

LAMPIRAN

Lampiran 1. Surat Ijin Surat Determinasi



INSTITUT TEKNOLOGI BANDUNG

SEKOLAH ILMU DAN TEKNOLOGI HAYATI

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Nomor : 144/IT1.C11.2/TA.00/2023
Hal : Determinasi tumbuhan

06 Januari 2022

Kepada Yth.
Dekan
Fakultas Farmasi
Universitas Bhakti Kencana
Jalan Soekarno Hatta No. 754
Bandung

Memperhatikan surat permintaan Saudara dalam surat No. 1047/03.FF-03/UBK/XII/2022 tanggal 12 Desember 2022 mengenai determinasi tumbuhan, dengan ini kami sampaikan bahwa setelah dilakukan determinasi oleh staf kami, sampel tumbuhan yang dikirim oleh Sdr. apt. Aris Suhardiman, M.Si (NIK: 0216010091), Tiara Nuraeni (NPM: 191FF03049), dan Tati Maryanti (NPM: 211FF04005), yaitu:

No	Nama sampel	Hasil determinasi	Famili
1	Gaharu	<i>Aquilaria malaccensis</i> Lam.	Thymelaeaceae

Referensi:

- Hou, Ding. (1960). Thymelaeaceae. *Flora Malesiana - Series 1, Spermatophyta*, 6(1), 1–48.

Demikian yang kami sampaikan. Atas perhatian dan kerjasama yang diberikan, kami ucapkan terima kasih.



Wakil Dekan Bidang Sumber Daya,

Dr. Angga Dwiartama
NIP. 198302052012121002

Tembusan:
Dekan SITH ITB, sebagai laporan.

Terakreditasi oleh :



Gambar	Keterangan
	Simplisia daun gaharu di dikeringkan di dalam oven dengan suhu 40 °C.
	Setelah kering dan di sortasi kering kemudian di haluskan menggunakan grinder.
	Simplisia halus ditimbang dan di masukkan kedalam wadah maserat
	Simplisia di maserasi menggunakan pelarut etanol 96% selama 3 hari dan di remaserasi setiap 1 x 24 jam dengan sesekali di aduk.
	

	Penyaringan hasil maserasi
	Filtrat yang didapatkan dari hasil maserasi didapat ± 9 botol
	Dilakukan pemekatan menggunakan rotary dan dilanjutkan penguapan pelarut dengan pemanasan agar didapatkan ekstrak kental.
	Ditimbang cawan kosong dan cawan isi didapatkan 102,21 ekstrak kental dan dihitung rendemen
Rendemen = $\left(\frac{\text{Massa produk yang dihasilkan}}{\text{Massa bahan baku yang digunakan}} \right) \times 100\%$ $= \frac{102,21 \text{ gram}}{1000 \text{ gram}} \times 100\%$ $= 10,221 \%$	

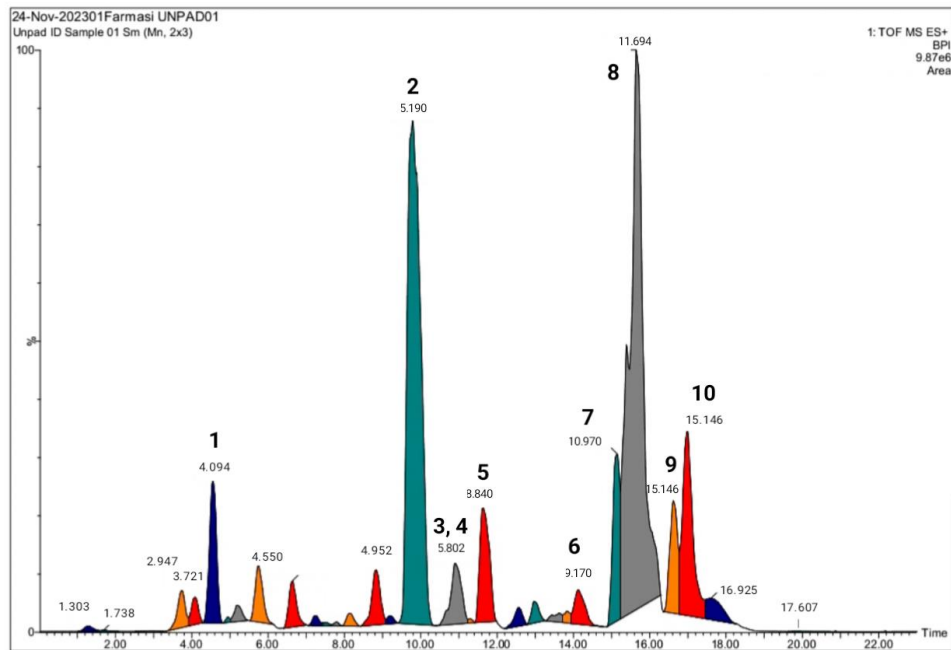
Lampiran 3. Fraksinasi (Ekstrak Cair-Cair)

Gambar	Keterangan
	Ekstrak ditimbang sebanyak 20 gram
	Ekstrak cair-cair dengan pelarut bertingkat n hexan, etil asetat dan etanol air
	Hasil fraksinasi ekstrak cair – cair
	Dilakukan pemekatan menggunakan rotary dan dilanjutkan penguapan pelarut dengan pemanasan agar didapatkan ekstrak kental.
	Fraksi n hexan Ditimbang cawan kosong dan cawan isi didapatkan 3,11 gram fraksi kental dan dihitung rendemen

	Fraksi Etil asetat Ditimbang cawan kosong dan cawan isi didapatkan 4,26 gram fraksi kental dan dihitung rendemen
	Fraksi etanol air Ditimbang cawan kosong dan cawan isi didapatkan 2,12 gram fraksi kental dan dihitung rendemen
Rendemen = $\left(\frac{\text{Massa produk yang dihasilkan}}{\text{Massa bahan baku yang digunakan}} \right) \times 100\%$ Rendemen Fraksi N-hexan $= \frac{3,11 \text{ gram}}{20 \text{ gram}} \times 100\% = 15,55 \%$ Rendemen Fraksi Etil Asetat $= \frac{4,26 \text{ gram}}{20 \text{ gram}} \times 100\% = 21,3 \%$ Rendemen Fraksi Etanol air $= \frac{2,12 \text{ gram}}{20 \text{ gram}} \times 100\% = 10,6 \%$	

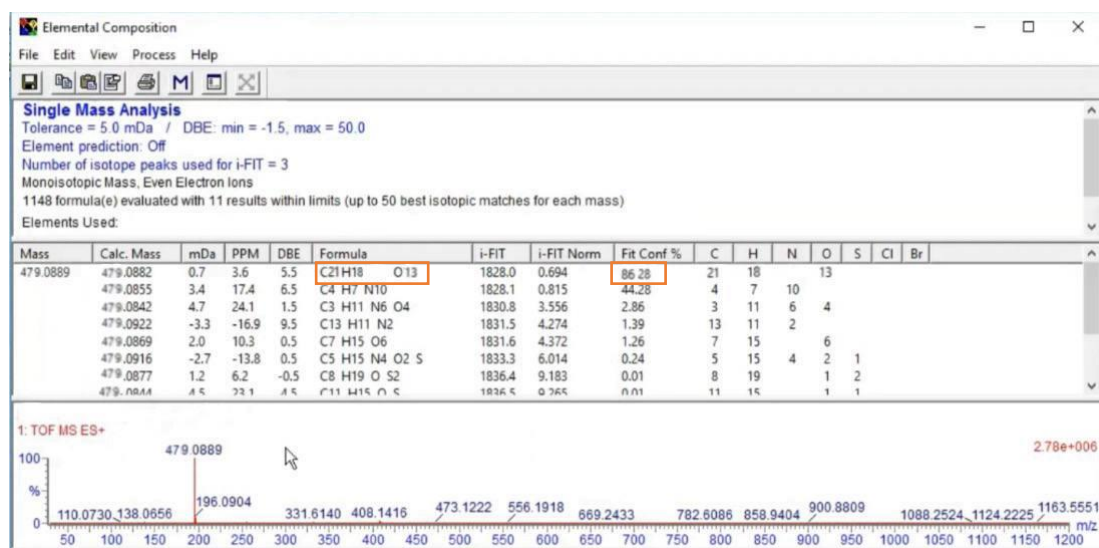
Lampiran 4. Hasil analisis data LCMS/MS pada fraksi etil asetat

Lampiran 4. 1. Hasil Kromatogram



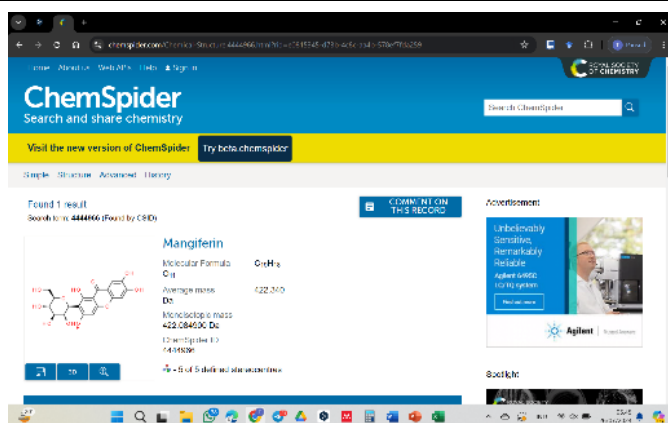
Lampiran 4. 2. Hasil Pencarian elemental compotion fraksi etil asetat

Quercetin 3-O-glucuronide; Miquelianin

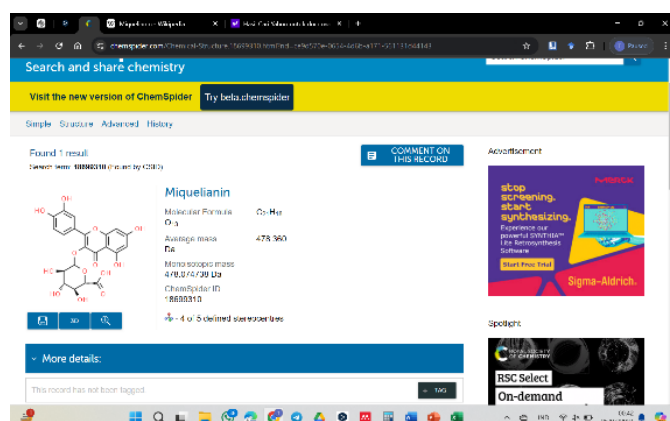
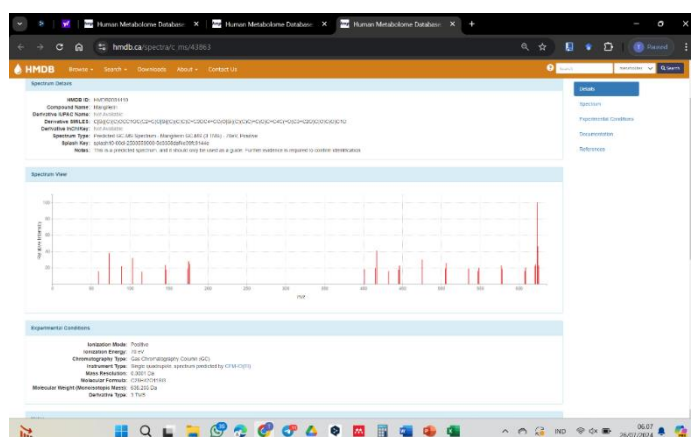


Lampiran 4. 3. Hasil penelusuran dugaan kandungan senyawa yang terdapat pada fraksi etil asetat

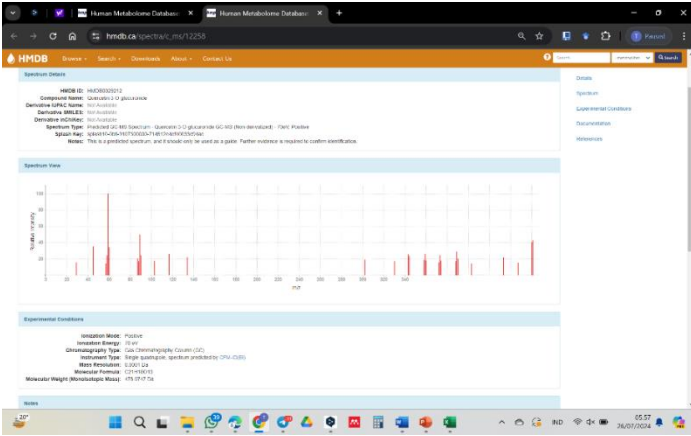
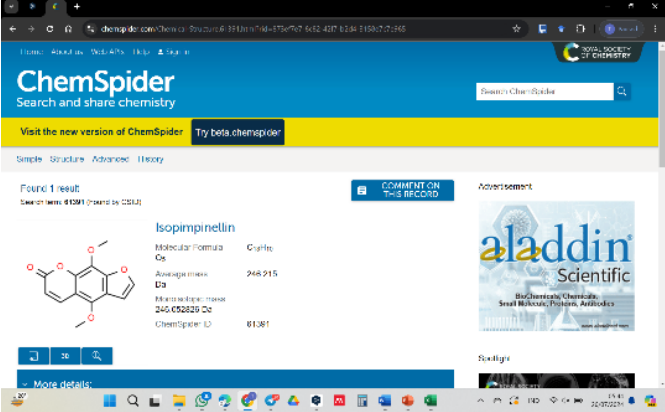
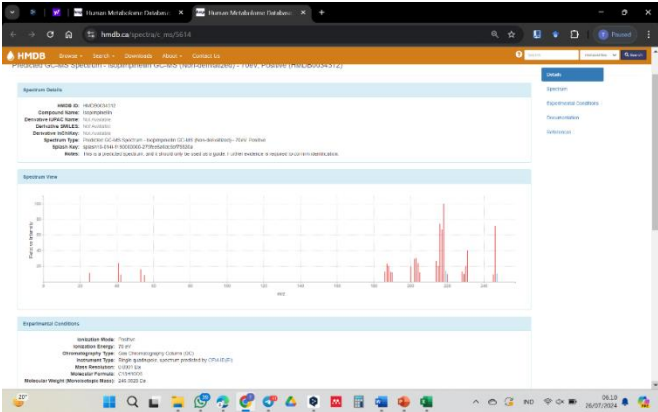
Data Bank ChemSpider dan HMDB

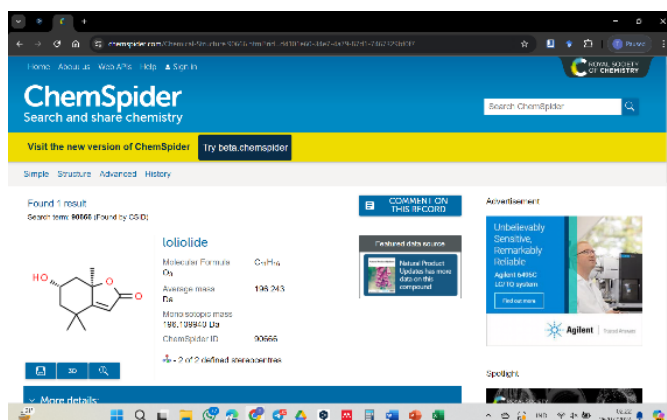


Mangiferin



Quercetin 3-O-glucuronide; (Miquelianin)

	
 	Isopimpinellin



The screenshot shows the ChemSpider website with a search for "Loliolide". The search results display the chemical structure of Loliolide, its molecular formula $C_{15}H_{26}O_3$, average mass 254.37, and monoisotopic mass 254.199913 Da. The ChemSpider ID is 90666. The page also includes a "COMMENT ON THIS RECORD" button, a "Featured data source" section, and an advertisement for Agilent.

ChemSpider
Search and share chemistry

Visit the new version of ChemSpider Try beta.chemspider

Simple Structure Advanced History

Found 1 result
Search term: 90666 (Found by CSID)

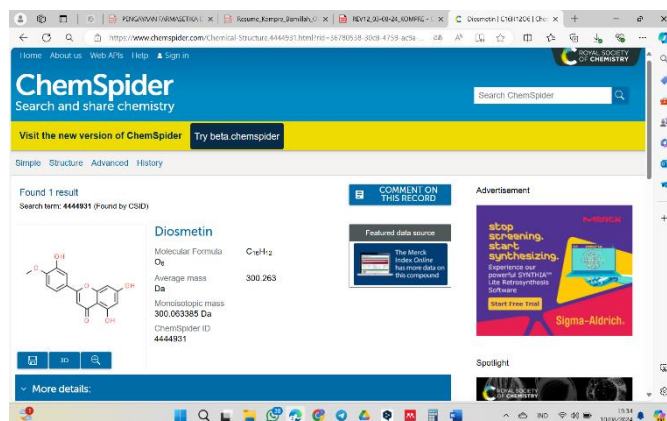
Loliolide

Molecular Formula: $C_{15}H_{26}O_3$
Average mass: 254.37
Monoisotopic mass: 254.199913 Da
ChemSpider ID: 90666

2 of 2 defined stereocentres

More details

Loliolide



The screenshot shows the ChemSpider website with a search for "Diosmetin". The search results display the chemical structure of Diosmetin, its molecular formula $C_{17}H_{12}O_5$, average mass 306.263, and monoisotopic mass 306.063385 Da. The ChemSpider ID is 4444931. The page also includes a "COMMENT ON THIS RECORD" button, a "Featured data source" section, and an advertisement for Sigma-Aldrich.

ChemSpider
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Simple Structure Advanced History

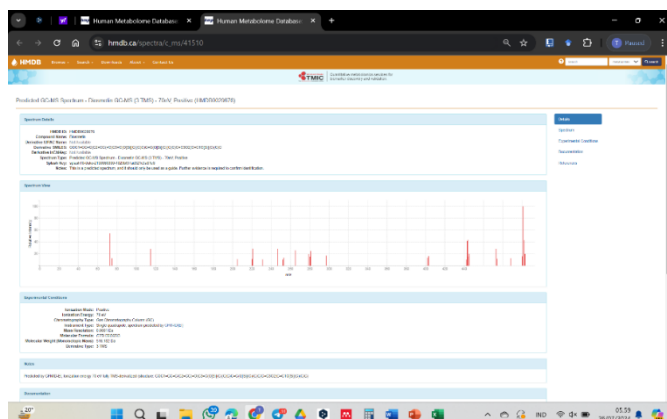
Found 1 result
Search term: 4444931 (Found by CSID)

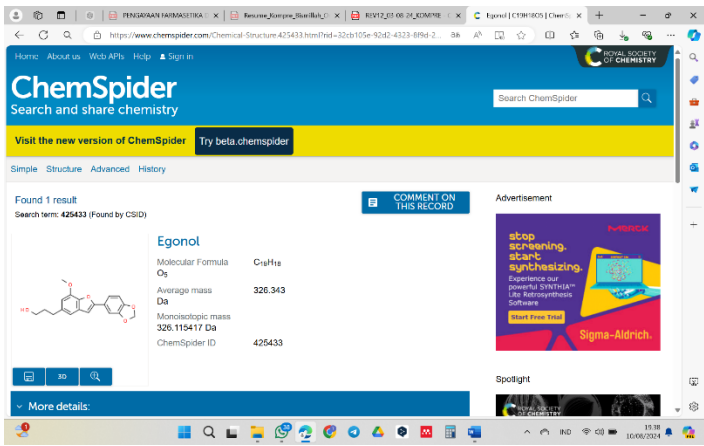
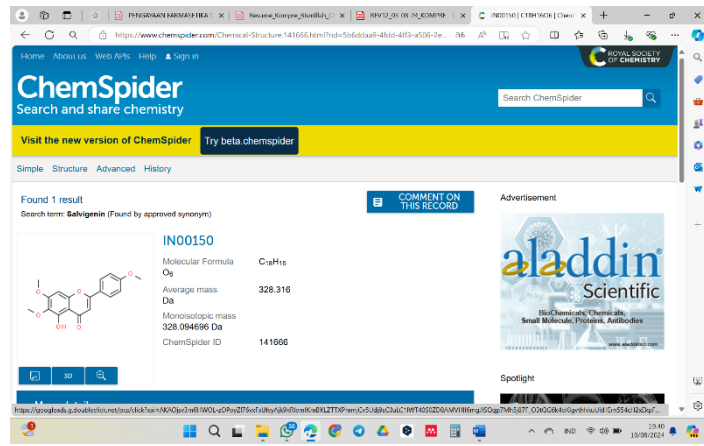
Diosmetin

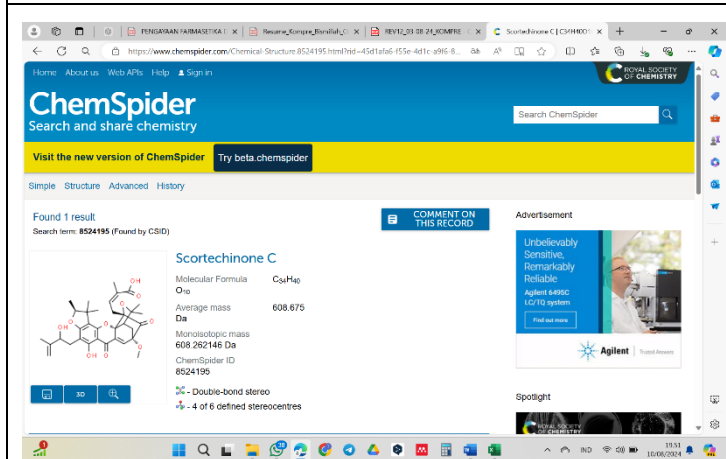
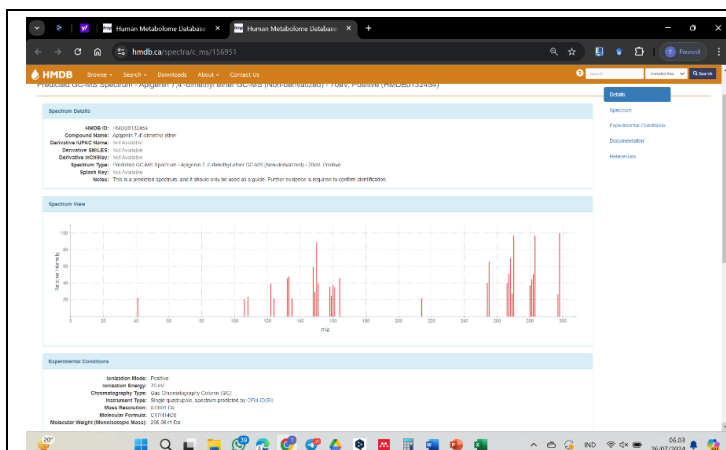
Molecular Formula: $C_{17}H_{12}O_5$
Average mass: 306.263
Monoisotopic mass: 306.063385 Da
ChemSpider ID: 4444931

More details

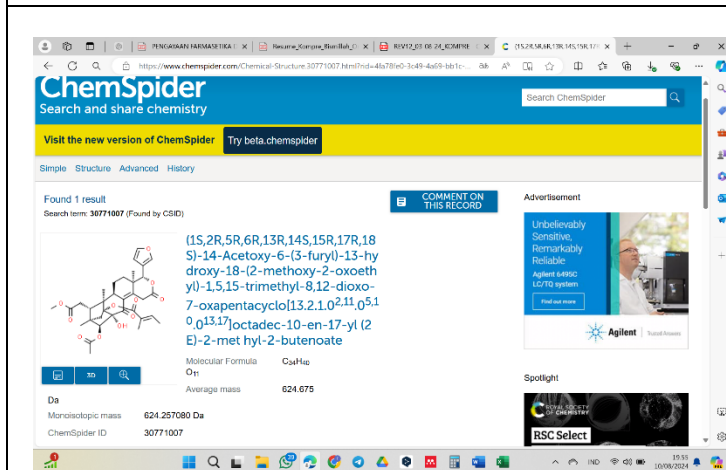
Diosmetin



 ChemSpider Search and share chemistry Visit the new version of ChemSpider Try beta.chemspider Simple Structure Advanced History Found 1 result Search term: 425433 (Found by CSID) Egonol Molecular Formula: C₁₈H₁₈O₅ Average mass: 326.343 Da Monoisotopic mass: 326.115417 Da ChemSpider ID: 425433 More details:	Egonol
 ChemSpider Search and share chemistry Visit the new version of ChemSpider Try beta.chemspider Simple Structure Advanced History Found 1 result Search term: Salviogenin (Found by approved synonym) IN00150 Molecular Formula: C₁₈H₁₈O₅ Average mass: 328.316 Da Monoisotopic mass: 328.094696 Da ChemSpider ID: 141666 More details: This record has not been tagged. Names: Properties Searches Spectra Vendors Analyses More Names and Synonyms: Salviogenin (Type) Validated by Experts, Validated by Users, Non-Validated, Removed by Users 225-887-4 [JWW#001] 4H-1-Benzopyran-4-one, 6-hydroxy-7-methoxy-2-[4-methoxyphenyl]- 4H-1-Benzopyran-4-one, 5-hydroxy-7-methoxy-2-[4-methoxyphenyl]- [AC2X/index Name] 5128-44-9 [CAS] 6-Hydroxy-4,7-dimethoxy-flavone 6-Hydroxy-7-methoxy-2-[4-methoxyphenyl]-4H-chromen-4-one [ChEMBL/ChEMBL Name] 5-Hydroxy-7-methoxy-2-[4-methoxyphenyl]-4H-chromen-4-one [AC2X/UPAC Name] 7,4'-Di-O-methylapigenin Apigenin 7,4'-dimethyl ether More...	Apigenin 7,4'-dimethyl ether



Scortechinone C



thaixylomolin D

Lampiran 4. 4. Data hasil dugaan LCMS/MS fraksi etil asetat

Peak	Retention Time (RT)	% Area	Measured ion Mass	Calculated ion Mass	Ion Formula [M-H] ⁺	Compound	Group	Refference
01	1.303	0.19	409.1086	409.1135	[C ₁₉ H ₂₁ O ₁₀] ⁺	khelloside	Glucoside	ChemSpider ID390535
02	1.303		391.0985	391.1029	[C ₁₉ H ₁₉ O ₉] ⁺	bicyclol	hydrolyzable tannins	ChemSpider ID7997503; HMDB0249191
03	1.738	0.03	268.1017	268.1046	[C ₁₀ H ₁₄ N ₅ O ₄] ⁺	Adenosine	Purine nucleosides	ChemSpider ID54923; HMDB0000050
04	2.947	0.04	158.0805	158.0817	[C ₇ H ₁₂ N ₃ O] ⁺	ACETYL PROLINE	N-acyl-alpha amino acids	ChemSpider ID59528; HMDB0242126
05	3.721	1.18	409.1084	409.1108	[C ₁₅ H ₁₇ N ₆ O ₈] ⁺	N-(2,6-dimethoxy-3-nitrobenzoyl)-N'-(4,6-dimethoxy-1,3,5-triazin-2-yl)urea	nitrobenzamide	ChemSpider ID2079119
06	4.094	0.79	423.0880	423.0927	[C ₁₉ H ₁₉ O ₁₁] ⁺	Mangiferin	xanthones	ChemSpider ID4444966; HMDB0034410
07	4.550	4.05	393.1147	393.1186	[C ₁₉ H ₂₁ O ₉] ⁺	garcimangosone D	phenolic glycosides	ChemSpider ID9178895; HMDB0038066
08	4.550		247.0596	247.0606	[C ₁₃ H ₁₁ O ₅] ⁺	isopimpinellin	8-methoxypsoralens	ChemSpider ID61391; HMDB0034312
09	4.952	0.08	479.1164	479.1190	[C ₂₂ H ₂₃ O ₁₂] ⁺	isorhamnetin 3-glucoside	flavonoid-3-o-glycosides	ChemSpider ID4477169; HMDB0301761

10	4.952		333.1323	333.1338	[C ₁₈ H ₂₁ O ₆] ⁺	Combretastatin A-1	stilbenes	ChemSpider ID4800178 ;HMDB0250412
11	4.952		247.0601	247.0606	[C ₁₃ H ₁₁ O ₅] ⁺	Isopimpinellin; 5,8-Dimethoxy-6,7- furanocoumarin	coumaric acids and derivatives	ChemSpider ID61391; HMDB0034312
12	5.190	0.52	249.1134	249.1127	[C ₁₄ H ₁₇ O ₄] ⁺	Prenyl caffeate	coumaric acids and derivatives	ChemSpider ID113260; HMDB0041140
13	5.190		479.0825	479.0826	[C ₂₁ H ₁₉ O ₁₃] ⁺	Quercetin 3-O-glucuronide; Miquelianin	flavonoid-3-o- glucuronides	ChemSpider ID18699310; HMDB0029212
14	5.802	1.78	435.1291	4345.1291	[C ₂₁ H ₂₃ O ₁₀] ⁺	Prunin	flavanone glycoside	ChemSpider ID83766
15	5.802		285.0771	285.0763	[C ₁₆ H ₁₃ O ₅] ⁺	Glycitein	isoflavones	ChemSpider ID4445116; HMDB0034127
16	5.802		247.0614	247.0606	[C ₁₃ H ₁₁ O ₅] ⁺	Isopimpinellin	psoralens	ChemSpider ID61391; HMDB0034312
17	5.802		197.1185	197.1178	[C ₁₁ H ₁₇ O ₃] ⁺	Loliolide	benzofuran	ChemSpider ID90666; HMDB0302428
18	6.638	1.44	555.1500	555.1503	[C ₂₈ H ₂₇ O ₁₂] ⁺	Methyl 3-[2-(3,4- dihydroxyphenyl)-3,5,7- trihydroxy-4-oxo-4H-chromen- 8-yl]-3-(2,3,4- trimethoxyphenyl)propanoate	Flavonoid	ChemSpider ID29771579
29	7.258	0.27	593.1866	593.1870	[C ₂₈ H ₃₃ O ₁₄] ⁺	Semiaquilinoside; Isomargaritene	Flavonoid	ChemSpider ID103883430
20	7.538	0.07	401.1607	401.1600	[C ₂₂ H ₂₅ O ₇] ⁺	(+)-Aschantin	furanoid lignans.	ChemSpider ID109346; HMDB0341133
21	7.785	0.08	301.0727	301.0712	[C ₁₆ H ₁₃ O ₆] ⁺	Diosmetin;	flavonoids	ChemSpider ID4444931;

						5,7,3'-trihydroxy-4'-methoxyflavone		HMDB0029676
22	8.157	0.38	346.2594	346.2593	[C18H36NO5] ⁺	2-Hydroxyundecanoylcarnitine	fatty acid	HMDB0241149
23	8.840	1.95	301.0729	301.0712	[C16H13O6] ⁺	Diosmetin; 5,7,3'-trihydroxy-4'-methoxyflavone	flavonoids	ChemSpider ID4444931; HMDB0029676
24	9.170	0.21	327.1230	327.1232	[C19H19O5] ⁺	Egonol; 2-(1,3-Benzodioxol-5-yl)-7-methoxy-5-benzofuranpropanol	2-arylbenzofuran flavonoids	ChemSpider ID425433; HMDB0034279
25	9.844	27.31	285.0782	285.0763	[C16H13O5] ⁺	Glycitein	isoflavones	ChemSpider ID4476508; HMDB0005781
26	10.970	2.69	627.2833	627.2805	[C34H43O11] ⁺	xylocarpin G	Terpenoid	ChemSpider ID27023530
27	10.970		329.1037	329.025	[C18H17O6] ⁺	Salvigenin	flavonoids	ChemSpider ID141666; HMDB0128577
28	11.279	0.07	299.2601	299.2586	[C18H35O3] ⁺	Ricinoleic Acid	lipid	ChemSpider ID558800
29	11.694	4.47	299.0932	299.0919	[C17H15O5] ⁺	Apigenin 7,4'-dimethyl ether	Flavonoid	ChemSpider ID4444920; HMDB0132454
30	12.573	0.62	655.3134	655.3118	[C36H47O11] ⁺	Euphorbiaproliferin I	Diterpenoid	ChemSpider ID28431516
31	12.945	0.65	672.4174	672.4170	[C31H62NO14] ⁺	No Information	No Information	No Information
32	13.627	0.34	611.2878	611.2870	[C35H39N4O6] ⁺	Manidipine	Diphenylmethane s	ChemSpider ID3868; HMDB0254323
33	13.824	0.30	623.2512	623.2546	[C40H35N2O5] ⁺	2-(4-Biphenyl)-2-oxoethyl 8-methyl-2-[4-(5-methyl-1,3-dioxooctahydro-2H-isoindol-2-yl)phenyl]-4-quinolinecarboxylate	quinoline	ChemSpider ID2554653

34	14.113	1.48	607.2582	607.2543	[C34H39O10] ⁺	(3S)-3-[(2E)-3-Carboxy-2-buten-1-yl]-7-hydroxy-4-methoxy-1,1,8,8,9-pentamethyl-11-(3-methyl-2-buten-1-yl)-6-oxo-3,6,8,9-tetrahydro-1H-difuro[3,2-b:3',4'-h]xanthene-3-carboxylic acid	xanthone	ChemSpider ID9853575
35	15.146	4.66	609.2726	609.2700	[C34H41O10] ⁺	Scortechinone C	Xanthone	ChemSpider ID8524195
36	15.146		625.2679	625.2649	[C34H41O11] ⁺	thaixylomolin D	Xanthone	ChemSpider ID30771007
37	15.644	31.54	593.2772	593.2751	[C34H41O9] ⁺	Scortechinone F	xanthone	ChemSpider ID10140412
38	16.615	3.51	637.3041	637.3013	[C36H45O10] ⁺	Ethyl (4Z,6E)-5-hydroxy-7-[3-methoxy-4-(tetrahydro-2H-pyran-2-yloxy)phenyl]-4-[(2E)-3-[3-methoxy-4-(tetrahydro-2H-pyran-2-yloxy)phenyl]-2-propenoyl]-4,6-heptadienoate	Esters,lipid	ChemSpider ID9853742
39	16.925	7.84	621.3095	621.3090	[C38H37N8O] ⁺	2,2'-(2,5-Furandiyl)-4,1-phenylenebis(N'-isopropyl-1H-benzimidazole-6-carboximidamide)	Lipid	ChemSpider ID404881
40	17.607	1.40	878.8001	878.7971	[C52H111NO4SP] ⁺	No Information	No Information	No Information

Lampiran 5. Hasil Optimasi Fitosom**Lampiran 5. 1** Uji pendahuluan kelarutan ekstrak dalam dmso dan diklorometana

Perhitungan dan pembuatan kurva baku kurkumin

Larutan Induk

$$\begin{aligned}
 \text{Konsentrasi Larutan} &= \frac{\text{Bobot sampel}}{\text{Volume}} \\
 \text{ppm} &= \frac{50\text{mg}}{50\text{ml}} \times 1000\text{ppm} \\
 &= 1000 \text{ ppm}
 \end{aligned}$$

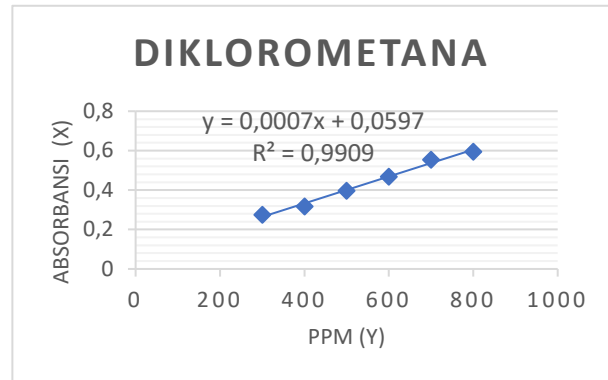
Pengenceran $V_1 \times C_1 = V_2 \times C_2$

- a. Konsentrasi 300ppm
 $V_1 \times 1000 \text{ ppm} = 5 \text{ ml} \times 300 \text{ ppm}$
 $= \frac{1500}{1000} = 1,5 \text{ ml}$
- b. Konsentrasi 400ppm
 $V_1 \times 1000 \text{ ppm} = 5 \text{ ml} \times 400 \text{ ppm}$
 $= \frac{2000}{1000} = 2 \text{ ml}$
- c. Konsentrasi 500ppm
 $V_1 \times 1000 \text{ ppm} = 5 \text{ ml} \times 500 \text{ ppm}$
 $= \frac{2500}{1000} = 2,5 \text{ ml}$
- d. Konsentrasi 600ppm
 $V_1 \times 1000 \text{ ppm} = 5 \text{ ml} \times 600 \text{ ppm}$
 $= \frac{3000}{1000} = 3 \text{ ml}$
- e. Konsentrasi 700ppm
 $V_1 \times 1000 \text{ ppm} = 5 \text{ ml} \times 700 \text{ ppm}$
 $= \frac{3500}{1000} = 3,5 \text{ ml}$
- f. Konsentrasi 800ppm
 $V_1 \times 1000 \text{ ppm} = 5 \text{ ml} \times 800 \text{ ppm}$

$$= \frac{4000}{1000} = 4 \text{ ml}$$

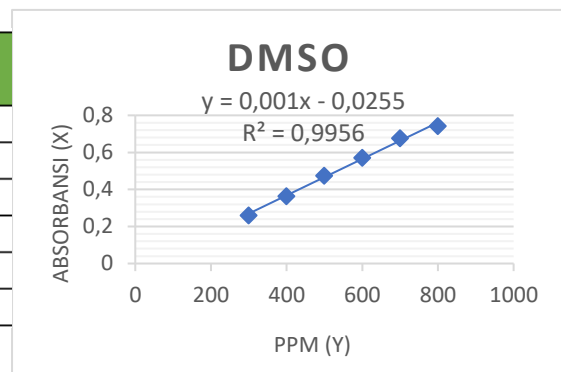
Kurva Kalibrasi Kelarutan

Diklorometana + Sampel ekstrak		
No.	ppm (X)	Abs (Y)
1	300	0,275
2	400	0,318
3	500	0,397
4	600	0,468
5	700	0,555
6	800	0,596



kons	abs	C(ppm)	Fp	C'(ppm)	Vol (ml)	mcg	mg	mg/ml
800	0,596	766,143	250	191535,7143	10	1915357,143	1915,36	19,15357143
vol diklorometana yang diperlukan untuk melarutkan 1mg ekstrak =								0,0522
Vol diklorometan yang diperlukan untuk melarutkan 1 g ekstrak =								52,2

DMSO + Sampel		
	ppm (C)	Abs (Y)
1	300	0,261
2	400	0,365
3	500	0,476
4	600	0,572
5	700	0,677
6	800	0,743



kons	abs	C(ppm)	Fp	C'(ppm)	Vol (ml)	mcg	mg	mg/ml
800	0,743	717,510	250	179377,5	25	4484437,5	4484,44	44,844375
vol DMSO yang diperlukan untuk melarutkan 1mg ekstrak =								0,0222
Vol DMSO yang diperlukan untuk melarutkan 1 g ekstrak =								22,2

$$S = \frac{V}{m} \times 100$$

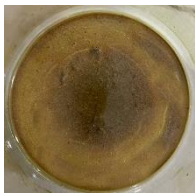
- S adalah kelarutan dalam gram per 100 mL (g/100 mL).
- M adalah massa zat terlarut dalam gram.
- V adalah volume pelarut dalam mL.

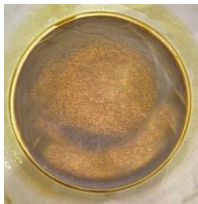
Lampiran 5. 2 Optimasi fitosom

Keterangan		Gambar	
Optimasi Ke 1			
Ekstrak	: 1:3		
Pelarut	: 20 mL diklorometan		
Suhu reflux	: -		
Rotary	: Dipekatkan ± 10 mL, 50 °C	Pemekatan	Setelah di rotary
Magnetic Stirrer	: 20 mL dalam 10 - N-hexan menit		
Waktu Pengendapan	: 3 jam		
Hasil	: Ekstrak kental, hijau kehitaman	Setelah pengendapan	Hasil akhir

Optimasi Ke 2			
Ekstrak	: 1:3		
Pelarut	: 20 mL diklorometan		
Suhu reflux	: -		
Rotary	: Dipekatkan ± 10 mL, 50 °C	Hasil rotary	Hasil pengendapan
Magnetic Stirrer	: 20 mL dalam 10 - N-hexan menit		
Waktu Pengendapan	: 2 jam		
Hasil	: Ekstrak kental, hijau kehitaman	Hasil akhir	

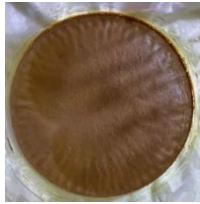
Optimasi Ke 3			
Fraksi etil	: 1:3		
Pelarut	: 20 mL diklorometan		
Suhu reflux	: -		
Rotary	: Dipekatkan ± 10 mL, 50 °C		Hasil akhir
Magnetic Stirrer	: 20 mL dalam 10 - N-hexan menit		
Waktu Pengendapan	: 2 jam		
Hasil	: Ekstrak kental, hijau kehitaman		

Optimasi ke 4, 5, 6, dan 8			
Ekstrak	1:3		
Pelarut	20 mL diklorometan		
Suhu reflux	-		
Magnetic Stirer, N-hexan	20 mL dalam 10 menit	Endapan opt 4	Endapan opt 5
Waktu Pengendapan	2 jam		
Hasil	Optimasi 4 dan 8, Serbuk berwarna coklat		
	Optimasi 5 dan 6, Serbuk berwarna coklat kehitaman	Endapan opt 6	Endapan opt 8
Hasil akhir			

Optimasi ke 7			
Ekstrak	1:3		
Pelarut	20 mL diklorometan		
Suhu reflux	- (heating mentel 2lt)		
Magnetic Stirer - N-hexan	20 mL dalam 10 menit		
Waktu Pengendapan	2 jam		
Hasil	Granul berwarna hitam	Hasil pengendapan	Hasil akhir

Optimasi ke 9				
Fraksi Etanol : air (3 :1)				
Pelarut	:	diklorometana	Etanol dan/atau metanol	DMSO
Endapan n-hexan	:	-	Tidak terbentuk endapan, terbentuk 2 fase	Tidak terbentuk endapan, terbentuk 2 fase
Hasil akhir		Tidak larut	larut	larut

Optimasi 9, 10 dan 11				
Pelarut	:	30 mL diklorometan		
Suhu reflux	:	-		
Magnetic stirrer, N-hexan	:	20 mL dalam 10 menit		
Waktu pengendapan	:	1,5 jam	Endapan opt 9	Endapan opt 10
Hasil akhir	:	Serbuk berwarna coklat, memiliki warna yang berbeda satu sama lain.		
			Endapan opt 11	Hasil akhir

Optimasi ke 12				
Ekstrak	:	1:3		
Pelarut	:	30mL diklorometan		
Suhu reflux	:	40°C		
Magnetic stirrer, N-hexan	:	20 mL dalam 10 menit	endapan	Hasil akhir
Waktu pengendapan	:	1 jam		

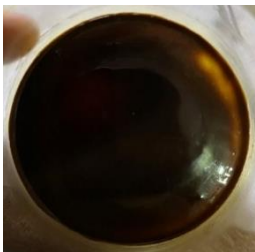
Hasil akhir	:	terbentuk serbuk.		

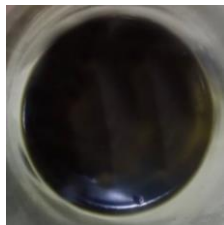
Optimasi ke 13 dan 15				
Ekstrak	:	1:1		
Fraksi	:	1:1		
Pelarut	:	30mL diklorometana		
Suhu reflux	:	40°C		
Magnetic stirrer, N-hexan	:	20mL dalam 10 menit		
Waktu pengendapan	:	1,5 jam		
Hasil akhir	:	Granul berwarna hitam		

Optimasi ke 16,17 & 18				
Ekstrak	:	1:3		
Pelarut	:	30mL diklorometana		
Suhu reflux	:	40°C		
Waktu melarutkan	:	10 menit		
Magnetic stirrer, N-hexan	:	20mL dalam 10 menit	Endapan opt 16	Endapan opt 17
Waktu pengendapan	:	1,5 jam		
Hasil akhir	:	Sebuk berwarna coklat	Endapan opt 18	Hasil Akhir opt 16
				

Hasil Akhir opt 17	Hasil Akhir opt 18
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Optimasi ke 19				
Fraksi etil asetat	:	1:3		
Pelarut	:	30mL diklorometana		
Suhu reflux	:	40°C		
Magnetic stirrer, N-hexan	:	20mL dalam 10 menit	Hasil akhir	
Waktu pengendapan	:	1,5 jam		
Hasil akhir	:	Serbuk berwarna coklat kehitaman		

Optimasi ke 20				
Pelarut	:	30 mL diklorometana		
Suhu reflux	:	40°C		
Magnetic stirrer, N-hexan	:	20mL dalam 10 menit		
Waktu pengendapan	:	3 jam		
Hasil akhir	:	Endapan berwarna coklat kehitaman, berbentuk ekstrak kental	Pengendapan N-hexan	

Optimasi ke 21				
Pelarut	:	30mL diklorometana		
Suhu reflux	:	40°C		
N-hexan	:	-		
Magnetic stirrer	:	10 menit		
Waktu pengendapan	:	1,5 jam		Hasil pengendapan tanpa N-hexan

Lampiran 6. Uji Karakteristik Fitosom

Lampiran 6. 1 Perhitungan %EE

a. Konsentrasi Larutan

$$\text{Konsentrasi} = \frac{y-a}{b}$$

b. Bobot Zat Aktif bebas

Bobot Zat aktif bebas = Konsentrasi x Volume x Faktor Pengenceran

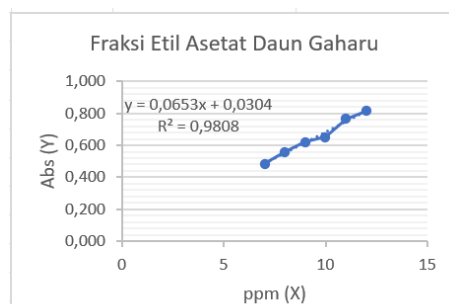
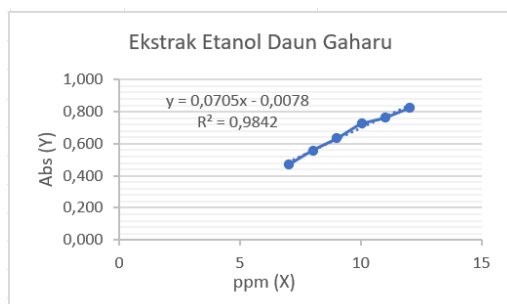
c. Rumus %EE

$$\%EE = \frac{\text{Total Zat Aktif} - \text{Zat Aktif bebas}}{\text{total zat aktif}} \times 100\%$$

d. Kurva Kalibrasi

Ekstrak Etanol Daun Gaharu		
No.	ppm (X)	Abs (Y)
1	7	0,468
2	8	0,561
3	9	0,633
4	10	0,725
5	11	0,761
6	12	0,824

Fraksi Etil Asetat Daun Gaharu		
No.	ppm (X)	Abs (Y)
1	7	0,487
2	8	0,562
3	9	0,622
4	10	0,651
5	11	0,766
6	12	0,815



PENGUJIAN %EE EKSTRAK DAN FRAKSI

Sampel		b	a					
Ekstrak Etanol Daun Gaharu		0,0705	0,0078					
Fraksi Etil Asetat Daun Gaharu		0,0653	0,0304					
Formula	Abs	C (ppm)	Fp	C' (ppm)	Vol (mL)	mcg	mg	%EE
Ekstrak Etanol 1:1	0,012	0,062	5	0,311	5	1,553191489	0,002	99,98964539
Ekstrak Etanol 1:2	0,211	2,875	5	14,38	5	71,88297872	0,072	99,52078014
Ekstrak Etanol 1:3	0,690	9,677	5	48,38	5	241,9219858	0,242	98,38718676
Fraksi Etil Asetat 1:1	0,137	1,637	5	8,185	5	40,92649311	0,041	99,72715671
Fraksi Etil Asetat 1:2	0,177	2,246	5	11,23	5	56,14854518	0,056	99,62567637
Fraksi Etil Asetat 1:3	0,198	2,571	5	12,85	5	64,26875957	0,064	99,57154160

PENGUJIAN %EE EKSTRAK DAN FRAKSI 50oC

Formula	Abs	C (ppm)	Fp	C' (ppm)	Vol (mL)	mcg	mg	%EE
Ekstrak Etanol 1:1	0,033	0,357	5	1,787	5	8,936170213	0,009	99,94042553
Ekstrak Etanol 1:2	0,015	0,102	5	0,51	5	2,553191489	0,003	99,98297872
Ekstrak Etanol 1:3	0,037	0,414	5	2,07	5	10,35460993	0,010	99,93096927
Fraksi Etil Asetat 1:1	0,131	1,541	5	7,703	5	38,51454824	0,039	99,74323635
Fraksi Etil Asetat 1:2	0,036	0,086	5	0,43	5	2,143950995	0,002	99,98570699
Fraksi Etil Asetat 1:3	0,108	1,188	5	5,94	5	29,70903522	0,030	99,80193977

Lampiran 6. 2 Optimasi Pengujian Zeta Potensial

Uji Zeta Ke-1 (Suhu Reflux 40oC)

Record	Type	Sample Name	Replikasi	Measurement Date and Time	T	ZP	Mob	Cond
					°C	mV	µmcm/Vs	mS/cm
733	Zeta	EKSTRAK 1:1	1	Friday, June 28, 2024 11:52:40 AM	25.0	-28.5	-2.236	0.120
734	Zeta	EKSTRAK 1:1	2	Friday, June 28, 2024 11:54:33 AM	25.0	-27.0	-2.119	0.119
735	Zeta	EKSTRAK 1:1	3	Friday, June 28, 2024 11:55:36 AM	25.0	-30.0	-2.350	0.119
736	Zeta	EKSTRAK 1:3	1	Friday, June 28, 2024 11:59:27 AM	25.0	-0.151	-0.01180	5.46e-4
737	Zeta	EKSTRAK 1:3	2	Friday, June 28, 2024 12:01:19 PM	25.0	-0.0603	-0.004729	0.00110
738	Zeta	EKSTRAK 1:3	3	Friday, June 28, 2024 12:02:22 PM	25.0	-0.436	-0.03417	0.00212
739	Zeta	FRAKSI 1:1	1	Friday, June 28, 2024 12:04:47 PM	25.0	0.306	0.02401	0.215
740	Zeta	FRAKSI 1:1	2	Friday, June 28, 2024 12:06:39 PM	25.0	0.105	0.008221	0.217
741	Zeta	FRAKSI 1:1	3	Friday, June 28, 2024 12:07:42 PM	25.0	-0.887	-0.06949	0.218
742	Zeta	FRAKSI 1:3	1	Friday, June 28, 2024 12:09:54 PM	25.0	-0.0465	-0.003647	0.0800
743	Zeta	FRAKSI 1:3	2	Friday, June 28, 2024 12:11:48 PM	25.0	0.182	0.01425	0.0779
744	Zeta	FRAKSI 1:3	3	Friday, June 28, 2024 12:12:51 PM	25.0	-1.22	-0.09543	0.0783

Uji Zeta Ke-2 (Suhu 40oC)

Record	Type	Sample Name	Replikasi	Measurement Date and Time	T	ZP	Mob	Cond
					°C	mV	µmcm/Vs	mS/cm
1193	Zeta	Ekstrak 1:1	1	Thursday, July 18, 2024 4:24:36 PM	25.0	-28.6	-2.243	0.0506
1194	Zeta	Ekstrak 1:1	2	Thursday, July 18, 2024 4:26:01 PM	25.0	-28.0	-2.196	0.0508
1195	Zeta	Ekstrak 1:1	3	Thursday, July 18, 2024 4:26:35 PM	25.0	-26.7	-2.096	0.0513
1199	Zeta	Ekstrak 1:2	1	Thursday, July 18, 2024 4:44:10 PM	25.0	-27.0	-2.114	0.0608
1200	Zeta	Ekstrak 1:2	2	Thursday, July 18, 2024 4:45:34 PM	25.0	-28.0	-2.195	0.0609
1201	Zeta	Ekstrak 1:2	3	Thursday, July 18, 2024 4:46:07 PM	25.0	-27.9	-2.188	0.0609
1208	Zeta	Ekstrak 1:3	1	Thursday, July 18, 2024 5:10:17 PM	25.0	-31.1	-2.435	0.0681
1209	Zeta	Ekstrak 1:3	2	Thursday, July 18, 2024 5:11:43 PM	25.0	-30.1	-2.356	0.0699
1210	Zeta	Ekstrak 1:3	3	Thursday, July 18, 2024 5:12:17 PM	25.0	-28.7	-2.254	0.0655
1214	Zeta	Fraksi 1:1	1	Thursday, July 18, 2024 5:25:26 PM	25.0	-28.5	-2.231	0.127
1215	Zeta	Fraksi 1:1	2	Thursday, July 18, 2024 5:26:51 PM	25.0	-27.5	-2.155	0.128
1216	Zeta	Fraksi 1:1	3	Thursday, July 18, 2024 5:27:25 PM	25.0	-29.6	-2.318	0.128
1217	Zeta	Fraksi 1:2	1	Thursday, July 18, 2024 5:28:30 PM	25.0	-30.9	-2.426	0.224
1218	Zeta	Fraksi 1:2	2	Thursday, July 18, 2024 5:29:25 PM	25.0	-30.7	-2.403	0.226
1219	Zeta	Fraksi 1:2	3	Thursday, July 18, 2024 5:31:25 PM	25.0	-31.6	-2.478	0.227
1220	Zeta	Fraksi 1:3	1	Thursday, July 18, 2024 5:35:15 PM	25.0	-43.2	-3.389	0.0812
1221	Zeta	Fraksi 1:3	2	Thursday, July 18, 2024 5:36:38 PM	25.0	-42.1	-3.298	0.0814
1222	Zeta	Fraksi 1:3	3	Thursday, July 18, 2024 5:37:12 PM	25.0	-42.3	-3.319	0.0815

Data Hasil Dari Uji Zeta Ke-2 (Suhu 50oC)

Record	Type	Sample Name	Replikasi	Measurement Date and Time	T	ZP	Mob	Cond
					°C	mV	µmcm/Vs	mS/cm
1070	Zeta	Ekstrak 1:1	1	Wednesday, July 17, 2024 2:33:29 PM	25.0	-47.0	-3.686	0.0151
1071	Zeta	Ekstrak 1:1	2	Wednesday, July 17, 2024 2:34:54 PM	25.0	-48.3	-3.785	0.0151
1072	Zeta	Ekstrak 1:1	3	Wednesday, July 17, 2024 2:35:28 PM	25.0	-48.4	-3.796	0.0151
1229	Zeta	Ekstrak 1:2	1	Thursday, July 18, 2024 5:53:56 PM	25.0	-25.9	-2.032	0.0446
1230	Zeta	Ekstrak 1:2	2	Thursday, July 18, 2024 5:55:24 PM	25.0	-24.1	-1.887	0.0447
1231	Zeta	Ekstrak 1:2	3	Thursday, July 18, 2024 5:55:58 PM	25.0	-26.5	-2.075	0.0455
1238	Zeta	Ekstrak 1:3	1	Thursday, July 18, 2024 6:26:56 PM	25.0	-27.2	-2.136	0.0563
1239	Zeta	Ekstrak 1:3	2	Thursday, July 18, 2024 6:28:20 PM	25.0	-26.9	-2.109	0.0535
1240	Zeta	Ekstrak 1:3	3	Thursday, July 18, 2024 6:28:53 PM	25.0	-25.7	-2.017	0.0533
1241	Zeta	Fraksi 1:1	1	Thursday, July 18, 2024 6:30:24 PM	25.0	-27.7	-2.170	0.0921
1242	Zeta	Fraksi 1:1	2	Thursday, July 18, 2024 6:31:47 PM	25.0	-25.1	-1.965	0.0914
1243	Zeta	Fraksi 1:1	3	Thursday, July 18, 2024 6:32:21 PM	25.0	-26.0	-2.040	0.0893
1244	Zeta	Fraksi 1:2	1	Thursday, July 18, 2024 6:33:47 PM	25.0	-39.0	-3.061	0.262
1245	Zeta	Fraksi 1:2	2	Thursday, July 18, 2024 6:34:22 PM	25.0	-39.2	-3.077	0.265
1246	Zeta	Fraksi 1:2	3	Thursday, July 18, 2024 6:35:40 PM	25.0	-38.5	-3.017	0.266

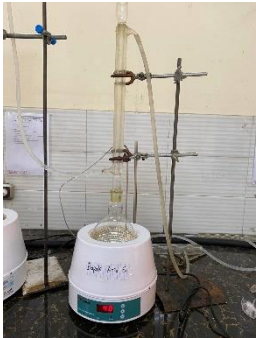
Lampiran 6. 3 Optimasi Pengujian Ukuran partikel dan PDI

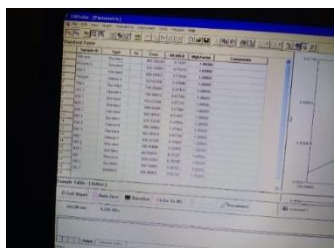
Hasil Uji PSA dan Pdi Ke-1 (Suhu Reflux 40oC)								
Record	Type	Sample Name	Replikasi	Measurement Date and Time	T	Z-Ave	Pdi	Pk 1 Mean Int
					°C	d.nm		d.nm
820	Size	EKSTRAK 1:1	1	Friday, June 28, 2024 2:28:28 PM	25.0	635.2	0.542	351.8
821	Size	EKSTRAK 1:1	2	Friday, June 28, 2024 2:28:55 PM	25.0	664.6	0.518	388.7
822	Size	EKSTRAK 1:1	3	Friday, June 28, 2024 2:29:22 PM	25.0	616.1	0.514	374.4
823	Size	FRAKSI 1:1	1	Friday, June 28, 2024 2:33:56 PM	25.0	1019	0.687	1543
824	Size	FRAKSI 1:1	2	Friday, June 28, 2024 2:34:23 PM	25.0	686.8	1.000	2867
825	Size	FRAKSI 1:1	3	Friday, June 28, 2024 2:34:50 PM	25.0	805.3	0.717	2414
826	Size	EKSTRAK 1:3	1	Friday, June 28, 2024 2:37:21 PM	25.0	363.8	0.609	226.5
827	Size	EKSTRAK 1:3	2	Friday, June 28, 2024 2:37:48 PM	25.0	348.7	0.507	210.8
828	Size	EKSTRAK 1:3	3	Friday, June 28, 2024 2:38:15 PM	25.0	334.3	0.425	263.7
829	Size	FRAKSI 1:3	1	Friday, June 28, 2024 2:40:50 PM	25.0	560.2	0.637	263.0
830	Size	FRAKSI 1:3	2	Friday, June 28, 2024 2:41:17 PM	25.0	560.2	0.637	349.1
831	Size	FRAKSI 1:3	3	Friday, June 28, 2024 2:41:43 PM	25.0	560.2	0.637	383.9

Hasil Uji PSA dan Pdi Ke-2 (Suhu Reflux 40oC)										
Record	Type	Sample Name	Replikasi	Measurement Date and Time	T	Z-Ave	Pdi	Pk 1 Mean Int	Pk 2 Mean Int	Pk 3 Mean Int
					°C	d.nm		d.nm	d.nm	d.nm
1190	Size	Ekstrak 1:1	1	Thursday, July 18, 2024 4:21:08 PM	25.0	647.6	0.036	433.7	0.000	0.000
1191	Size	Ekstrak 1:1	2	Thursday, July 18, 2024 4:21:35 PM	25.0	710.2	0.436	538.4	0.000	0.000
1192	Size	Ekstrak 1:1	3	Thursday, July 18, 2024 4:22:02 PM	25.0	593.8	0.538	398.9	0.000	0.000
1202	Size	Ekstrak 1:2	1	Thursday, July 18, 2024 4:52:45 PM	25.0	412.4	0.456	271.6	0.000	0.000
1203	Size	Ekstrak 1:2	2	Thursday, July 18, 2024 4:53:11 PM	25.0	379.2	0.450	280.5	5560	0.000
1204	Size	Ekstrak 1:2	3	Thursday, July 18, 2024 4:53:38 PM	25.0	481.0	0.315	374.1	0.000	0.000
1205	Size	Ekstrak 1:3	1	Thursday, July 18, 2024 5:07:45 PM	25.0	672.8	0.408	500.3	0.000	0.000
1206	Size	Ekstrak 1:3	2	Thursday, July 18, 2024 5:08:12 PM	25.0	604.9	0.463	439.2	0.000	0.000
1207	Size	Ekstrak 1:3	3	Thursday, July 18, 2024 5:08:39 PM	25.0	676.4	0.398	536.2	0.000	0.000
1211	Size	Fraksi 1:1	1	Thursday, July 18, 2024 5:23:01 PM	25.0	476.9	0.344	422.3	0.000	0.000
1212	Size	Fraksi 1:1	2	Thursday, July 18, 2024 5:23:28 PM	25.0	509.9	0.232	485.5	0.000	0.000
1213	Size	Fraksi 1:1	3	Thursday, July 18, 2024 5:23:55 PM	25.0	513.5	0.377	428.2	0.000	0.000
1220	Size	Fraksi 1:2	1	Thursday, July 18, 2024 5:40:54 PM	25.0	539.4	0.631	693.6	121.2	0.000
1221	Size	Fraksi 1:2	2	Thursday, July 18, 2024 5:41:24 PM	25.0	523.9	0.548	1057	174.4	0.000
1222	Size	Fraksi 1:2	3	Thursday, July 18, 2024 5:41:51 PM	25.0	628.6	0.601	510.4	110.2	5433
1223	Size	Fraksi 1:3	1	Thursday, July 18, 2024 5:42:55 PM	25.0	864.8	0.820	939.5	161.3	0.000
1224	Size	Fraksi 1:3	2	Thursday, July 18, 2024 5:43:44 PM	25.0	764.4	0.630	728.6	116.4	0.000
1225	Size	Fraksi 1:3	3	Thursday, July 18, 2024 5:44:40 PM	25.0	891.0	1.000	1489	195.5	5224

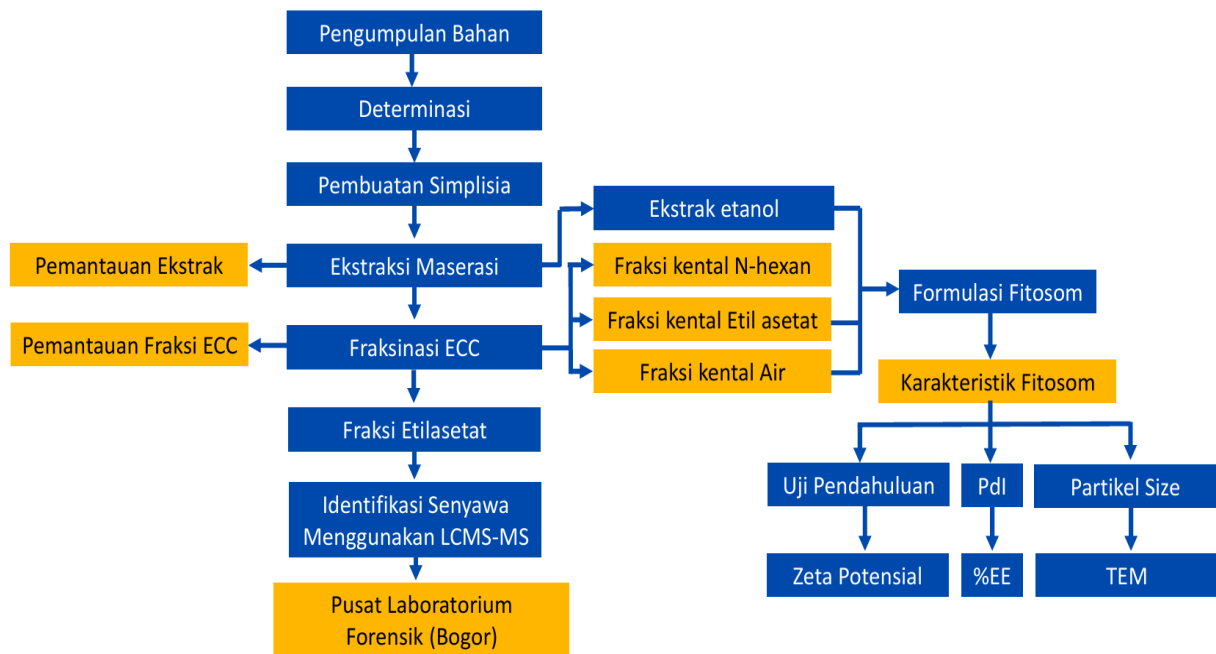
Hasil Uji PSA dan Pdi Ke-2 (Suhu Reflux 50oC)									
Type	Sample Name	Replikasi	Measurement Date and Time	T	Z-Ave	Pdi	Pk 1 Mean Int	Pk 2 Mean Int	Pk 3 Mean Int
				°C	d.nm		d.nm	d.nm	d.nm
Size	Ekstrak 1:1	1	Wednesday, July 17, 2024 2:27:15 PM	25.0	867.8	0.759	295.3	0.000	0.000
Size	Ekstrak 1:1	2	Wednesday, July 17, 2024 2:27:15 PM	25.0	922.6	0.601	655.5	136.3	0.000
Size	Ekstrak 1:1	3	Wednesday, July 17, 2024 2:27:15 PM	25.2	829.3	0.537	585.3	0.000	0.000
Size	Ekstrak 1:2	1	Thursday, July 18, 2024 5:52:00 PM	25.0	754.4	0.769	291.4	0.000	0.000
Size	Ekstrak 1:2	2	Thursday, July 18, 2024 5:52:26 PM	25.0	881.0	0.572	472.8	0.000	0.000
Size	Ekstrak 1:2	3	Thursday, July 18, 2024 5:52:53 PM	25.0	786.3	0.509	443.8	0.000	0.000
Size	Ekstrak 1:3	1	Thursday, July 18, 2024 6:18:35 PM	25.0	985.5	0.538	698.6	68.42	0.000
Size	Ekstrak 1:3	2	Thursday, July 18, 2024 6:19:01 PM	25.0	927.2	0.621	538.1	61.69	0.000
Size	Ekstrak 1:3	3	Thursday, July 18, 2024 6:19:28 PM	25.0	1070	0.675	536.3	61.79	0.000
Size	Fraksi 1:1	1	Thursday, July 18, 2024 6:36:01 PM	25.0	864.8	0.820	939.5	161.3	0.000
Size	Fraksi 1:1	2	Thursday, July 18, 2024 6:36:28 PM	25.0	764.4	0.630	728.6	116.4	0.000
Size	Fraksi 1:1	3	Thursday, July 18, 2024 6:36:55 PM	25.0	891.0	1.000	1489	195.5	5224
Size	Fraksi 1:2	1	Thursday, July 18, 2024 6:38:01 PM	25.0	444.8	0.753	969.2	184.4	5064
Size	Fraksi 1:2	2	Thursday, July 18, 2024 6:38:58 PM	25.0	449.4	0.496	505.9	155.0	0.000
Size	Fraksi 1:2	3	Thursday, July 18, 2024 6:39:10 PM	25.0	447.4	0.662	606.0	141.6	5406

Lampiran 7. Dokumentasi Penelitian

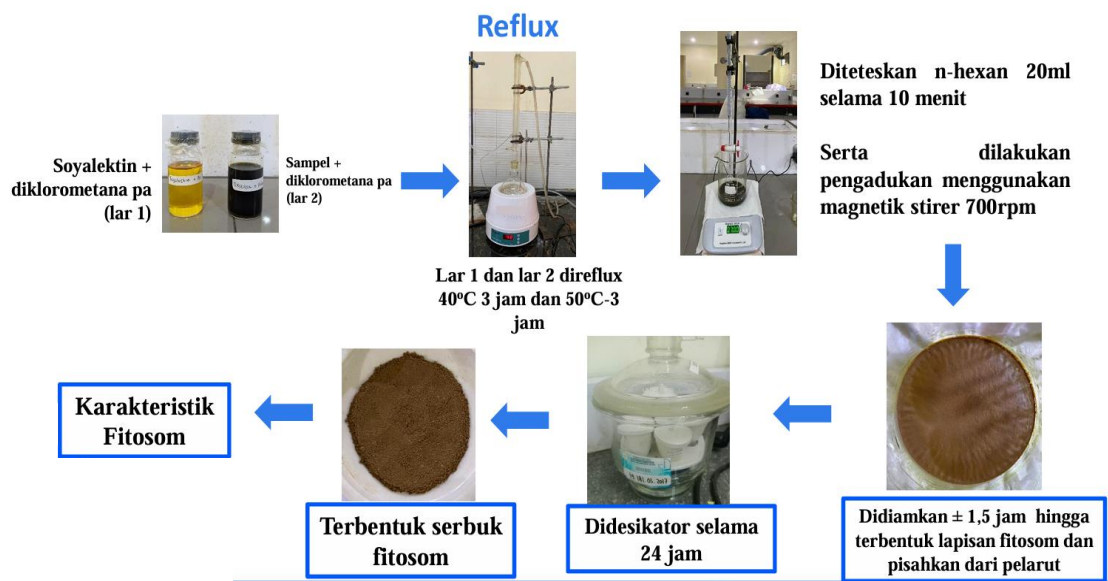
		
Uji TEM di Universitas Gajah Mada Yogyakarta	Pengujian karakterisasi PSA PDI dan Zeta di PT. DKSH Jakarta dan Universitas Bhakti Kencana	Alat Sonikator probe
		
Proses Reflux	Alat disentrifugasi	Penetesan n-hexan berbarengan dengan pemutaran magnetic stirer
		
Kuvet	desikator	Rotary

		
Absorban kelarutan Diklorometana	Absorban kelarutan DMSO	Spektrofotometri UV-Vis
		
Serbuk fitosom		

Lampiran 8. Alur Penelitian



Pembuatan Fitosom



Lampiran 9. Cek Plagiarisme

Bismillah_Revisi 14_SemHas_Tifania Nurhalimah (Cek Plagiat)

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KARTU BIMBINGAN TUGAS AKHIR I/TUGAS AKHIR II

Pembimbing Utama	: apt.Aris Suhardiman, M.Si
Nama Mahasiswa	: Tifania Nurhalimah
NPM	: 221FF04026
Bidang Ilmu	: Biologi Farmasi

No	Hari/Tanggal	Waktu	Tempat	Materi	Paraf Dosen
1.	Jum'at, 16 Februari 2024	15.00	Ruang Kaprodi	Diskusi Hasil ekstrak	JS
2.	Kamis, 22 Februari 2024	07.30	Ruang Kaprodi	Diskusi Hasil Fraksinasi	JS
3.	Selasa, 27 Februari 2024	08.00	Ruang Kaprodi	Diskusi Pemantauan Plat KLT Ekstrak	JS
4.	Jum'at 01 Maret 2024	07.30	Ruang Kaprodi	Diskusi Pemantauan Fraksi	JS
5.	Jum'at 08 Maret 2024	14.00	Ruang Kaprodi	Diskusi Prosedur Formula	JS
6.	Kamis, 21 Maret 2024	07.30	Ruang Kaprodi	Optimasi 1 Formula 1	JS
7.	Kamis, 28 Maret 2024	14.00	Ruang Kaprodi	Optimasi 2 Formula 1	JS
8.	Senin, 22 April 2024	13.40	Ruang Kaprodi	Optimasi 3 Formula 2	JS
9.					
10.					
11.					
12.					
13.					
14.					
15.					
16.					
17.					

Kartu Bimbingan Pembimbing 2



No. Dok. 02.64.00/FRM-03/AKD-SPM



KARTU BIMBINGAN TUGAS AKHIR I/TUGAS AKHIR II

Pembimbing Serta	: Dr. apt. Gamadi Jafar M. Si
Nama Mahasiswa	: Tifania Nurhalimah
NPM	: 221FF04026
Bidang Ilmu	: Biologi Farmasi

No	Hari/Tanggal	Waktu	Tempat	Keterangan	Paraf
1.	29 Feb 2024	13.00	Rc 205	Diskusi Prosedur kerja	✓
2.	18 Maret 2024	13.00	Rc 205	Optimasi 1 formula 1	✓
3.	22 April 2024	13.00	Rc 205	Optimasi 2 formula 2	✓
4.	23 April 2024	13.00	Rc 205	Diskusi hasil optimasi	✓
5.	26 April 2024	13.00	Rc 205	Diskusi prosedur kerja	✓
6.	30 April 2024	13.00	Rc 205	Diskusi hasil optimasi	✓
7.	10 Mei 2024	16.00	Lab 7	Diskusi Karakterisasi Fitosom	✓
8.	25 Juni 2024	19.00	Lab 7	Diskusi Hasil Karakterisasi	✓
9.					
10.					
11.					
12.					
13.					
14.					
15.					

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Yang bertanda tangan di bawah ini,

Nama : apt. Aris Suhardiman, M.Si

NIDN : 0401018308

Selaku pembimbing utama dari mahasiswa,

Nama : Tifania Nurhalimah

NIM : 221FF04026

menyatakan bahwa demi kebaikan perkembangan ilmu pengetahuan, saya menyetujui Skripsi yang telah dibuat oleh mahasiswa tersebut dengan judul:

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Mengetahui,

Bandung, 20 September 2024


(apt. Aris Suhardiman, M.Si)
NIDN. 0401018308

♥

CURRICULUM VITAE

TIFANIA NURHALIMAH

Tempat tgl. Lahir : Metro, 17 Februari 2000

“ Menjadi Muslimah Yang Taat dan Kaya Raya (Berusaha Bermanfaat dalam bidang Kesehatan, Pendidikan, dan Sosial Ekonomi).”



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□

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PENDIDIKAN	PENGALAMAN ORGANISASI
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APOTEK PKL Apotek Jogokaryan PUSKESMAS PKL Puskesmas Piyungan	+6282389285762 tifania.nh@gmail.com Gaya Baru 3, Seputih Surabaya, Lampung Tengah, Lampung Kreatif ★★★★★ Komunikasi ★★★★★ Inovatif ★★★★★ Bekerja Tim ★★★★★