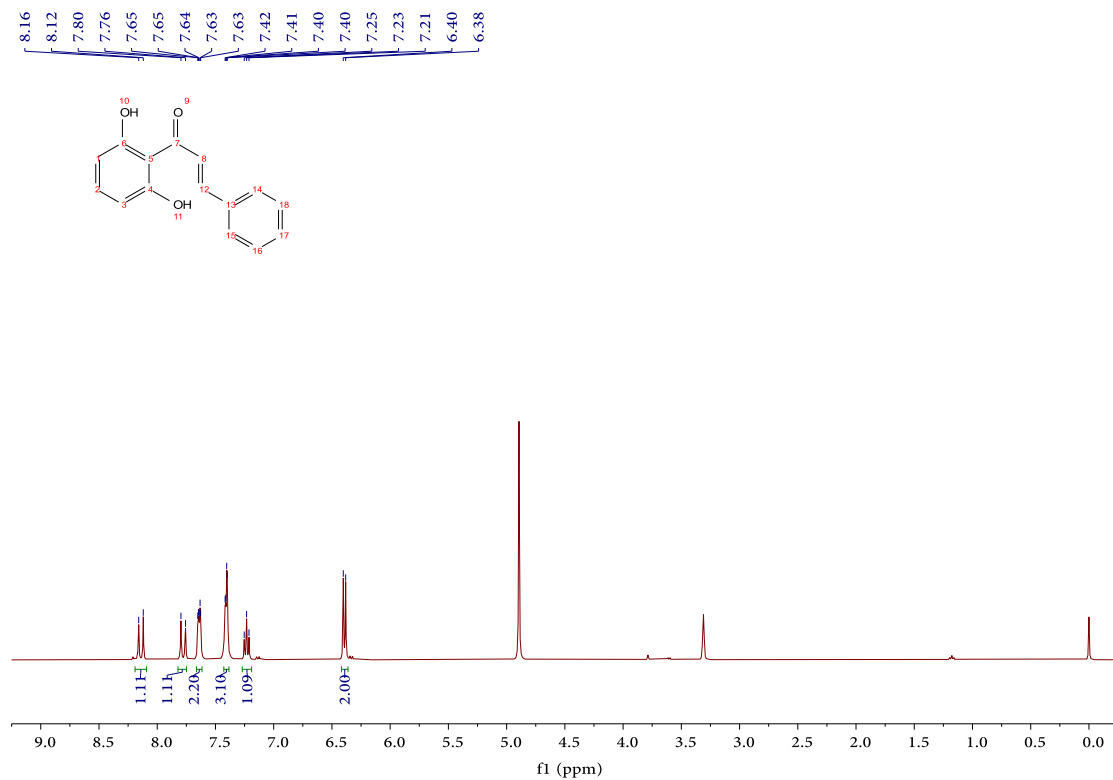
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Sample Name LIHU200831
Comment

Acquisition Date 8/31/2020 1:08:04 PM

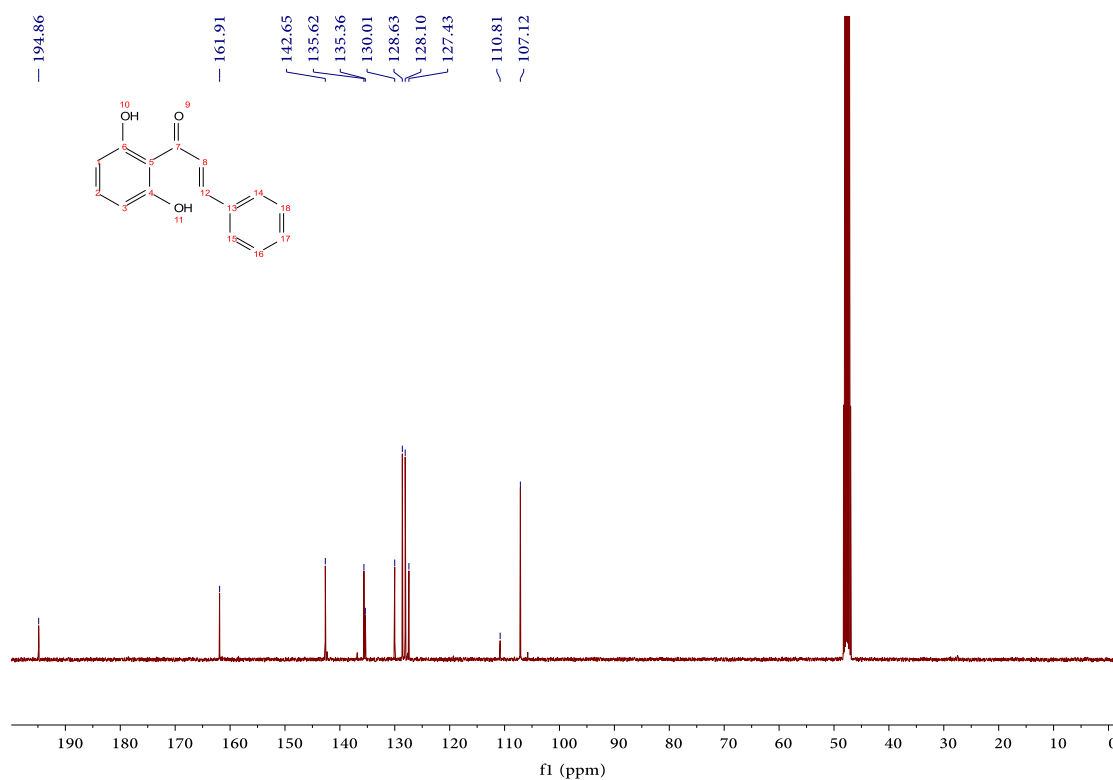
Operator LZU
Instrument micrOTOF



MS (ESI) spectrum of compound **LH-18**



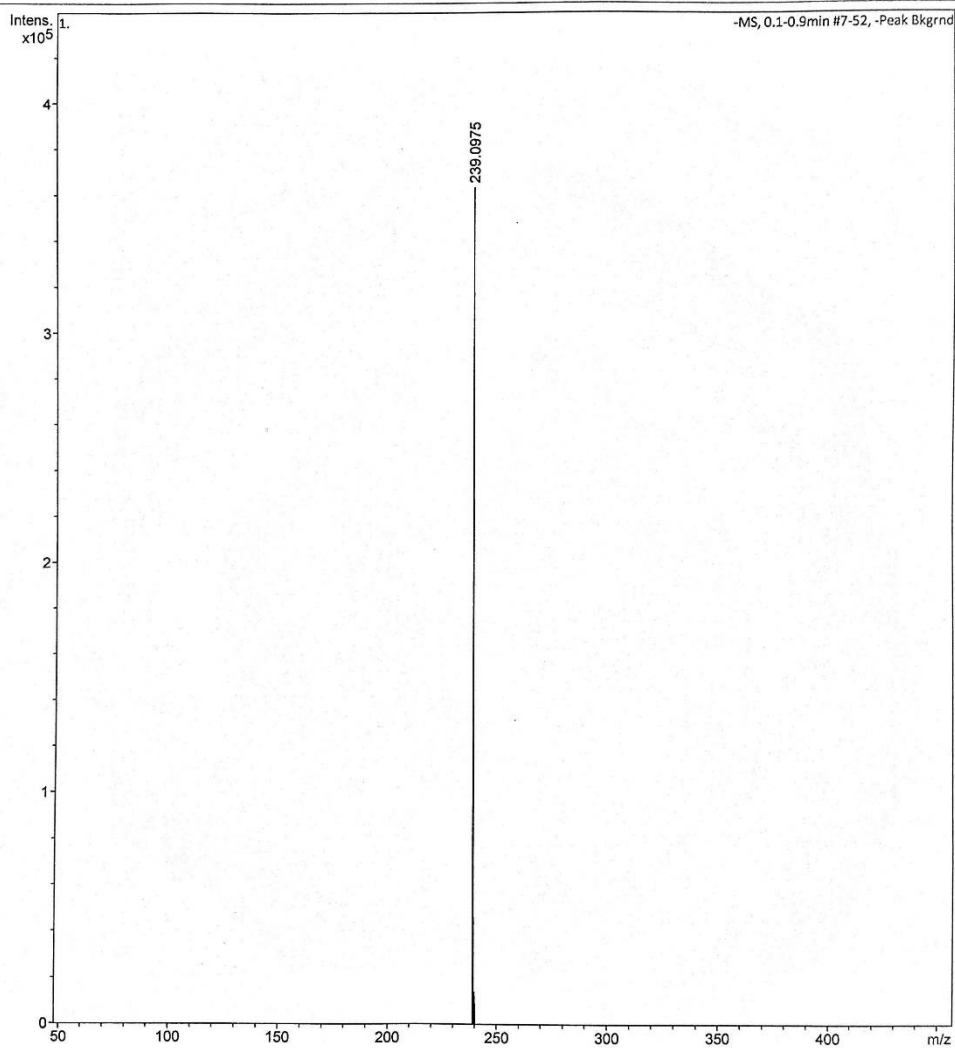
¹H NMR spectrum of compound LH-19



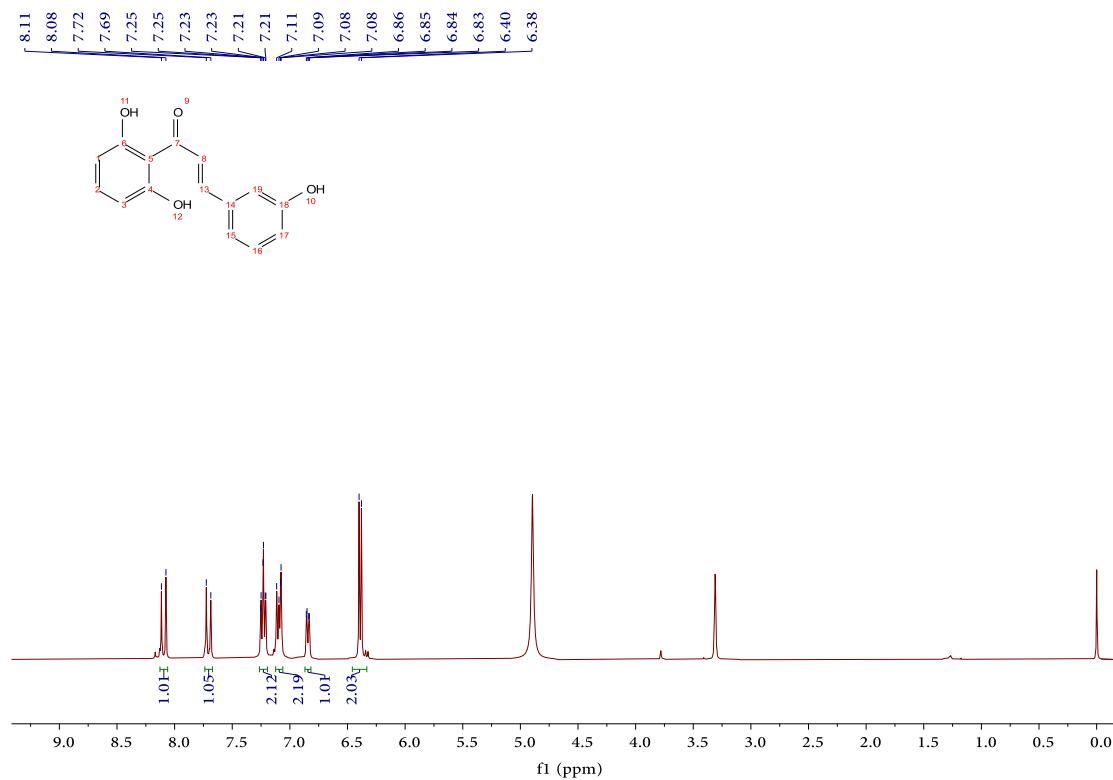
¹³C NMR spectrum of compound LH-19

Generic Display Report

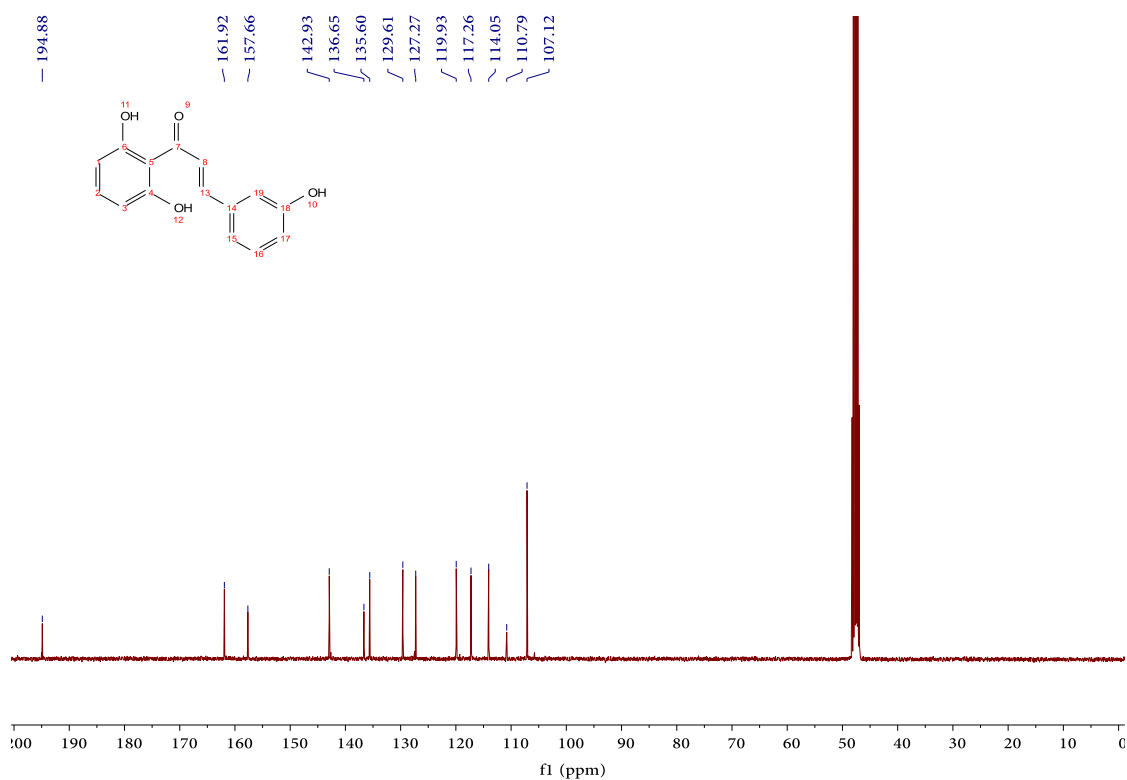
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Analysis Name	D:\Data\yangy\new\LIHU200914_1_34_01_33679.d	Operator	LZU
Method	NEG_100-1200_For LC.m	Instrument	micrOTOF
Sample Name	LIHU200914_1		
Comment			



MS (ESI) spectrum of compound **LH-19**



$^1\text{H NMR}$ spectrum of compound LH-20



$^{13}\text{C NMR}$ spectrum of compound LH-20

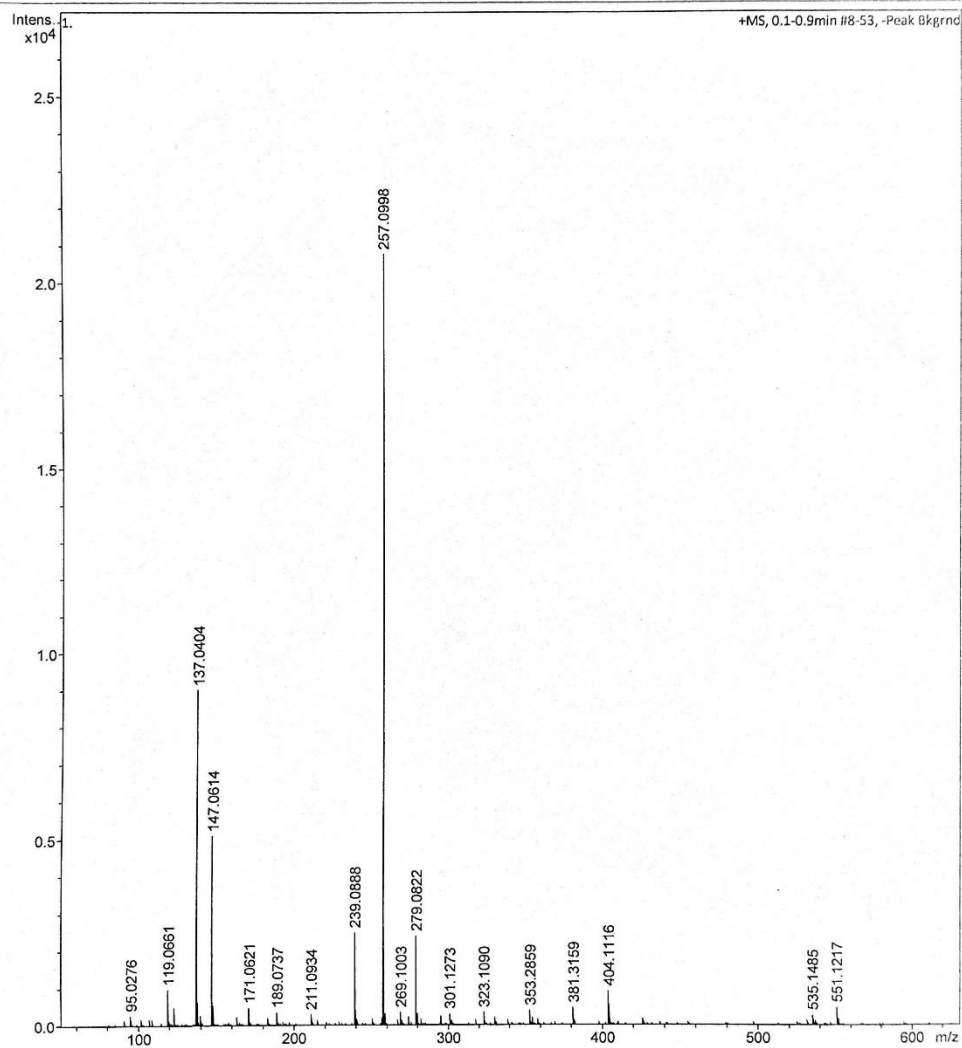
Generic Display Report

Analysis Info

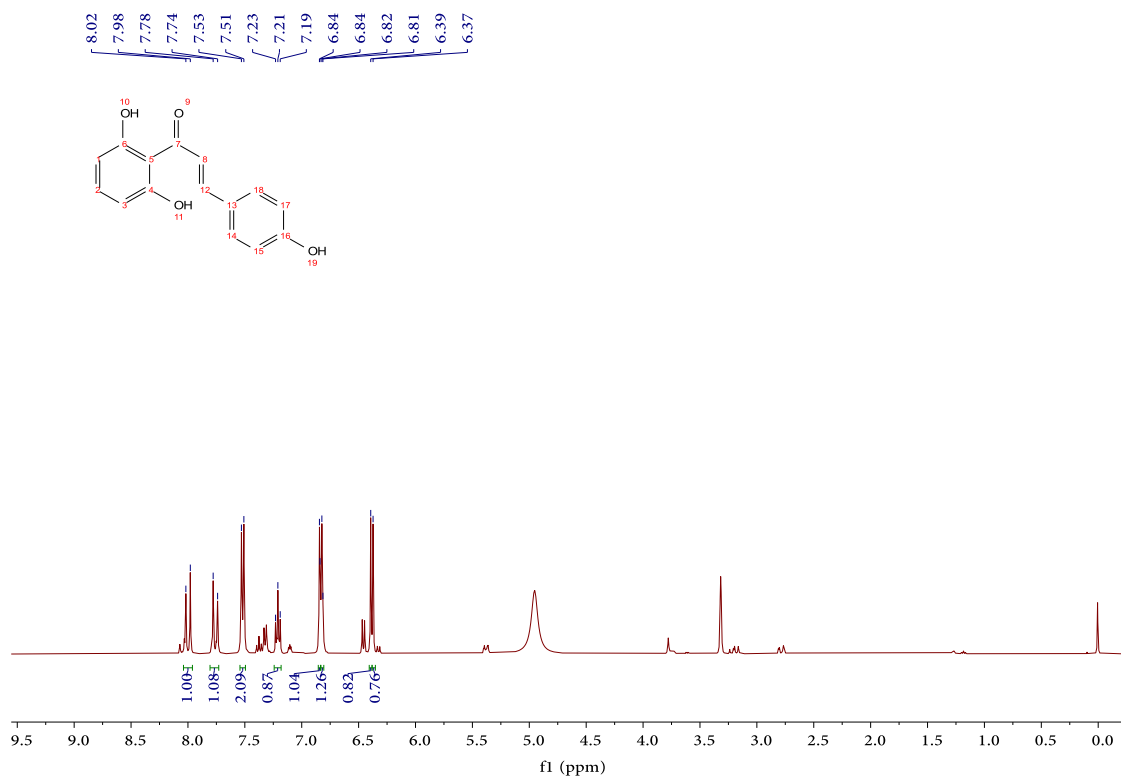
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Comment

Acquisition Date 12/31/2020 12:50:38 PM

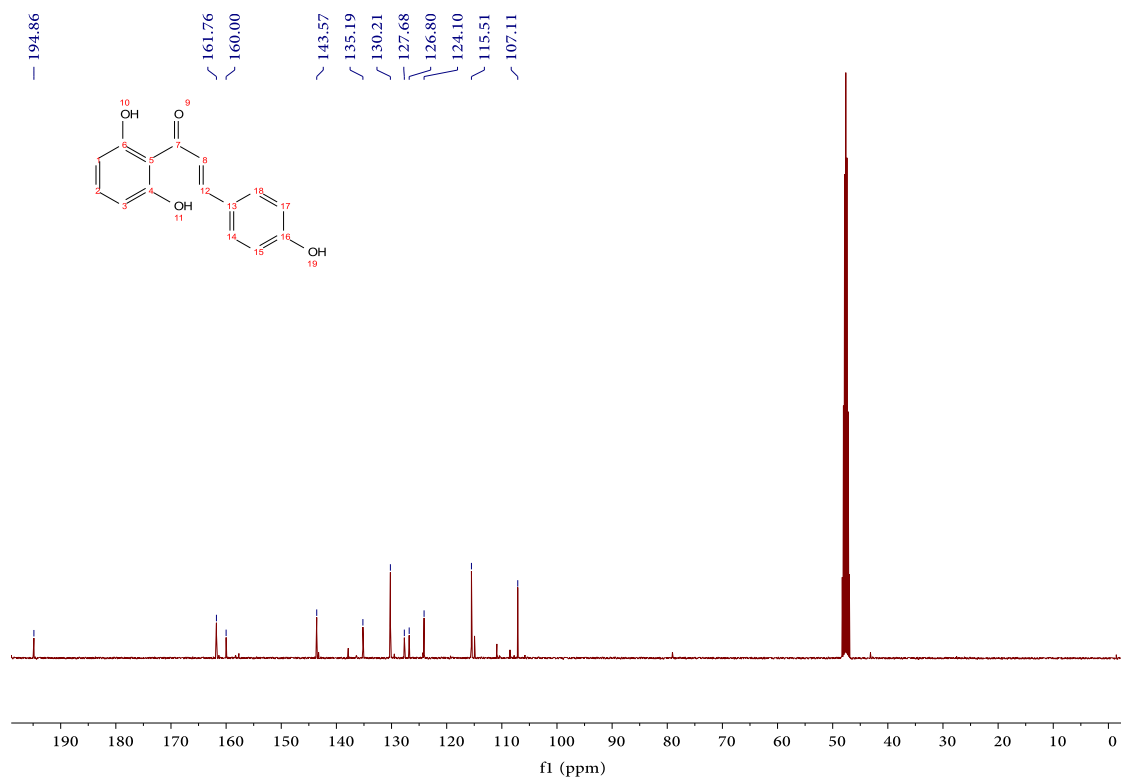
Operator LZU
Instrument micrOTOF



MS (ESI) spectrum of compound **LH-20**



$^1\text{H NMR}$ spectrum of compound LH-21



$^{13}\text{C NMR}$ spectrum of compound LH-21

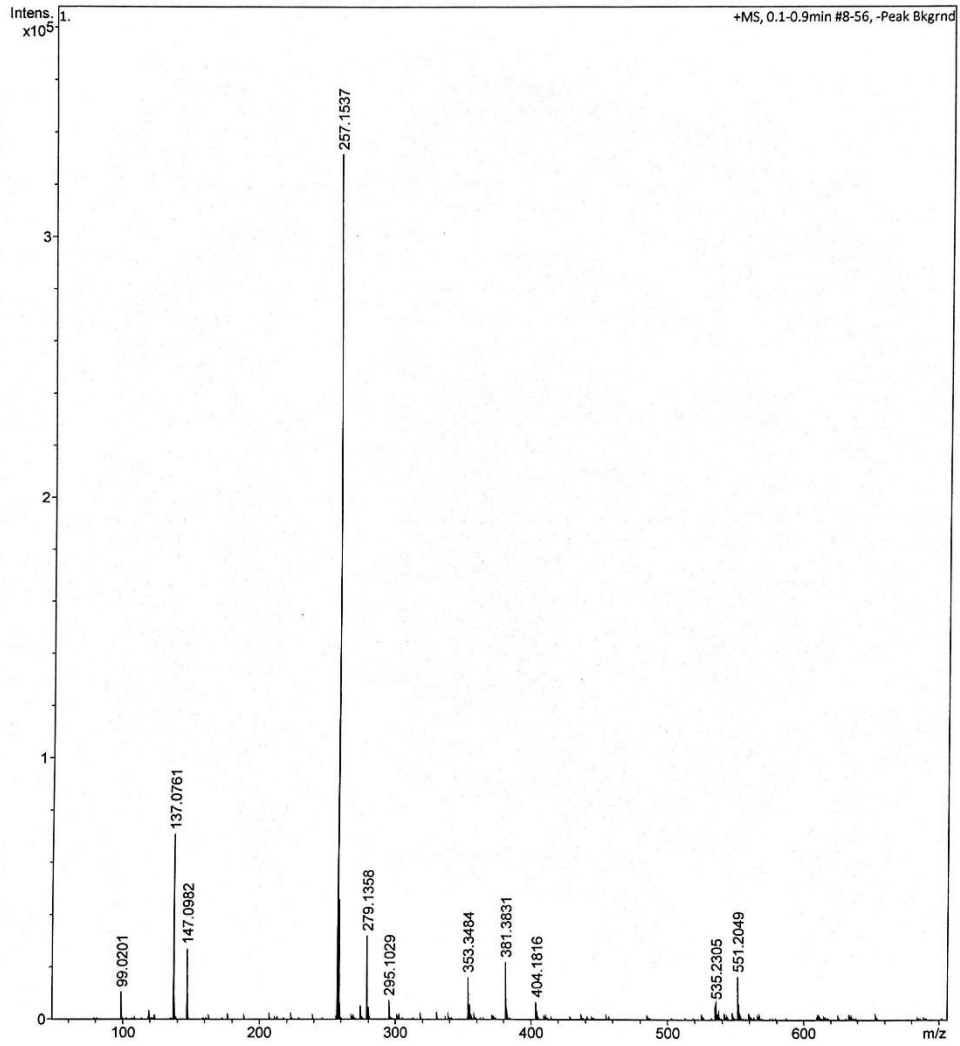
Generic Display Report

Analysis Info

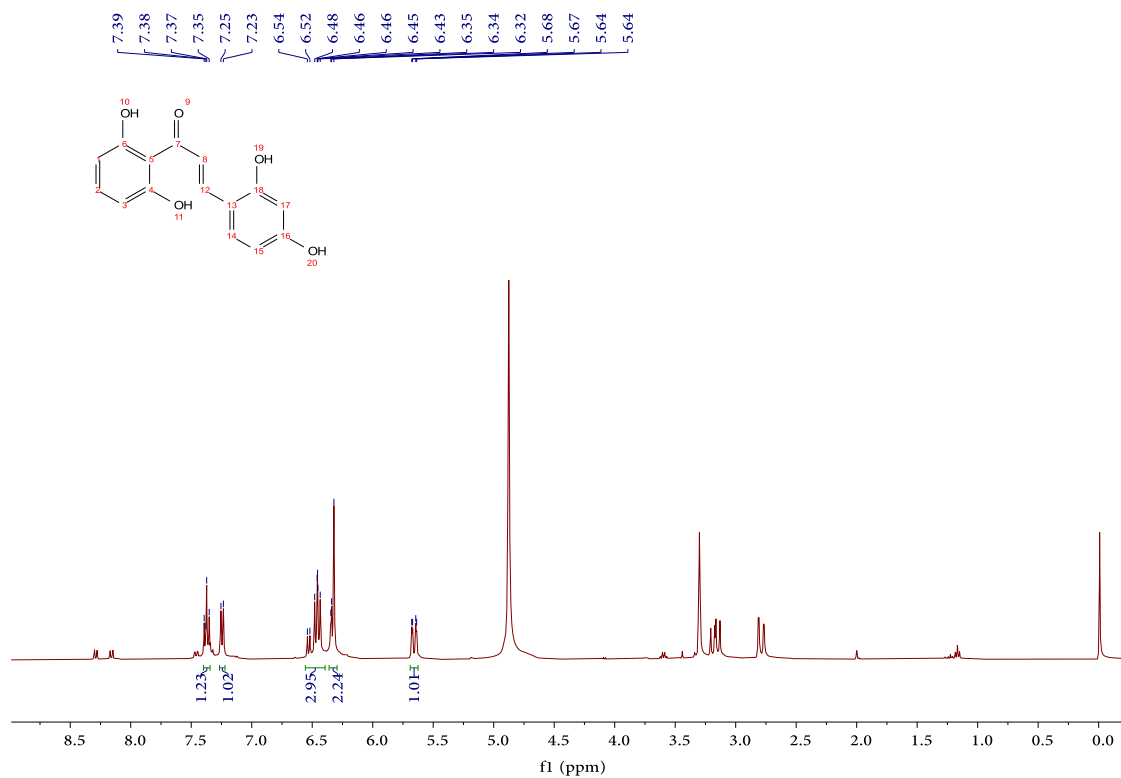
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Method POS_100-1200_For LC.m
Sample Name LIHU210112_15
Comment

Acquisition Date 1/12/2021 1:11:03 PM

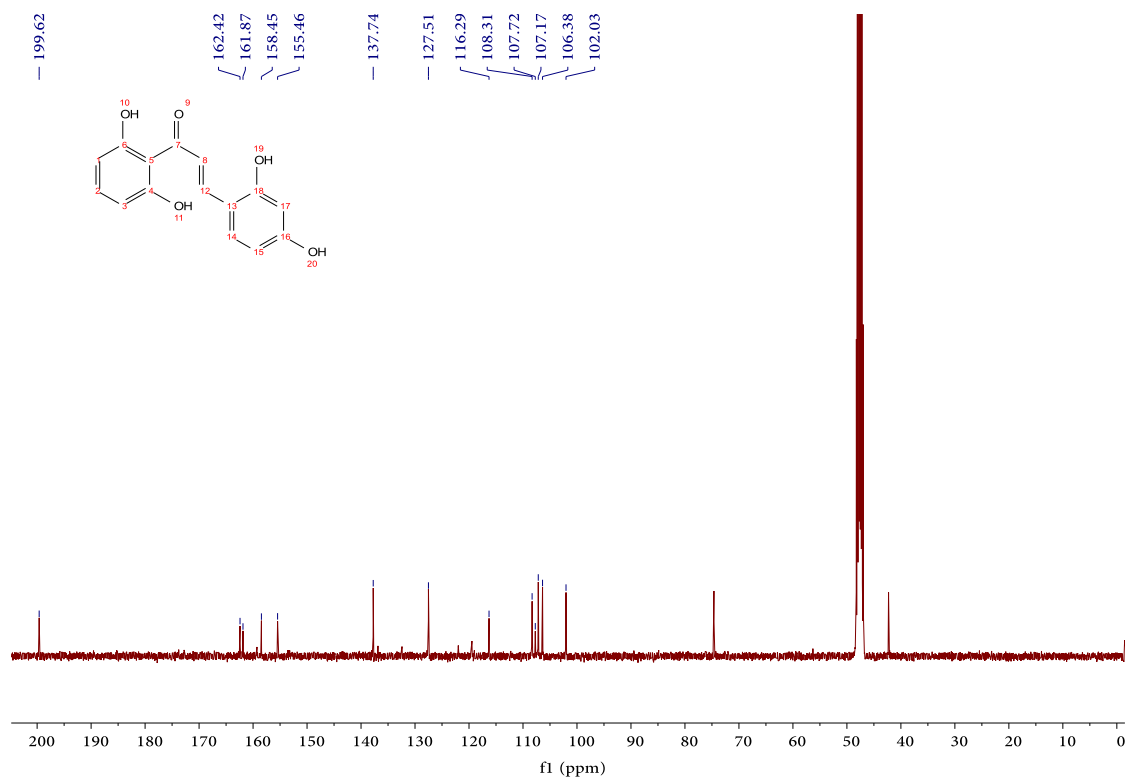
Operator LZU
Instrument micrOTOF



MS (ESI) spectrum of compound **LH-21**



¹H NMR spectrum of compound LH-22



¹³C NMR spectrum of compound LH-22

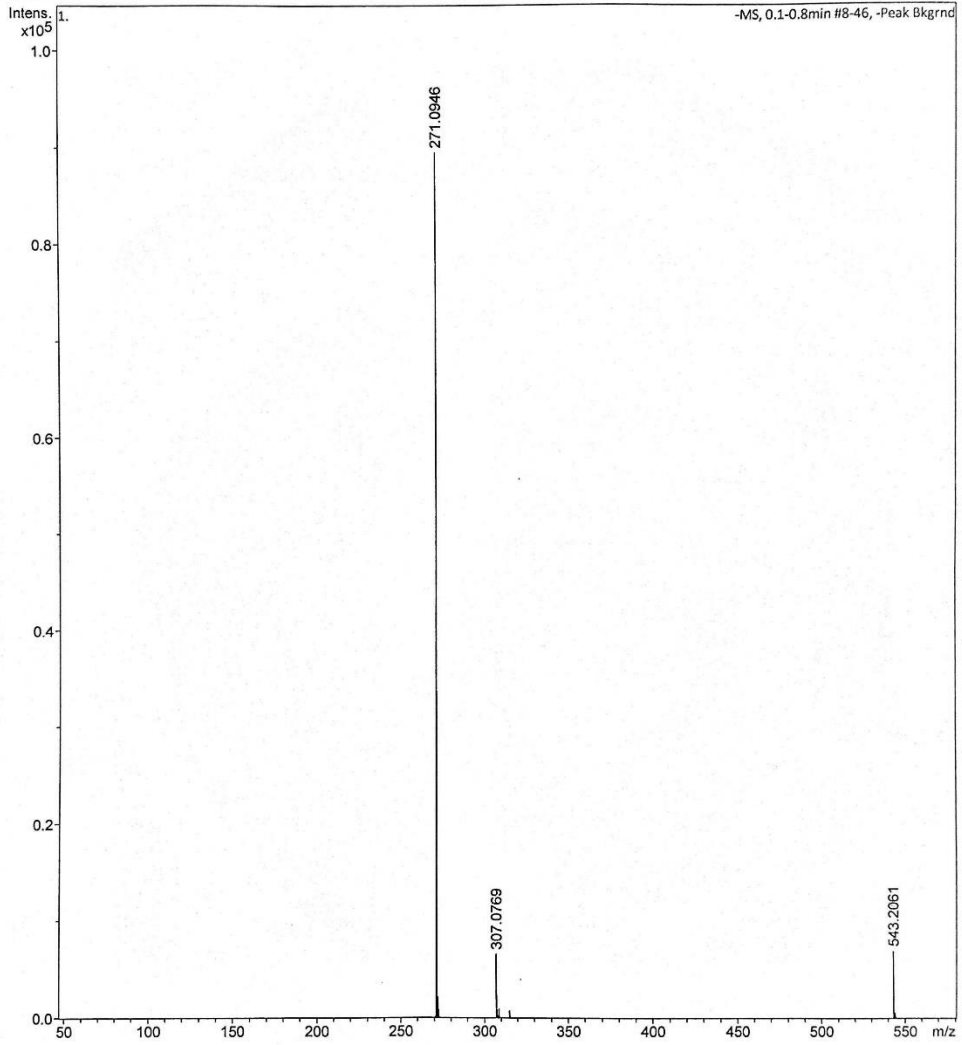
Generic Display Report

Analysis Info

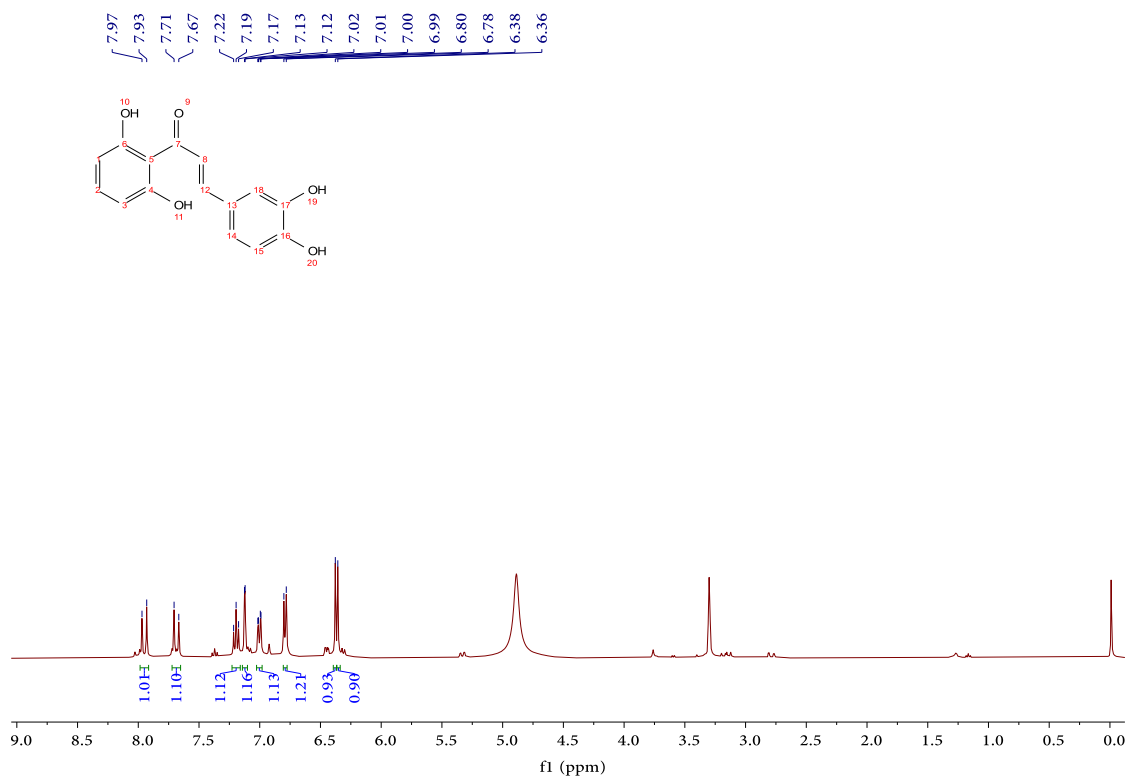
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Acquisition Date 9/7/2020 4:10:55 PM

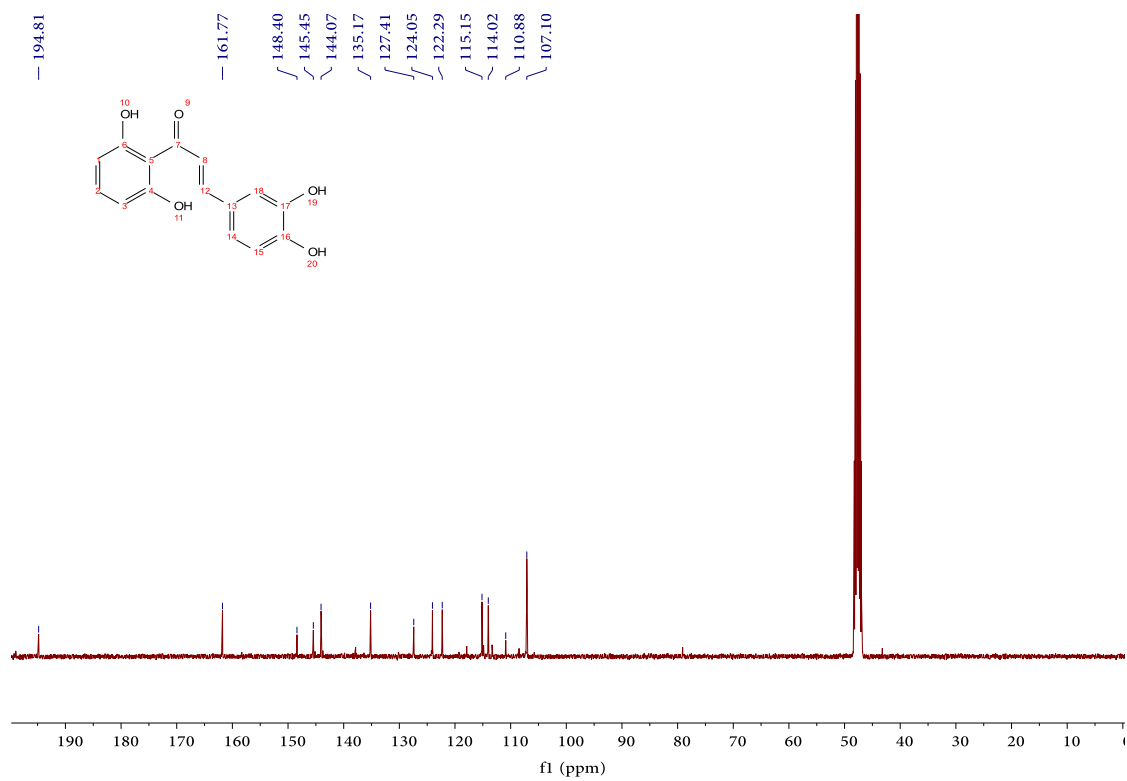
Operator LZU
Instrument micrOTOF



MS (ESI) spectrum of compound **LH-22**



^1H NMR spectrum of compound LH-23



^{13}C NMR spectrum of compound LH-23

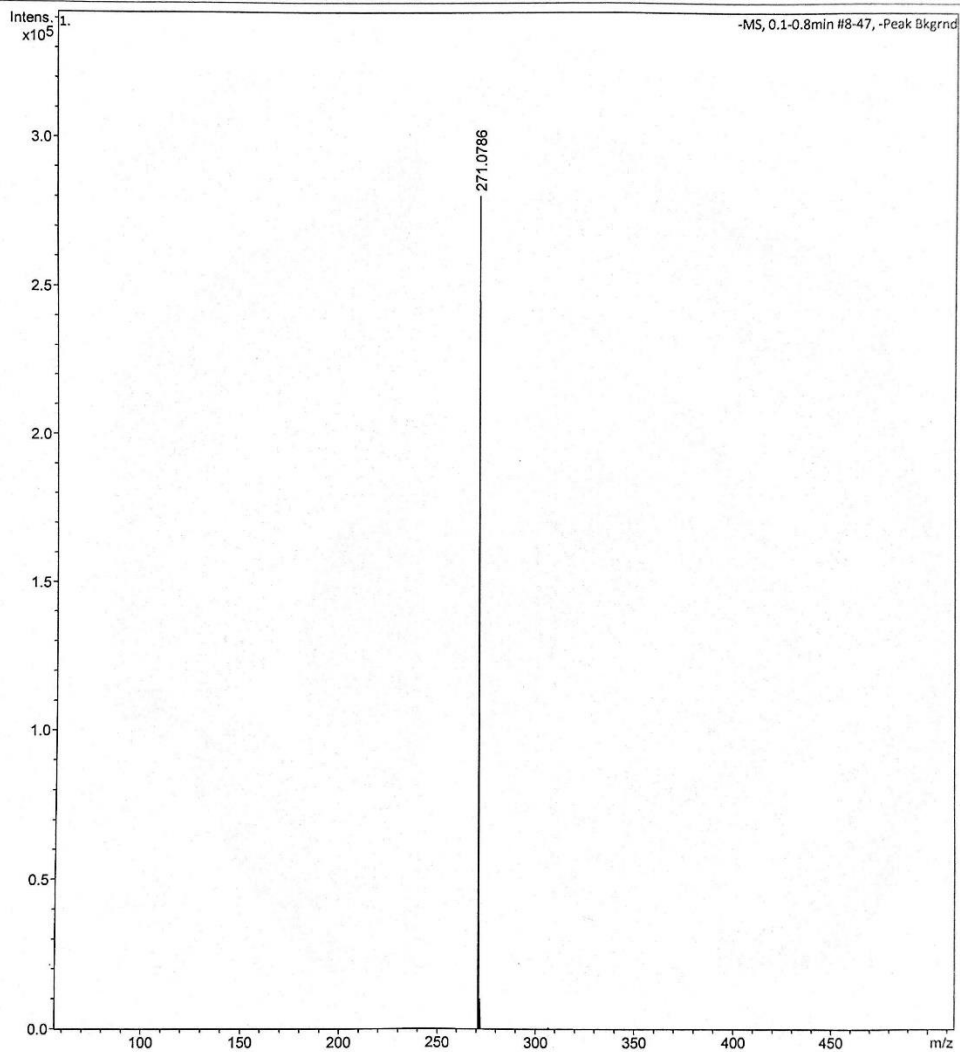
Generic Display Report

Analysis Info

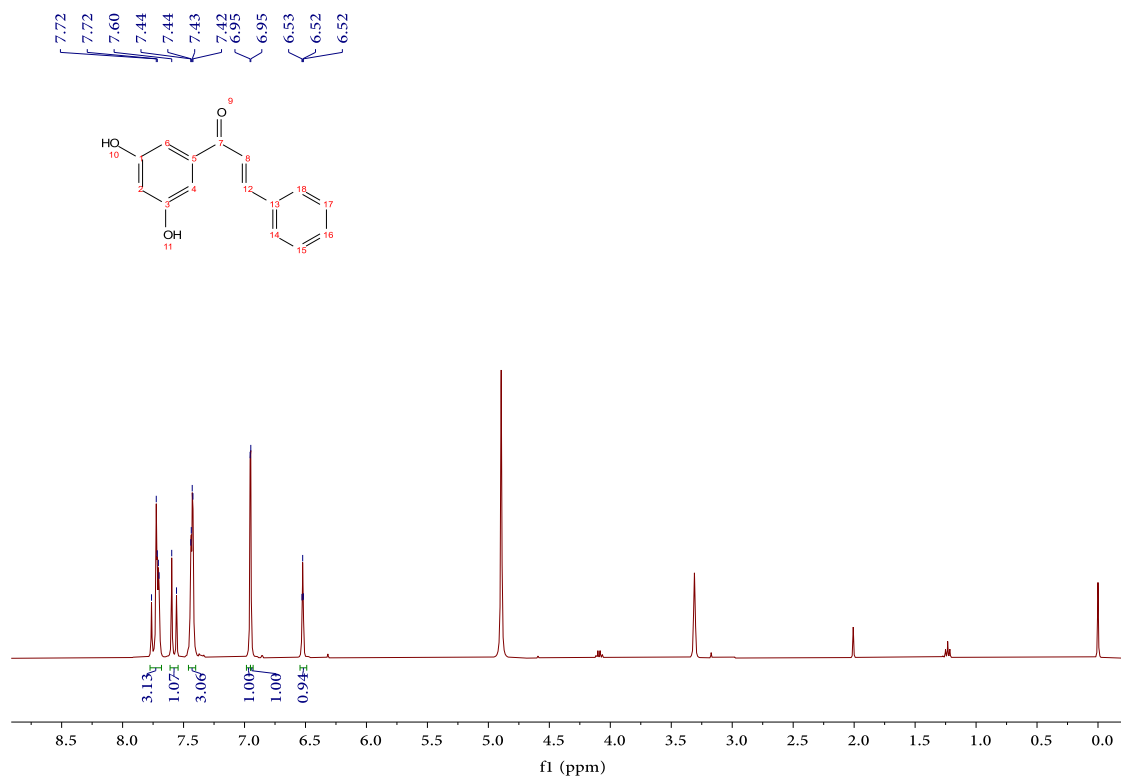
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Method NEG_100-1200_For LC.m
Sample Name LIHU200915_1
Comment

Acquisition Date 9/15/2020 2:04:34 PM

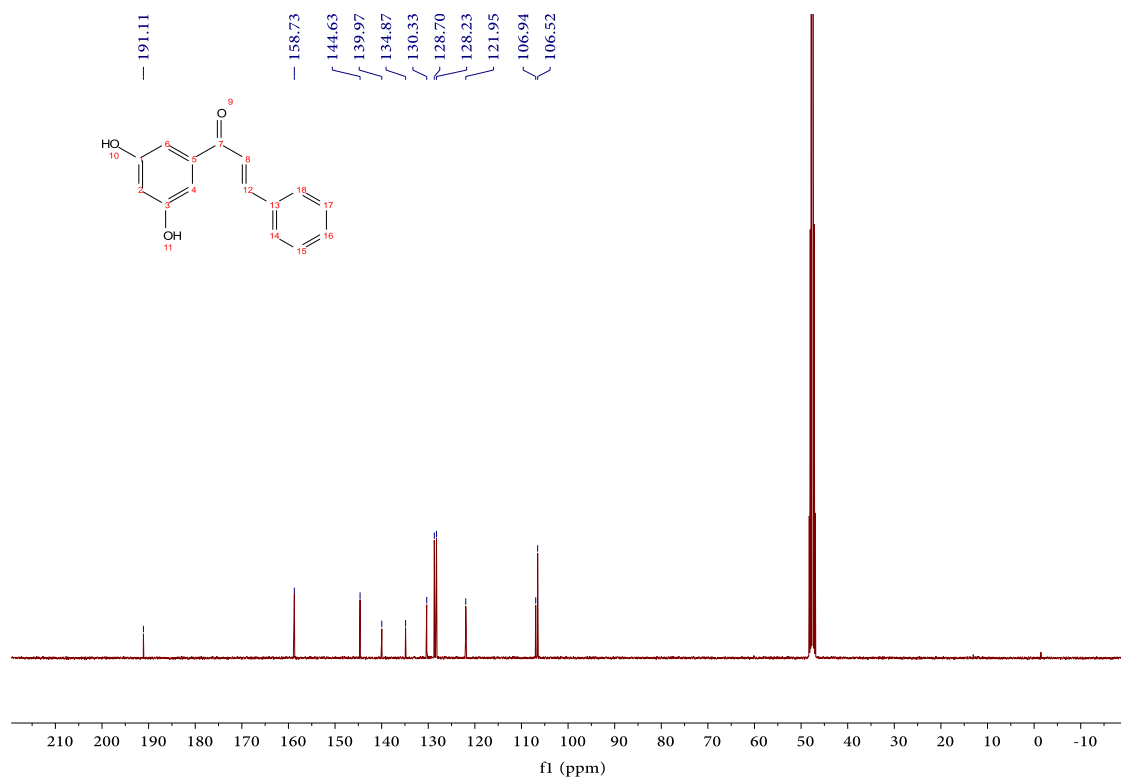
Operator LZU
Instrument micrOTOF



MS (ESI) spectrum of compound **LH-23**



¹H NMR spectrum of compound LH-24



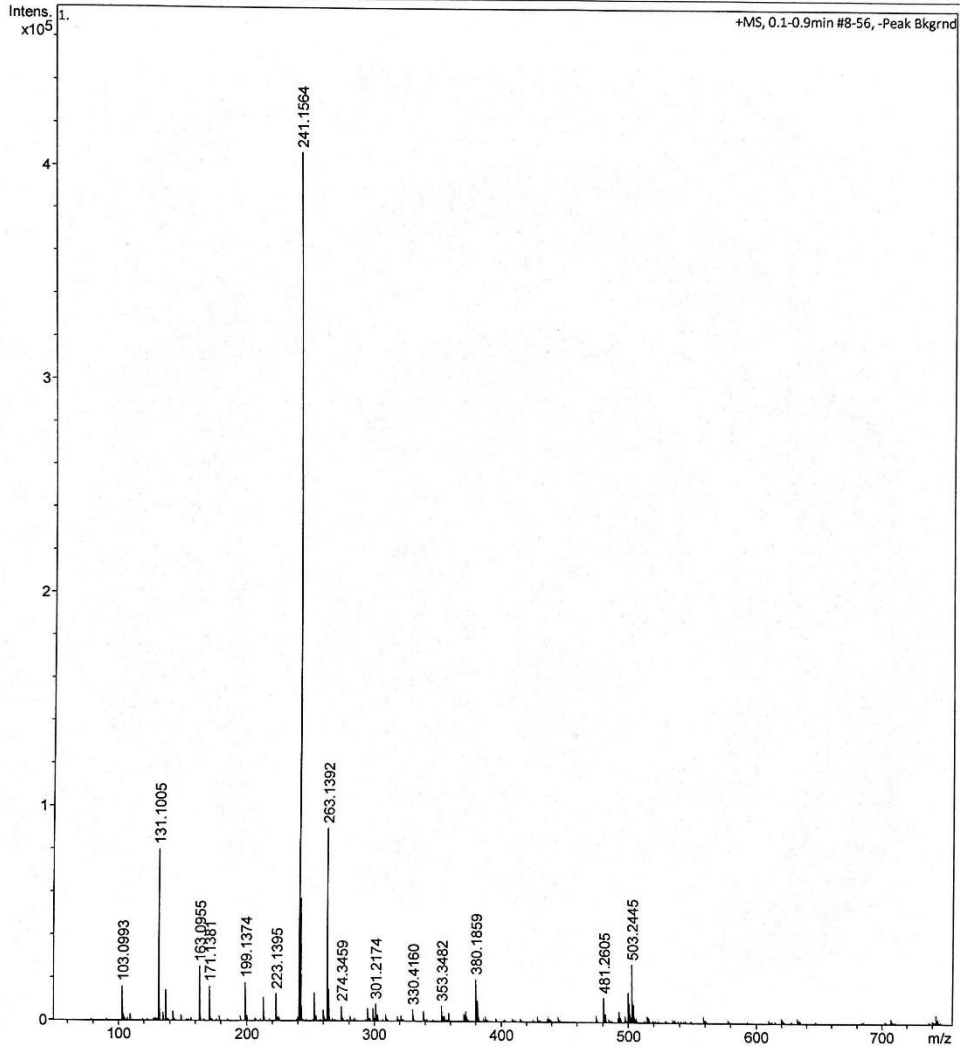
¹³C NMR spectrum of compound LH-24

Generic Display Report

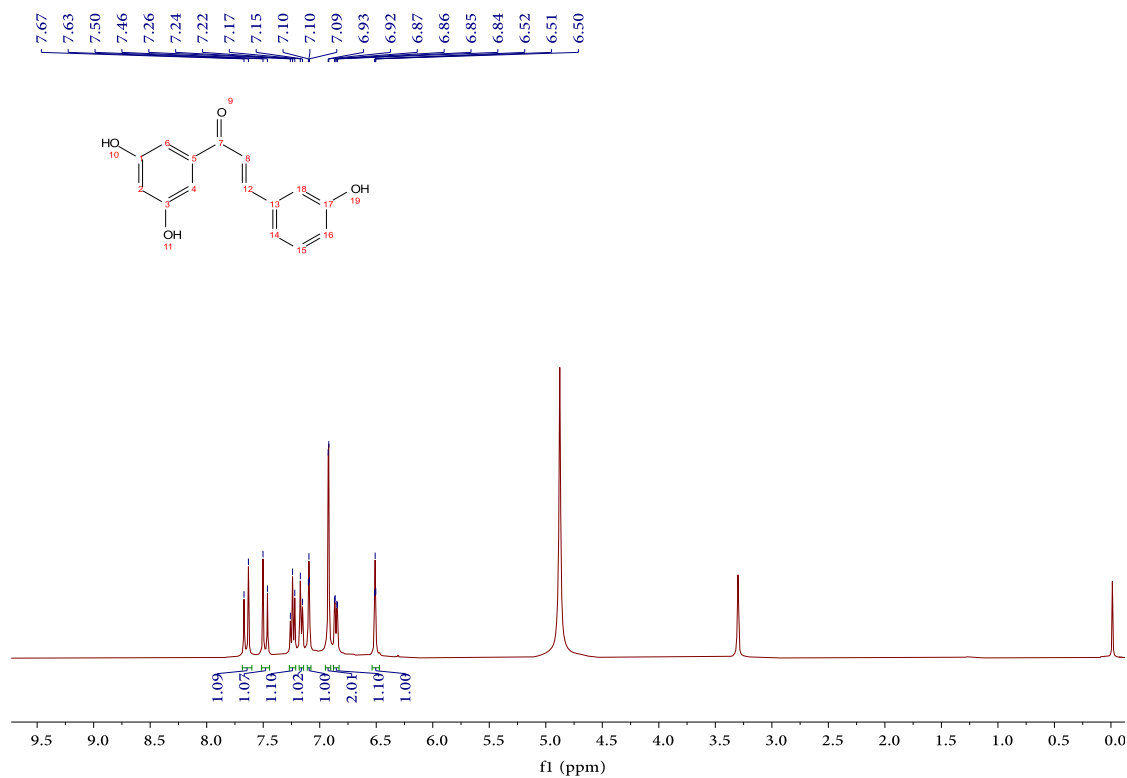
Analysis Info

Analysis Name D:\Data\yangy\new\LIHU210112_12_21_01_36829.d
Method POS_100-1200_For LC.m
Sample Name LIHU210112_12
Comment

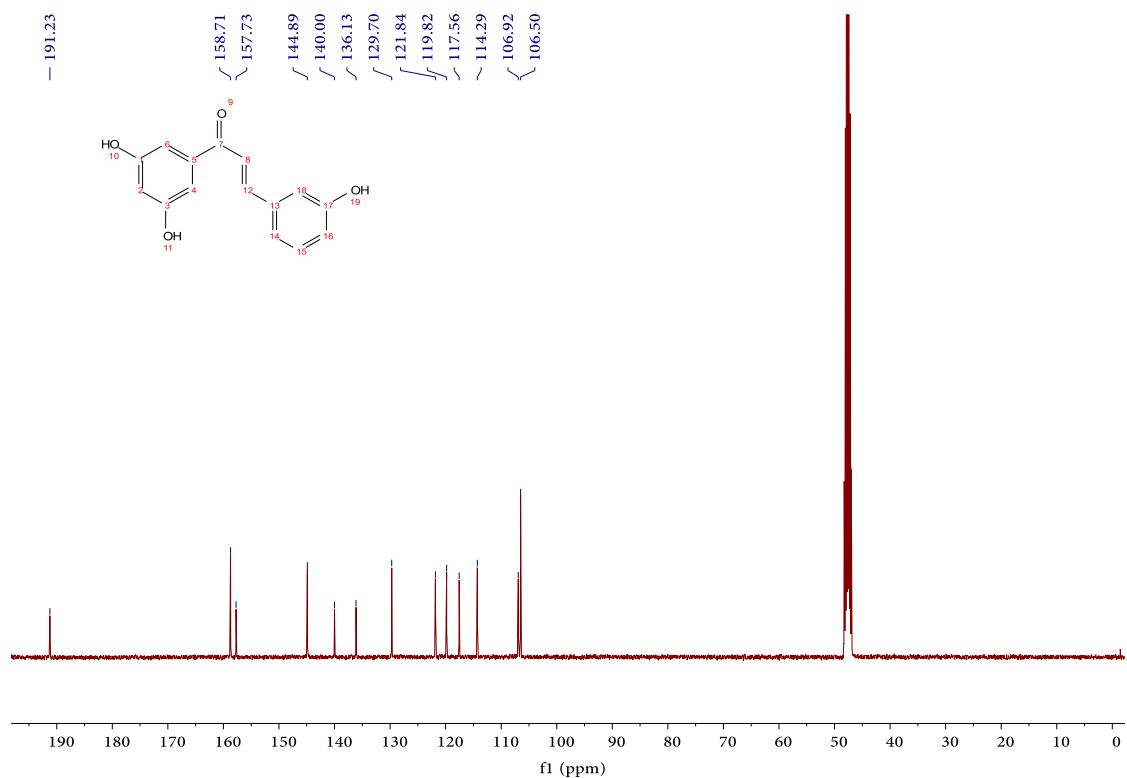
Acquisition Date 1/12/2021 1:01:52 PM
Operator LZU
Instrument microTOF



MS (ESI) spectrum of compound **LH-24**



$^1\text{H NMR}$ spectrum of compound **LH-25**



$^{13}\text{C NMR}$ spectrum of compound **LH-25**

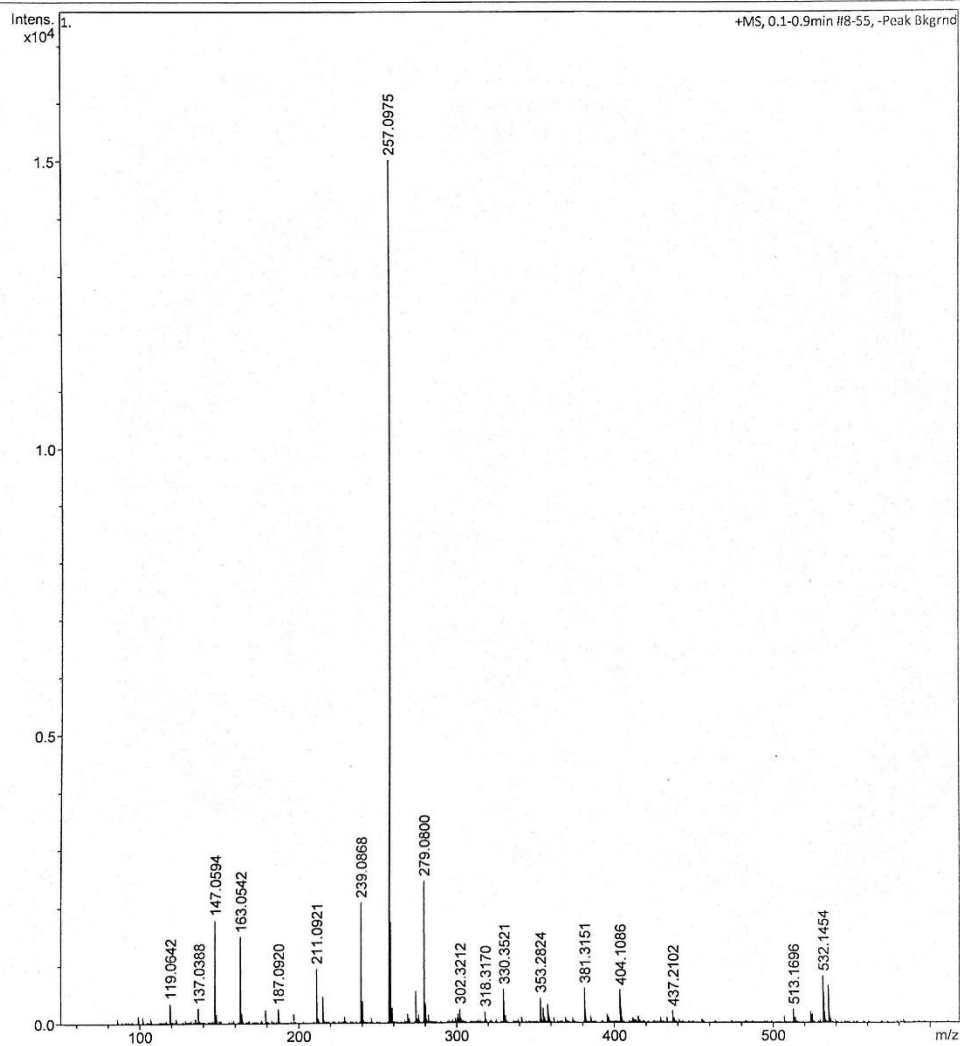
Generic Display Report

Analysis Info

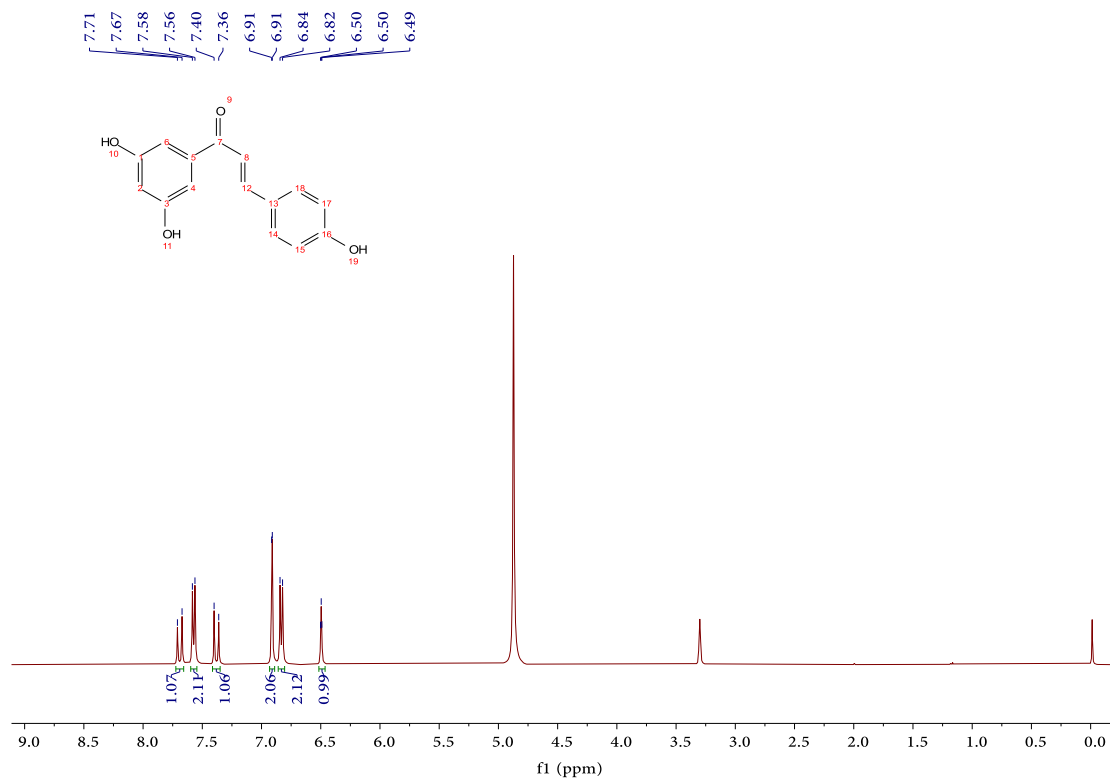
Analysis Name D:\Data\yangy\new\LIHU201231_2_8_01_36592.d
Method POS_100-1200_For LC.m
Sample Name LIHU201231_2
Comment

Acquisition Date 12/31/2020 12:32:08 PM

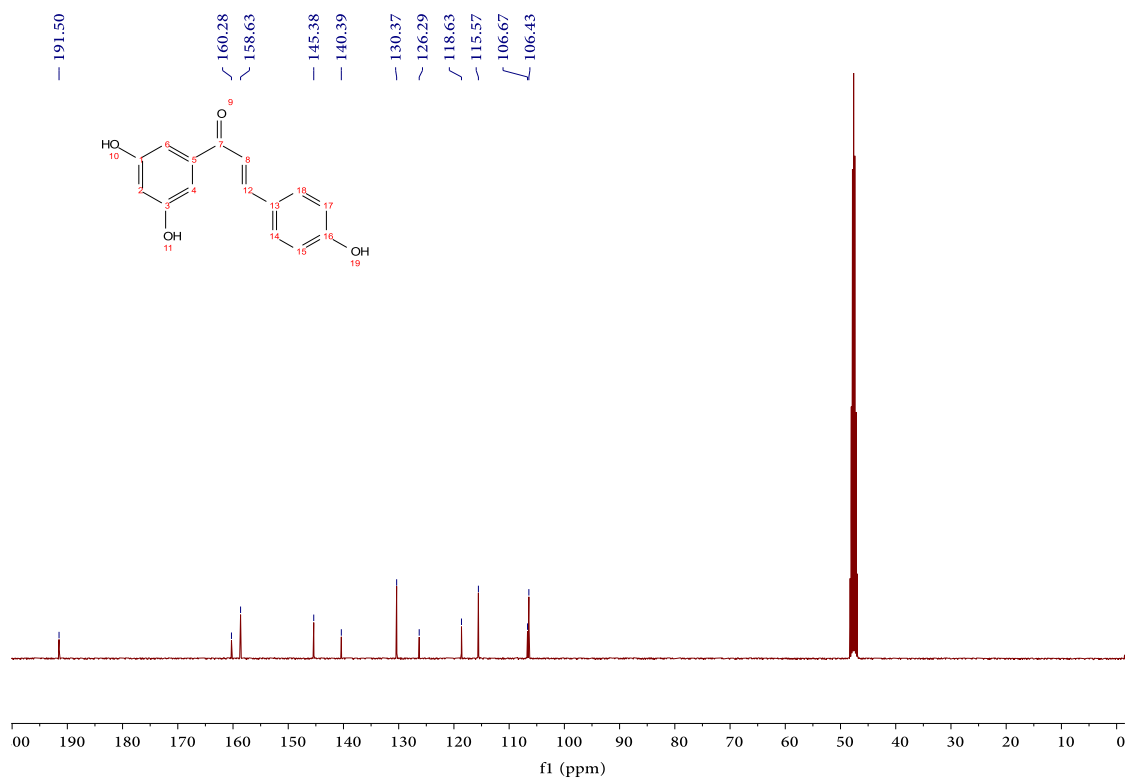
Operator LZU
Instrument micrOTOF



MS (ESI) spectrum of compound **LH-25**



^1H NMR spectrum of compound LH-26



^{13}C NMR spectrum of compound LH-26

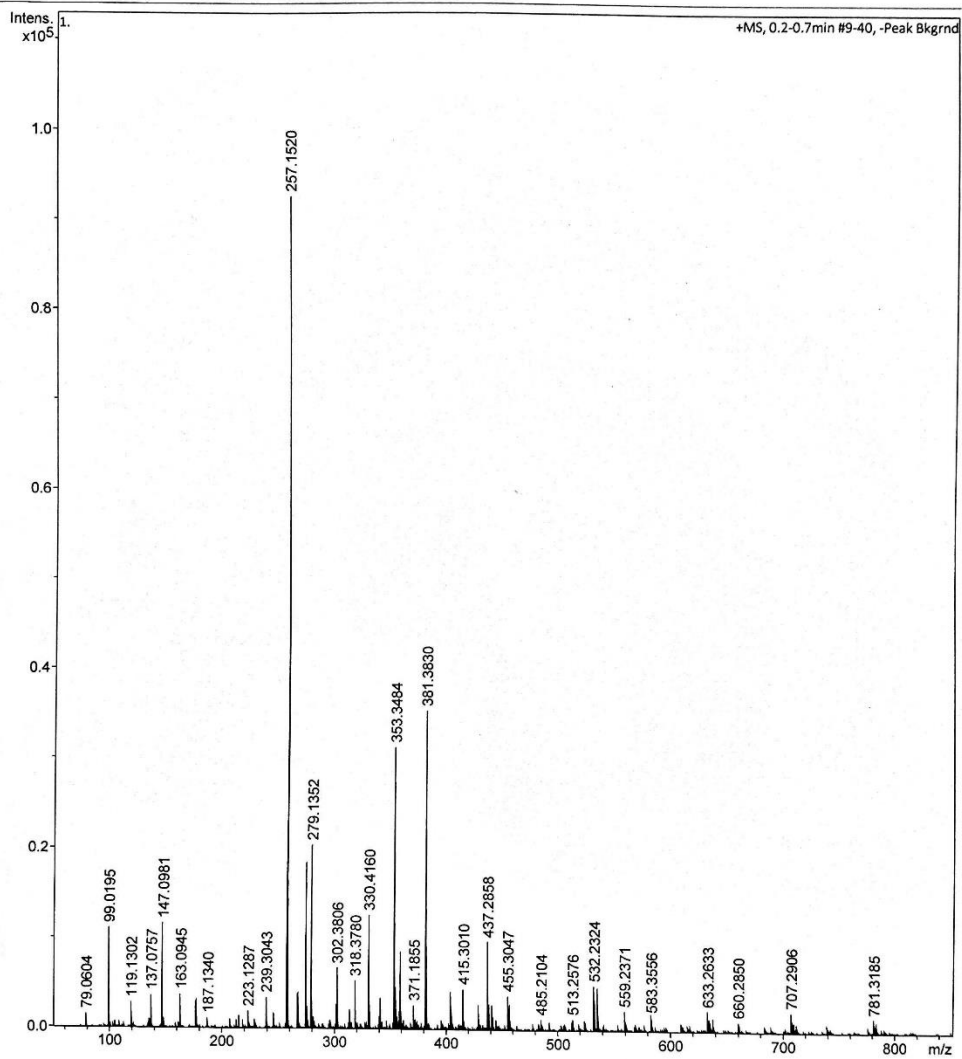
Generic Display Report

Analysis Info

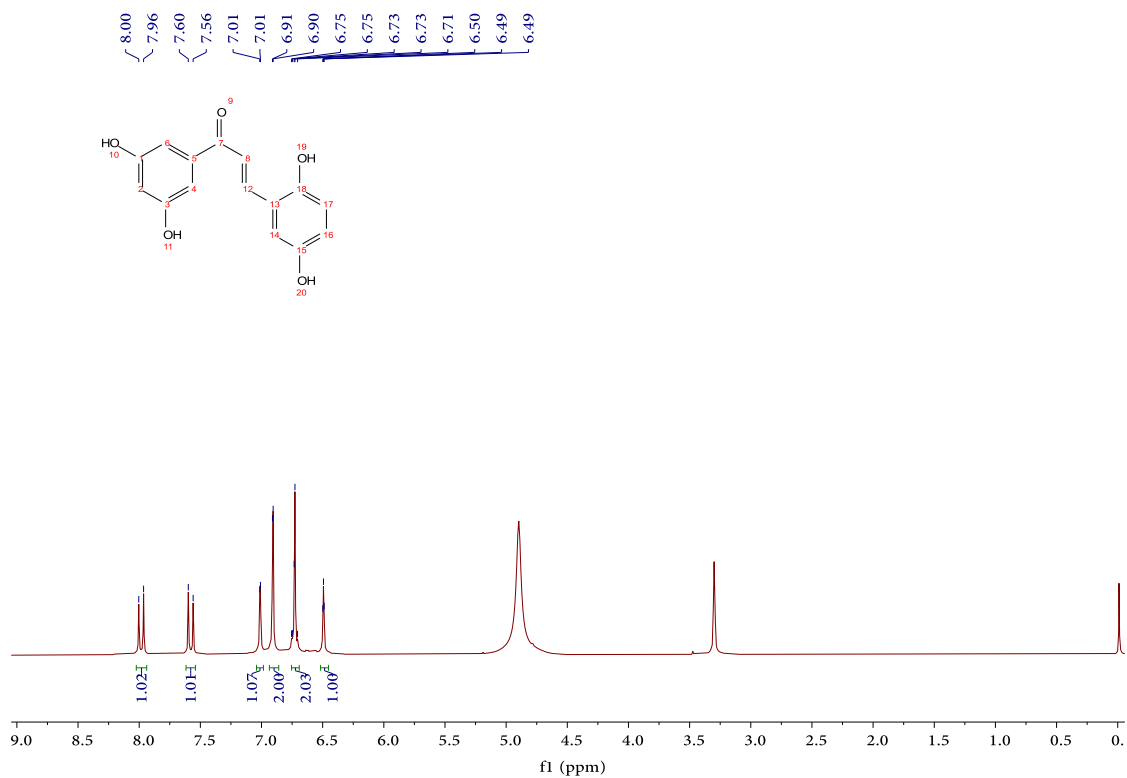
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Sample Name LIHU210112_11
Comment

Acquisition Date 1/12/2021 12:58:47 PM

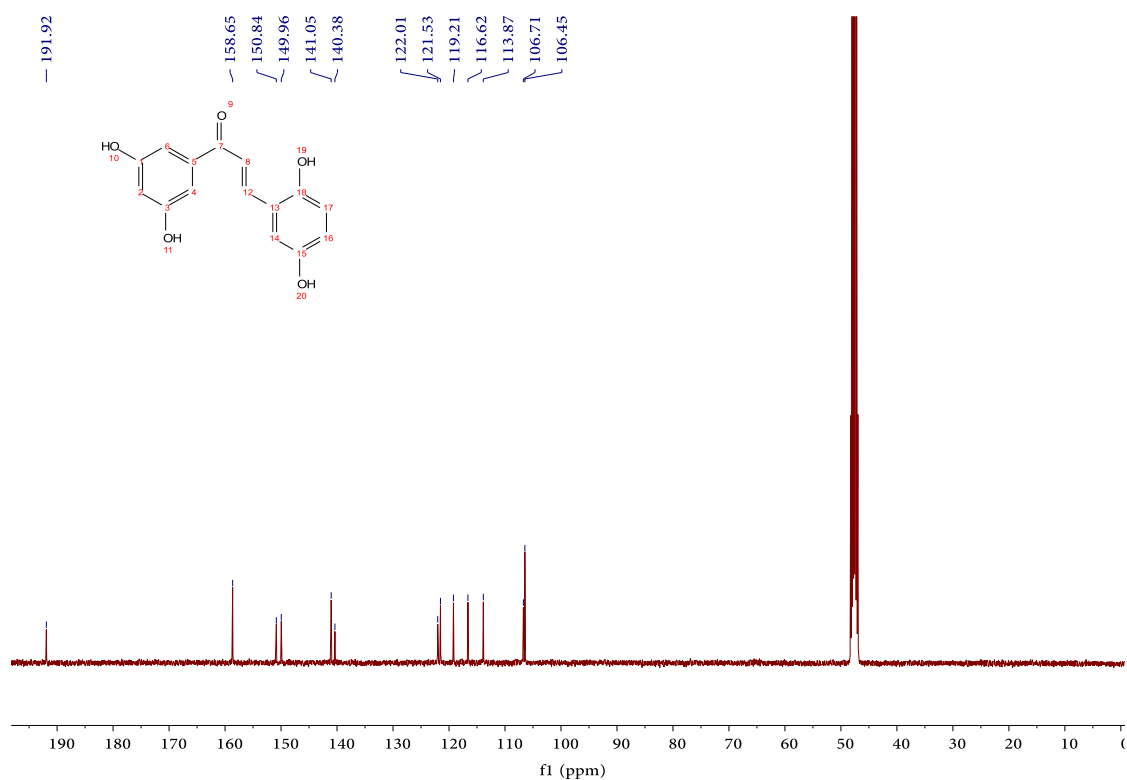
Operator LZU
Instrument micrOTOF



MS (ESI) spectrum of compound **LH-26**



¹H NMR spectrum of compound LH-27



¹³C NMR spectrum of compound LH-27

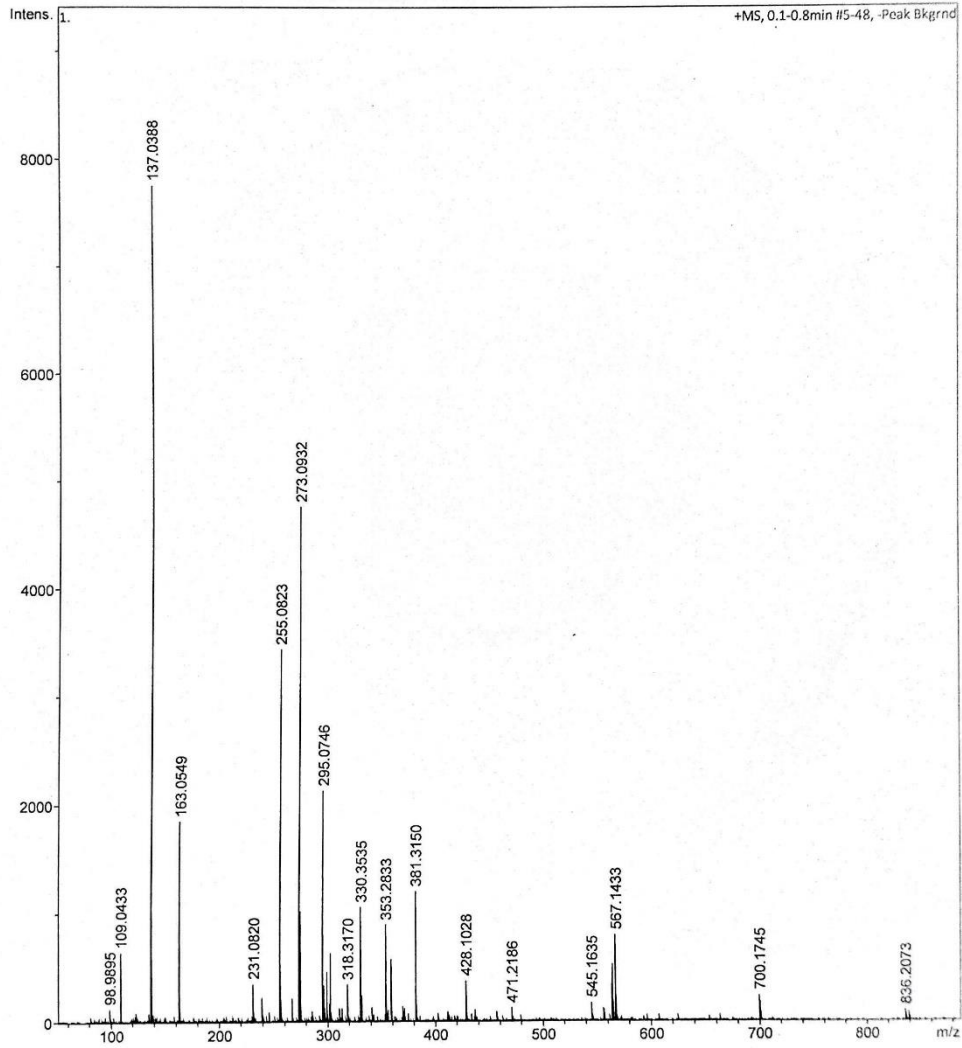
Generic Display Report

Analysis Info

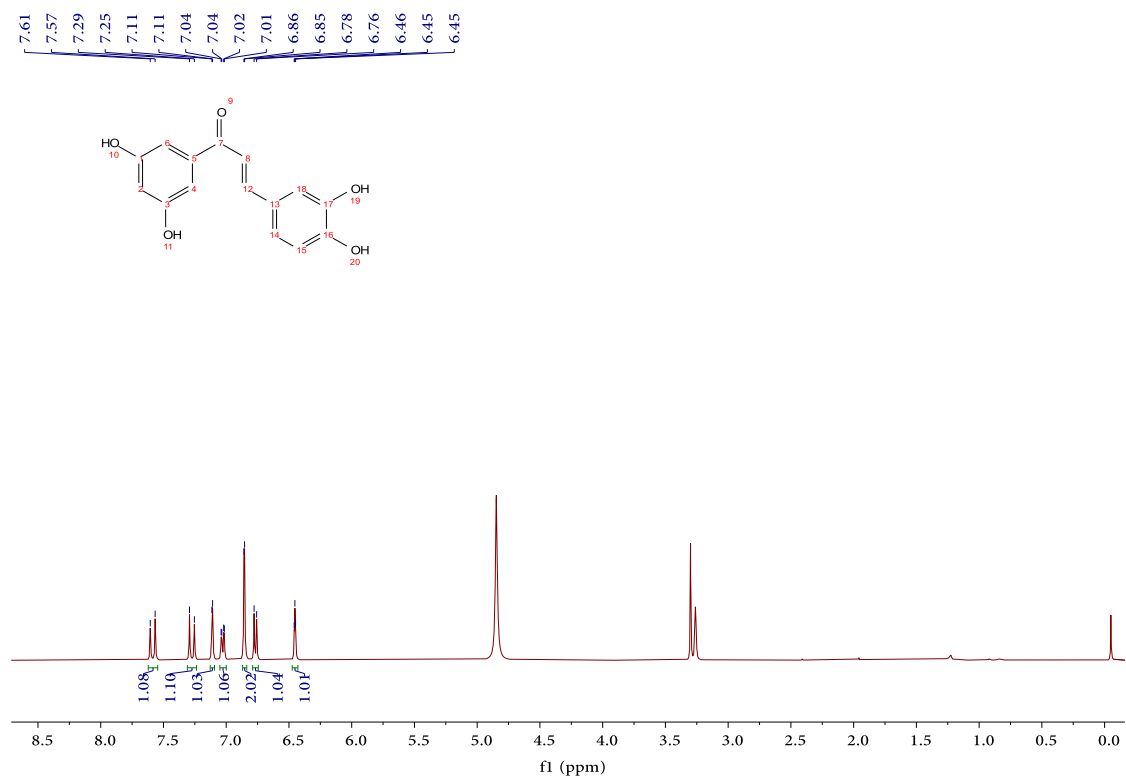
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Sample Name LIHU201231_3
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Acquisition Date 12/31/2020 12:35:13 PM

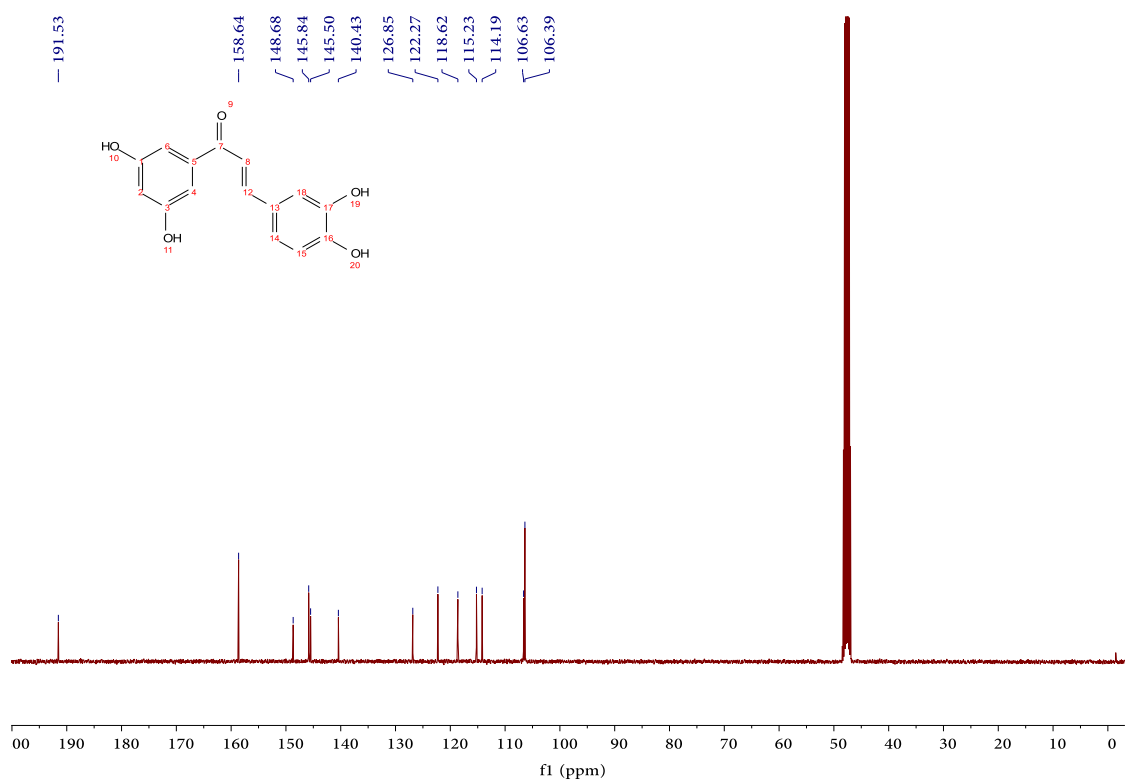
Operator LZU
Instrument micrOTOF



MS (ESI) spectrum of compound **LH-27**



^1H NMR spectrum of compound **LH-28**

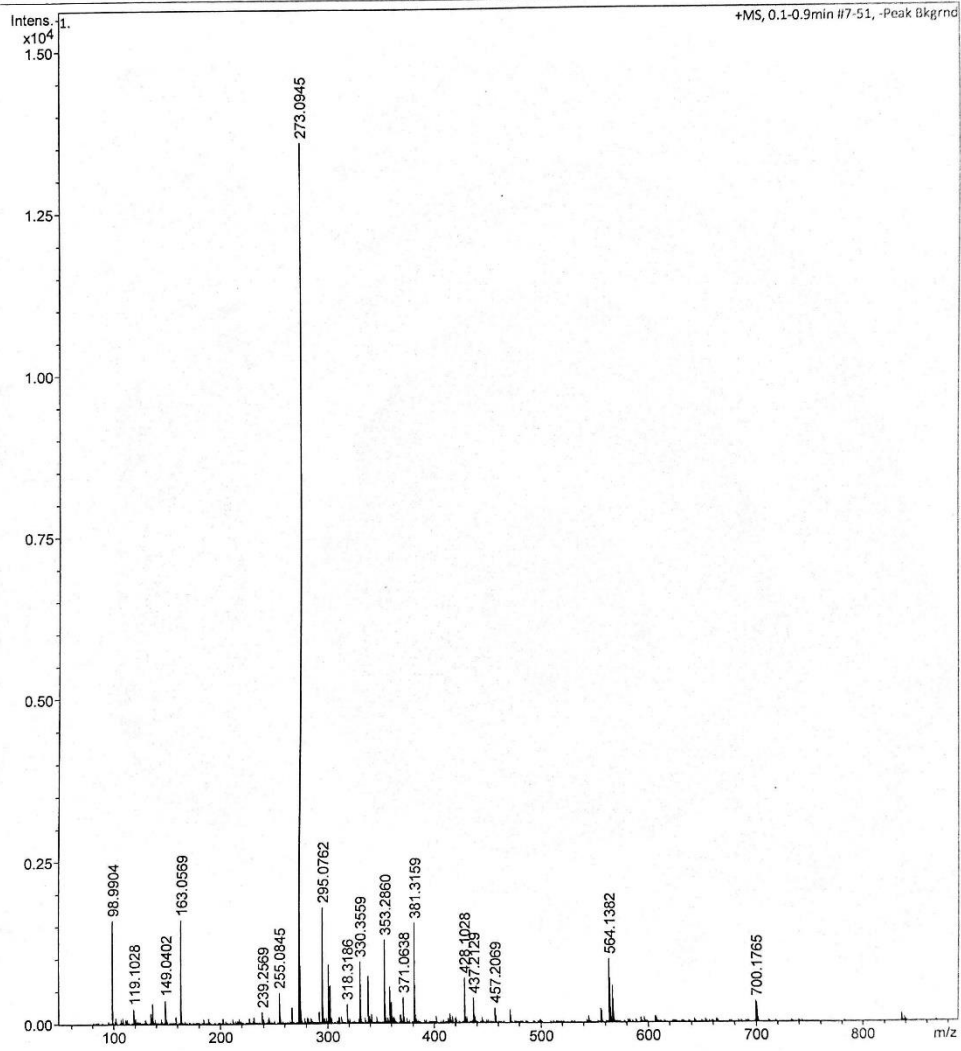


^{13}C NMR spectrum of compound **LH-28**

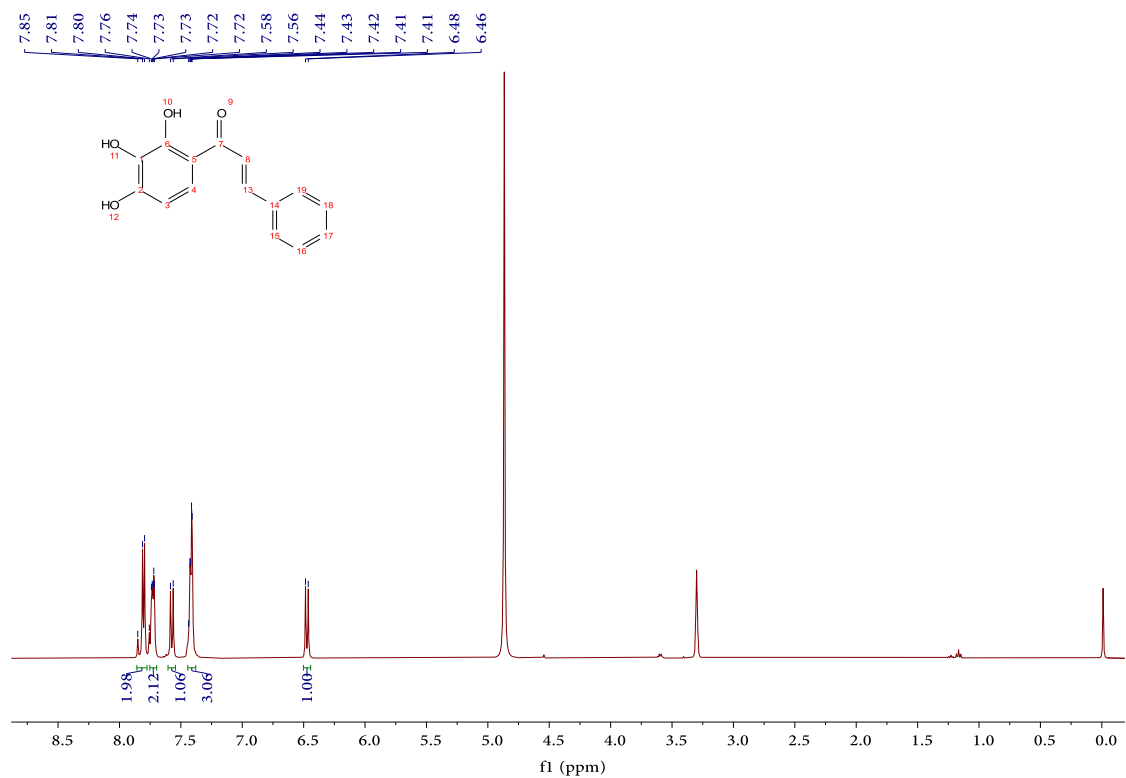
Generic Display Report

Analysis Info
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Method POS_100-1200_For LC.m
Sample Name LIHU201231_9
Comment

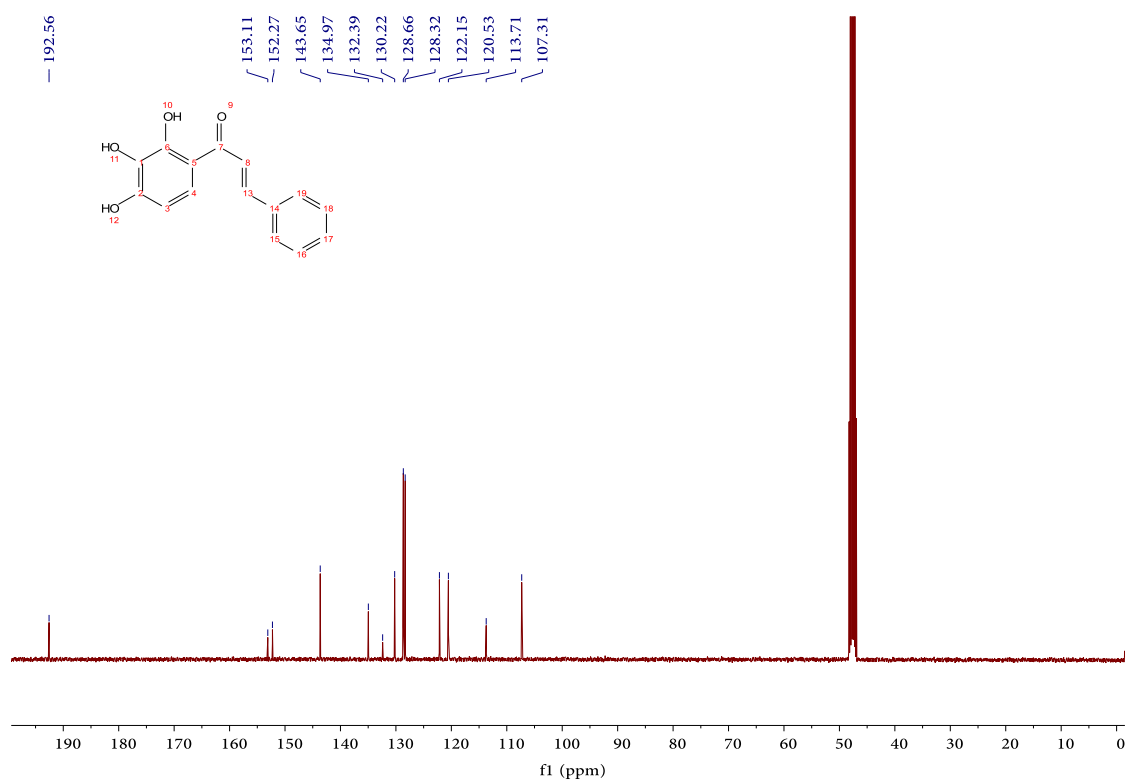
Acquisition Date 12/31/2020 12:53:40 PM
Operator LZU
Instrument micrOTOF



MS (ESI) spectrum of compound **LH-28**



$^1\text{H NMR}$ spectrum of compound LH-29



$^{13}\text{C NMR}$ spectrum of compound LH-29

Generic Display Report

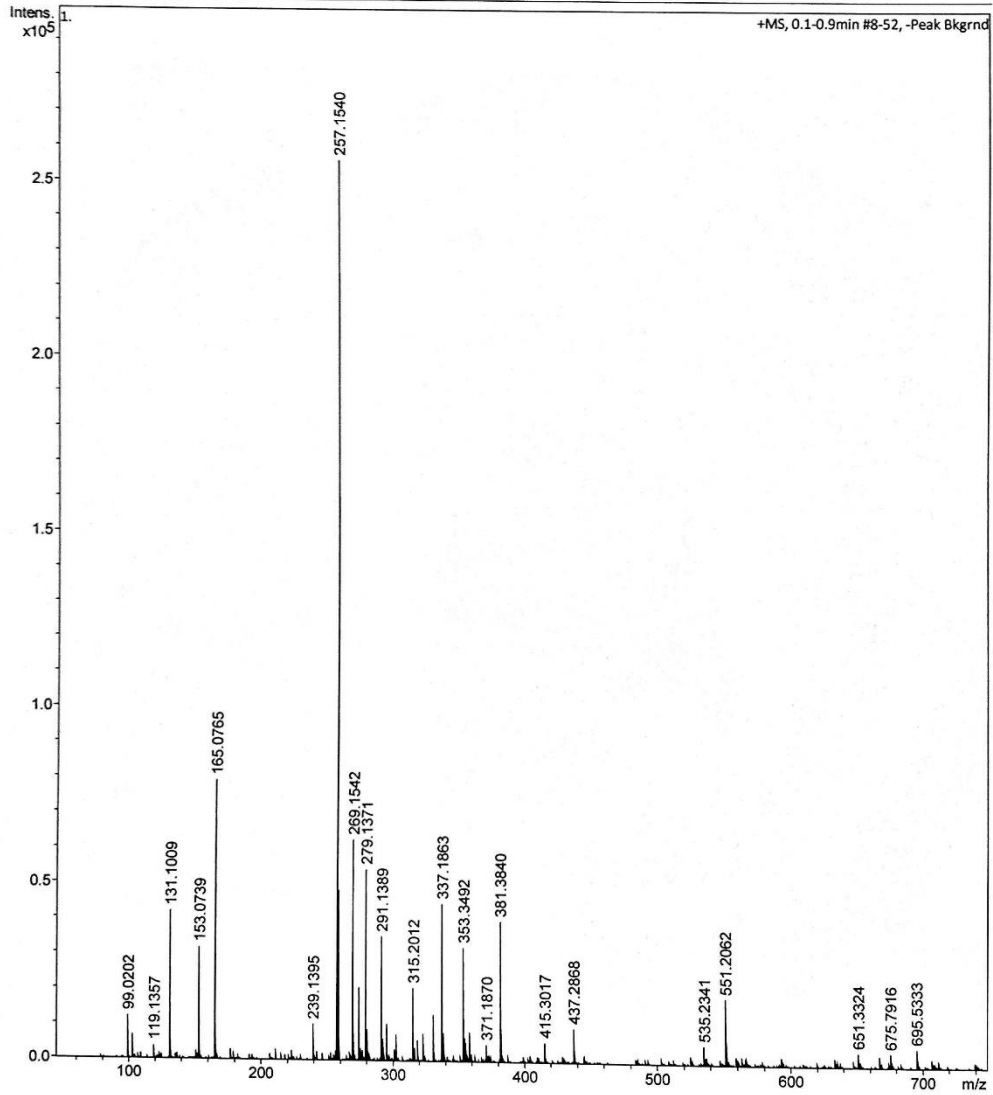
Analysis Info

Analysis Name D:\Data\yangy\new\LIHU210112_17_26_01_36834.d
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Sample Name LIHU210112_17
Comment

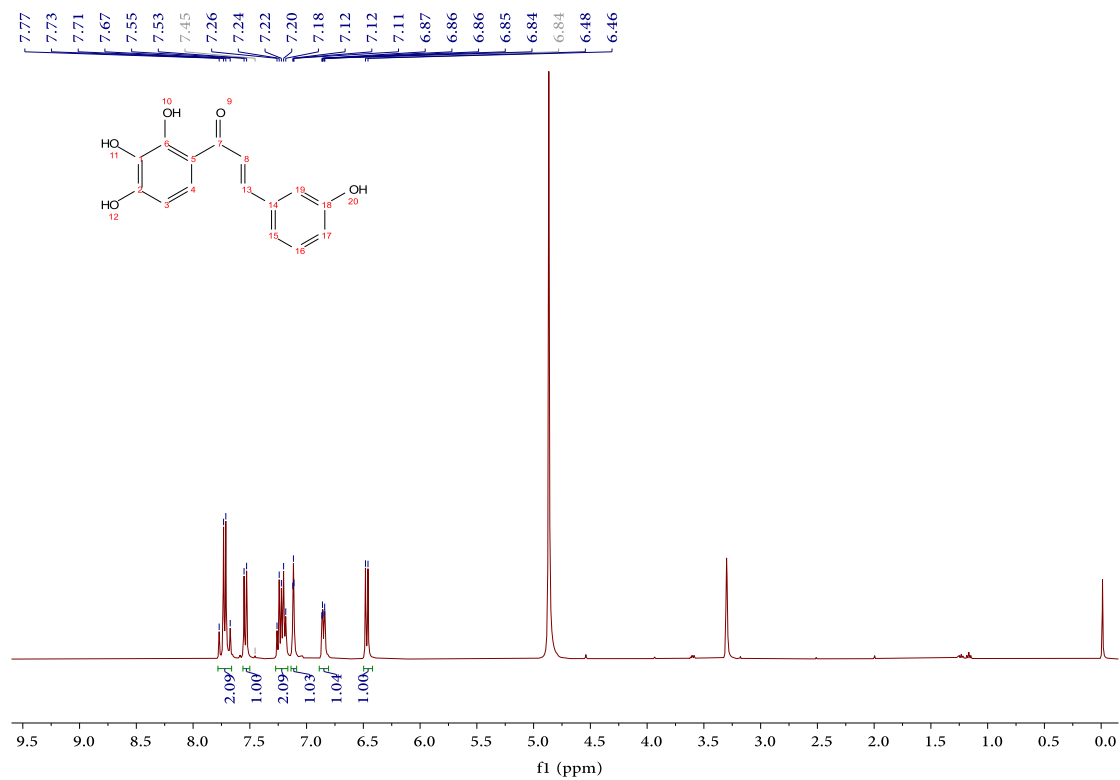
Acquisition Date 1/12/2021 1:17:15 PM

Operator LZU

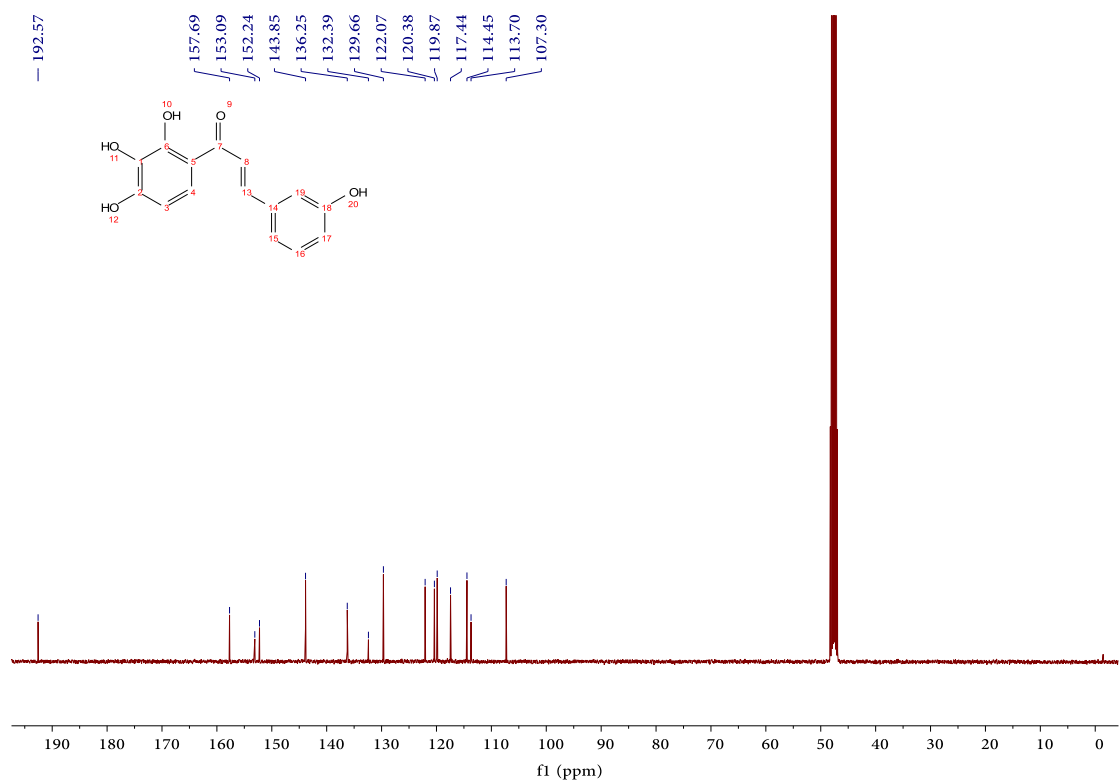
Instrument micrOTOF



MS (ESI) spectrum of compound **LH-29**



$^1\text{H NMR}$ spectrum of compound LH-30



$^{13}\text{C NMR}$ spectrum of compound LH-30

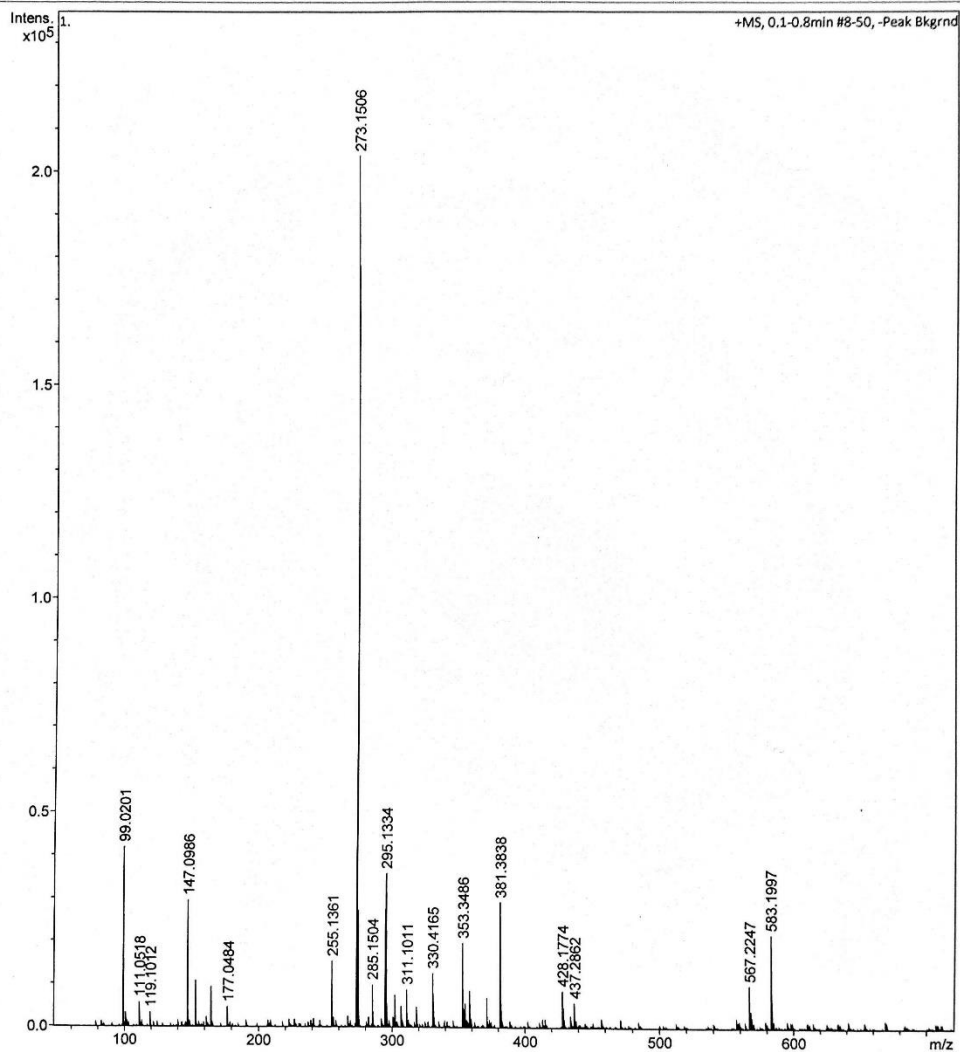
Generic Display Report

Analysis Info

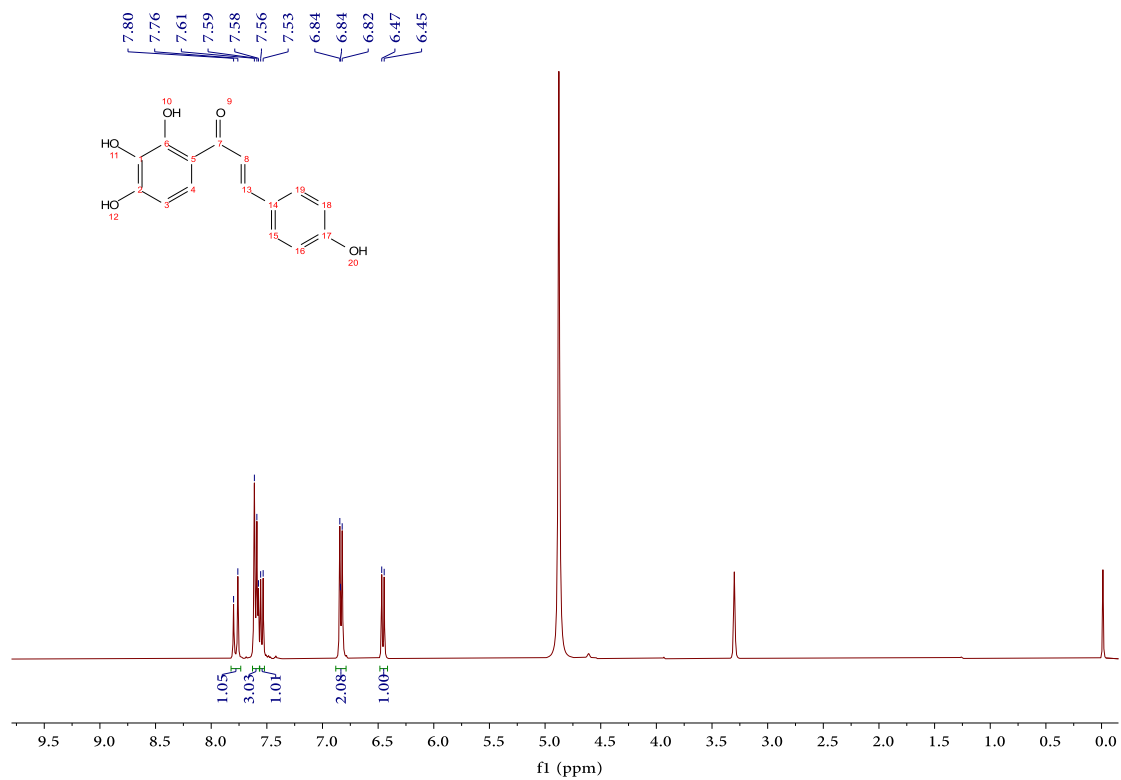
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Method POS_100-1200_For LC.m
Sample Name LIHU210112_16
Comment

Acquisition Date 1/12/2021 1:14:11 PM

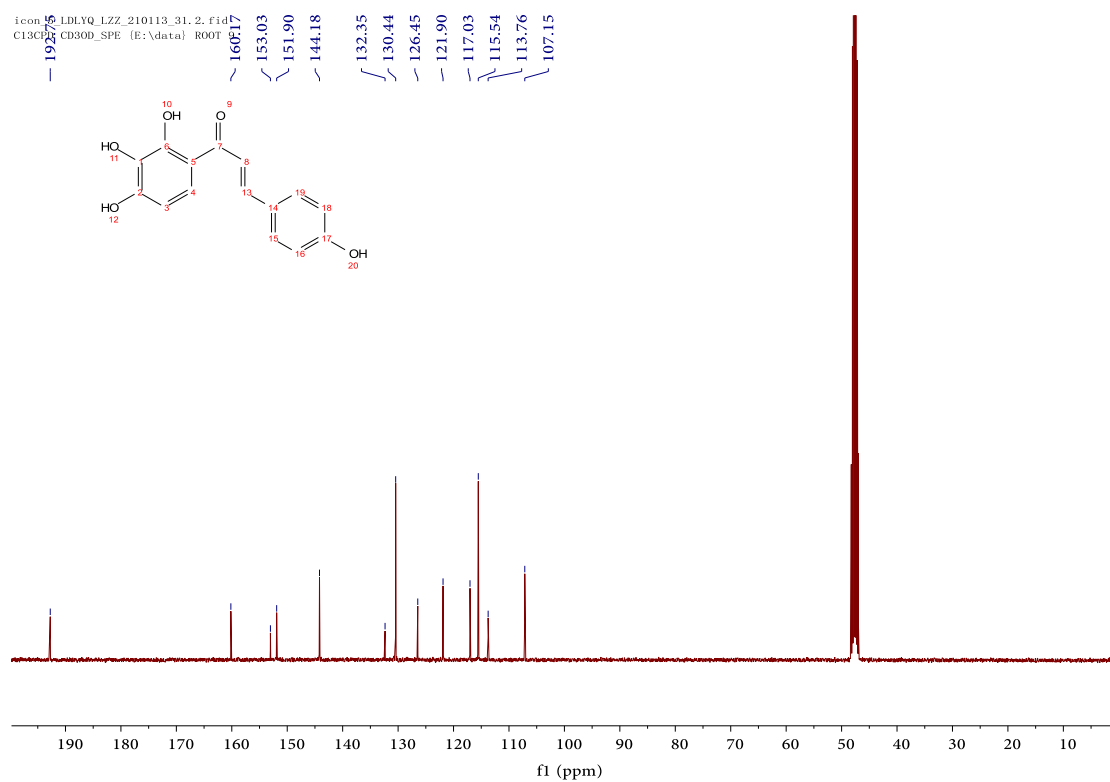
Operator LZU
Instrument micrOTOF



MS (ESI) spectrum of compound **LH-30**



¹H NMR spectrum of compound LH-31



¹³C NMR spectrum of compound LH-31

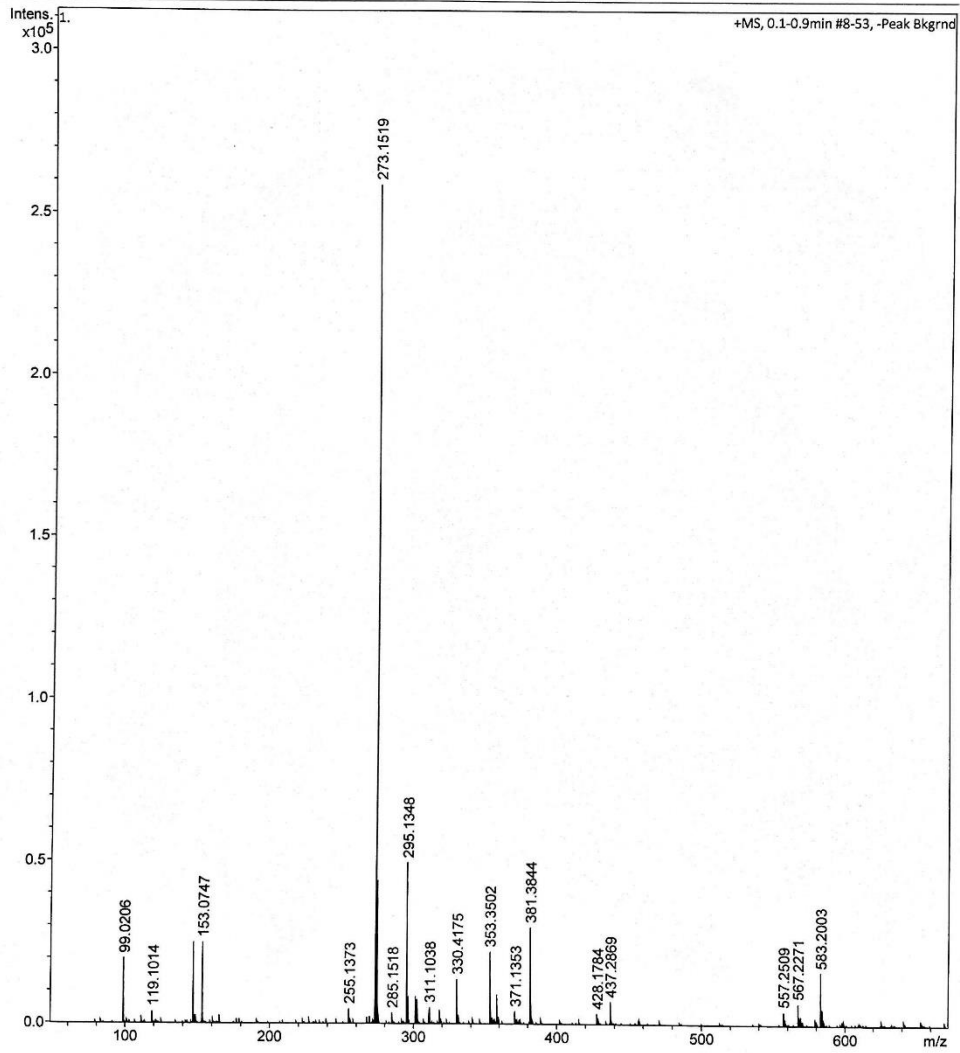
Generic Display Report

Analysis Info

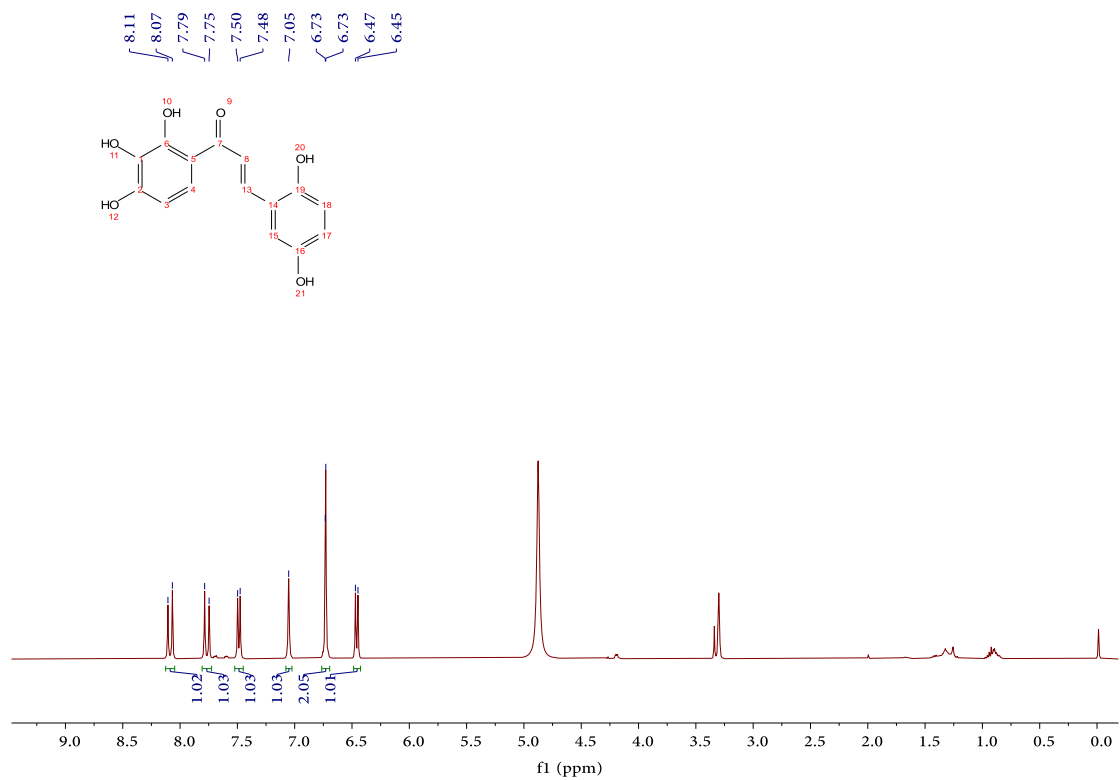
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Method POS_100-1200_For LC.m
Sample Name LIHU210112_19
Comment

Acquisition Date 1/12/2021 1:23:27 PM

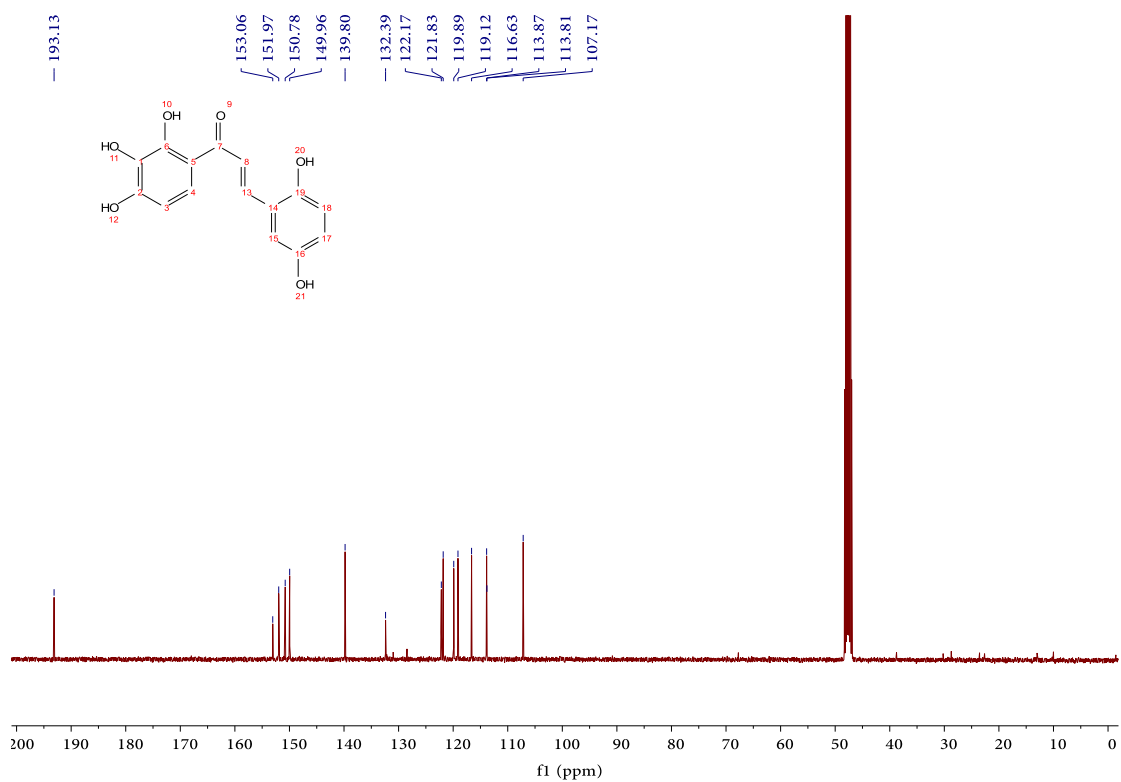
Operator LZU
Instrument micrOTOF



MS (ESI) spectrum of compound **LH-31**



^1H NMR spectrum of compound LH-32



^{13}C NMR spectrum of compound LH-32

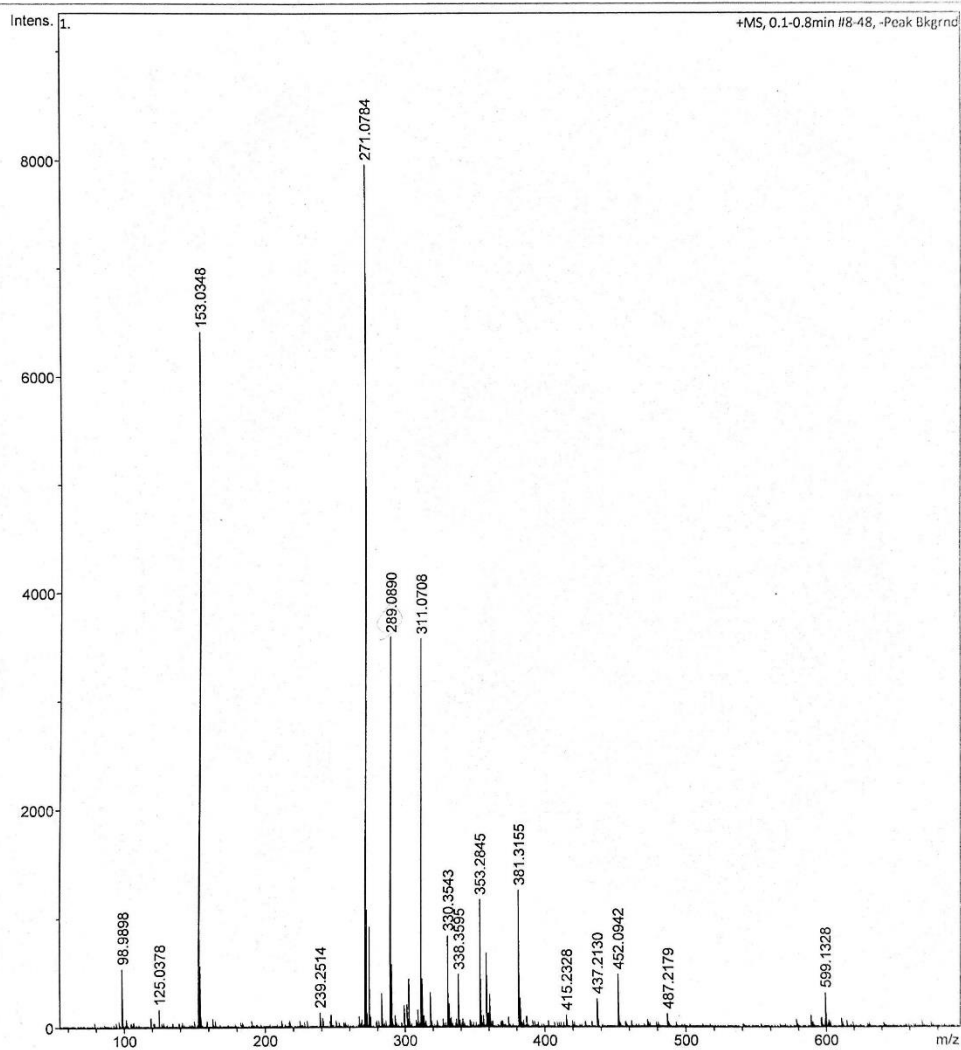
Generic Display Report

Analysis Info

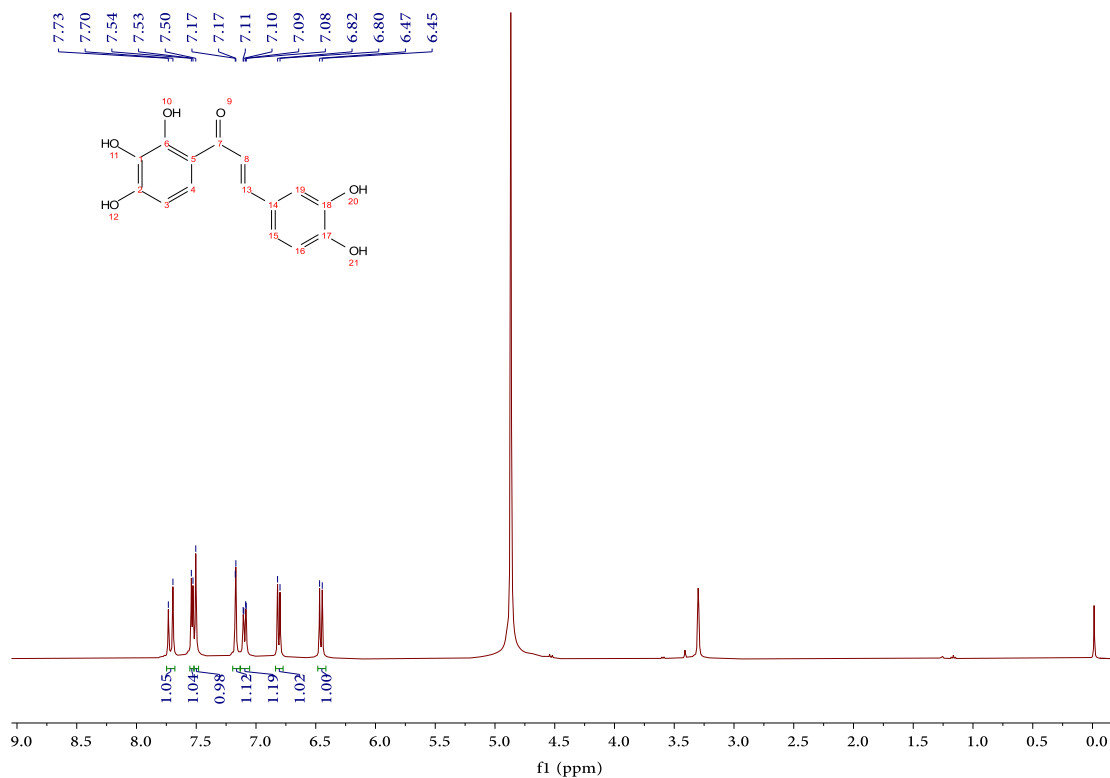
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Method POS_100-1200_For LC.m
Sample Name LIHU201231_6
Comment

Acquisition Date 12/31/2020 12:44:28 PM

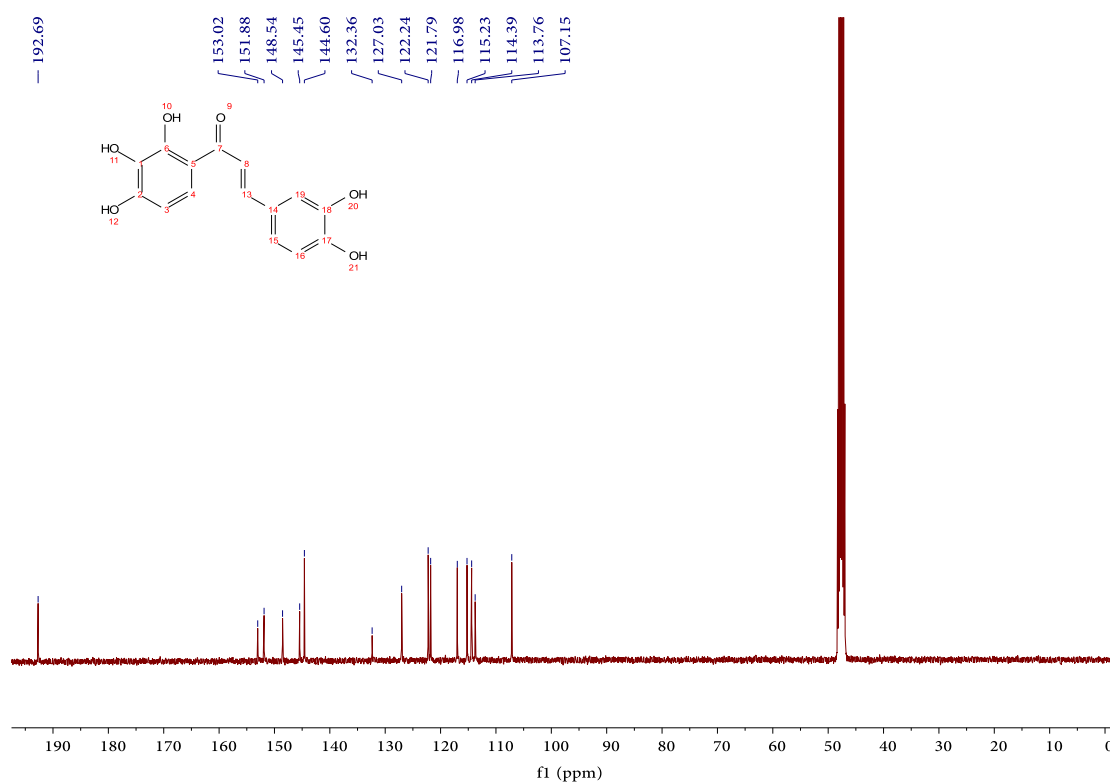
Operator LZU
Instrument micrOTOF



MS (ESI) spectrum of compound **LH-32**



^1H NMR spectrum of compound **LH-33**



^{13}C NMR spectrum of compound **LH-33**

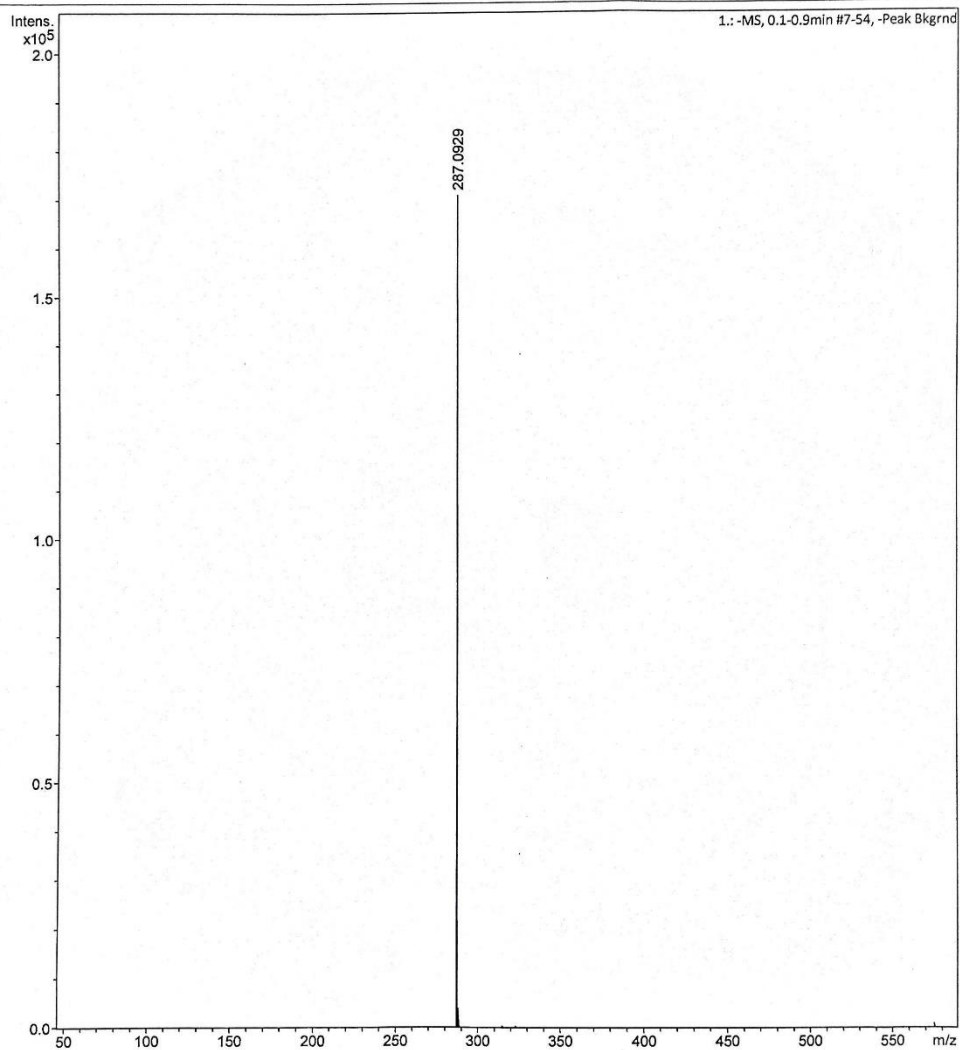
Generic Display Report

Analysis Info

Analysis Name D:\Data\yangy\new\LIHU200921_2_41_01_33892.d
Method NEG_100-1200_For LC.m
Sample Name LIHU200921_2
Comment

Acquisition Date 9/21/2020 1:54:23 PM

Operator LZU
Instrument micrOTOF



MS (ESI) spectrum of compound **LH-33**