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Lampiran 1. Hasil identifikasi tanaman pisang raja (*Musa paradisiaca* L.)



UPT-LABORATORIUM

Jl. Letjen Sutoyo, Mojosongo-Solo 57127 Telp. 0271-852518, Fax. 0271-853275

Nomor : 198/DET/UPT-LAB/27.03.2021
 Hal : Hasil determinasi tumbuhan
 Lamp. : -

Nama Pemesan : Ririn Angraini
 NIM : 23175355A
 Prodi : S1 Farmasi, Universitas Setia Budi, Surakarta
 Nama Sampel : *Musa paradisiaca* L/Pisang raja

HASIL DETERMINASI TUMBUHAN

Klasifikasi

Kingdom : Plantae
 Super Divisi : Spermatophyta
 Divisi : Magnoliophyta
 Kelas : Monocotyledoneae
 Ordo : Zingiberales
 Famili : Musaceae
 Genus : Musa
 Species : *Musa paradisiaca* L.

Hasil Determinasi menurut C.A. Backer & R.C. Bakhuizen van den Brink Jr. (1963) :

1b – 2b – 3b – 4b – 12b – 13b – 14b – 17b – 18b – 19b – 20b – 21b – 22b – 23b – 24a. 205.

Familia Musaceae 1. Musa. 1a – 2b – 3a – 4b. *Musa paradisiaca* L.

Deskripsi:

Habitus : Herba menahun, berumpun, tinggi lk 2 m.

Batang : Batang semu, terdiri dari tumpukan pelepah daun yang tumbuh dari bawah tanah.

- Daun : Daun tunggal, tersebar, helaian daun bentuk lanset memanjang, panjang lk 147 cm, lebar lk 62 cm, mudah koyak, permukaan atas hijau tua, permukaan bawah hijau muda dan berkilin.
- Bunga : Bunga majemuk, tandan. Tandan bertangkai, di ujung, 0,5-1,5 m, dengan daun penumpu yang berjejal rapat dan tersusun spiral. Daun pelindung merah tua, berkilin, mudah rontok, panjang 10-25 cm, masing-masing dalam ketiaknya dengan banyak bunga yang tersusun dalam dua baris melintang. Bagian ujung yang belum terbuka dan massif menggantung. Bunga betina di bawah, yang jantan (jika ada) di atas. Lima daun tenda bunga melekat sampai tinggi, panjang 6-7 cm, 1 lepas, pendek. Benangsari 5, pada bunga betina tak sempurna. Bakal buah persegi.
- Buah : Buah buni, bentuk buah silinder dan sedikit melengkung, panjang 10-12 cm, tidak berbiji, kulit buah tebal 2,4 – 3 mm, waktu muda hijau, setelah masak kuning, daging buah tebal, lunak, berwarna putih kekuningan, rasa manis. Jumlah sisir 7- 10, tiapsisir terdiri dari 10 – 16 buah.
- Akar : Akar rimpang.

Kepala UPT-LAB
Universitas Setia Budi



Asik Gunawan, Amdk

Surakarta, 27 Maret 2021
Penanggung jawab
Determinasi Tumbuhan

Dra. Dewi Sulistyawati. M.Sc.

Lampiran 2. Sertifikat analisis senyawa rutin

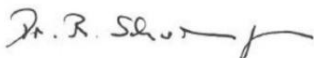
SIGMA-ALDRICH

3050 Spruce Street, Saint Louis, MO 63103 USA
 Email USA: techserv@sial.com Outside USA: eurtechserv@sial.com

Certificate of Analysis

Product Name: RUTIN HYDRATE
 >= 94 % HPLC, powder
Product Number: R5143
Batch Number: BCBW7626
Brand: Sigma
CAS Number: 207671-50-9
Formula: $C_{27}H_{30}O_{16} \cdot xH_2O$
Formula Weight: 610.52
Quality Release Date: 13 APR 2018



TEST	SPECIFICATION	RESULT
APPEARANCE (COLOR)	YELLOW OR GREEN	YELLOW
APPEARANCE (FORM)	POWDER	POWDER
PURITY (HPLC AREA %)	≥ 94 %	95 %
SOLUBILITY (COLOR)	YELLOW TO VERY DARK YELLOW AND BROWN AND YELLOW-BROWN	CONFORMS
SOLUBILITY (TURBIDITY)	CLEAR TO SLIGHTLY HAZY	CLEAR
SOLUBILITY (METHOD)	50MG/ML PYRIDINE	50MG/ML PYRIDINE
LOSS ON DRYING	5.5 - 9.0 %	7.4 %
WAVELENGTH (1) (UV)	256 - 258 NM	257 NM
MOLAR ABSORBANCY INDEX (1)	EMM = 21.8 TO 22.8 (DRY BASIS)	EMM = 22.6 (DRY BASIS)
SOLVENT (UV)	METHANOL	METHANOL



Dr. Reinhold Schwenninger
 Quality Assurance
 Buchs, Switzerland

Sigma-Aldrich warrants that at the time of the quality release or subsequent retest date this product conformed to the information contained in this publication. The current specification sheet may be available at Sigma-Aldrich.com. For further inquiries, please contact Technical Service. Purchaser must determine the suitability of the product for its particular use. See reverse side of invoice or packing slip for additional terms and conditions of sale.

Lampiran 3. Gambar alat dan bahan penelitian

Bahan	
<p>a. Gambar buah pisang raja</p> 	<p>b. Gambar kulit pisang raja</p> 
<p>c. Gambar serbuk halus kulit pisang raja</p> 	<p>d. Gambar pelarut etanol 96%</p> 
<p>e. Gambar pelarut aquades</p> 	<p>f. Gambar pelarut n-heksana</p> 

g. Gambar pelarut etil asetat



h. Gambar DPPH



i. Gambar reagen identifikasi fitokimia

j. Gambar etanol *p.a*

k. Gambar rutin



Alat

a. Gambar botol maserasi

b. Gambar alat *moisture balance*

c. Gambar ayakan mesh no. 60

d. Gambar *vacuum rotary evaporator*e. Gambar rangkaian alat *Sterling Bidwell*

f. Gambar spektrofotometer UV-Vis



g. Gambar oven



h. Gambar vial



Lampiran 4. Perhitungan dan hasil persentase rendemen bobot kering terhadap bobot basah kulit pisang raja

Bobot Basah (g)	Bobot Kering (g)	Rendemen (% b/b)	LOD(%b/b)
14000	1200	8,57	14,28

Perhitungan:

$$\begin{aligned} \% \text{ rendemen kering} &= \frac{\text{Berat kering}}{\text{Berat basah}} \times 100\% \\ &= \frac{1200}{14000} \times 100\% \\ &= 8,57\% \end{aligned}$$

$$\% \text{ LOD} = \frac{\text{Berat Basah} - \text{Berat kering}}{\text{Berat basah}} \times 100\%$$

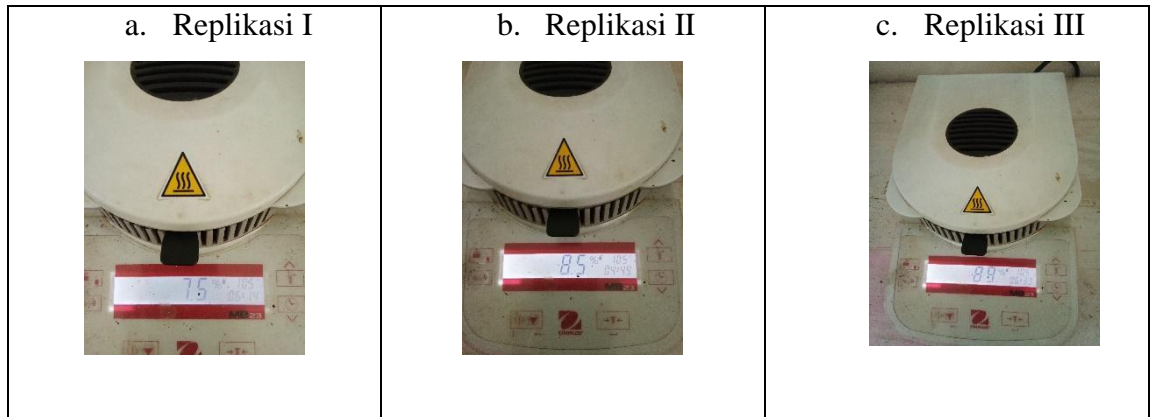
$$= \frac{1400 - 1200}{1400} \times 100\%$$

$$= 14,28 \%$$

Lampiran 5. Hasil perhitungan susut pengeringan serbuk kulit pisang raja

No	Berat serbuk (g)	Susut pengeringan (%)
1	2	7,5
2	2	8,5
3	2	8,9
Rata – rata		8,3

$$\text{Persentase rata-rata} = \frac{7,5\% + 8,5\% + 8,9\%}{3} = 8,3\%$$

Lampiran 6. Gambar uji susut pengeringan

Lampiran 7. Hasil persentase rendemen ekstrak terhadap serbuk halus kulit pisang raja

Berat Serbuk (g)	Bobot Ekstrak (g)	Rendemen (%)
750	79	10,53

Perhitungan rendemen:

$$\begin{aligned}\% \text{ rendemen ekstrak} &= \frac{\text{Bobot Ekstrak}}{\text{Berat Serbuk}} \times 100\% \\ &= \frac{79}{750} \times 100\% \\ &= 10,533\%\end{aligned}$$

Lampiran 8. Gambar proses maserasi

a. Gambar proses perendaman



b. Gambar proses penyaringan



c. Gambar filtrat hasil maserasi



d. Gambar ekstrak kental



Lampiran 9. Hasil rendemen fraksinasi ekstrak kulit pisang raja

Berat ekstrak (g)	Fraksi	Berat fraksi (g)	Rendemen fraksi(% b/b)
10,0	n-heksana	2,384	23,84
	Etil asetat	0,599	5,99
	air	5,661	56,61

$$\% \text{ rendemen fraksi} = \frac{\text{Berat fraksi}}{\text{Berat ekstrak}} \times 100\%$$





Perhitungan rendemen :

$$\begin{aligned} \% \text{ rendemen fraksi n-heksana} &= \frac{2,384}{10} \times 100\% \\ &= 23,84\% \end{aligned}$$


$$\begin{aligned} \% \text{ rendemen fraksi etil asetat} &= \frac{0,599}{10} \times 100\% \\ &= 5,99\% \end{aligned}$$

$$\begin{aligned} \% \text{ rendemen fraksi air} &= \frac{5,661}{10} \times 100\% \\ &= 56,61\% \end{aligned}$$

Lampiran 10. Gambar proses fraksinasi kulit pisang raja

<p>a. Gambar proses fraksinasi</p> 	<p>b. Gambar fraksi n-heksana</p> 
<p>c. Gambar fraksi etil asetat</p> 	<p>d. Gambar ekstrak kental</p> 

Lampiran 11. Gambar hasil pemeriksaan ekstrak kulit pisang raja

<p>Gambar organoleptis ekstrak</p> 	<p>Pemeriksaan organoleptik</p> <p>Bentuk : Kental</p> <p>Warna : Hitam kecoklatan</p> <p>Bau : Khas</p>
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Lampiran 12. Hasil penetapan kadar air ekstrak kulit pisang raja.

No	Bobot Awal (g)	Volume Air (ml)	Kadar Air (%v/b)
1	5,03	0,4	7,95
2	5,05	0,4	7,92
3	5,1	0,5	9,80
Rata – rata			8,55

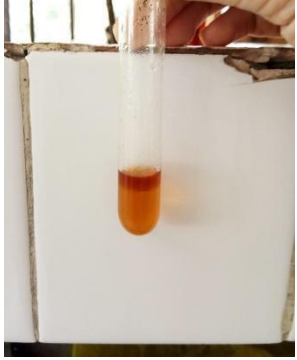


$$\begin{aligned}
 \text{Kadar air}_1 \text{ Ekstrak} &= \frac{\text{volume terbaca (mL)}}{\text{berat serbuk (g)}} \times 100\% \\
 &= \frac{0,4 \text{ mL}}{5,03 \text{ g}} \times 100\% \\
 &= 7,95 \%
 \end{aligned}$$



$$\begin{aligned}
 \text{Kadar air}_2 \text{ Ekstrak} &= \frac{\text{volume terbaca (mL)}}{\text{berat serbuk (g)}} \times 100\% \\
 &= \frac{0,4 \text{ mL}}{5,05 \text{ g}} \times 100\% \\
 &= 7,92 \%
 \end{aligned}$$

$$\begin{aligned}
 \text{Kadar air}_3 \text{ Ekstrak} &= \frac{\text{volume terbaca (mL)}}{\text{berat serbuk (g)}} \times 100\% \\
 &= \frac{0,5 \text{ mL}}{5,1 \text{ g}} \times 100\% \\
 &= 9,80 \%
 \end{aligned}$$


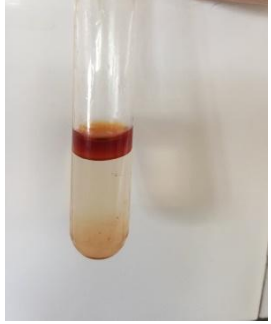





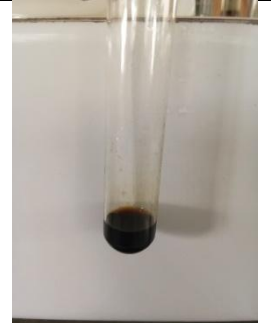

$$\begin{aligned}
 \text{Rata-rata kadar air ekstrak kulit pisang raja} &= \frac{\text{Kadar air 1} + \text{kadar air 2} + \text{kadar air 3}}{3} \\
 &= \frac{7,95\% + 7,92\% + 9,80\%}{3} = 8,55 \%
 \end{aligned}$$

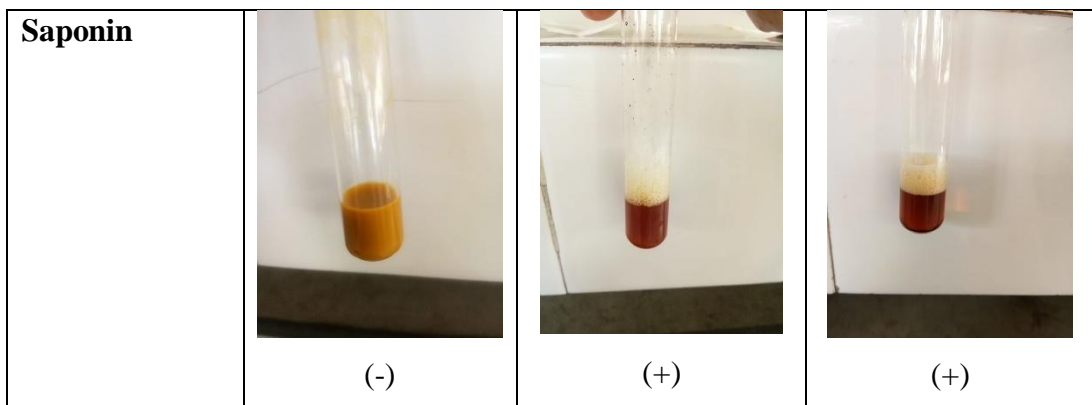
Lampiran 13. Gambar hasil identifikasi senyawa kimia ekstrak kulit pisang raja.

Senyawa	Gambar	Hasil
Flavonoid		<p>Cincin jingga pada lapisan amil alkohol.</p> <p>Hasil positif mengandung flavonoid.</p>
Alkaloid	 <p>Mayer Dragendorf</p>	<p>Tidak terbentuk endapan putih/kuning.</p> <p>Tidak terbentuk endapan merah/jingga.</p>
Tanin		<p>Warna kehitaman, menunjukkan hasil positif tanin.</p>

Saponin		Terbentuk buih
Steroid/triterpenoid		Tidak terbentuk warna hijau atau warna kecoklatan atau ungu pada perbatasan dua pelarut.

Lampiran 14. Gambar hasil identifikasi senyawa kimia fraksi kulit pisang raja.

Senyawa kimia	Fraksi n-heksana	Fraksi etil asetat	Fraksi air
Flavonoid	 (+)	 (+)	 (+)
Alkaloid	 (-)	 (-)	 (-)
Tanin	 (-)	 (+)	 (+)



Lampiran 15. Data penimbangan dan pembuatan DPPH

Serbuk DPPH untuk uji aktivitas antioksidan ditimbang sesuai dengan hasil perhitungan berikut :

$$\begin{aligned} \text{Penimbangan DPPH} &= \text{BM DPPH} \times \text{volume larutan} \times \text{molaritas DPPH} \\ &= 394,32 \text{ g/mol} \times 0,100 \text{ liter} \times 0,0004 \text{ M} \\ &= 0,01578 \text{ gram} \\ &= 15,78 \text{ mg} \approx 15,8 \text{ mg} \end{aligned}$$

Serbuk DPPH sebanyak 15,8 mg dilarutkan dengan etanol *p.a* dalam labu takar 100 mL.

Pembuatan larutan stok rutin

Rutin ditimbang dengan seksama sebanyak 10 mg dan dilarutkan dengan etanol *p.a* sampai tanda batas labu takar 100 mL sehingga diperoleh konsentrasi 100 ppm.

$$\begin{aligned} \text{Konsentrasi rutin} &= 10 \text{ mg} / 100 \text{ mL} \\ &= 100 \text{ mg} / 1000 \text{ ml} \\ &= 100 \text{ ppm} \end{aligned}$$

Larutan rutin 100 ppm diencerkan menjadi 5 seri pengenceran yakni 2 ppm, 4 ppm, 6 ppm, 8 ppm, dan 10 ppm sebanyak 10 mL.

Konsentrasi 2 ppm

$$\begin{aligned} V_1 \times C_1 &= V_2 \times C_2 \\ V_1 \times 100 \text{ ppm} &= 10 \times 2 \text{ ppm} \\ V_1 &= 0,2 \text{ mL} \end{aligned}$$

Konsentrasi 4 ppm

$$\begin{aligned} V_1 \times C_1 &= V_2 \times C_2 \\ V_1 \times 100 \text{ ppm} &= 10 \times 4 \text{ ppm} \\ V_1 &= 0,4 \text{ mL} \end{aligned}$$

Konsentrasi 6 ppm

$$\begin{aligned} V_1 \times C_1 &= V_2 \times C_2 \\ V_1 \times 100 \text{ ppm} &= 10 \times 6 \text{ ppm} \\ V_1 &= 0,6 \text{ mL} \end{aligned}$$

Konsentrasi 8 ppm

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

$$V_1 \times 100 \text{ ppm} = 10 \times 8 \text{ ppm}$$

$$V_1 = 0,8 \text{ mL}$$

Konsentrasi 10 ppm

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

$$V_1 \times 100 \text{ ppm} = 10 \times 10 \text{ ppm}$$

$$V_1 = 1 \text{ mL}$$

Pembuatan larutan stok ekstrak kulit pisang raja

Pembuatan larutan ekstrak dilakukan dengan menimbang ekstrak sebanyak 10 mg dan dimasukkan kedalam labu takar 100 mL lalu ditambahkan etanol pro analisis *ad* tanda batas sehingga diperoleh konsentrasi 100 ppm.

$$\begin{aligned} \text{Konsentrasi larutan ekstrak} &= 10 \text{ mg} / 100 \text{ mL} \\ &= 100 \text{ mg} / 1000 \text{ mL} \\ &= 100 \text{ ppm} \end{aligned}$$

Larutan tersebut kemudian diencerkan menjadi 5 seri pengenceran yakni 2 ppm, 4 ppm, 6 ppm, 8 ppm, dan 10 ppm sebanyak 10 ml.

Konsentrasi 2 ppm

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

$$V_1 \times 100 \text{ ppm} = 10 \times 2 \text{ ppm}$$

$$V_1 = 0,2 \text{ mL}$$

Konsentrasi 4 ppm

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

$$V_1 \times 100 \text{ ppm} = 10 \times 4 \text{ ppm}$$

$$V_1 = 0,4 \text{ mL}$$

Konsentrasi 6 ppm

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

$$V_1 \times 100 \text{ ppm} = 10 \times 6 \text{ ppm}$$

$$V_1 = 0,6 \text{ mL}$$

Konsentrasi 8 ppm

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

$$V_1 \times 100 \text{ ppm} = 10 \times 8 \text{ ppm}$$

$$V_1 = 0,8 \text{ mL}$$

Konsentrasi 10 ppm

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

$$V_1 \times 100 \text{ ppm} = 10 \times 10 \text{ ppm}$$

$$V_1 = 1 \text{ mL}$$

Pembuatan larutan stok fraksi (fraksi n-heksana, etil asetat dan air)

Pembuatan larutan stok fraksi dilakukan dengan menimbang fraksi sebanyak 10 mg dan dimasukkan ke dalam labu takar 100 mL lalu ditambahkan etanol pro analis *ad* tanda batas sehingga diperoleh konsentrasi 100 ppm.

$$\begin{aligned} \text{Konsentrasi larutan stok fraksi} &= 10 \text{ mg} / 100 \text{ mL} \\ &= 100 \text{ mg} / 1000 \text{ ml} \\ &= 100 \text{ ppm} \end{aligned}$$

Larutan tersebut kemudian diencerkan menjadi 5 seri pengenceran yakni 2 ppm, 4 ppm, 6 ppm, 8 ppm, dan 10 ppm sebanyak 10 ml.

Konsentrasi 2 ppm

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

$$V_1 \times 100 \text{ ppm} = 10 \times 2 \text{ ppm}$$

$$V_1 = 0,2 \text{ mL}$$

Konsentrasi 4 ppm

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

$$V_1 \times 100 \text{ ppm} = 10 \times 4 \text{ ppm}$$

$$V_1 = 0,4 \text{ mL}$$

Konsentrasi 6 ppm

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

$$V_1 \times 100 \text{ ppm} = 10 \times 6 \text{ ppm}$$

$$V_1 = 0,6 \text{ mL}$$

Konsentrasi 8 ppm

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

$$V_1 \times 100 \text{ ppm} = 10 \times 8 \text{ ppm}$$

$$V_1 = 0,8 \text{ mL}$$

Konsentrasi 10 ppm

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

$$V_1 \times 100 \text{ ppm} = 10 \times 10 \text{ ppm}$$

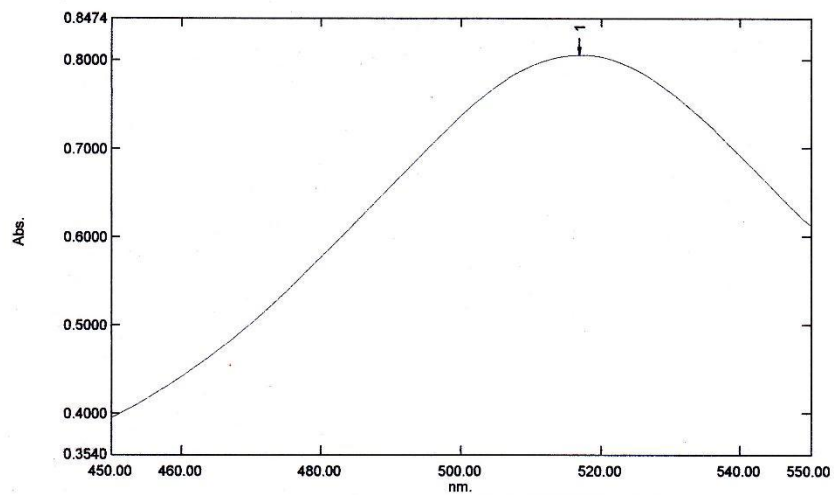
$$V_1 = 1 \text{ mL}$$

Lampiran 16. Penentuan panjang gelombang maksimum

Spectrum Peak Pick Report

04/07/2021 10:49:51 AM

Data Set: File_210407_104910 - RawData



[Measurement Properties]
 Wavelength Range (nm.): 450.00 to 550.00
 Scan Speed: Fast
 Sampling Interval: 1.0
 Auto Sampling Interval: Disabled
 Scan Mode: Single

No.	P/V	Wavelength	Abs.	Description
1	●	517.00	0.8063	

[Instrument Properties]
 Instrument Type: UV-1800 Series
 Measuring Mode: Absorbance
 Slit Width: 1.0 nm
 Light Source Change Wavelength: 340.0 nm
 S/R Exchange: Normal

[Attachment Properties]
 Attachment: None

[Operation]
 Threshold: 0.0010000
 Points: 4
 InterPolate: Disabled
 Average: Disabled

[Sample Preparation Properties]
 Weight:
 Volume:
 Dilution:
 Path Length:
 Additional Information:

Lampiran 17. Penentuan *operating time*

a. *operating time* rutin

Kinetics Data Print Report

Time (Minute)	RawData ...
0.000	0.302
1.000	0.304
2.000	0.306
3.000	0.306
4.000	0.308
5.000	0.309
6.000	0.310
7.000	0.311
8.000	0.312
9.000	0.313
10.000	0.313
11.000	0.314
12.000	0.315
13.000	0.317
14.000	0.317
15.000	0.317
16.000	0.318
17.000	0.317
18.000	0.319
19.000	0.320
20.000	0.320
21.000	0.320
22.000	0.320
23.000	0.321
24.000	0.322
25.000	0.322
26.000	0.322
27.000	0.322
28.000	0.322
29.000	0.322
30.000	0.322
31.000	0.323
32.000	0.323
33.000	0.322
34.000	0.322
35.000	0.323
36.000	0.323
37.000	0.323
38.000	0.324
39.000	0.323
40.000	0.323
41.000	0.323
42.000	0.323
43.000	0.323
44.000	0.323
45.000	0.323
46.000	0.323
47.000	0.323
48.000	0.322
49.000	0.323
50.000	0.322

Kinetics Data Print Report

Time (Minute)	RawData ...
51.000	0.322
52.000	0.322
53.000	0.322
54.000	0.322
55.000	0.322
56.000	0.322
57.000	0.323
58.000	0.322
59.000	0.322
60.000	0.321

b. *operating time ekstrak***Kinetics Data Print Report**

Time (Minute)	RawData ...
0.000	0.573
1.000	0.567
2.000	0.563
3.000	0.559
4.000	0.557
5.000	0.555
6.000	0.552
7.000	0.550
8.000	0.550
9.000	0.549
10.000	0.548
11.000	0.547
12.000	0.546
13.000	0.545
14.000	0.544
15.000	0.544
16.000	0.543
17.000	0.543
18.000	0.542
19.000	0.542
20.000	0.541
21.000	0.541
22.000	0.540
23.000	0.540
24.000	0.540
25.000	0.539
26.000	0.539
27.000	0.539
28.000	0.539
29.000	0.538
30.000	0.538
31.000	0.538
32.000	0.539
33.000	0.537
34.000	0.536
35.000	0.537
36.000	0.537
37.000	0.537
38.000	0.536
39.000	0.536
40.000	0.536
41.000	0.536
42.000	0.535
43.000	0.535
44.000	0.535
45.000	0.535
46.000	0.535
47.000	0.534
48.000	0.534
49.000	0.534
50.000	0.533

Kinetics Data Print Report

Time (Minute)	RawData ...
51.000	0.534
52.000	0.533
53.000	0.533
54.000	0.533
55.000	0.534
56.000	0.532
57.000	0.532
58.000	0.532
59.000	0.531
60.000	0.531

c. *operating time* fraksi n-heksana**Kinetics Data Print Report**

Time (Minute)	RawData ...
0.000	0.701
1.000	0.697
2.000	0.694
3.000	0.693
4.000	0.691
5.000	0.691
6.000	0.690
7.000	0.688
8.000	0.687
9.000	0.687
10.000	0.687
11.000	0.686
12.000	0.686
13.000	0.685
14.000	0.685
15.000	0.684
16.000	0.684
17.000	0.684
18.000	0.684
19.000	0.684
20.000	0.683
21.000	0.683
22.000	0.683
23.000	0.683
24.000	0.683
25.000	0.683
26.000	0.683
27.000	0.682
28.000	0.683
29.000	0.682
30.000	0.682
31.000	0.682
32.000	0.682
33.000	0.682
34.000	0.682
35.000	0.682
36.000	0.682
37.000	0.683
38.000	0.682
39.000	0.682
40.000	0.683
41.000	0.681
42.000	0.683
43.000	0.682
44.000	0.681
45.000	0.682
46.000	0.682
47.000	0.682
48.000	0.682
49.000	0.682
50.000	0.682

Kinetics Data Print Report

Time (Minute)	RawData ...
51.000	0.682
52.000	0.682
53.000	0.682
54.000	0.682
55.000	0.682
56.000	0.682
57.000	0.682
58.000	0.682
59.000	0.681
60.000	0.683

d. *operating time* fraksi etil asetat

Kinetics Data Print Report

Time (Minute)	RawData ...
0.000	0.385
1.000	0.390
2.000	0.386
3.000	0.388
4.000	0.389
5.000	0.390
6.000	0.391
7.000	0.391
8.000	0.393
9.000	0.394
10.000	0.395
11.000	0.397
12.000	0.397
13.000	0.398
14.000	0.399
15.000	0.400
16.000	0.401
17.000	0.401
18.000	0.401
19.000	0.402
20.000	0.403
21.000	0.403
22.000	0.404
23.000	0.403
24.000	0.403
25.000	0.404
26.000	0.405
27.000	0.404
28.000	0.404
29.000	0.404
30.000	0.405
31.000	0.405
32.000	0.405
33.000	0.405
34.000	0.405
35.000	0.405
36.000	0.405
37.000	0.405
38.000	0.404
39.000	0.404
40.000	0.405
41.000	0.405
42.000	0.404
43.000	0.404
44.000	0.403
45.000	0.404
46.000	0.404
47.000	0.404
48.000	0.403
49.000	0.403
50.000	0.404

Kinetics Data Print Report

Time (Minute)	RawData ...
51.000	0.403
52.000	0.403
53.000	0.403
54.000	0.403
55.000	0.403
56.000	0.403
57.000	0.402
58.000	0.402
59.000	0.401
60.000	0.401

e. *operating time* fraksi air

Kinetics Data Print Report

Time (Minute)	RawData ...
0.000	0.629
1.000	0.623
2.000	0.621
3.000	0.617
4.000	0.615
5.000	0.614
6.000	0.613
7.000	0.611
8.000	0.611
9.000	0.609
10.000	0.609
11.000	0.609
12.000	0.608
13.000	0.607
14.000	0.608
15.000	0.608
16.000	0.607
17.000	0.607
18.000	0.608
19.000	0.608
20.000	0.607
21.000	0.607
22.000	0.608
23.000	0.608
24.000	0.608
25.000	0.608
26.000	0.608
27.000	0.608
28.000	0.609
29.000	0.609
30.000	0.609
31.000	0.609
32.000	0.609
33.000	0.610
34.000	0.611
35.000	0.611
36.000	0.611
37.000	0.611
38.000	0.611
39.000	0.612
40.000	0.613
41.000	0.612
42.000	0.613
43.000	0.612
44.000	0.613
45.000	0.614
46.000	0.614
47.000	0.614
48.000	0.615
49.000	0.614
50.000	0.614

Kinetics Data Print Report

Time (Minute)	RawData ...
51.000	0.615
52.000	0.615
53.000	0.616
54.000	0.615
55.000	0.615
56.000	0.616
57.000	0.617
58.000	0.615
59.000	0.616
60.000	0.616

Lampiran 18. Perhitungan aktivitas antioksidan dan IC₅₀

Rutin

Kons. (pp)	Abs. sampel			Abs. kontrol	% inhibisi		
	R1	R2	R3		R1	R2	R3
2	0,615	0,618	0,622	0,806	23,6973	23,3251	22,8288
4	0,558	0,560	0,559		30,7692	30,5211	30,6452
6	0,472	0,469	0,477		41,4392	41,8114	40,8189
8	0,377	0,382	0,379		53,2258	52,6055	52,9777
10	0,345	0,346	0,350		57,1960	57,0720	56,5757

% inhibisi = $\frac{\text{absorbansi blanko} - \text{absorbansi sampel}}{\text{absorbansi blanko}} \times 100\%$

- replikasi 1
% inhibisi = $\frac{0,806 - 0,615}{0,806} \times 100\%$
= 23,6973
- replikasi 2
% inhibisi = $\frac{0,806 - 0,618}{0,806} \times 100\%$
= 23,3251
- replikasi 3
% inhibisi = $\frac{0,806 - 0,622}{0,806} \times 100\%$
= 22,8288

Replikasi	Regresi linear	IC ₅₀ (ppm)	Rata-rata	□SD
1	a :14,4292 b : 4,4727 r : 0,9904	7,9528	8,0008	0,0515
2	a :14,1935 b : 4,4789 r : 0,9917	7,9944		
3	a :13,8213 b : 4,4913 r : 0,9900	8,0552		

Perhitungan IC₅₀ rutin

$$Y = a + bx$$

X = nilai IC₅₀

- replikasi 1

$$50 = 14,4292 + 4,4727x$$

$$X = \frac{50 - 14,4292}{4,4727}$$

$$X = 7,9528$$

- replikasi 2

$$50 = 14,1935 + 4,4789x$$

$$X = \frac{50 - 14,1935}{4,4789}$$

$$X = 7,9944$$

- replikasi 3

$$50 = 13,8213 + 4,4913x$$

$$X = \frac{50 - 13,8213}{4,4913}$$

$$X = 8,0552$$

Ekstrak

Kons. (ppm)	Abs. sampel			Abs. kontrol	% inhibisi		
	R1	R2	R3		R1	R2	R3
2	0,760	0,758	0,756	0,806	5,7072	5,9553	6,3197
4	0,745	0,750	0,748		7,5682	6,9479	7,3110
6	0,725	0,730	0,728		10,0496	9,4293	9,7893
8	0,705	0,708	0,706		12,5310	12,1588	12,5155
10	0,698	0,695	0,693		13,3995	13,7717	14,1264

$$\% \text{ inhibisi} = \frac{\text{absorbansi blanko} - \text{absorbansi sampel}}{\text{absorbansi blanko}} \times 100\%$$

- replikasi 1

$$\% \text{ inhibisi} = \frac{0,806 - 0,760}{0,806} \times 100\%$$

$$= 5,7072$$

- replikasi 2

$$\% \text{ inhibisi} = \frac{0,806 - 0,758}{0,806} \times 100\%$$

$$= 5,9553$$
- replikasi 3

$$\% \text{ inhibisi} = \frac{0,806 - 0,756}{0,806} \times 100\%$$

$$= 6,3197$$

Replikasi	Regresi linear	IC ₅₀ (ppm)	Rata-rata	SD
1	a : 3,7468 b : 1,0173 r : 0,9905	45,4634	44,8647	0,5393
2	a : 3,3995 b : 1,0421 r : 0,9905	44,7142		
3	a : 3,7670 b : 1,0408 r : 0,9904	44,4166		

Perhitungan IC₅₀ ekstrak

$$Y = a + bx$$

X = nilai IC₅₀

- replikasi 1

$$50 = 3,7468 + 1,0173x$$

$$X = \frac{50 - 3,7468}{1,0173}$$

$$X = 45,4634$$
- replikasi 2

$$50 = 3,3995 + 1,0421x$$

$$X = \frac{50 - 14,1935}{4,4789}$$

$$X = 44,7142$$

- replikasi 3

$$50 = 3,7670 + 1,0408x$$

$$X = \frac{50 - 3,7670}{1,0408}$$

$$X = 44,4166$$

Fraksi n-heksana

Kons. (ppm)	Abs. sampel			Abs. kontrol	% inhibisi		
	R1	R2	R3		R1	R2	R3
2	0,604	0,605	0,603	0,811	25,5240	25,4007	25,6473
4	0,600	0,602	0,600		26,0173	25,7707	26,0173
6	0,597	0,598	0,596		26,3872	26,2639	26,5105
8	0,595	0,595	0,593		26,6338	26,6338	26,8804
10	0,590	0,592	0,590		27,2503	27,0037	27,2503

$$\% \text{ inhibisi} = \frac{\text{absorbansi blanko} - \text{absorbansi sampel}}{\text{absorbansi blanko}} \times 100\%$$

- replikasi 1

$$\% \text{ inhibisi} = \frac{0,811 - 0,604}{0,811} \times 100\%$$

$$= 25,5240$$

- replikasi 2

$$\% \text{ inhibisi} = \frac{0,811 - 0,605}{0,811} \times 100\%$$

$$= 25,4007$$

- replikasi 3

$$\% \text{ inhibisi} = \frac{0,811 - 0,603}{0,811} \times 100\%$$

$$= 25,6473$$

Replikasi	Regresi linear	IC ₅₀ (ppm)	Rata-rata	SD
1	a : 25,1418 b : 0,2034 r : 0,9913	122,1818	122,2626	0,6100
2	a : 24,9938 b : 0,2034 r : 0,9986	122,9090		
3	a : 25,2404 b : 0,2034 r : 0,9986	121,6969		

Perhitungan IC₅₀ fraksi *n*-heksana

$$Y = a + bx$$

X = nilai IC₅₀

- replikasi 1

$$50 = 25,1418 + 0,2034x$$

$$X = \frac{50 - 25,1418}{0,2034}$$

$$X = 122,1818$$

- replikasi 2

$$50 = 24,9938 + 0,2034x$$

$$X = \frac{50 - 24,9938}{0,2034}$$

$$X = 122,9090$$

- replikasi 3

$$50 = 25,2404 + 0,2034x$$

$$X = \frac{50 - 25,2404}{0,2034}$$

$$X = 121,6969$$

Fraksi etil asetat

Kons. (pp)	Abs. sampel			Abs. kontrol	% inhibisi		
	R1	R2	R3		R1	R2	R3
2	0,551	0,550	0,548	0,811	32,0592	32,1825	32,4291
4	0,537	0,536	0,533		33,7855	33,9088	34,2787
6	0,521	0,520	0,515		35,7583	35,8816	36,7246
8	0,498	0,492	0,490		38,5943	39,3342	39,5808
10	0,482	0,481	0,481		40,5672	40,9429	40,6905

$$\% \text{ inhibisi} = \frac{\text{absorbansi blanko} - \text{absorbansi sampel}}{\text{absorbansi blanko}} \times 100\%$$

- replikasi 1

$$\begin{aligned} \% \text{ inhibisi} &= \frac{0,811 - 0,551}{0,811} \times 100\% \\ &= 32,0592 \end{aligned}$$

- replikasi 2

$$\begin{aligned} \% \text{ inhibisi} &= \frac{0,811 - 0,550}{0,811} \times 100\% \\ &= 32,1825 \end{aligned}$$

- replikasi 3

$$\begin{aligned} \% \text{ inhibisi} &= \frac{0,811 - 0,548}{0,811} \times 100\% \\ &= 32,4291 \end{aligned}$$

Replikasi	Regresi linear	IC ₅₀ (ppm)	Rata-rata	SD
1	a : 29,6054 b : 1,0912 r : 0,9965	18,6892	18,2166	0,4432
2	a : 29,5661 b : 1,1473 r : 0,9920	17,8102		
3	a : 30,1932 b : 1,0912 r : 0,9928	18,1505		

Perhitungan IC₅₀ fraksi etil asetat

$$Y = a + bx$$

X = nilai IC₅₀

- replikasi 1

$$50 = 29,6054 + 1,0912x$$

$$X = \frac{50 - 29,6054}{1,0912}$$

$$X = 18,6892$$

- replikasi 2

$$50 = 29,5661 + 1,1473x$$

$$X = \frac{50 - 29,5661}{1,1473}$$

$$X = 17,8102$$

- replikasi 3

$$50 = 30,1932 + 1,0912x$$

$$X = \frac{50 - 30,1932}{1,0912}$$

$$X = 18,1505$$

Fraksi air

Kons. (pp)	Abs. sampel			Abs. kontrol	% inhibisi		
	R1	R2	R3		R1	R2	R3
2	0,604	0,607	0,609	0,811	25,5240	25,1541	24,9075
4	0,600	0,602	0,603		26,0173	25,7707	25,6473
6	0,592	0,594	0,596		27,0037	26,7571	26,5105
8	0,588	0,590	0,592		27,4969	27,2503	27,0037
10	0,580	0,583	0,584		28,4834	28,1134	27,9901

$$\% \text{ inhibisi} = \frac{\text{absorbansi blanko} - \text{absorbansi sampel}}{\text{absorbansi blanko}} \times 100\%$$

- replikasi 1

$$\% \text{ inhibisi} = \frac{0,811 - 0,604}{0,811} \times 100\%$$

$$= 25,5240$$

- replikasi 2

$$\% \text{ inhibisi} = \frac{0,811 - 0,607}{0,811} \times 100\%$$

$$= 25,1541$$

- replikasi 3

$$\% \text{ inhibisi} = \frac{0,811 - 0,609}{0,811} \times 100\%$$

$$= 24,9075$$

Replikasi	Regresi linear	IC ₅₀ (ppm)	Rata-rata	SD
1	a : 24,6855 b : 0,3699 r : 0,9933	68,4333	68,7959	0,4051
2	a : 24,3896 b : 0,3699 r : 0,9961	69,2333		
3	a : 24,1553 b : 0,3760 r : 0,9963	68,7213		

Perhitungan IC₅₀ fraksi air

$$Y = a + bx$$

X = nilai IC₅₀

- replikasi 1

$$50 = 24,6855 + 0,3699x$$

$$X = \frac{50 - 24,6855}{0,3699}$$

$$X = 68,4333$$

- replikasi 2

$$50 = 24,3896 + 0,3699x$$

$$X = \frac{50 - 24,3896}{0,3699}$$

$$X = 69,2333$$

- replikasi 3

$$50 = 24,1553 + 0,3760x$$

$$X = \frac{50 - 24,1553}{0,3760}$$

$$X = 68,7213$$

Lampiran 19. Uji statistik aktivitas antioksidan

Uji Antioksidan

Kelompok	Replikasi	IC ₅₀	Rata-rata	SD	Efek
Rutin	1	7,952	8,000333	0,051791	Sangat kuat
	2	7,994			
	3	8,055			
Ekstrak Etanol Kulit Pisang	1	45,463	44,86433	0,539446	Sangat kuat
	2	44,714			
	3	44,416			
Fraksi N-Heksana	1	122,182	122,2627	0,610013	Sedang
	2	122,909			
	3	121,697			
Fraksi Etil Asetat	1	18,689	18,21667	0,443164	Sangat kuat
	2	17,81			
	3	18,151			
Fraksi Air	1	68,433	68,79567	0,405193	Kuat
	2	69,233			
	3	68,721			

Uji Normalitas

Tests of Normality

	Kelompok	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
		Statistic	df	Sig.	Statistic	df	Sig.
IC ₅₀	Rutin	.215	3	.	.989	3	.797
	Ekstrak	.276	3	.	.942	3	.534
	Fraksi n-heksana	.219	3	.	.987	3	.781
	Fraksi etil asetat	.226	3	.	.984	3	.754
	Fraksi air	.240	3	.	.975	3	.694

a. Lilliefors Significance Correction

Hasil : Semua kelompok Uji memiliki nilai Sig >0,05

Kesimpulan : Data Memenuhi syarat Normalitas. Melanjutkan Analisis dengan Anova.

Uji Homogenitas

Test of Homogeneity of VariancesIC₅₀

Levene Statistic	df1	df2	Sig.
1.570	4	10	.256

Hasil : Data memiliki nilai Sig >0,05

Kesimpulan : Data Memenuhi syarat Homogenitas. Melanjutkan Analisis dengan Anova post-hoc Tukey test.

Anova

ANOVAIC₅₀

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	25038.669	4	6259.667	30494.006	.000
Within Groups	2.053	10	.205		
Total	25040.722	14			

Hasil : Data memiliki nilai Sig <0,05

Kesimpulan : Ada perbedaan yang bermakna di setiap kelompok uji. Diperlukan uji post hoc tukey test.

Post Hoc tukey test

Multiple ComparisonsDependent Variable: IC₅₀

Tukey HSD

(I) Kelompok	(J) Kelompok	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Rutin	Ekstrak	-36.864000*	.369933	.000	-38.08148	-35.64652
	Fraksi n-heksana	-	.369933	.000	-115.47981	-113.04485
	Fraksi etilasetat	114.262333*	.369933	.000	-11.43381	-8.99885
	Fraksi air Rutin	-10.216333*	.369933	.000	-62.01281	-59.57785
Ekstrak	Fraksi n-heksana	36.864000*	.369933	.000	35.64652	38.08148
	Fraksi etilasetat	-77.398333*	.369933	.000	-78.61581	-76.18085
	Fraksi air Rutin	26.647667*	.369933	.000	25.43019	27.86515
	Fraksi etilasetat	-23.931333*	.369933	.000	-25.14881	-22.71385
Fraksi heksana	Fraksi n-asetat	114.262333*	.369933	.000	113.04485	115.47981
	Fraksi etilasetat	77.398333*	.369933	.000	76.18085	78.61581
	Fraksi air Rutin	104.046000*	.369933	.000	102.82852	105.26348
	Fraksi etilasetat	53.467000*	.369933	.000	52.24952	54.68448
Fraksi asetat	Fraksi n-asetat	10.216333*	.369933	.000	8.99885	11.43381
	Fraksi etilasetat	-26.647667*	.369933	.000	-27.86515	-25.43019
	Fraksi n-asetat	-	.369933	.000	-105.26348	-102.82852
	Fraksi etilasetat	104.046000*	.369933	.000	102.82852	105.26348
Fraksi air	Fraksi n-asetat	-50.579000*	.369933	.000	-51.79648	-49.36152
	Fraksi etilasetat	60.795333*	.369933	.000	59.57785	62.01281
	Fraksi n-asetat	23.931333*	.369933	.000	22.71385	25.14881
	Fraksi etilasetat	-53.467000*	.369933	.000	-54.68448	-52.24952
	Fraksi etilasetat	50.579000*	.369933	.000	49.36152	51.79648

*. The mean difference is significant at the 0.05 level.

Hasil :

Sampel 1	Sampel 2	Nilai sig	Kesimpulan
Rutin	Ekstrak	.000	Memiliki perbedaan yang signifikan
	Fraksi n-heksana	.000	Memiliki perbedaan yang signifikan
	Fraksi etil asetat	.000	Memiliki perbedaan yang signifikan
	Fraksi air	.000	Memiliki perbedaan yang signifikan