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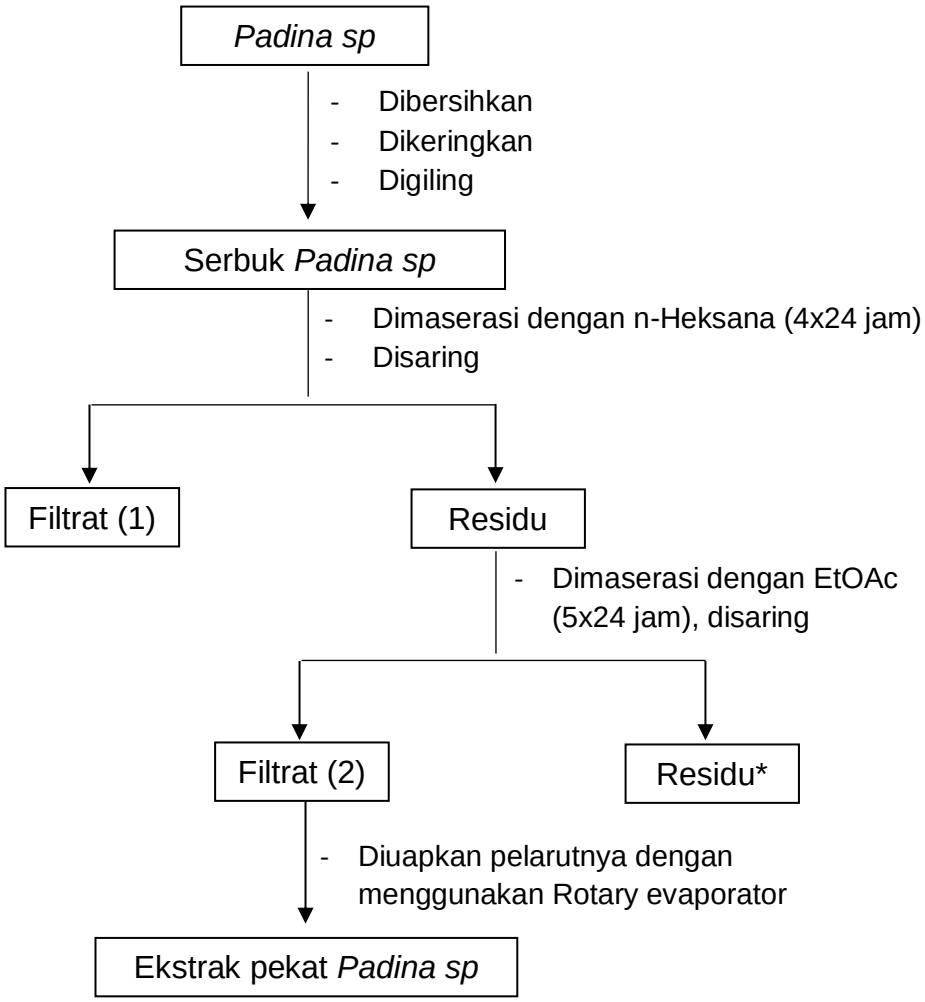
LAMPIRAN BAGAN KERJA

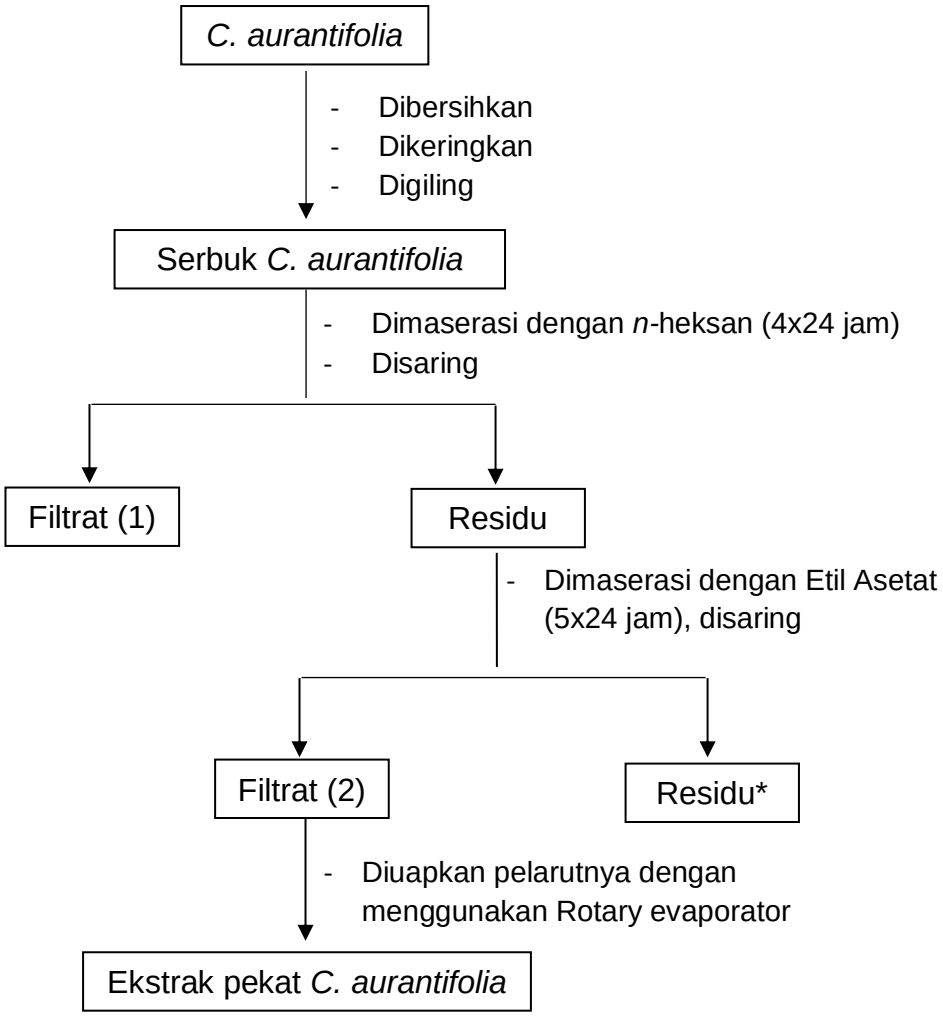
Lampiran 1. Bagan kerja isolasi metabolit sekunder dari kombinasi ekstrak etil asetat *Padina sp* dan *Citrus aurantifolia*

1.1. Ekstraksi sampel *Padina sp*



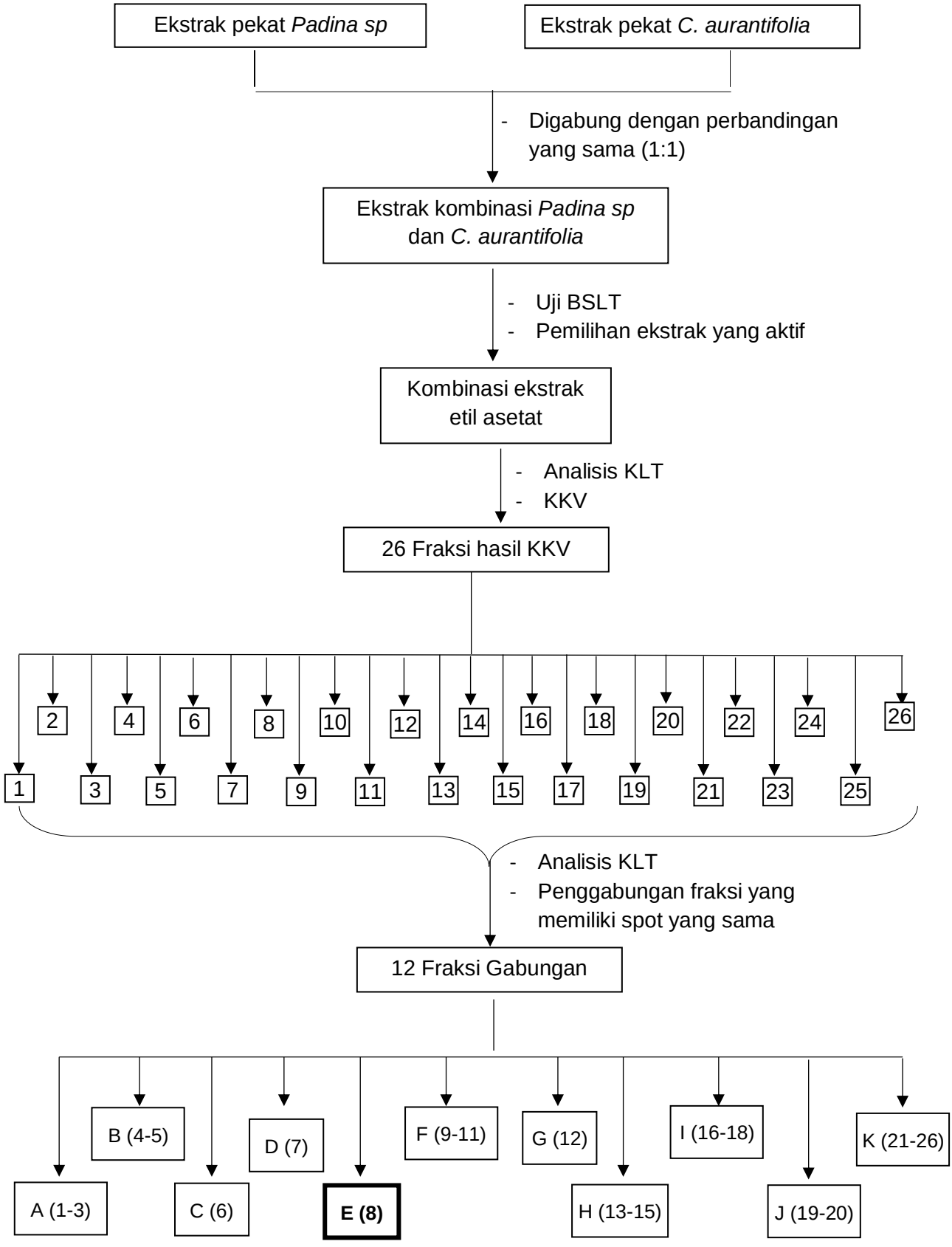
*Catatan : dilanjutkan dengan maserasi menggunakan pelarut Aseton (4x24 jam) dan metanol (4x24 jam)

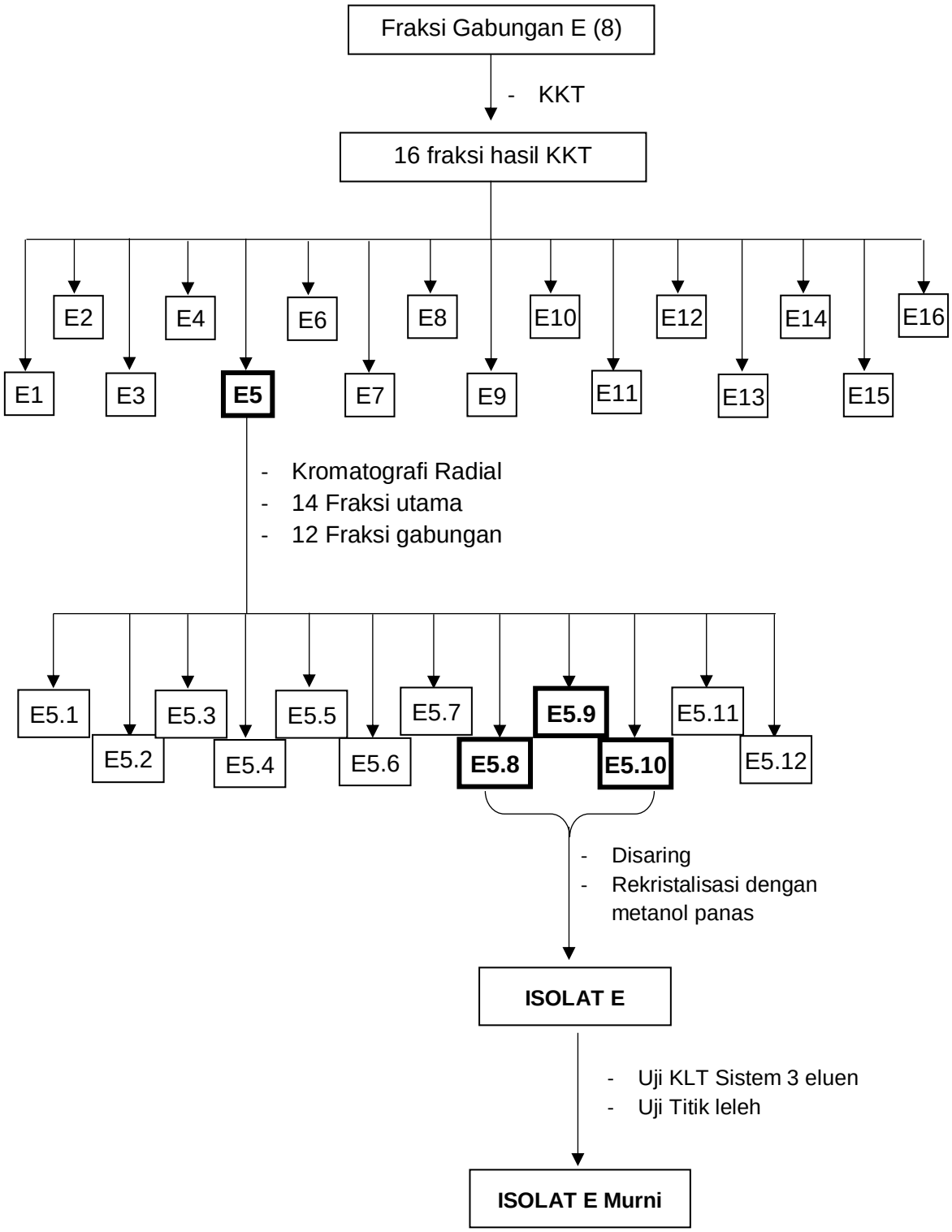
1.2. Ekstraksi sampel *C. aurantifolia*



*Catatan : dilanjutkan dengan maserasi menggunakan pelarut Aseton (4x24 jam) dan metanol (4x24 jam)

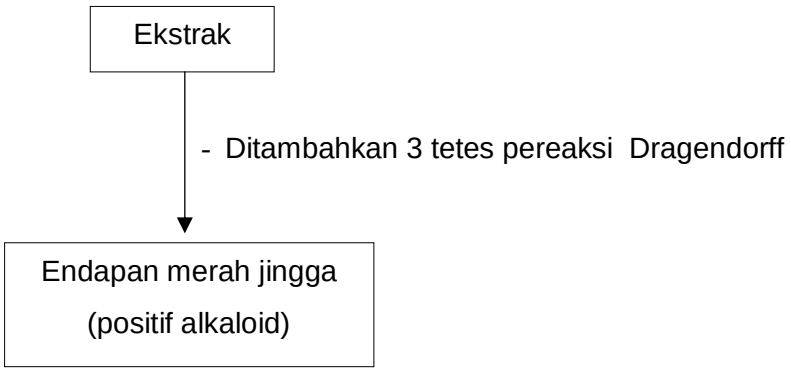
1.3 Fraksinasi Kombinasi Ekstrak *Padina sp* dan *C. aurantifolia*



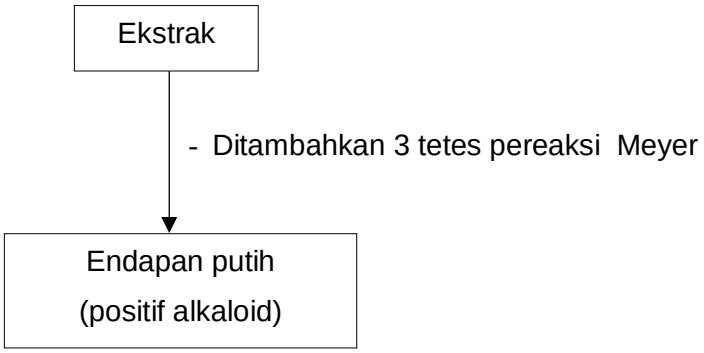

Fraksi Gabungan E (8)
- KKT
16 fraksi hasil KKT
E1
E2
E3
E4
E5
E6
E7
E8
E9
E10
E11
E12
E13
E14
E15
E16
- Kromatografi Radial
- 14 Fraksi utama
- 12 Fraksi gabungan
E5.1
E5.2
E5.3
E5.4
E5.5
E5.6
E5.7
E5.8
E5.9
E5.10
E5.11
E5.12
- Disaring
- Rekristalisasi dengan metanol panas
ISOLAT E
- Uji KLT Sistem 3 eluen
- Uji Titik leleh
ISOLAT E Murni

Lampiran 2. Uji fitokimia

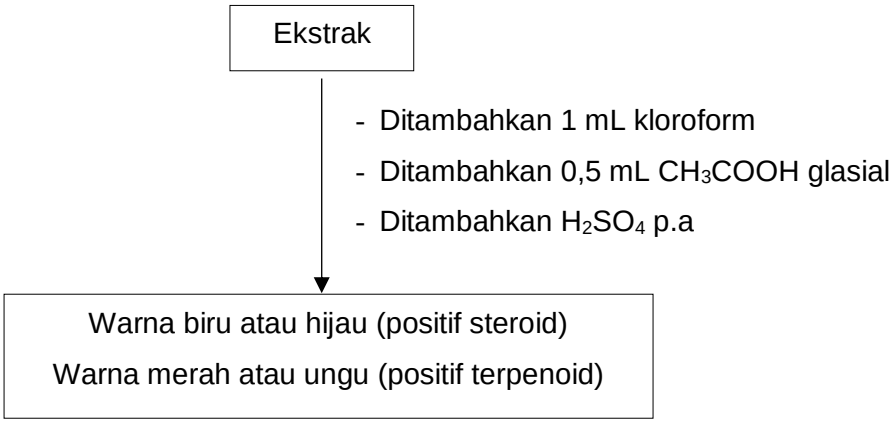
2.1 Uji Alkaloid (Pereaksi Dragendorff)



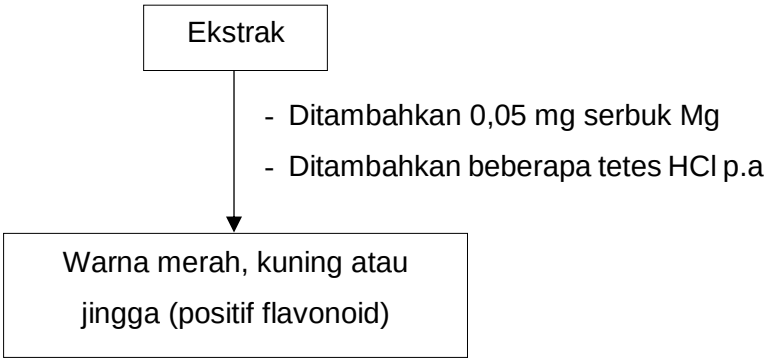
2.2 Uji Alkaloid (Pereaksi Meyer)



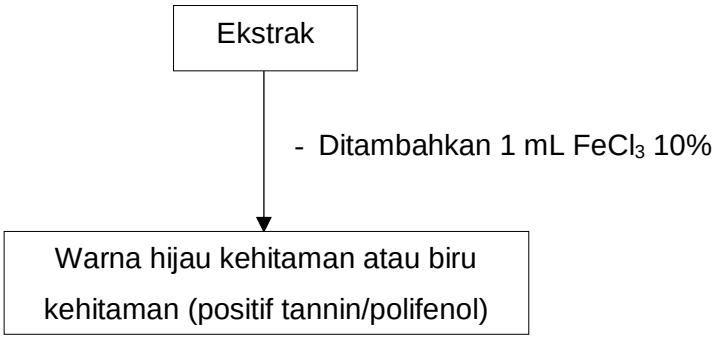
2.3 Uji Steroid/Terpenoid



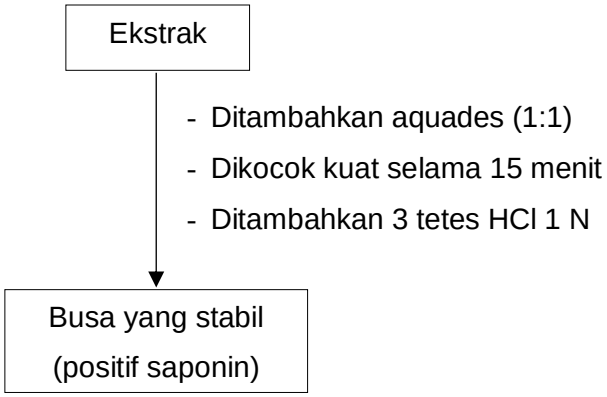
2.4 Uji Flavonoid



2.5 Uji Tanin

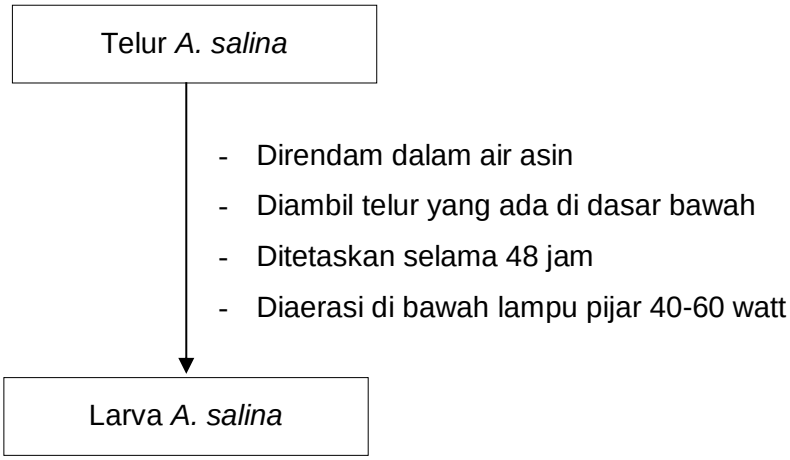


2.6 Uji Saponin

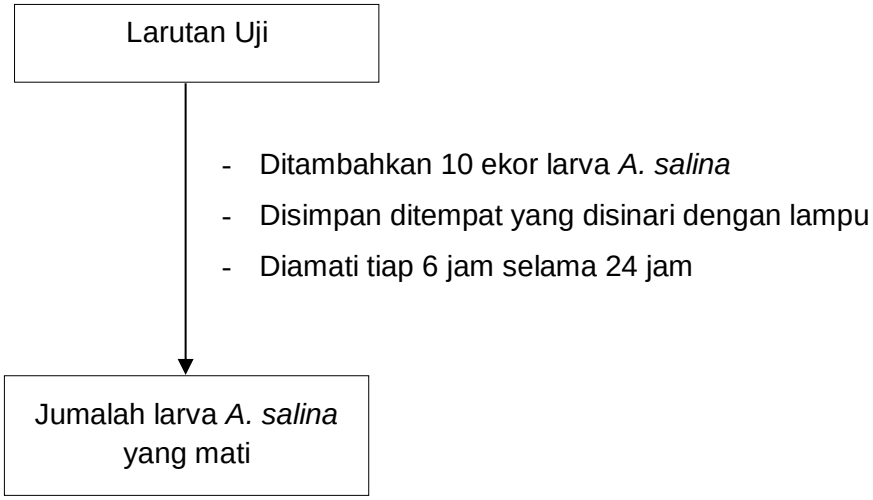


Lampiran 3. Pengujian toksisitas dengan metode BSLT

3.1 Penetasan telur *Artemia salina (A. salina)*

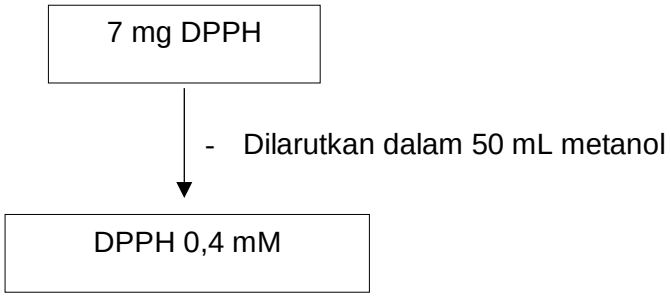


3.2 Pengujian Toksisitas

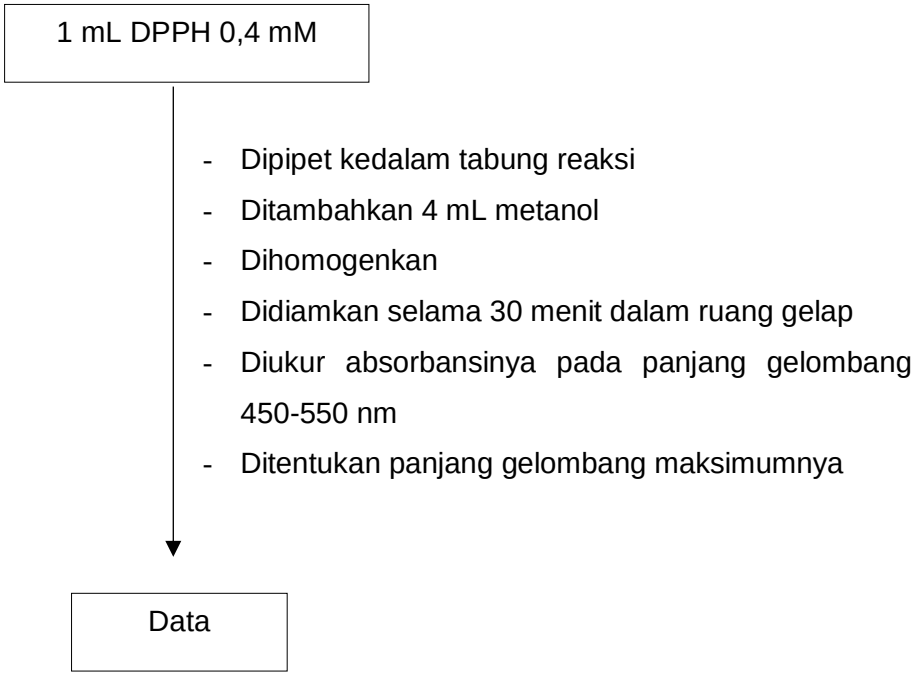


Lampiran 4. Pengujian aktivitas antioksidan dengan metode DPPH

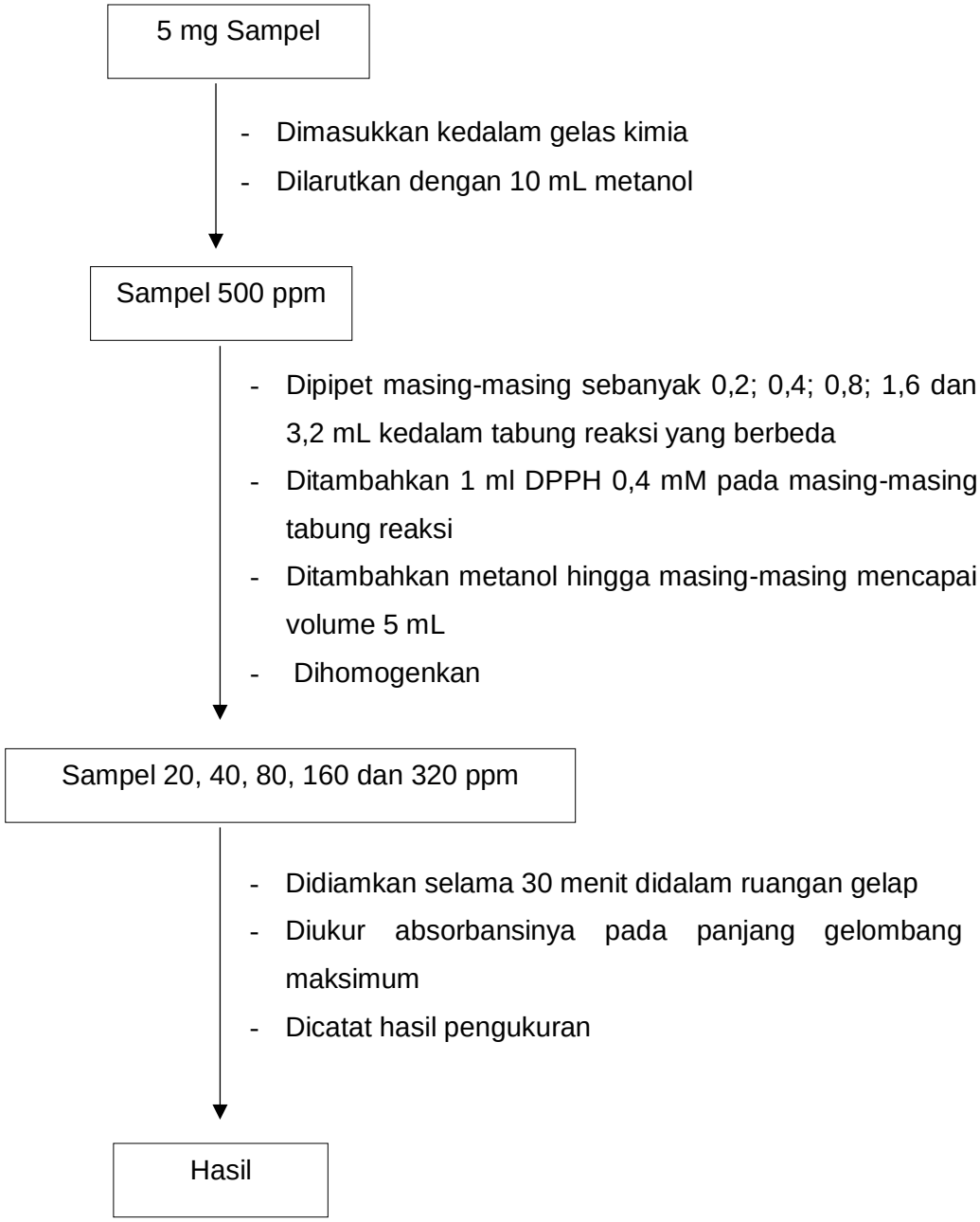
4.1 Pembuata Larutan DPPH (2,2-Diphenyl-1-Picrylhydrazyl) 0,4 mM



4.2 Penentuan Panjang Gelombang Maksimum

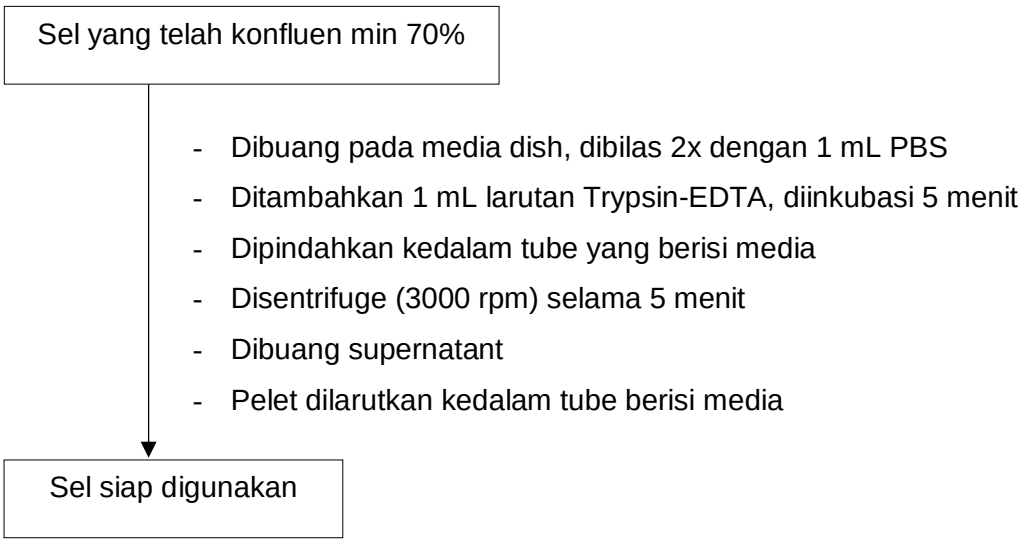


4.3 Pengukuran Daya Antioksidan Sampel

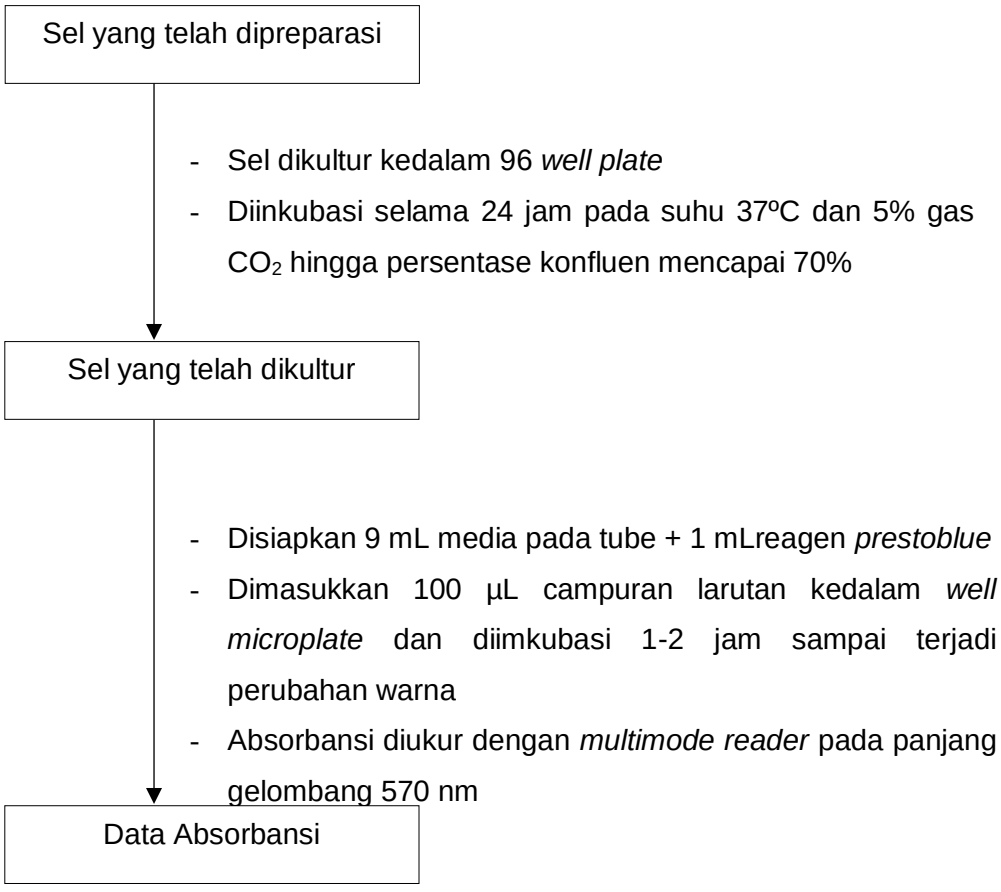


Lampiran 5. Pengujian sitotosik terhadap sel MCF-7

5.1 Preparasi Sel



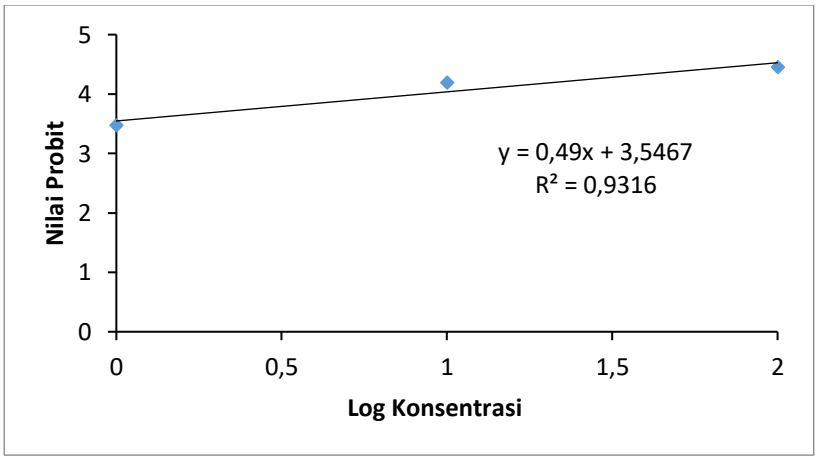
5.2 Pengujian sampel terhadap sel MCF-7



Lampiran 6. Perhitungan nilai LC_{50} dengan metode BSLT

6.1 Perhitungan nilai LC_{50} ekstrak *n*-heksana *Padina sp*

Log Konsentrasi (X)	% Kematian	Nilai Probit (Y)
0	7	3,47
1	20	4,19
2	33	4,45



Untuk LC_{50} (x), nilai probit adalah 5 (y), dimasukkan ke persamaan regresi

$y = 0{,}490\ x + 3{,}546$

$$y - \frac{3{,}546}{0{,}490} = x$$

$$5 - \frac{3{,}546}{0{,}490} = 2{,}967346$$

Jadi, Log x = 2,967346

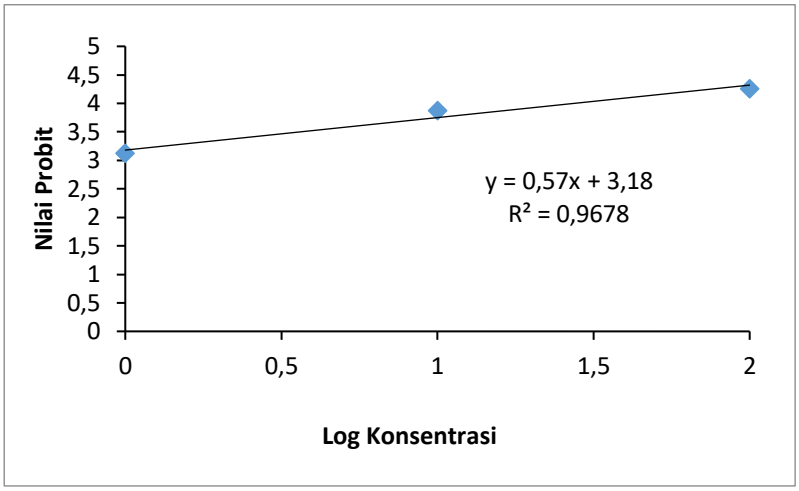
x = antilog 2,967346

x = 927,568 ppm

LC_{50} sampel = 927,568 ppm

6.2 Perhitungan nilai LC_{50} ekstrak etil asetat *Padina sp*

Log Konsentrasi (X)	% Kematian	Nilai Probit (Y)
0	3	3,12
1	13	3,87
2	23	4,26



Untuk LC_{50} (x), nilai probit adalah 5 (y), dimasukkan ke persamaan regresi

$y = 0{,}570\ x + 3{,}180$

$y - \frac{3{,}180}{0{,}570} = x$

$5 - \frac{3{,}180}{0{,}570} = 3{,}192982$

Jadi, Log x = 3,192982

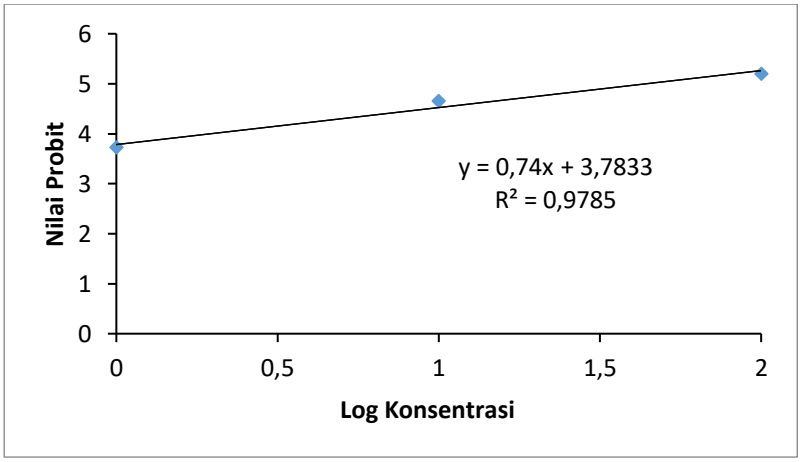
x = antilog 3,192982

x = 1559,490 ppm

LC_{50} sampel = 1559,490 ppm

6.3 Perhitungan nilai LC_{50} ekstrak aseton *Padina sp*

Log Konsentrasi (X)	% Kematian	Nilai Probit (Y)
0	3	3,12
1	20	3,72
2	33	4,12



Untuk LC_{50} (x), nilai probit adalah 5 (y), dimasukkan ke persamaan regresi

$y = 0{,}50\ x + 3{,}1533$

$$y - \frac{3{,}1533}{0{,}50} = x$$

$$5 - \frac{3{,}1533}{0{,}50} = 3{,}6934$$

Jadi, Log x = 3,6934

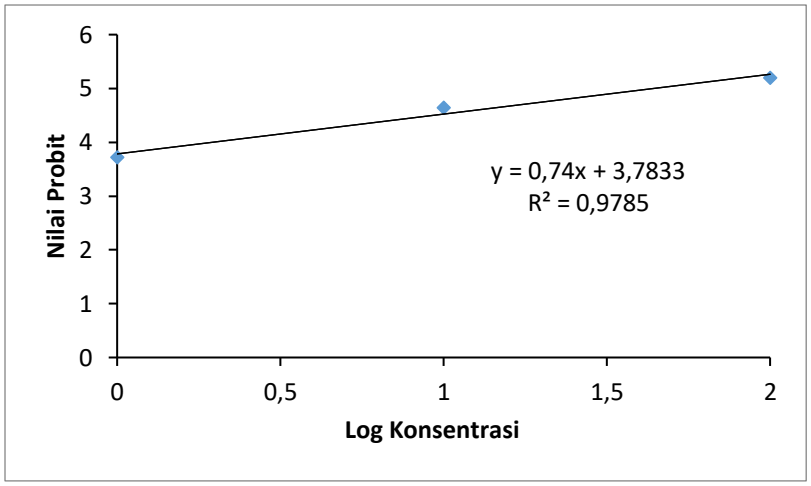
x = antilog 3,6934

x = 4936,282 ppm

LC_{50} sampel = 4936,282 ppm

6.4 Perhitungan nilai LC_{50} ekstrak metanol *Padina sp*

Log Konsentrasi (X)	% Kematian	Nilai Probit (Y)
0	3	3,12
1	13	3,87
2	27	4,39



Untuk LC_{50} (x), nilai probit adalah 5 (y), dimasukkan ke persamaan regresi

$y = 0{,}635\ x + 3{,}158$

$y - \frac{3{,}158}{0{,}635} = x$

$5 - \frac{3{,}158}{0{,}635} =$

Jadi, Log x = 2,900787

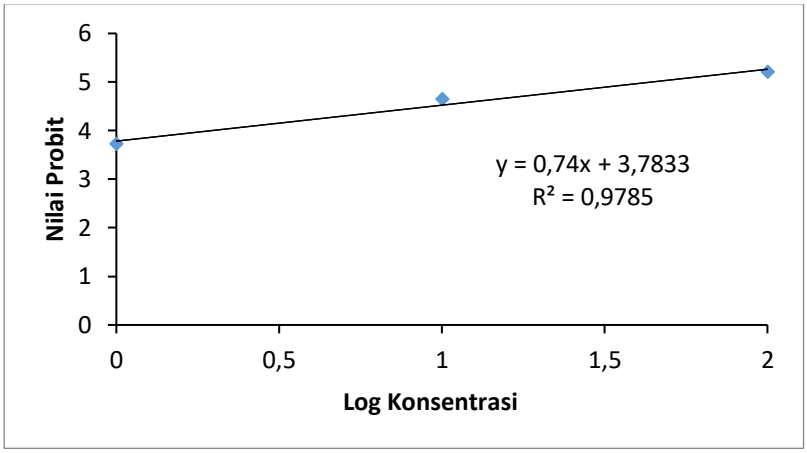
x = antilog 2,900787

x = 795,768 ppm

LC_{50} sampel = 795,768 ppm

6.5 Perhitungan nilai LC_{50} ekstrak *n*-heksana *C. aurantifolia*

Log Konsentrasi (X)	% Kematian	Nilai Probit (Y)
0	10	3,72
1	35	4,65
2	58	5,2



Untuk LC_{50} (x), nilai probit adalah 5 (y), dimasukkan ke persamaan regresi

y = 0,740 x + 3,043

$$y - \frac{3,043}{0,740} = x$$

$$5 - \frac{3,043}{0,740} = 2,644594$$

Jadi, Log x = 2,644594

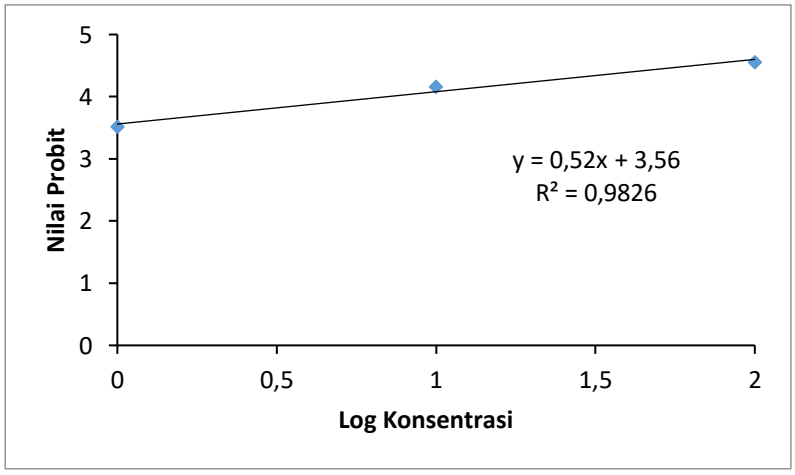
x = antilog 2,644594

x = 441,157 ppm

LC_{50} sampel = 441,157 ppm

6.6 Perhitungan nilai LC_{50} ekstrak etil asetat *C. aurantifolia*

Log Konsentrasi (X)	% Kematian	Nilai Probit (Y)
0	7	3,52
1	20	4,16
2	33	4,56



Untuk LC_{50} (x), nilai probit adalah 5 (y), dimasukkan ke persamaan regresi

$y = 0{,}520\ x + 3{,}560$

$$y - \frac{3{,}560}{0{,}520} = x$$

$$5 - \frac{3{,}560}{0{,}520} = 2{,}769231$$

Jadi, Log x = 2,769231

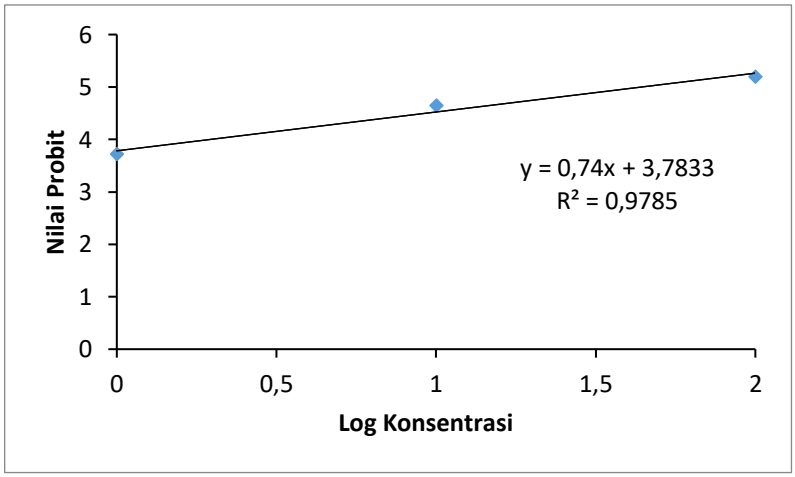
x = antilog 2,769231

x = 587,801 ppm

LC_{50} sampel = 587,801 ppm

6.7 Perhitungan nilai LC_{50} ekstrak aseton *C. aurantifolia*

Log Konsentrasi (X)	% Kematian	Nilai Probit (Y)
0	7	3,12
1	20	4,01
2	23	4,36



Untuk LC_{50} (x), nilai probit adalah 5 (y), dimasukkan ke persamaan regresi

$y = 0{,}620\ x + 3{,}210$

$y - \frac{3{,}210}{0{,}620} = x$

$5 - \frac{3{,}210}{0{,}620} = 2{,}887096$

Jadi, Log x = 2,887096

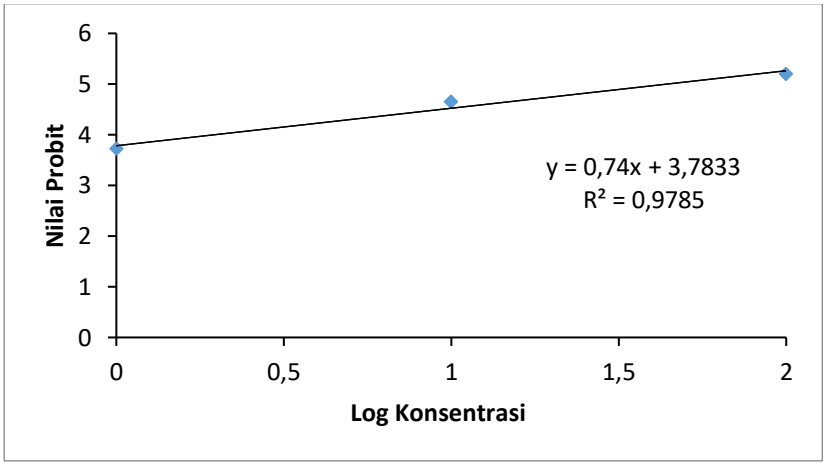
x = antilog 2,887096

x = 771,075 ppm

LC_{50} sampel = 771,075 ppm

6.8 Perhitungan nilai LC_{50} ekstrak metanol *C. aurantifolia*

Log Konsentrasi (X)	% Kematian	Nilai Probit (Y)
0	0	3,12
1	7	3,82
2	15	4,26



Untuk LC_{50} (x), nilai probit adalah 5 (y), dimasukkan ke persamaan regresi

$y = 0{,}570\ x + 3{,}1633$

$$y - \frac{3{,}1633}{0{,}570} = x$$

$$5 - \frac{3{,}1633}{0{,}570} = 3{,}222280$$

Jadi, Log x = 3,222280

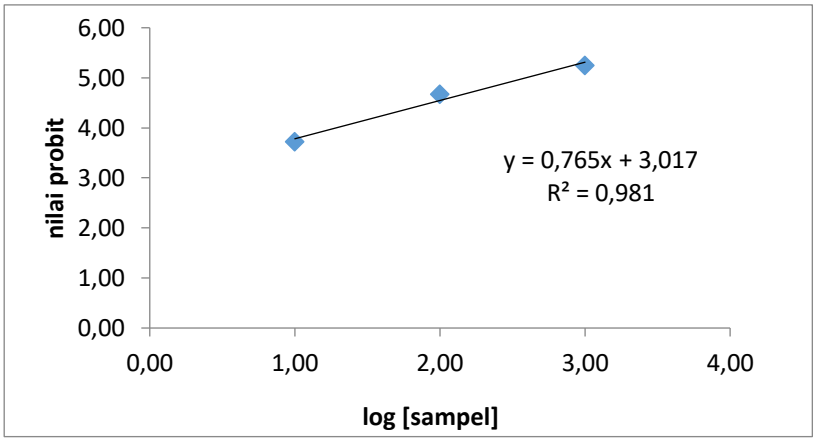
x = antilog 3,222280

x = 1668,322 ppm

LC_{50} sampel = 1668,322 ppm

6.9 Perhitungan nilai LC_{50} ekstrak *n*-heksana KPC

Log Konsentrasi (X)	% kematian	Nilai Probit (Y)
1	10	3,72
2	37	4,67
3	60	5,25



Untuk LC_{50} (x), nilai probit adalah 5 (y), dimasukkan ke persamaan regresi

$$y = 0{,}765\ x + 3{,}017$$

$$y - \frac{3{,}017}{0{,}765} = x$$

$$5 - \frac{3{,}017}{0{,}765} = 2{,}5921$$

Jadi, Log x = 2,5921

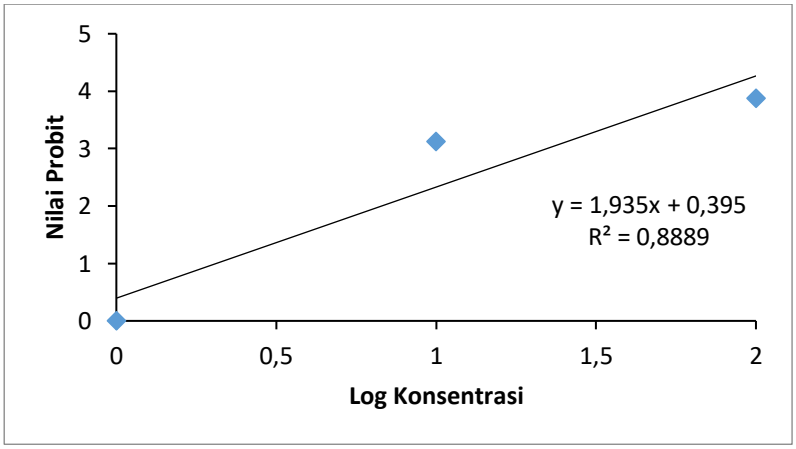
x = antilog 2,5921

x = 390,930 ppm

LC_{50} sampel = 390,930 ppm

6.10 Perhitungan nilai LC_{50} ekstrak etil asetat KPC

Log Konsentrasi (X)	% Kematian	Nilai Probit (Y)
0	0	0
1	3	3,12
2	13	3,87



Untuk LC_{50} (x), nilai probit adalah 5 (y), dimasukkan ke persamaan regresi

$y = 1{,}935\ x + 0{,}395$

$y - \frac{0{,}395}{1{,}935} = x$

$5 - \frac{0{,}395}{1{,}935} = 2{,}3798$

Jadi, Log x = 2,3798

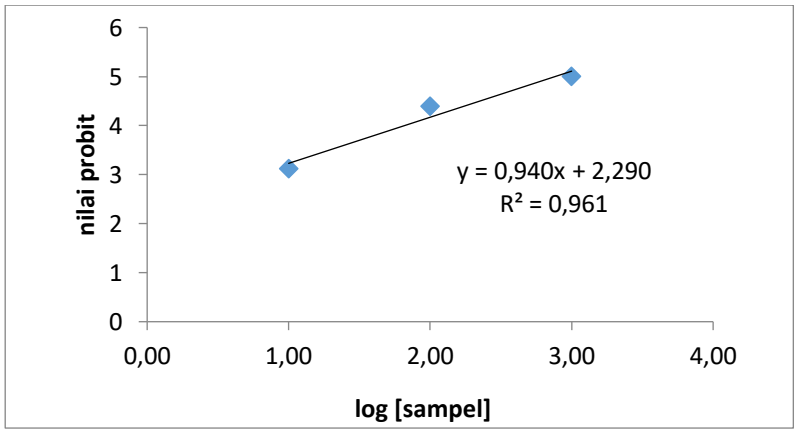
x = antilog 2,3798

x = 239,798 ppm

LC_{50} sampel = 239,798 ppm

6.11 Perhitungan nilai LC_{50} ekstrak aseton KPC

Log Konsentrasi (X)	% Kematian	Nilai Probit (Y)
1	3	3,12
2	27	4,39
3	50	5,00



Untuk LC_{50} (x), nilai probit adalah 5 (y), dimasukkan ke persamaan regresi

$y = 0{,}940\ x + 2{,}290$

$$y - \frac{2{,}290}{0{,}940} = x$$

$$5 - \frac{2{,}290}{0{,}940} = 2{,}8829$$

Jadi, Log x = 2,8829

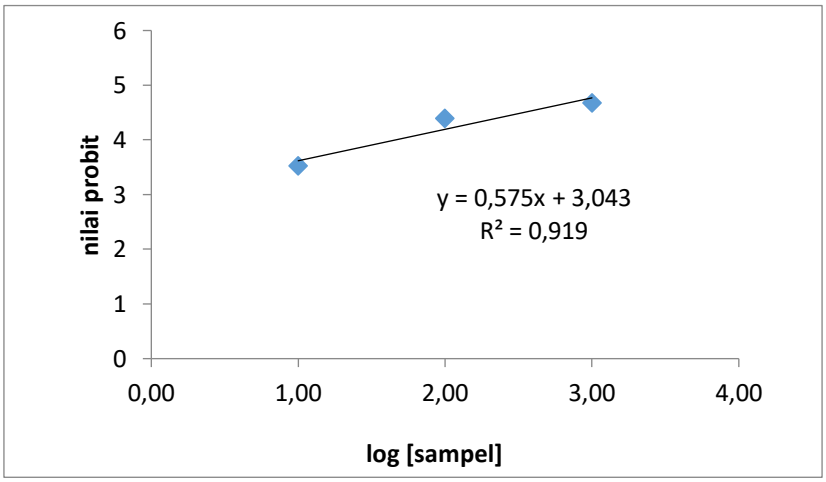
x = antilog 2,8829

x = 763,659 ppm

LC_{50} sampel = 763,659 ppm

6.12 Perhitungan nilai LC_{50} ekstrak metanol KPC

Log Konsentrasi (X)	% Kematian	Nilai Probit (Y)
1	7	3,52
2	27	4,39
3	37	4,67



Untuk LC_{50} (x), nilai probit adalah 5 (y), dimasukkan ke persamaan regresi

$y = 0{,}575\ x + 3{,}043$

$y - \frac{3{,}043}{0{,}575} = x$

$5 - \frac{3{,}043}{0{,}575} = 3{,}404378$

Jadi, Log x = 3,404378

x = antilog 3,404378

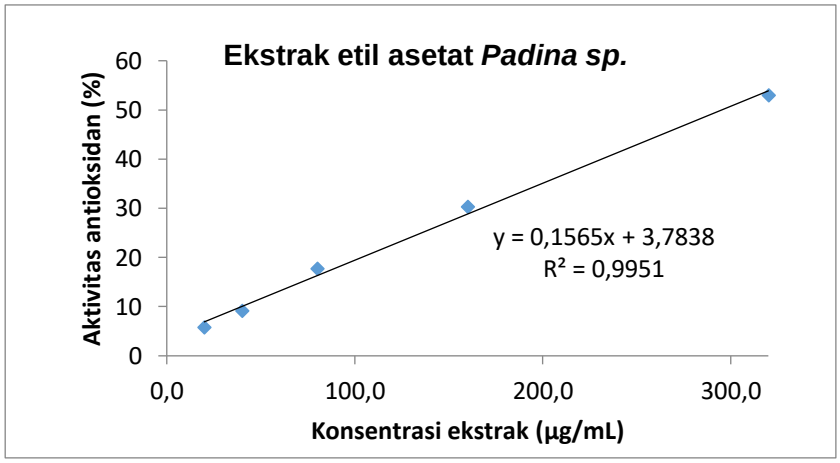
x = 2532,084 ppm

LC_{50} sampel = 2532,084 ppm

Lampiran 7. Perhitungan aktivitas antioksidan dengan metode DPPH

7.1 Aktivitas antioksidan ekstrak etil asetat *Padina sp.*

No	Konsentrasi (µg/mL)	Absorbansi (A) λ = 516 nm	Aktivitas Antioksidan (%)
1	20	0,705	12,639
2	40	0,655	18,835
3	80	0,565	29,988
4	160	0,360	55,390
5	320	-0,017	102,107
6	kontrol	0,807	-



y = 0,2989x + 6,7276

50 = 0,2989(IC_{50}) + 6,7276

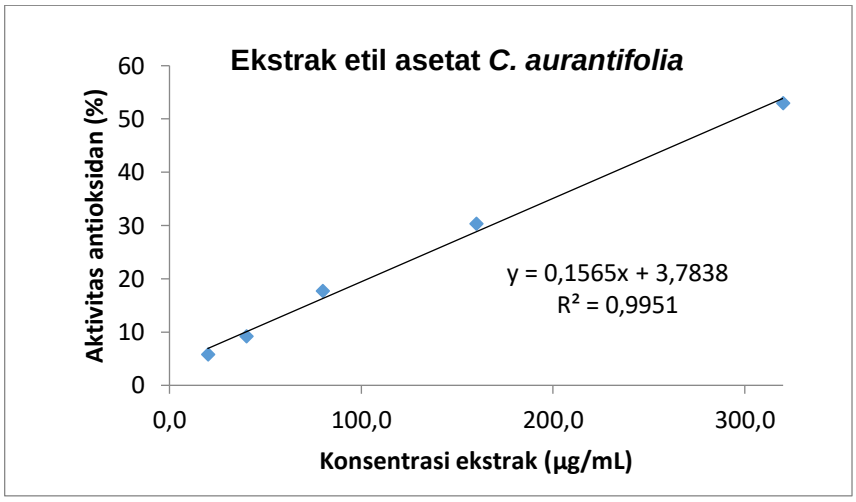
$$IC_{50} = \frac{50 - 6{,}7276}{0{,}2989}$$

IC_{50} = 144,77 µg/mL

Nilai IC_{50} sampel 144,77 µg/mL

7.2 Aktivitas antioksidan ekstrak etil asetat *C. aurantifolia*

No	Konsentrasi (µg/mL)	Absorbansi (A) λ = 516 nm	Aktivitas Antioksidan (%)
1	20	0,749	5,786
2	40	0,722	9,182
3	80	0,654	17,736
4	160	0,554	30,314
5	320	0,374	52,956
6	kontrol	0,795	-



y = 0,1565x + 3,7841

50 = 0,1565 (IC_{50}) + 3,7841

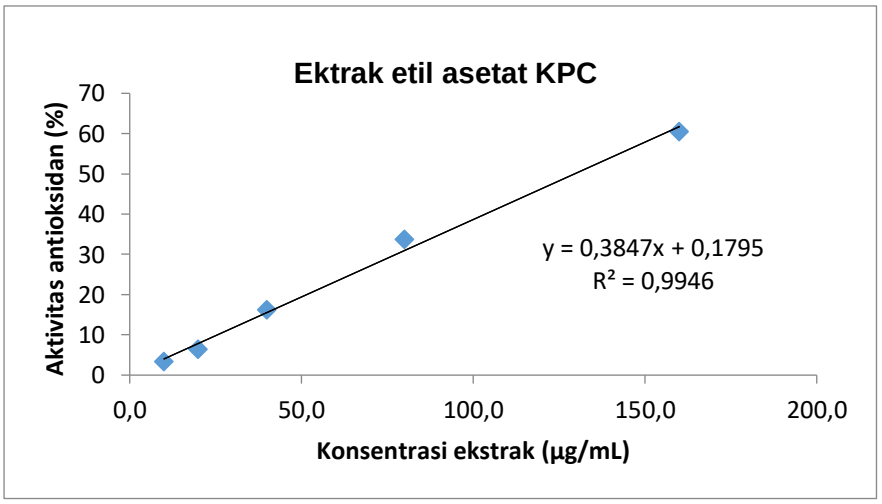
$$IC_{50} = \frac{50 - 3{,}7841}{0{,}1565}$$

IC_{50} = 295,31 µg/mL

Nilai IC_{50} sampel 295,31 µg/mL

7.3 Aktivitas antioksidan ekstrak etil KPC

No	Konsentrasi (µg/mL)	Absorbansi (A) λ = 515 nm	Aktivitas Antioksidan (%)
1	10,0	0,979	1,90
2	20	0,917	8,12
3	40	0,844	15,43
4	80	0,661	33,77
5	160	0,393	60,62
6	kontrol	0,998	-



y = 0,3847x + 0,1795

50 = 0,3847 (IC_{50}) + 0,1795

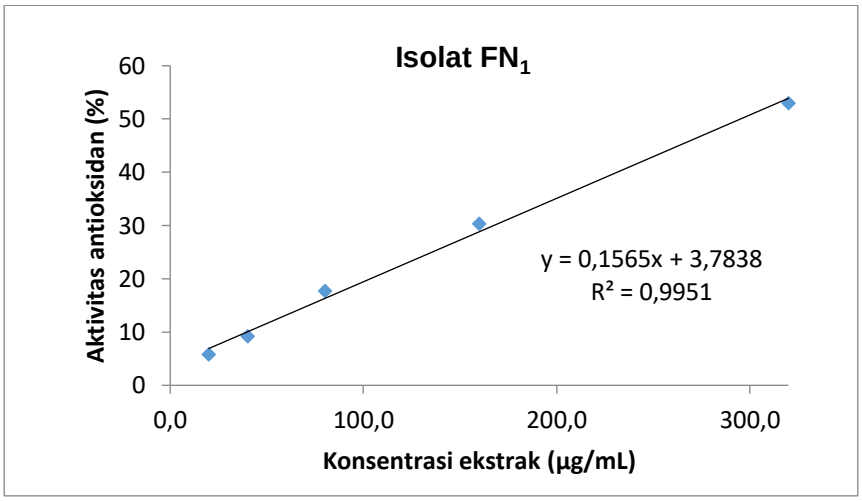
$$IC_{50} = \frac{50 - 0{,}3847}{0{,}1795}$$

IC_{50} = 128,60 µg/mL

Nilai IC_{50} sampel 128,60 µg/mL

7.4 Aktivitas antioksidan isolat FN_1

No	Konsentrasi (µg/mL)	Absorbansi (A) λ = 515 nm	Aktivitas Antioksidan (%)
1	20	0,925	4,05
2	40	0,914	5,19
3	80	0,879	8,82
4	160	0,843	12,55
5	320	0,772	19,92
6	kontrol	0,964	-



y = 0,0523x + 3,6221

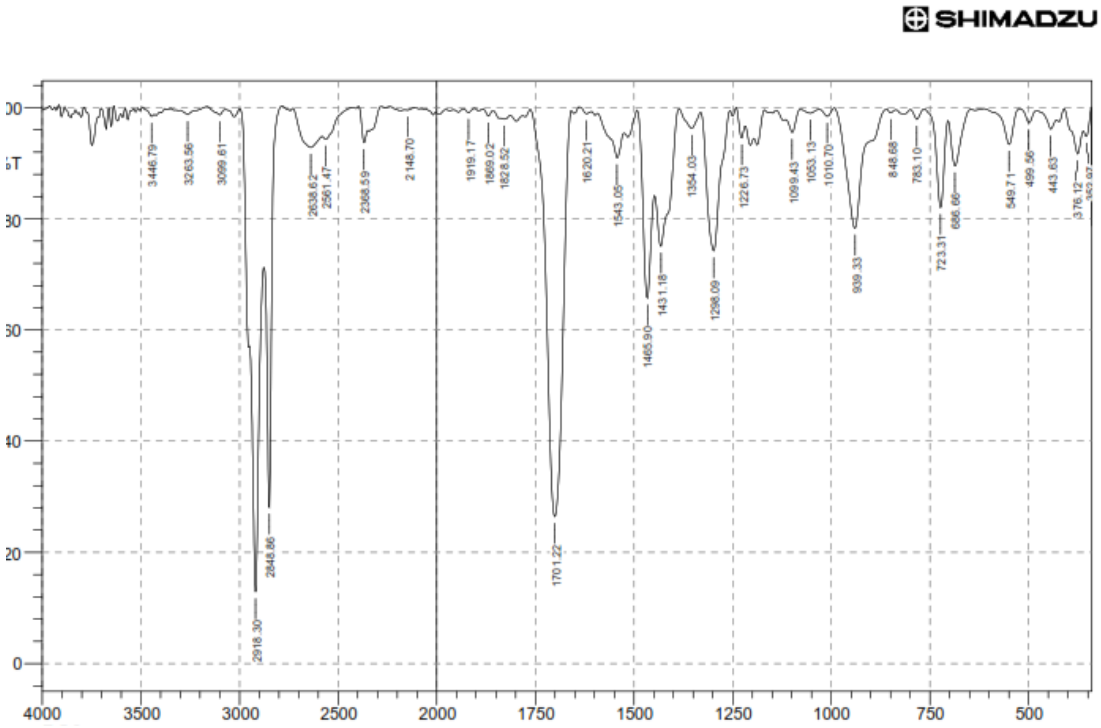
50 = 0,0523 (IC_{50}) + 3,6221

$$IC_{50} = \frac{50 - 0{,}0523}{3{,}6221}$$

IC_{50} = 886,76 µg/mL

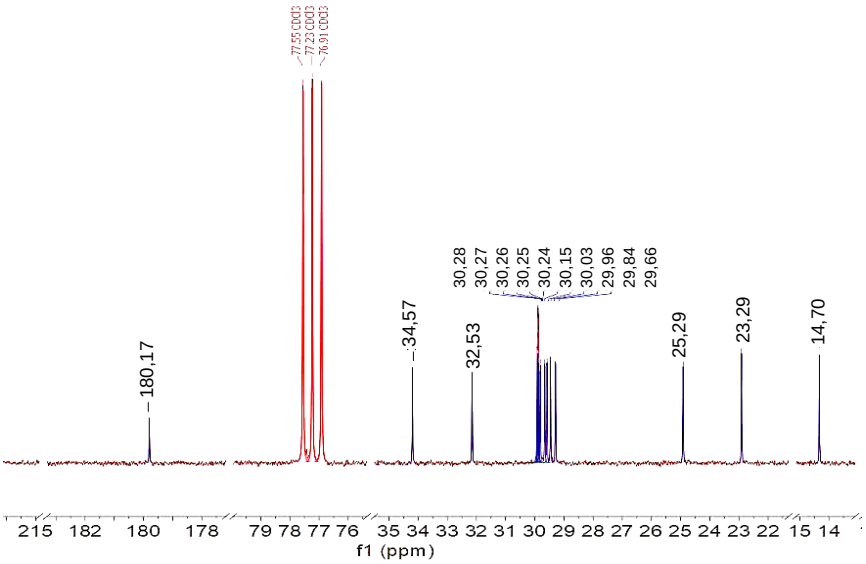
Nilai IC_{50} sampel 886,76 µg/mL

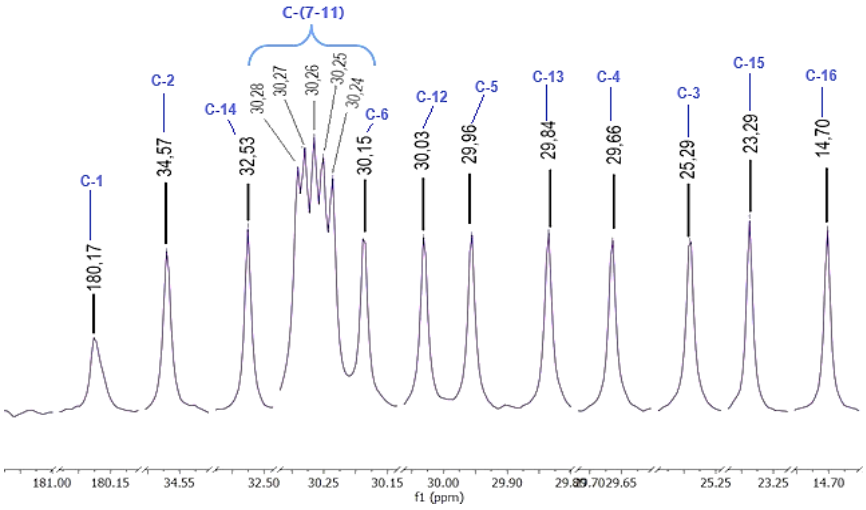
Lampiran 8. Spektrum FT-IR Isolat FN_1

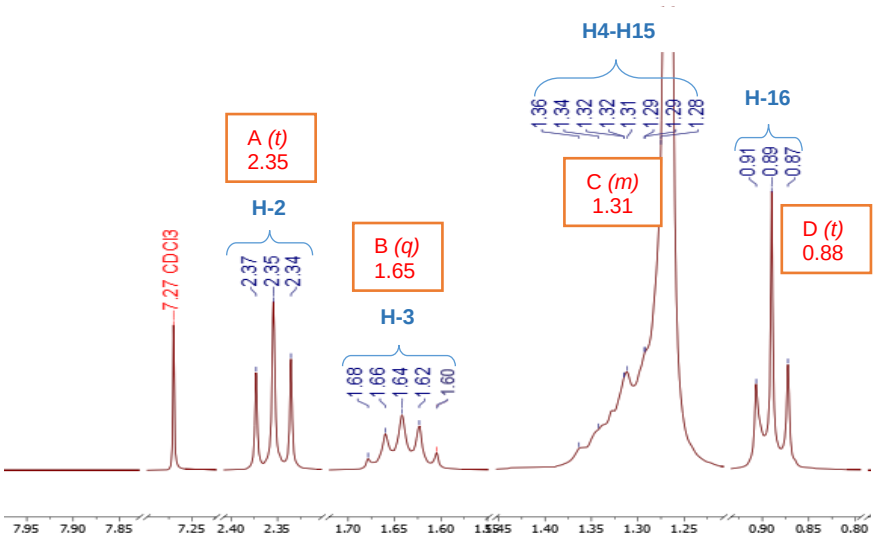


No.	Peak	Intensity	Corr. Intensity	Base (H)	Base (L)	Area	Corr. Area
1	352.97	94.809	2.703	360.69	341.4	0.315	0.14
2	376.12	91.686	5.242	408.91	362.62	1.025	0.55
3	443.63	96.15	2.144	478.35	428.2	0.456	0.152
4	499.56	97.27	2.312	522.71	482.2	0.242	0.174
5	549.71	93.39	6.422	613.36	522.71	0.876	0.802
6	686.66	89.515	8.786	704.02	648.08	1.337	1.024
7	723.31	82.002	16.081	763.81	705.95	1.91	1.531
8	783.1	97.891	1.791	798.53	765.74	0.167	0.122
9	848.68	99.081	0.583	858.32	837.11	0.061	0.03
10	939.33	78.329	21.532	991.41	860.25	5.116	5.02
11	1010.7	98.421	1.406	1029.99	991.41	0.142	0.113
12	1053.13	98.992	0.697	1076.28	1029.99	0.136	0.073
13	1099.43	95.549	3.105	1114.86	1080.14	0.42	0.231
14	1226.73	94.575	3.209	1242.16	1219.01	0.337	0.166
15	1298.09	74.215	25.072	1330.88	1257.59	4.596	4.375
16	1354.03	96.264	3.138	1384.89	1330.88	0.551	0.42
17	1431.18	75.105	12.949	1446.61	1386.82	4.536	2.316
18	1465.9	65.721	24.665	1490.97	1448.54	4.368	2.653
19	1543.05	90.978	5.381	1591.27	1525.69	1.584	0.752
20	1620.21	98.893	0.741	1639.49	1606.7	0.088	0.046
21	1701.22	26.411	73.008	1762.94	1660.71	21.738	21.496
22	1828.52	97.924	0.414	1840.09	1815.02	0.209	0.028
23	1869.02	98.474	1.11	1884.45	1857.45	0.101	0.055
24	1919.17	99.123	0.692	1932.67	1903.74	0.063	0.04
25	2148.7	99.558	0.145	2164.13	2108.2	0.066	0.013
26	2368.59	93.715	3.88	2395.59	2351.23	0.737	0.356
27	2561.47	94.325	1.168	2580.76	2436.09	1.716	0.236
28	2638.62	92.833	3.938	2727.35	2582.68	3.452	1.717
29	2848.86	28.162	51.73	2875.86	2785.21	13.462	8.046
30	2918.3	12.915	50.291	2949.16	2877.79	30.046	16.197
31	3099.61	98.694	1.119	3165.19	3070.68	0.259	0.225
32	3263.56	98.741	0.757	3300.2	3224.98	0.27	0.106
33	3446.79	98.431	0.655	3491.16	3431.36	0.215	0.061

Lampiran 9. Spektrum ^{1}H-NMR dan ^{13}C-NMR Isolat FN_1







Lampiran 10. Hasil Pengujian antikanker terhadap sel MCF-7

10.1 Gambar Layout Plate

PLATE 1	1	2	3	4	5	6	7	8	9	10	11	12
A												
B												
C												
D												
E												
F												
G												
H												

Keterangan:

	Media		Sampel -1
	Media + sel		Sampel -2
	Kontrol Positif		Sampel -3
	Kontrol Negatif: Pelarut		Sampel -4

10.2 Hasil Uji Antipoliferasi

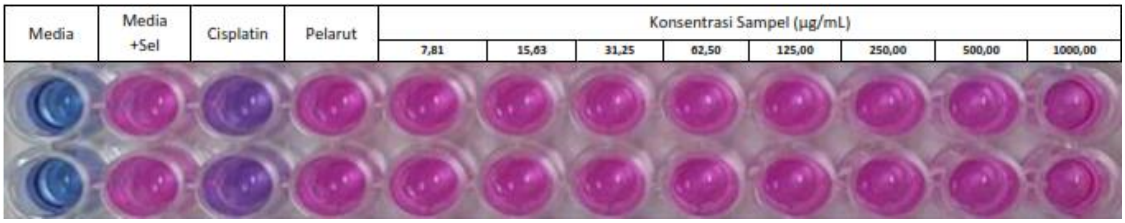
Sampel	IC_{50} (µg/mL)
Isolat FN_1	>1.000

10.3 Absorbansi Hasil isolat FN_1 terhadap sel MCF-7

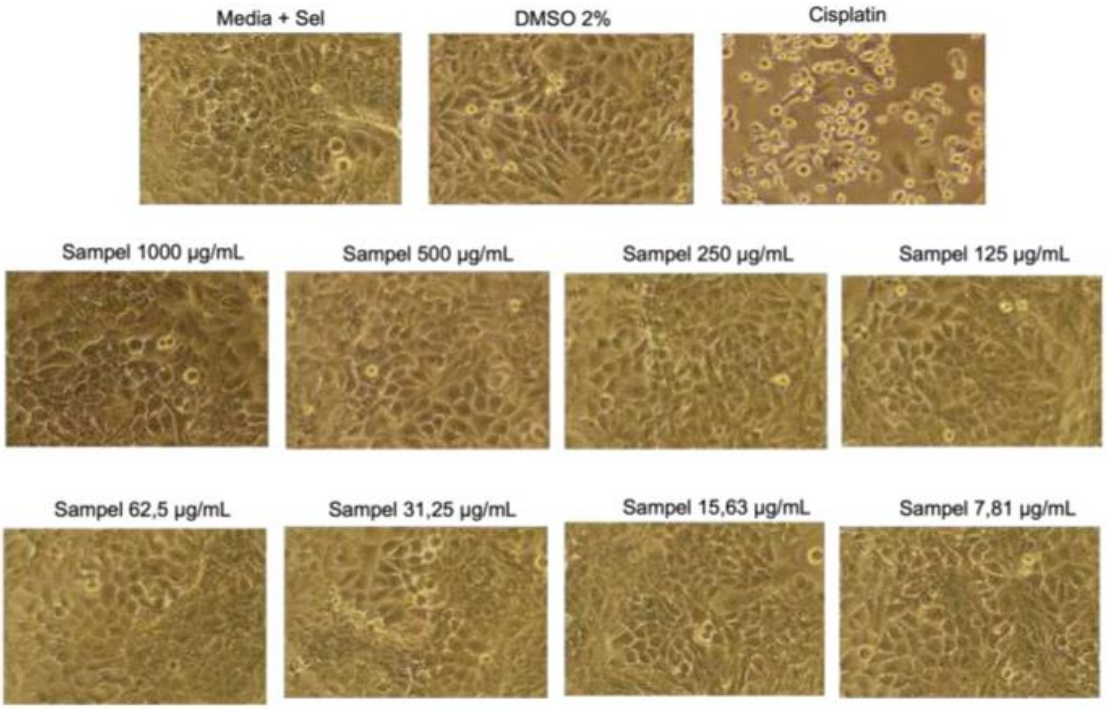
	Media	Media + Sel	Cisplatin	Pelarut	Konsentrasi Sampel (µg/mL)							
					7,81	15,63	31,25	62,50	125,00	250,00	500,00	1000,00
Absorbansi 570nm	0,4882	0,7953	0,6384	0,8006	0,8001	0,8019	0,7751	0,7735	0,7968	0,7880	0,7948	0,8021
	0,4944	0,7955	0,6482	0,8014	0,7871	0,7815	0,7680	0,7927	0,7845	0,8082	0,8101	0,8236
Absorbansi 600nm	0,6193	0,1983	0,4219	0,2041	0,2082	0,2059	0,2161	0,2140	0,2324	0,4780	0,5910	0,6126
	0,6188	0,2004	0,4536	0,2067	0,2031	0,2015	0,1999	0,1950	0,2010	0,2021	0,2148	0,2373
Selisih Absorbansi	-0,1311	0,5970	0,2165	0,5965	0,5919	0,5960	0,5590	0,5595	0,5644	0,3100	0,2038	0,1895
	-0,1244	0,5951	0,1946	0,5947	0,5840	0,5800	0,5681	0,5977	0,5835	0,6061	0,5953	0,5803
% Sel hidup		100,19	47,59	100,12	99,49	100,06	94,94	95,01	95,69	60,52	45,84	43,80
		99,93	44,56	99,88	98,40	97,84	96,20	100,29	98,33	101,45	99,96	98,71
Rata-rata % sel hidup		100,06	46,08	100,00	98,94	98,95	95,57	97,65	97,01	80,98	72,90	71,29
SEM		0,13	1,51	0,12	0,55	1,11	0,63	2,64	1,32	20,47	27,06	27,43
Normalisasi data % Sel hidup		100,06	46,08	100,00	98,94	98,95	95,57	97,65	97,01	80,98	72,90	71,29

Keterangan: Konsentrasi cisplatin yang digunakan dalam uji sebesar 53 µM.

10.4 *Well Plate* hasil pengujian isolat FN_1 terhadap sel MCF-7



10.5 Morfologi sel MCF-7 terhadap hasil uji isolat FN_1

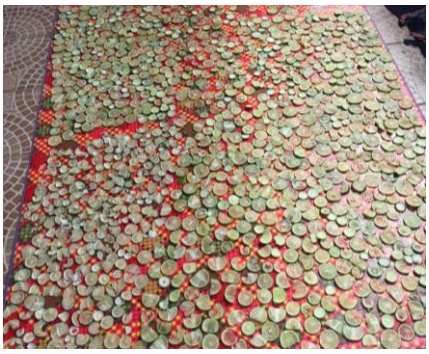


Lampiran 11. Dokumentasi Penelitian

Sampel *Padina sp.*

Sampel *Citrus aurantifolia*

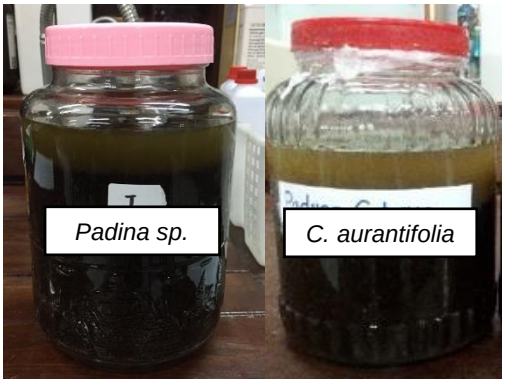
Pengeringan sampel *Padina sp*



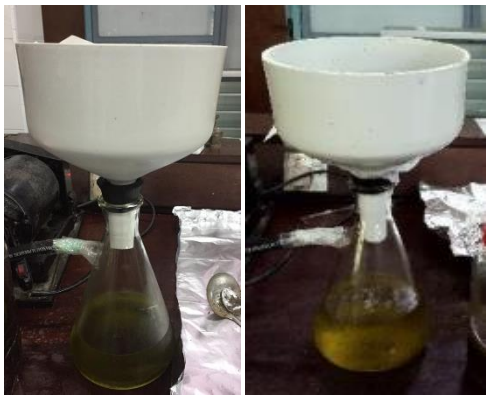
Pengeringan *Citrus aurantifolia*

Serbuk *Padina sp*

Serbuk C. aurantifolia



Maserasi masing-masing Sampel



Penyaringan hasil maserasi
Padina sp dan *C. aurantifolia*

Proses Evaporasi

Ekstrak *n*-heksan
Padina sp

Ekstrak etil asetat
Padina sp

Ekstrak aseton
Padina sp

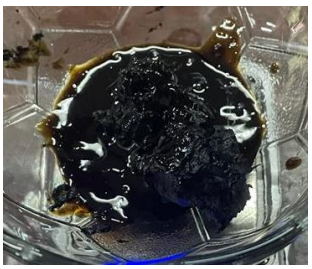
Ekstrak Metanol
Padina sp

Ekstrak *n*-heksana
C. aurantifolia

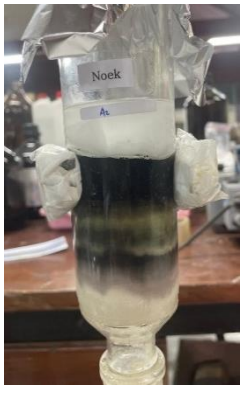
Ekstrak etil asetat
C. aurantifolia

Ekstrak aseton
C. aurantifolia

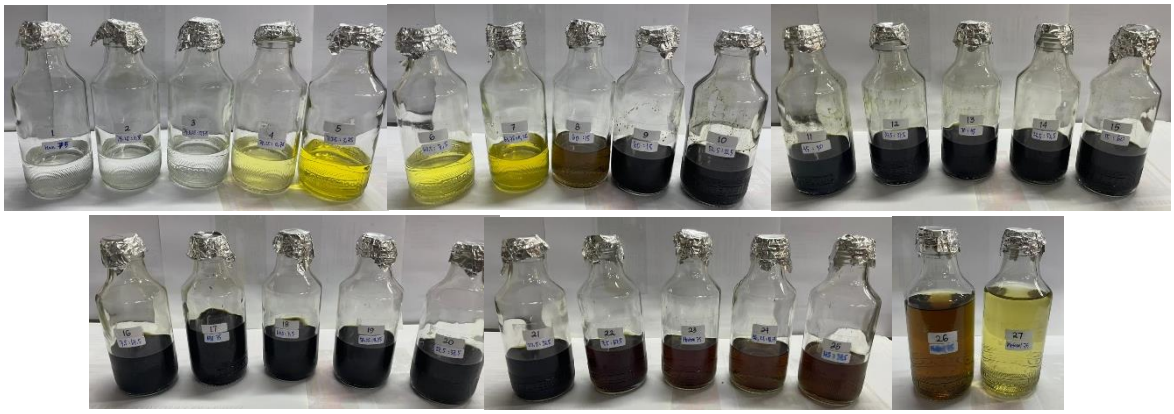
Ekstrak Metanol
C. aurantifolia



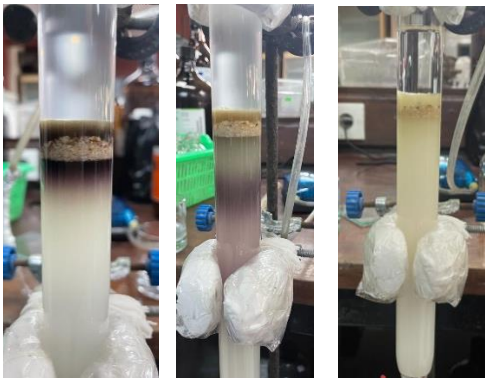
Ekstrak etil *Padina sp* dan
C. aurantifolia digabung (1:1)



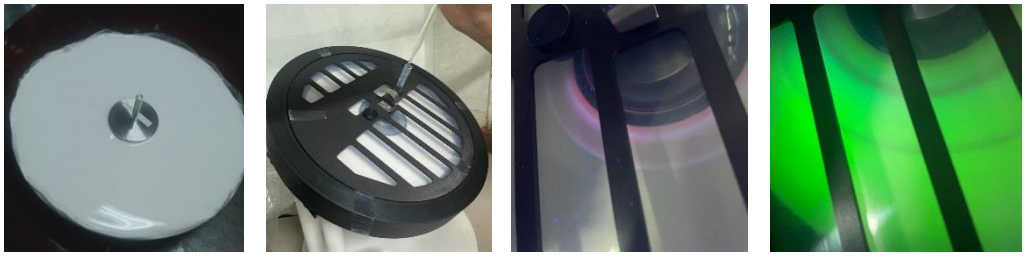
Proses Fraksinasi metode KKV



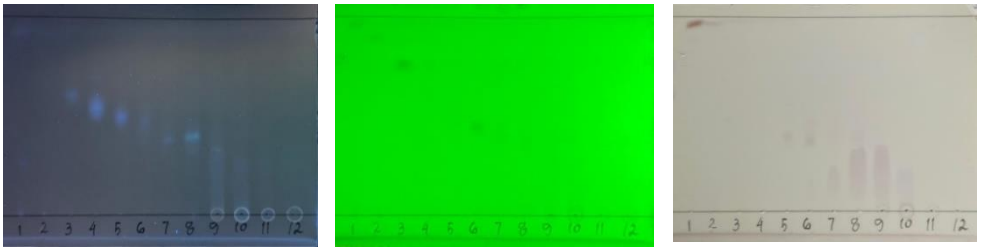
Fraksi-fraksi hasil KKV



Proses Fraksinasi
Dengan metode KKT

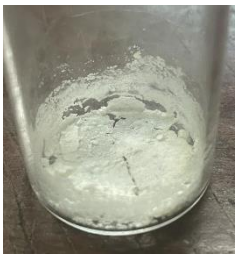


Proses Fraksinasi menggunakan Kromatotron



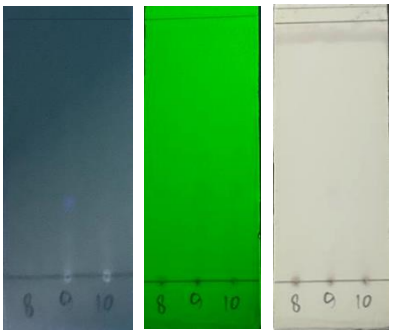
Hasil analisis KLT Fraksi gabungan kromatotron dengan eluen EtOAc : $CHCl_3$: *n*-heksana (0,2 : 1,3 : 8,5)

Fraksi gabungan 8



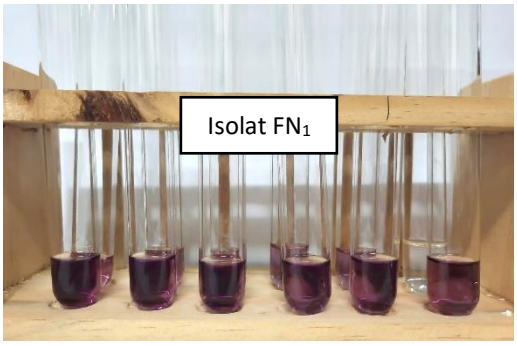
Fraksi gabungan 9

Fraksi gabungan 10



Hasil KLT 3 Fraksi gabungan dengan eluen $CHCL_3$: *n*-heksana (3 : 7)

Isolat FN_1



Uji aktivitas antioksidan isolat FN_1 dengan menggunakan metode DPPH

Media	Media +Sel	Cisplatin	Pelarut	Konsentrasi Sampel (µg/mL)							
				7,81	15,63	31,25	62,50	125,00	250,00	500,00	1000,00

Hasil uji aktivitas antikanker isolat FN_1 terhadap sel MCF-7 pada *Well Plate*