Empowering adsorption and photocatalytic degradation of ciprofloxacin on BiOI composites: A materials-by-design investigation

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Supplementary Information

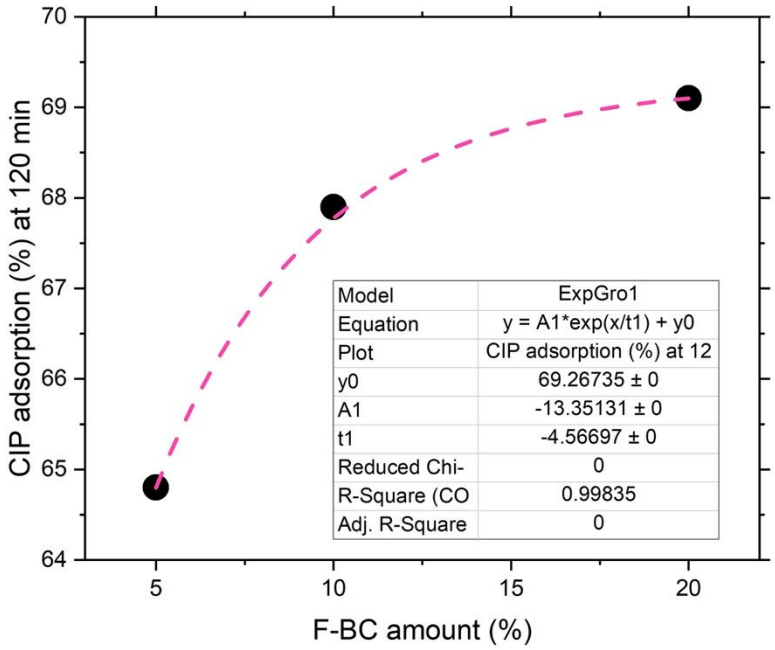


Figure S 1. CIP adsorption under dark vs. F-BC content for the ternary composites.

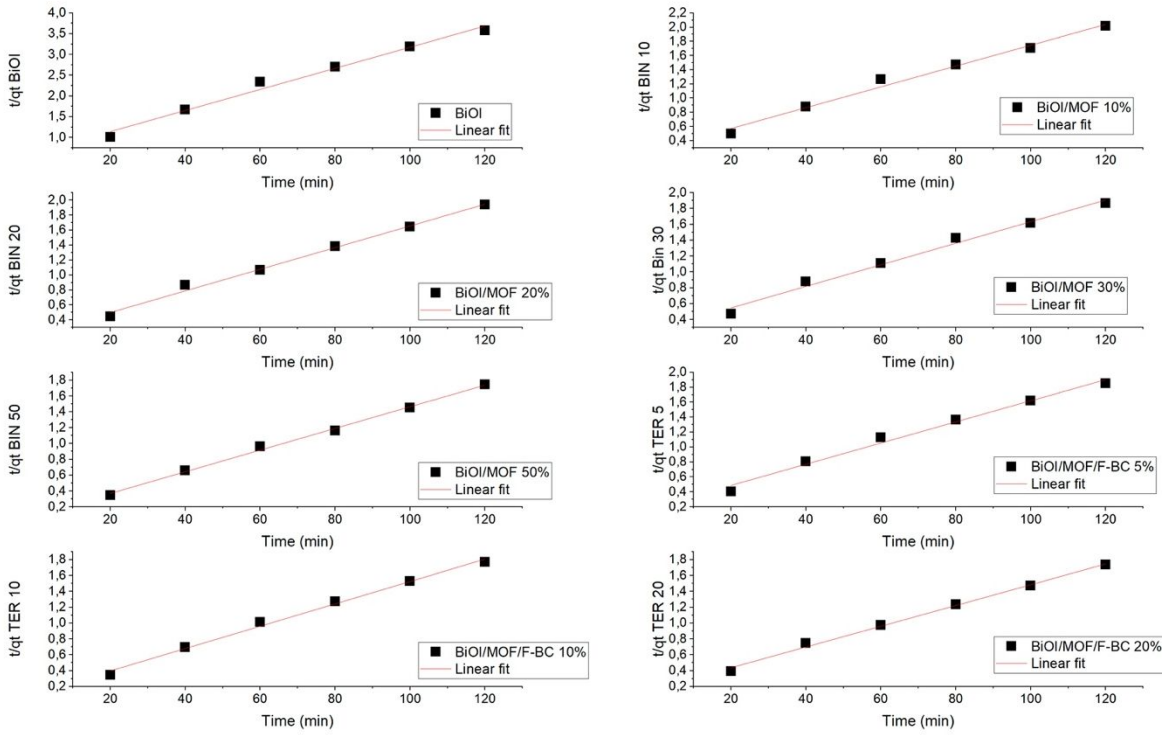


Figure S 2. Fitting according to a pseudo-second order model of the absorption process supported by the materials under investigation. Markers are experimental points, lines are fitting equations. Integrated equation: $q_t = \frac{q_e^2 k_2 t}{1 + q_e k_2 t}$.

Material	R^2	Slope (g mg^{-1})	Intercept (g mg^{-1} min)
BiOI	0.98599	0.02544 ± 0.00152	1.022
BiOI/MOF 10%	0.98690	0.01467 ± 0.06582	0.7698
BiOI/MOF 20%	0.99337	0.01446 ± 0.00059146	0.9936
BiOI/MOF 30%	0.98821	0.0136 ± 0.00074292	0.6739
BiOI/MOF 50%	0.99700	0.01368 ± 0.00037544	1.938
BiOI/MOF/F-BC 5%	0.98787	0.01415 ±0.00078370	0.9787
BiOI/MOF/F-BC 10%	0.99944	0.0141 ± 0.00053052	1.721
BiOI/MOF/F-BC 20%	0.99580	0.01309 ± 0.0004.2494	0.9751

Table S 1. Parameters of the fitting of the adsorption process for the materials under investigation.

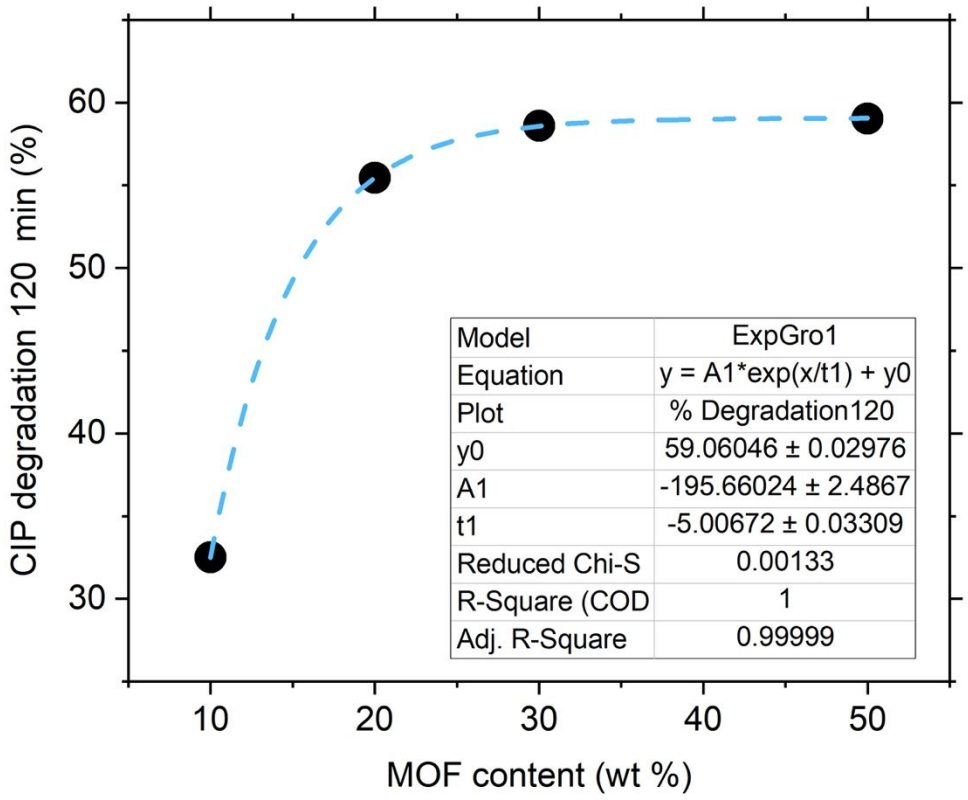


Figure S 3. CIP degradation under simulated solar light catalyzed by the binary composites vs. MOF content. Markers are experimental points; the dashed line is the exponential fit of the data.

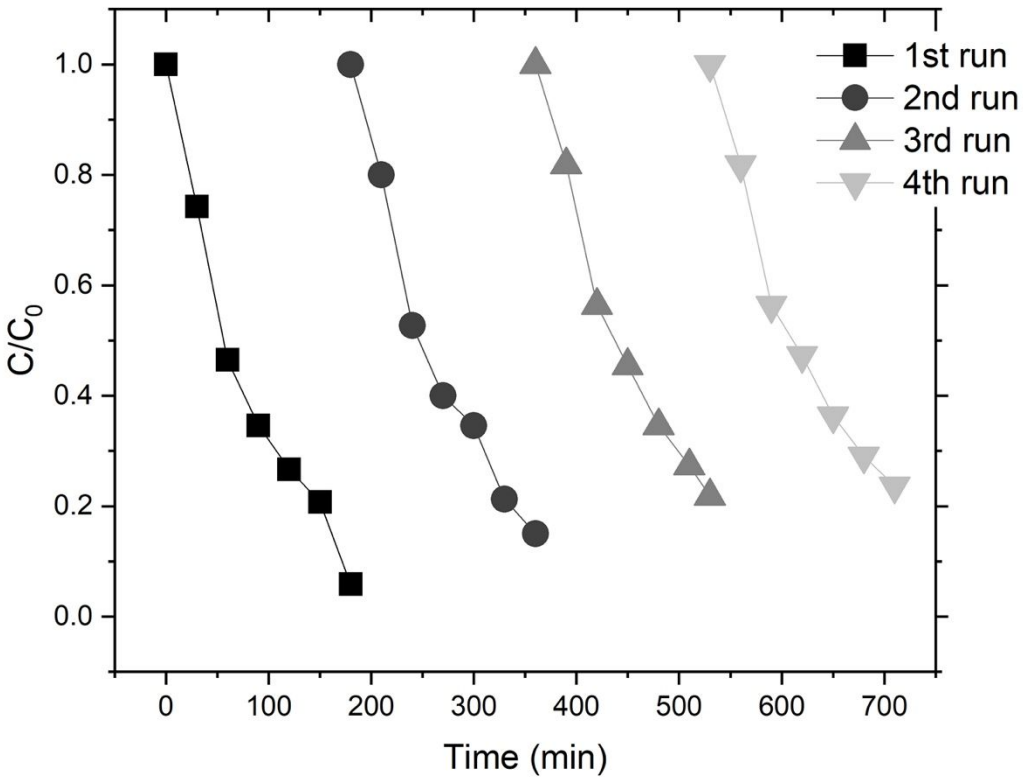


Figure S 4. Recyclability runs for the ternary composite BiOI/MOF/F-BC 10%.

Material	**-ln(C_t/C_0) *vs.* Time**	
	Fitting Equations	**R-Square**
MOF	Sigmoidal	R^2 = 0.99947
BiOI	Linear	R^2 = 0.9896
BiOI/MOF-30%	Linear	R^2 = 0.99457
BiOI/MOF/F-BC-10%	Linear AND exponential	R^2 = 0.99295 R^2 = 0.99342

Table S 2. Fitting parameters for the reaction course.

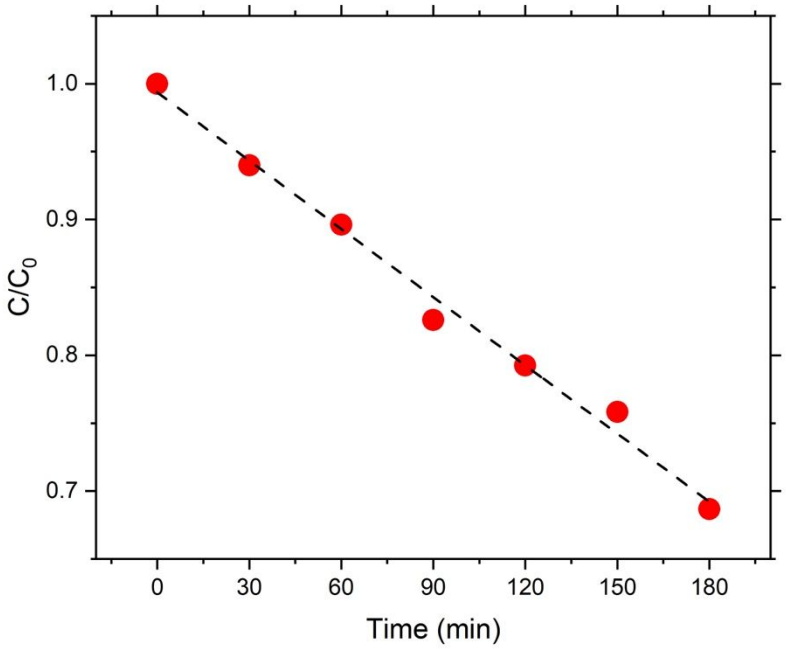


Figure S 5. Fitting of the reaction course for CIP degradation under simulated solar light catalyzed by pure BiOI.Markers are experimental point, line is the linear fitting (R^2=0.9912).

Material	2 Theta (°)	Reflection (hkl)	d-spacing (Å)
BiOI	8.70	001	10.1
	29.09	102	3.06
	31.77	110	2.81
	45.45	200	1.99
	55.09	212	1.66
BiOI/MOF 30%	29.35	102	3.03
	31.91	110	2.80
	45.73	200	1.98
	55.35	212	1.66
BiOI/MOF 50%	30.07	102	2.96
	32.09	110	2.78
	45.97	200	1.97
	55.94	212	1.64
BiOI/MOF/F-BC 10%	28.98	102	3.07
	31.81	110	2.81
	45.60	200	1.98
	54.88	212	1.67
BiOI/MOF/F-BC 20%	28.98	102	3.07
	31.81	110	2.81
	45.60	200	1.98
	54.88	212	1.67

Table S 3. XRD analysis, reporting the observed angles of reflection of different crystalline planes and the calculated interplanar distances (Bragg law was used, so that the interplanar distance is $d = \frac{n\lambda}{2\sin\theta}$*).*

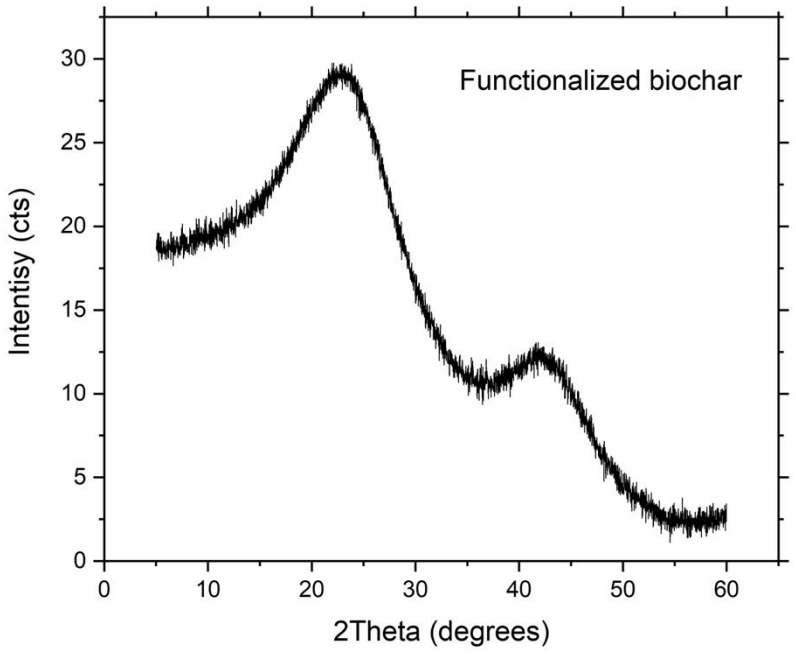
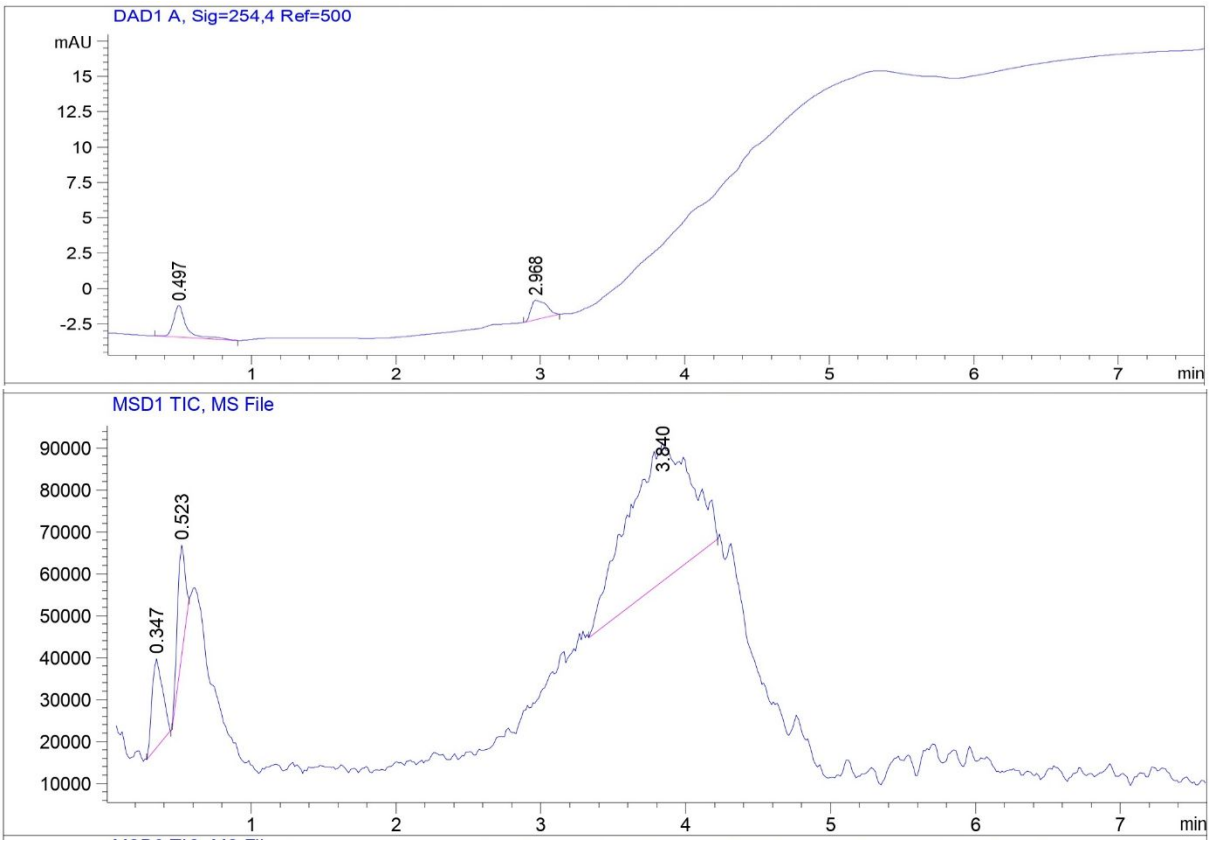
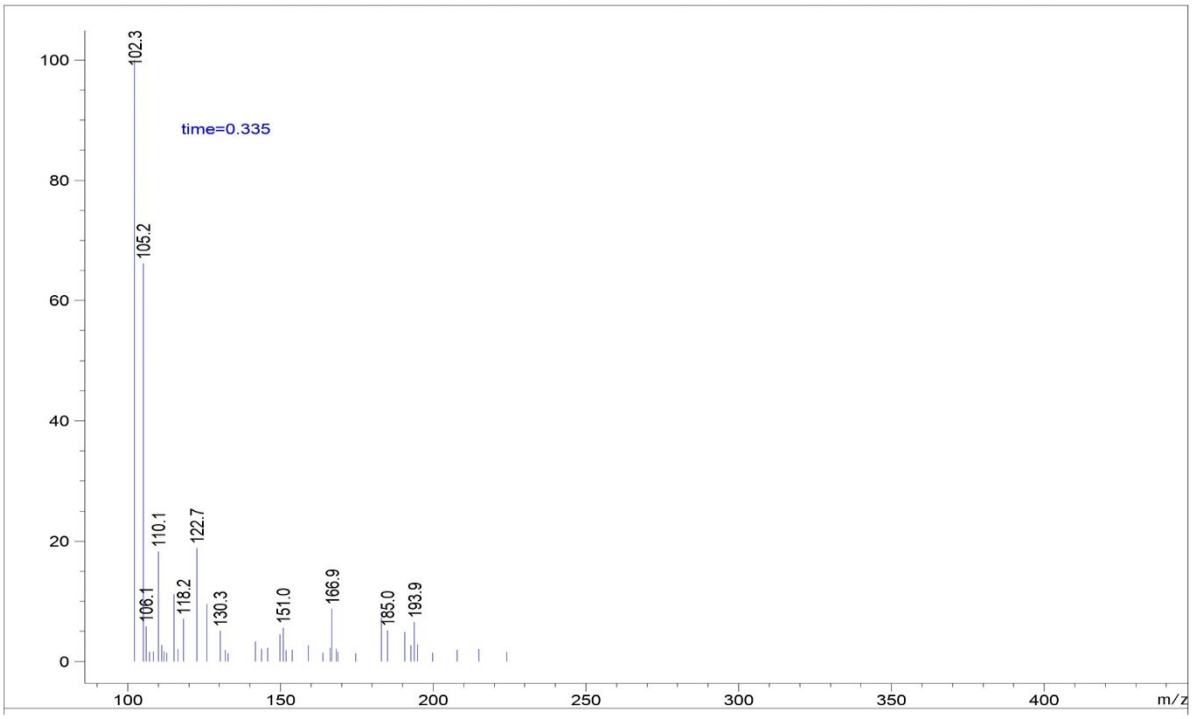


Figure S 6. XRD pattern of the oxidized biochar.

Figure S 7. UV spectrum along with the liquid chromatograms and mass-to-charge ratio spectra of the main photodegradation intermediates of ciprofloxacin generated in the photodegradation reaction catalyzed by the ternary composite (BiOI/MOF/F-BC 10%) at: (a) pH=3, (b) pH=6.2, (c) pH=9, and (d) pH=11.

a) pH=3

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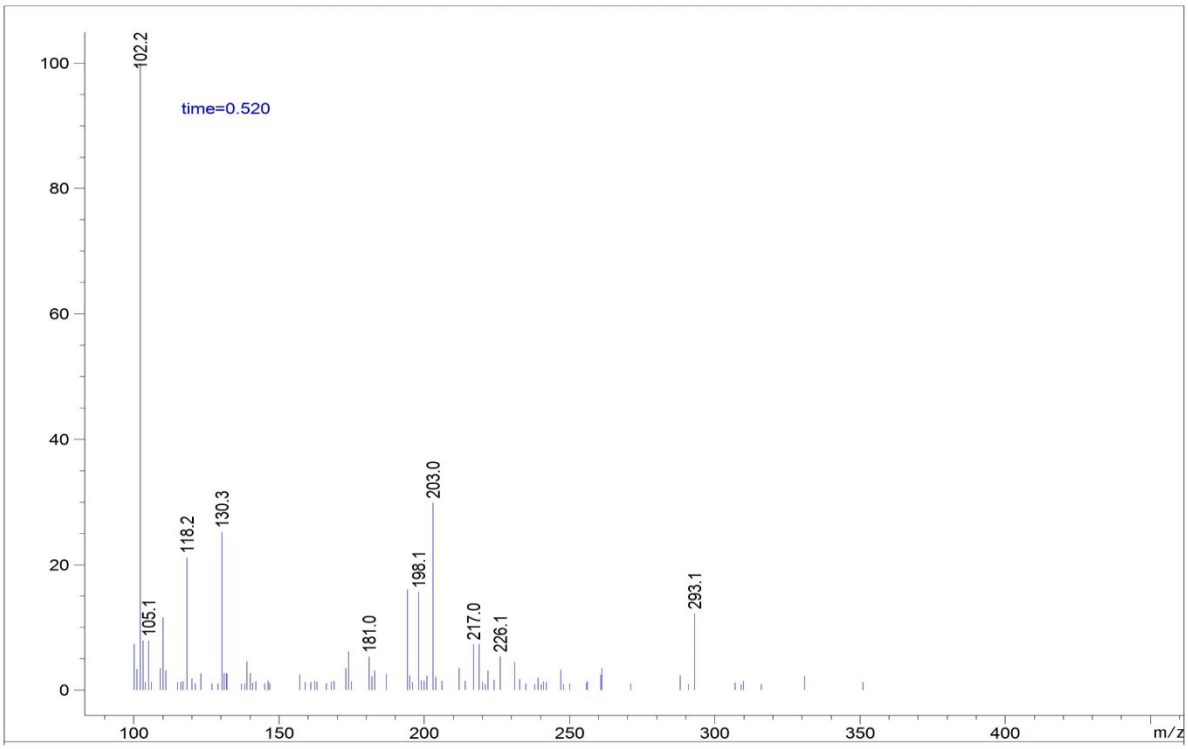
193.9
m/z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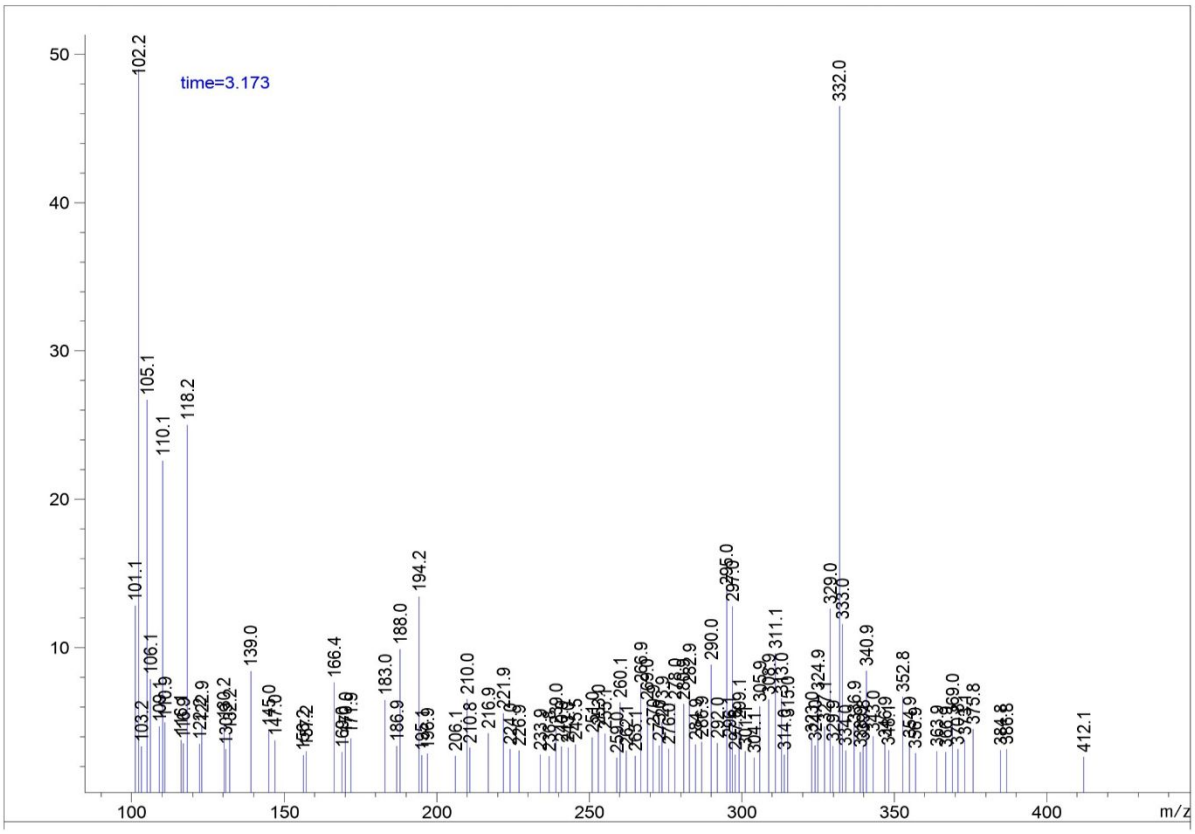

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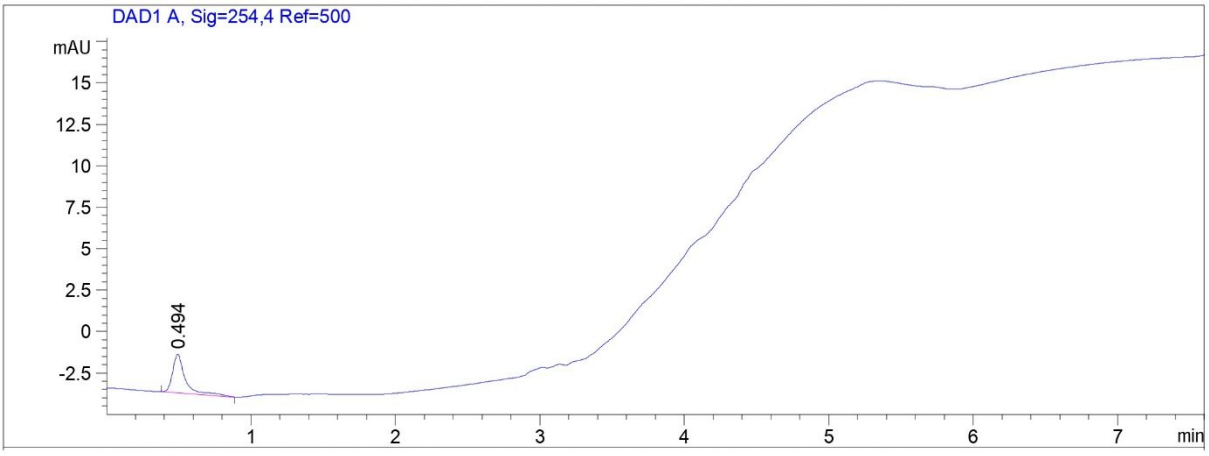

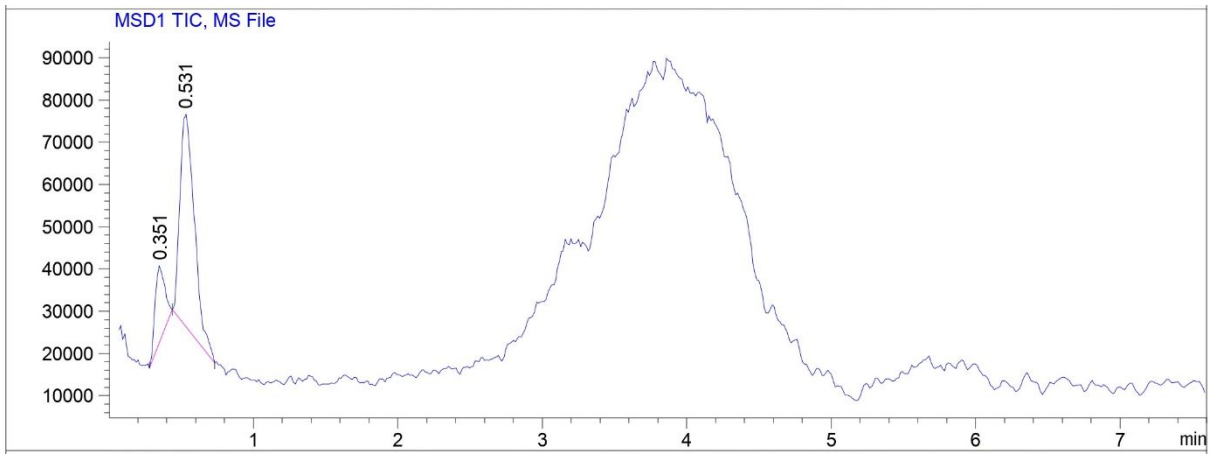
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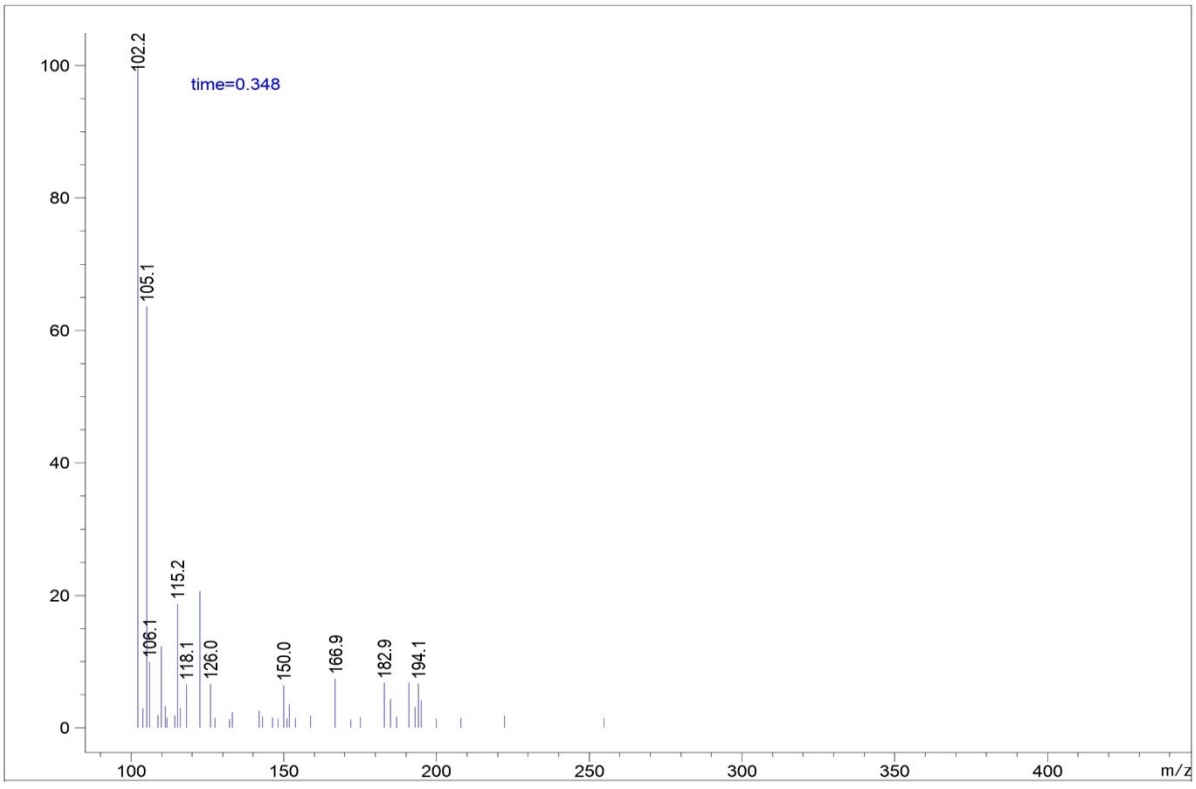
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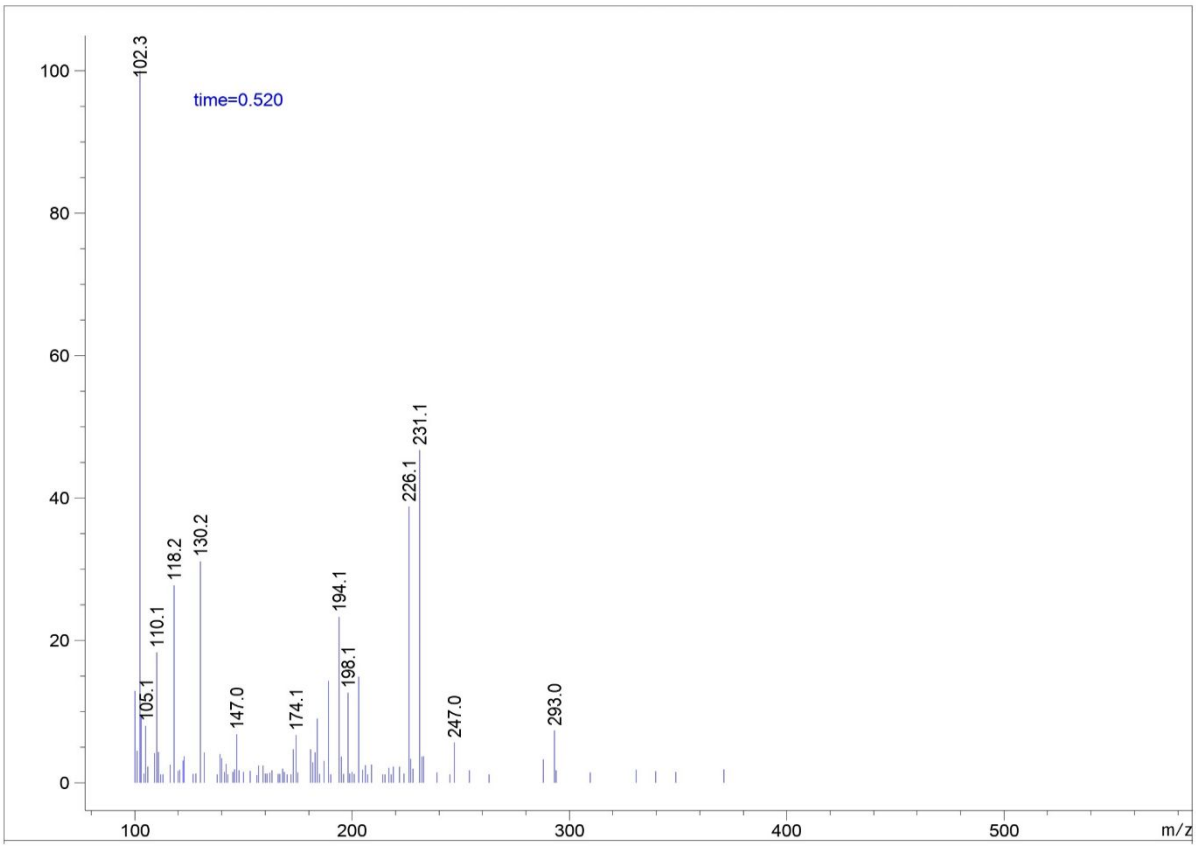
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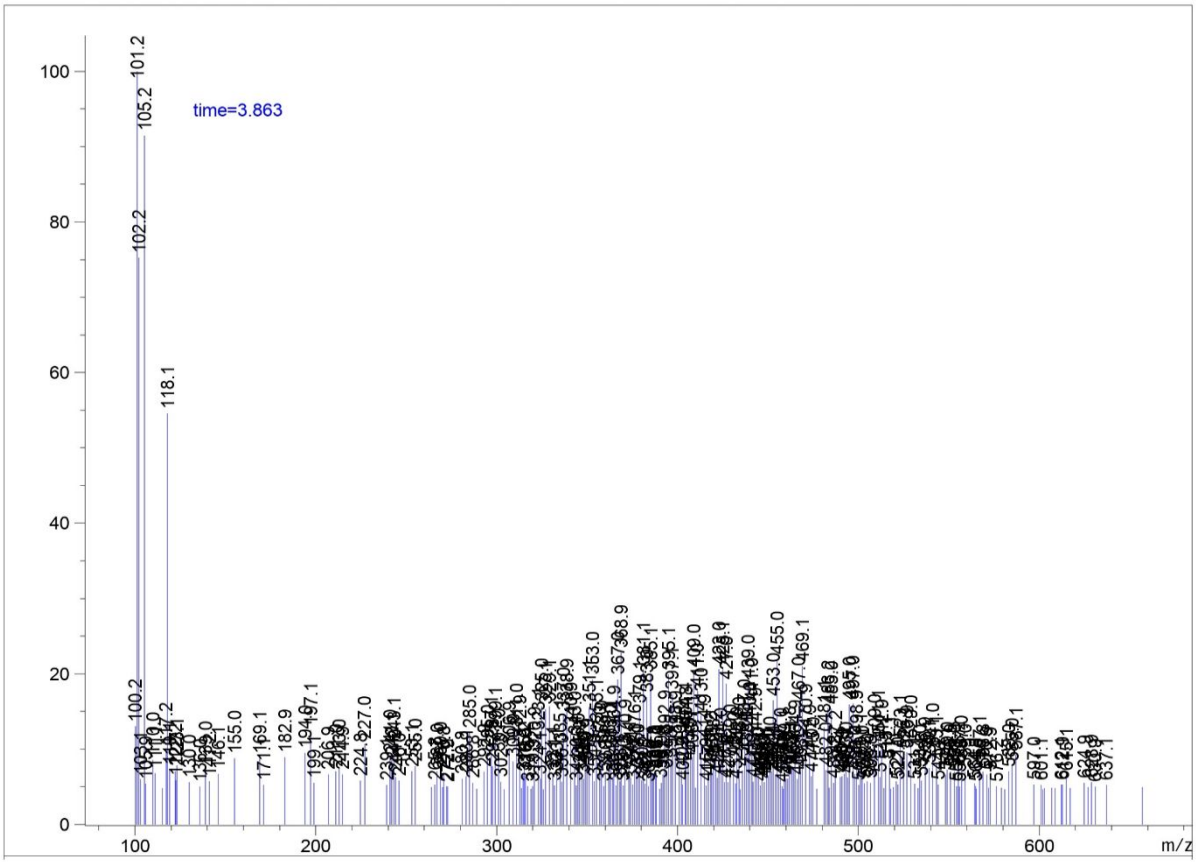
293.0
m/z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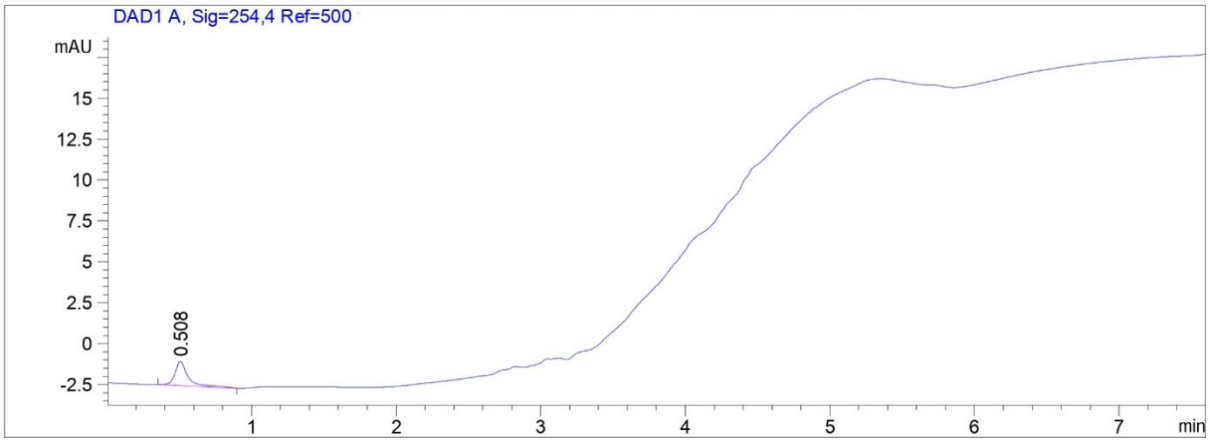
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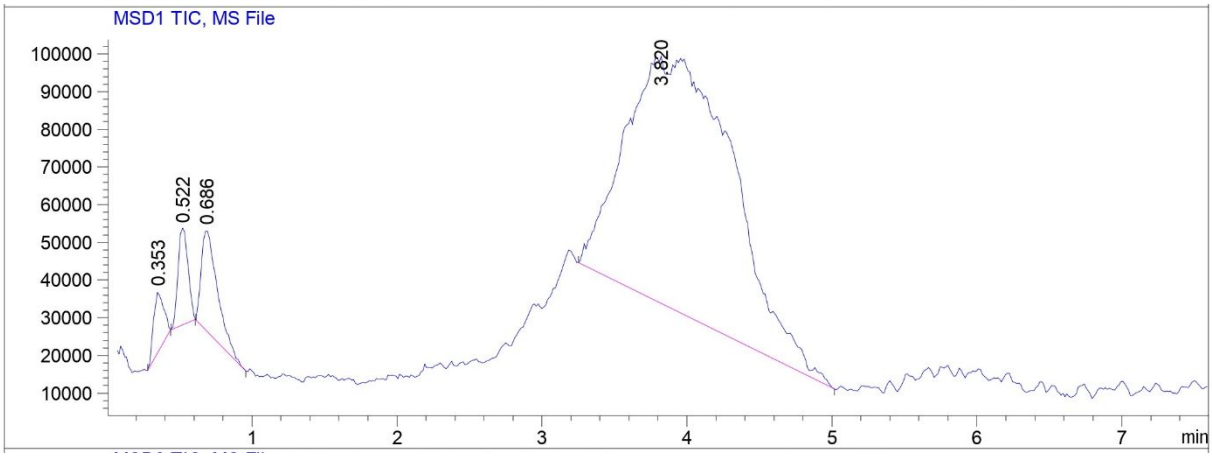
5
6
7
min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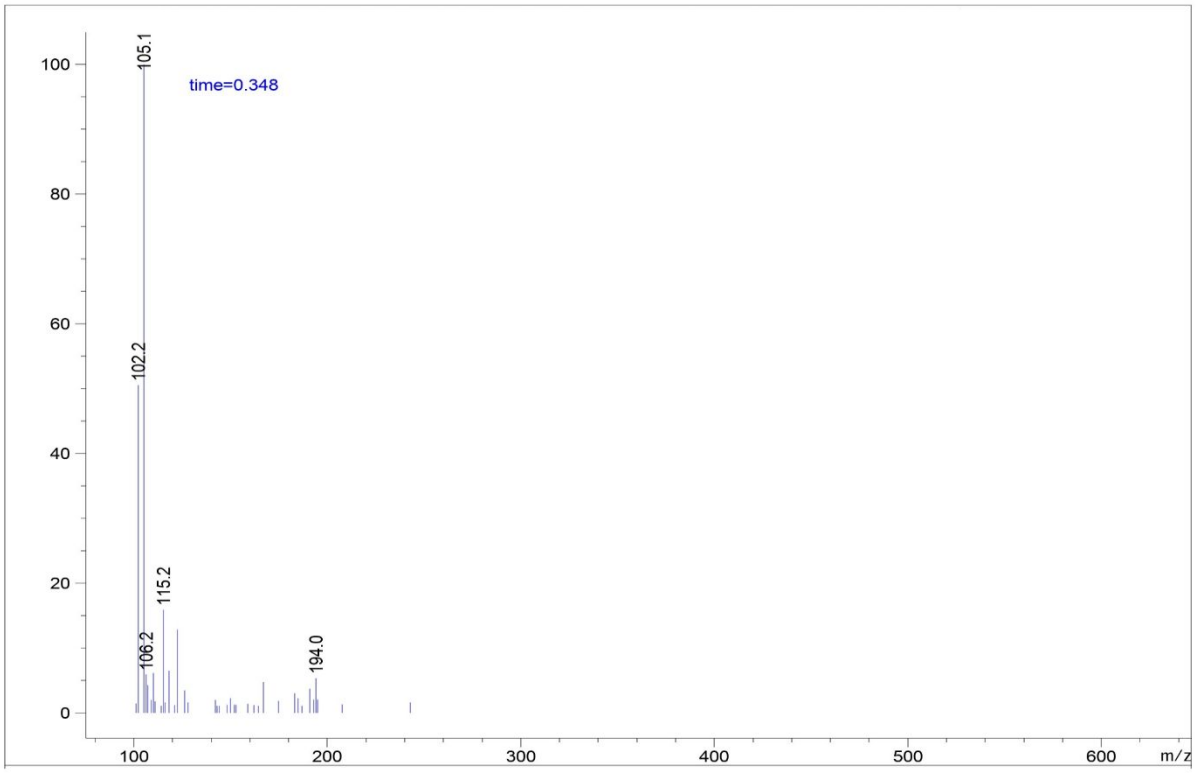
4
5
6
7
min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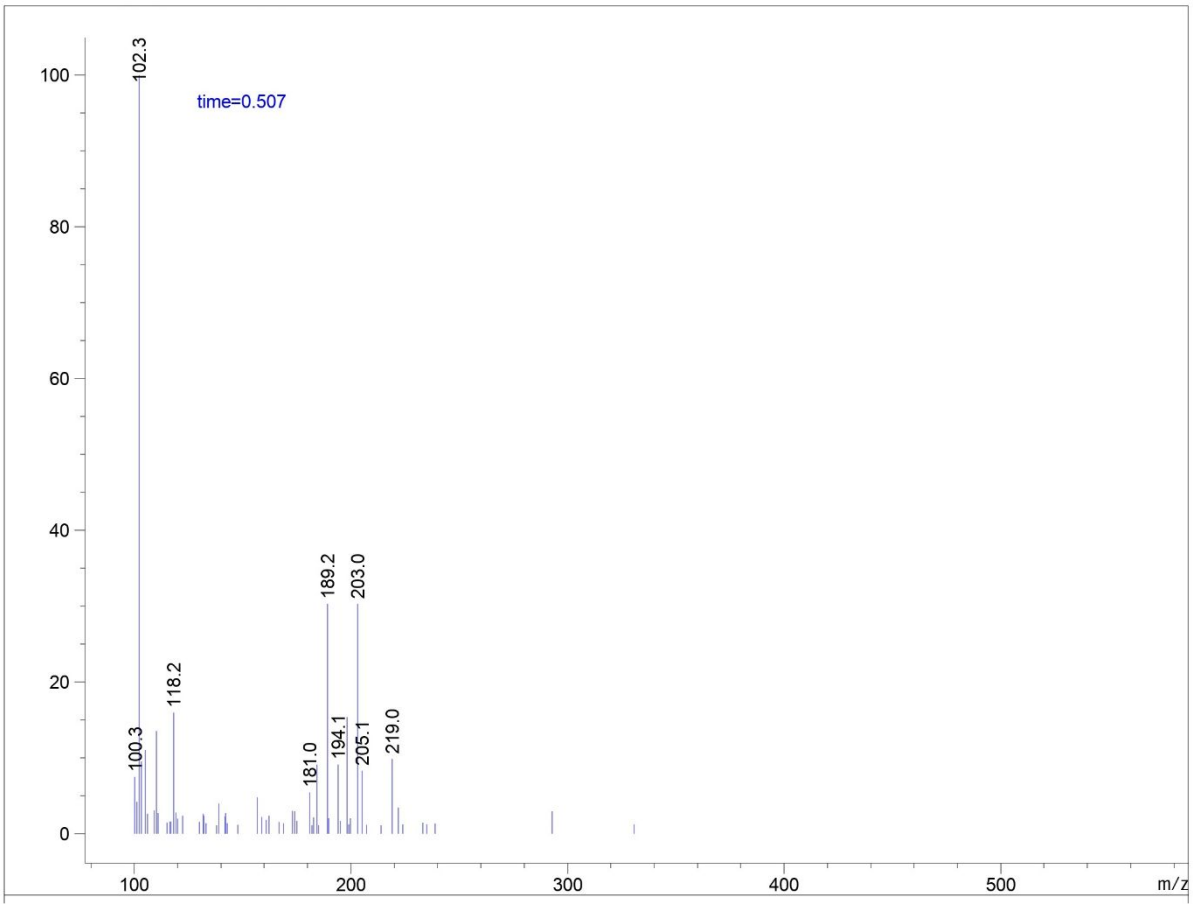
400
500
600
m/z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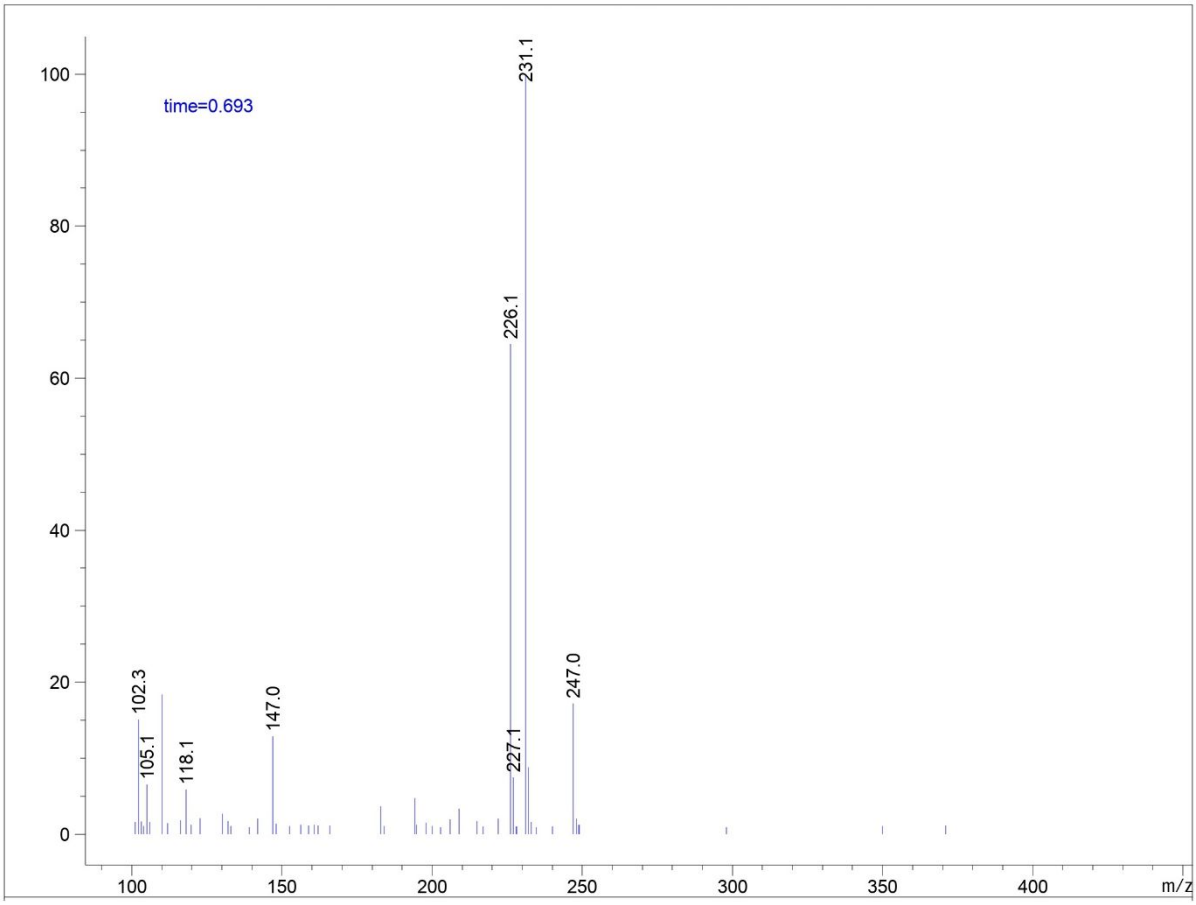
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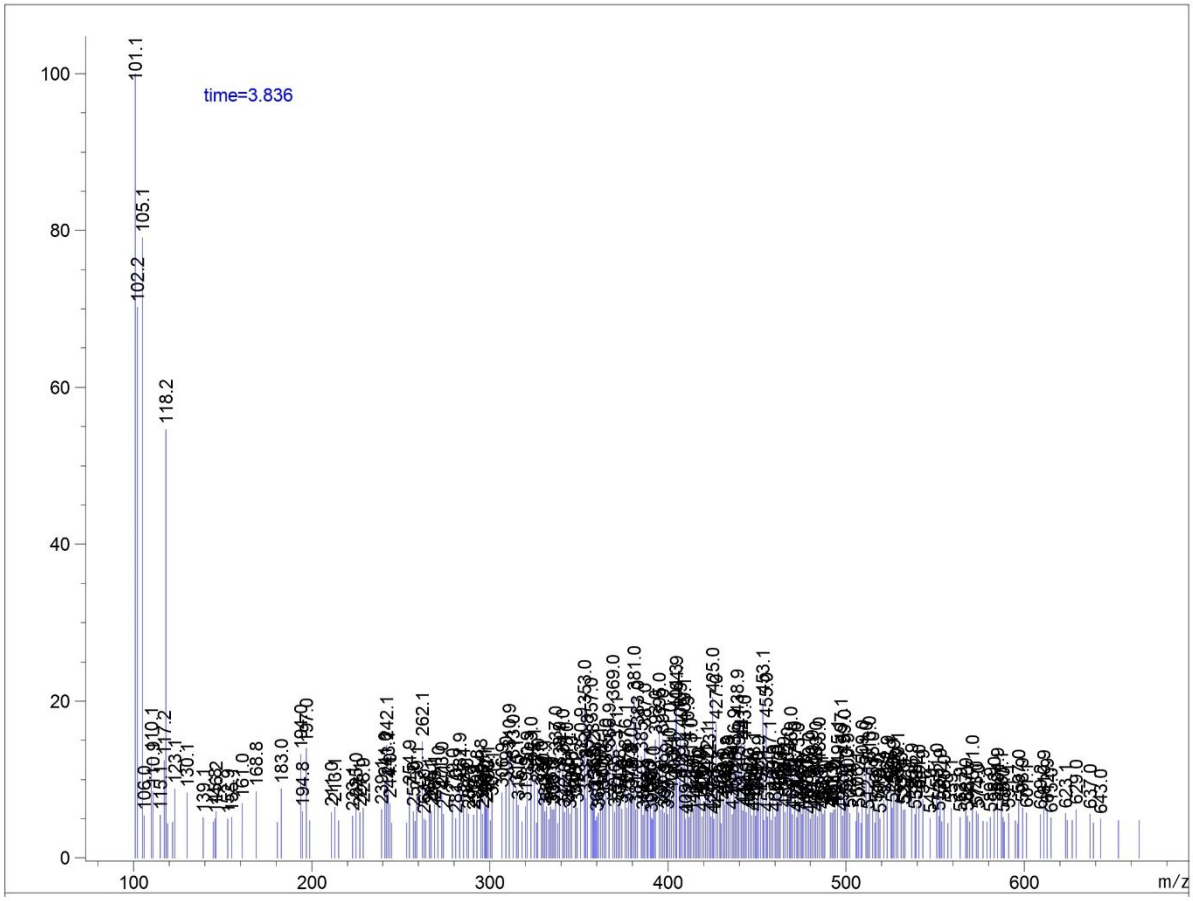
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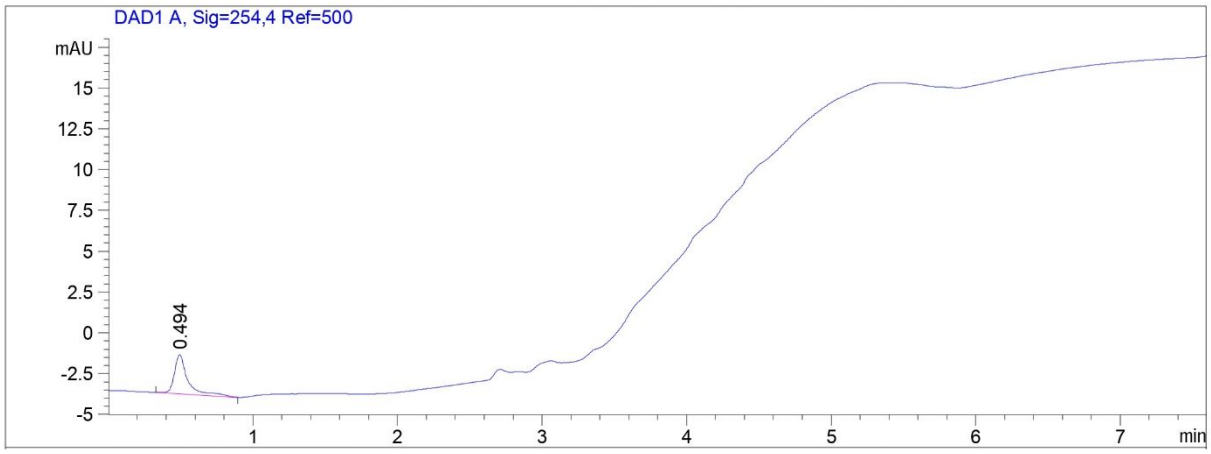
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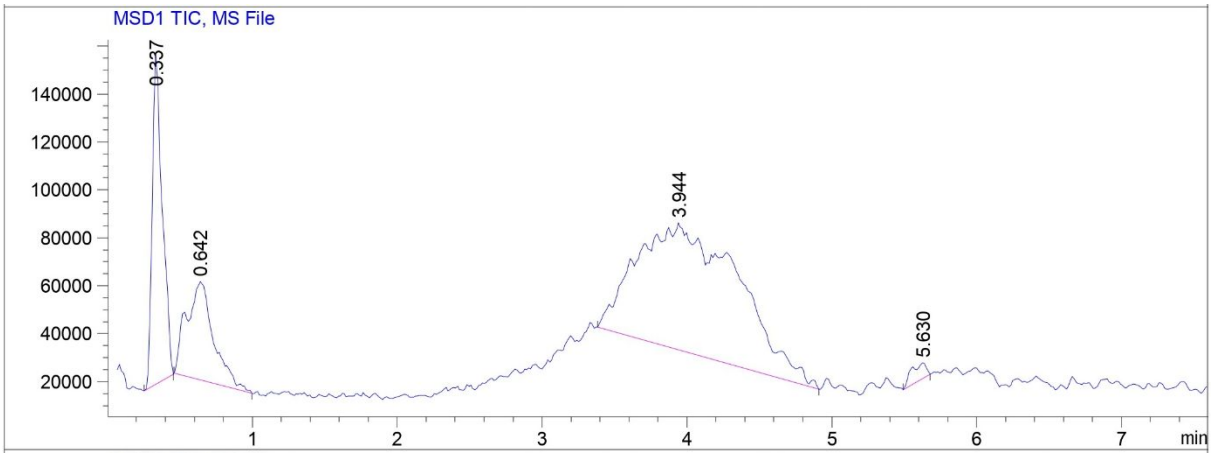
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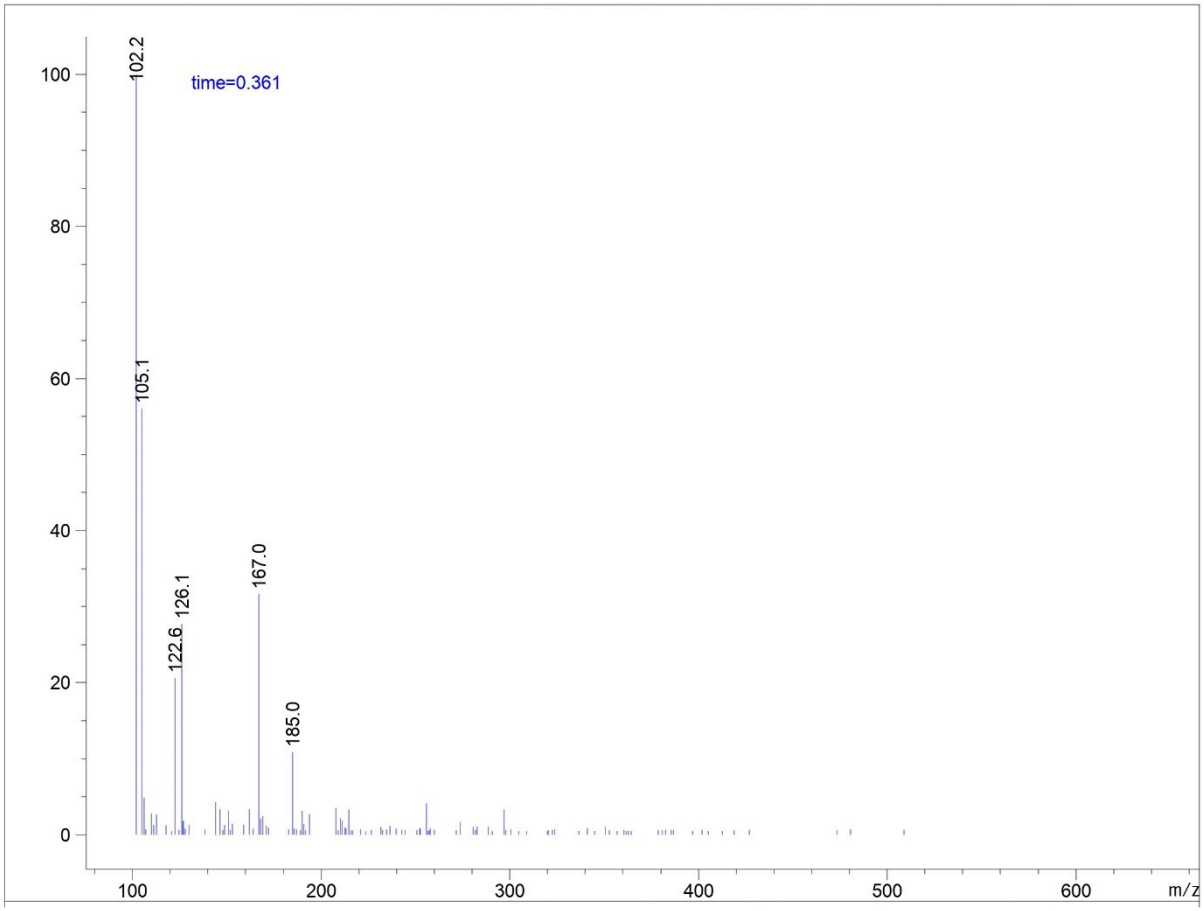
min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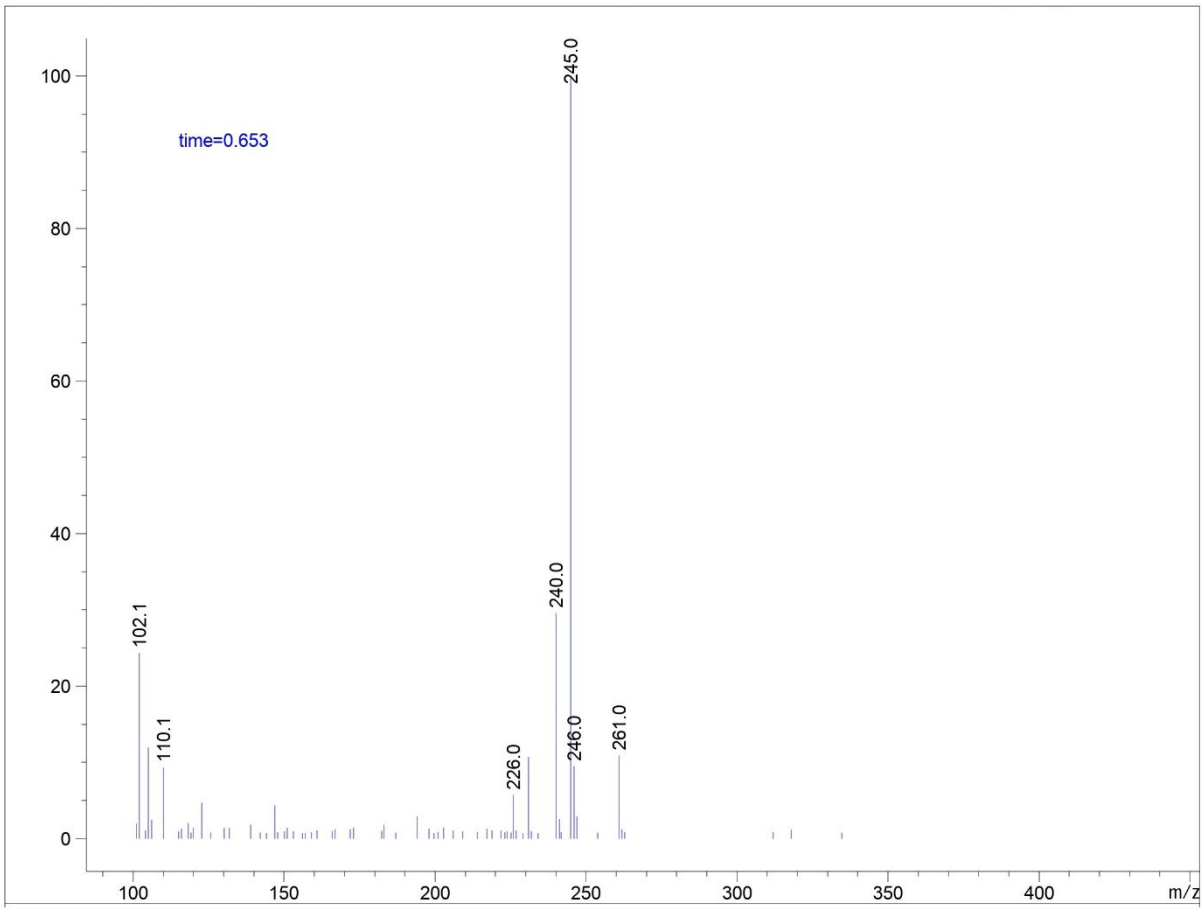
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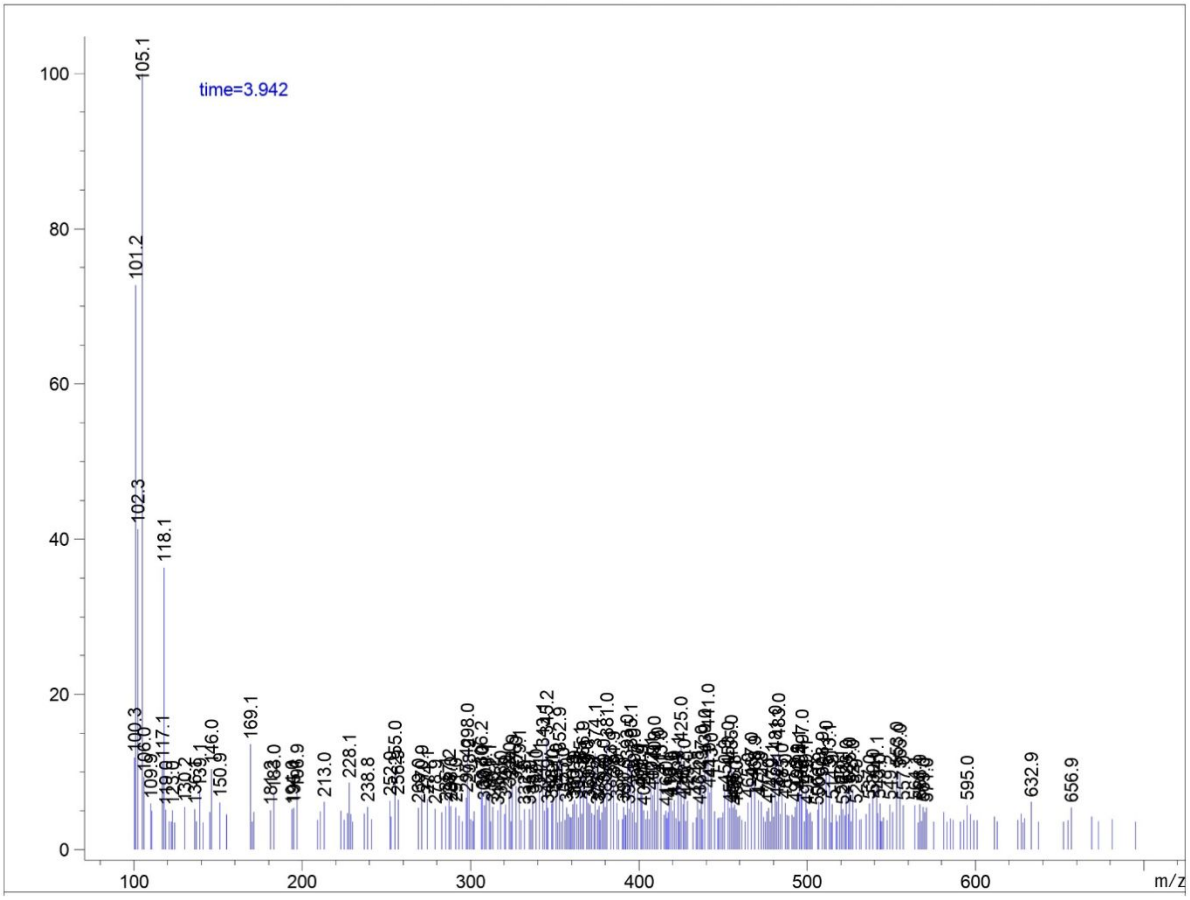
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