LAMPIRAN

Lampiran 1 Surat Determinasi Tumbuhan

KEMENTERIAN PENDIDIKANKEBUDAYAAN
RISET DAN TEKNOLOGI
UNIVERSITAS DIPONEGORO
FAKULTAS SAINS DAN MATEMATIKA
LAB. EKOLOGI & BIOSISTEMATIK DEPARTEMEN BOLOGI
Jl. Prof. H. Soedarto, SH. Tembalang, Semarang. 024 7474754, 024 76480923

SURAT KETERANGAN

Yang bertanda tangan dibawah ini, menyatakan bahwa mahasiswa sbb :

Nama	: Rosa Lelyana Kusuma
NIM	: 051191109
Prodi/Fak	: *S1* Farmasi/Kesehatan
Perguruan Tinggi	: Universitas Ngudi Waluyo
Judul Penelitian	: Penentuan Kadar Flavonoid Total dan Uji Aktivitas Antioksidan Ekstrak Etanol Sacha Inchi (*Plukentia volubilis*) dengan Metode DPPH

Telah telah melakukan identifikasi sampel tumbuhan (satu jenis) di Laboratorium Ekologi dan Biosistematika Departemen Biologi FSM UNDIP. Hasil determinasi/identifikasi terlampir.

Demikian surat keterangan ini dibuat untuk dapat digunakan seperlunya.

Semarang 18 Desember 2023
Laboratorium Ekologi & Biosistematik
Kepala,

Rully Rahadian, S.Si, M.Si.PhD
NIP 197207022000031001

KEMENTERIAN PENDIDIKANKEBUDAYAAN
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HASIL DETERMINASI

Klasifikasi:

Kingdom	: Plantae
Sunkingdom	: Tracheobionta
Superdivisi	: Spermatophyta
Divisi	: Magnoliophyta
Kelas	: Magnoliopsida (Dicotyledoneae)
Ordo	: Malphigiales
Famili	: Euphorbiaceae
Genus	: *Plukenetia*
Species	: *Plukenetia volubilis* L.
Nama lokal	: Sacha inchi

(https://www.gbif.org/species/3070717)

Kunci Determinasi:
1b-2b-3b-4b-12b-13b-14b-17b-18b-19b-20b-21a-22b-23b-24b-25b-26b-27b-28b-29b-30a-31a-32a-33b-34a-35a-36b-37b-38b-39b-41b-42b-44b-54b-46e-50b-51b-53b-54b-56b-57b-58b-59d-72b-73a-(Famili 99. Euphorbiaceae)1b-3b-4b-6a-7b-8b-10b-13b-15b-25b-26b-27b-28b-29b-30a31b-32b-33b-35a-Genus 48. Plukenetia (1a. *Plukenetia volubilis.*

Deskripsi:
Tanaman terna mencapai tinggi 2 meter, tanaman ini sering kali merupakan tanaman merambat yang memerlukan penyangga. Daun tunnggal, duduk daun berseling, daun berbentuk hati, panjang 10 hingga 12 cm dan lebar 8 hingga 10 cm, yang memiliki tangkai daun sepanjang 2–6 cm (0,8-2,3"), tepi daun bergerigi. Bunga jantan berukuran kecil, berwarna putih, dan tersusun berkelompok. Buahnya berbentuk kapsul berdiameter 3 sampai 5 cm dengan 4 sampai 7 titik, berwarna hijau dan matang berwarna coklat kehitaman. Saat matang, buahnya mengandung daging buah basah berwarna hitam lembut. Kapsul buah biasanya terdiri dari empat hingga lima lobus, tetapi ada pula yang bisa mencapai tujuh. Di dalamnya terdapat biji, lonjong, coklat tua, diameter 1,5 sampai 2 cm dan berat 45 sampai 100 gram.

(https://www.gbif.org/occurrence/4400452473)

Gambar 1. Tanaman dan Biji Sacha Inchi (*Plukenetia volubilis*)

Pustaka:

1. Backer, C.A & Backuizen van den Brink. 1968. Flora of Java. Vol. 1& Vol.II. Noordhof N.V. Gronigen. The Netherland
2. https://en.wikipedia.org/wiki/Plukenetia_volubilis (17 Des 2023)
3. https://powo.science.kew.org/taxon/urn:lsid:ipni.org:names:354970-1 (17 Des 2023)
4. https://www.gbif.org/species/3070717 (17 Des 2023)

Lampiran 2 Certificate of Analysis Etanol pa

PT. SMART LAB INDONESIA

MANUFACTURER OF ANALYTICAL REAGENTS

F/QCL/009 Rev.02

CERTIFICATE OF ANALYSIS

Product Name : Ethanol (Absolute) AR
Mol. Formula : C_2H_5OH
Mol. Weight : 46.07 g/mol
Catalog No. : A-1035
Cas No : 64-17-5
Batch No. : 300823013

Mfg. Date : August, 2023
Exp. Date : August, 2028

Recommended for a plastic container for 6 month from the date of pouring (Expiry date corresponding to label)

NO.	TESTS	UNITS	SPECIFICATIONS	RESULTS
1.	Appearance	–	Clear colorless liquid	Clear colorless liquid
2.	Assay (Alcoholmeter)	wt %	min 99.7	99.956
3.	Wt. Per ml at 20 °C	g/cm^3	0.789 – 0.792	0.790
4.	Colour	Hazen	max 10	< 10
5.	Refractive Index	$n^{20}D$	1.358 – 1.363	1.359
6.	Water (H_2O)	wt %	max 0.2	0.1457
7.	Non-volatile matter	wt %	max 0.001	0.00059
8.	Acidity (CH_3COOH)	wt %	max 0.0006	0.00032
9.	Alkalinity (NH_3)	wt %	max 0.0002	0.00010
10.	Acetone, isopropyl alcohol	–	passes test	passes test
11.	Methanol (CH_3OH)	wt %	max 0.1	NIL
12.	Iron (Fe)	wt %	max 0.00002	< 0.00002
13.	Lead (Pb)	wt %	max 0.00005	< 0.00005
14.	Solubility in water	–	passes test	passes test
15.	Substances darkened (by H_2SO_4)	–	passes test	passes test
16.	Substances Reducing $KMnO_4$	–	passes test	passes test

Result: The above product corresponds to AR Grade

Reference or standard of product specification to Analar standard and ACS specification

PT. SMART-LAB INDONESIA

Yuvraj Sagvekar
Manager QC

Ruko Boulevard Taman Tekno Blok E No. 9 - 11 BSD, Serpong, Tangerang Selatan Indonesia
Telp: (62-21) 7588 0205, F a x : (62-21) 7588 0198
Email: sales@smartlab.co.id, Website: www.smartlab.co.id

Lampiran 3 Uji Metabolit Sekunder

flavonoid

Lampiran 4 Analisis Hasil

1. Uji Kadar Air Simplisia

   % kadar air $= \frac{b-c}{b-a} x100\%$

   % kadar air $= \frac{121,6 - 121,4}{121,6 - 116,6} x100\%$

   $= 4\%$

   Keterangan:

   a = berat cawan kosong : 116,6

   b = berat cawan kosong + sampel sebelum di oven : 121,6

   c = berat cawan kosong + sampel setelah di oven : 121,4

2. Rendemen Ekstrak

   Rendemen ekstrak dihitung menggunakan rumus:

   %Rendemen $= \frac{\text{volume ekstrak minyak}}{\text{berat kering sampel}}$ x 100%

   $= \frac{25 \text{ gram}}{300 \text{ gram}}$ x 100%

   = 8,3 %

3. Kadar Flavonoid Total

   a. pembuatan larutan deret kuersetin 1,2,3,4,5 ppm

      - larutan kuersetin 1 ppm

      V1 x N1 = V2 x N2

      V1 x 1000 = 1 x 10

      V1 = 0,1 ml⟶ dipipet 0,1 ml larutan kuersetin 1000 ppm kemudian dilarutkan ke dalam labu takar 10 ml

- Larutan kuersetin 2 ppm

V1 x N1 = V2 x N2

V1 x 1000 = 2 x 10

V1 = 0,2 ml ⟶ dipipet 0,2 ml larutan kuersetin 1000 ppm kemudian dilarutkan ke dalam labu takar 10 ml

- Larutan kuersetin 3 ppm

V1 x N1 = V2 x N2

V1 x 1000 = 3 x 10

V1 = 0,3 ml ⟶ dipipet 0,3 ml larutan kuersetin 1000 ppm kemudian dilarutkan ke dalam labu takar 10 ml

- Larutan kuersetin 4 ppm

V1 x N1 = V2 x N2

V1 x 1000 = 4 x 10

V1 = 0,4 ml ⟶ dipipet 0,4 ml larutan kiersetin 1000 ppm kemudian dilarutkan ke dalam labu takar 10 ml

- Larutan kuersetin 5 ppm

V1 x N1 = V2 x N2

V1 x 1000 = 5 x 10

V1 = 0,5 ml ⟶ dipipet 0,5 ml larutan kuersetin 1000 ppm kemudian dilarutkan ke dalam labu takar 10 ml

Tabel Konsentrasi dan Absorbansi Kuersetin

konsentrasi (ppm)	absorbansi kuersetin
30	0,210
40	0,276
50	0,352
60	0,427
70	0,497

Dari kurva baku kuersetin maka didapatkan persamaan regresi linear sebagai berikut:

y = 0,0725x + 0,0624

a = 0,0624

b = 0,0725

r = 0,9997

b. Perhitungan kadar flavonoid total

Diketahui:

berat kuersetin = 10 mg atau 0,01 gram

dilarutkan dalam = 10 ml etanol

konsentrasi larutan induk = 1000 ppm

deret konsentrasi kuersetin = 30, 40, 50, 60, 70 ppm

berat ekstrak = 10 mg atau 0,01 gram

dilarutkan dalam = 10 ml etanol

konsentrasi larutan induk ekstrak = 1000 ppm

konsentrasi yang diuji = 200 ppm

Fp = $\frac{1000\ \text{ppm}}{200\ \text{ppm}} = 5$

- Perhitungan kadar flavonoid total replikasi 1

y = 0,0725x + 0,0624

0,458 = 0,0725x + 0,0624

x = 5,45 µg/ml

x = 0,00545 mg/ml

$$KFT = \frac{V\ (ml) * X\ (mg/ml) * Fp}{\text{berat ekstrak}}$$

$$KFT = \frac{10\ (ml) * 0{,}00545\ (mg/ml) * 5}{0{,}01\ gram}$$

KFT = 27,25 mgQE/g ekstrak

- Perhitungan kadar flavonoid total replikasi 2

y = 0,0725x + 0,0624

0,453 = 0,0725x + 0,0624

x = 5,39 µg/ml

x = 0,00539 mg/ml

$$KFT = \frac{V\ (ml) * X\ (mg/ml) * Fp}{\text{berat ekstrak}}$$

$$KFT = \frac{10\ (ml) * 0{,}00539\ (mg/ml) * 5}{0{,}01\ gram}$$

KFT = 26,9 mgQE/g ekstrak

- Perhitungan kadar flavonoid total replikasi 3

y = 0,0725x + 0,0624

0,456 = 0,0725x + 0,0624

x = 5,43 µg/ml

x = 0,00543 mg/ml

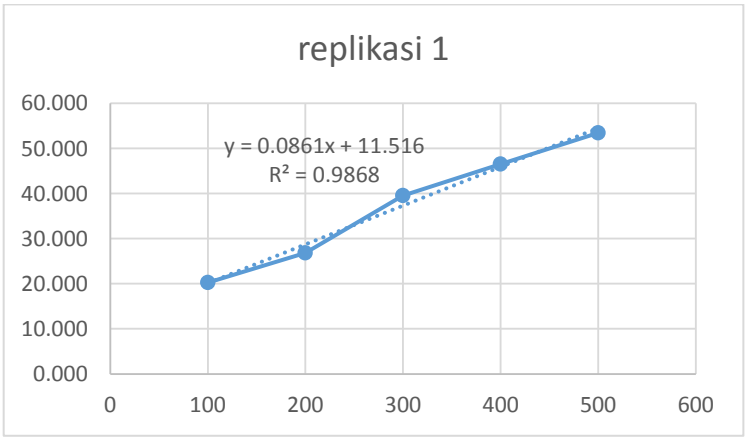
$$KFT = \frac{V\ (ml) * X\ (mg/ml) * Fp}{\text{berat ekstrak}}$$

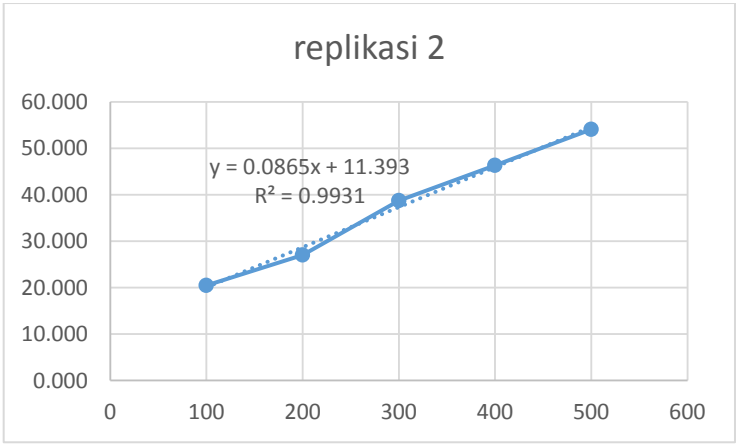
$$KFT = \frac{10\ (ml) * 0{,}00543\ (mg/ml) * 5}{0{,}01\ gram}$$

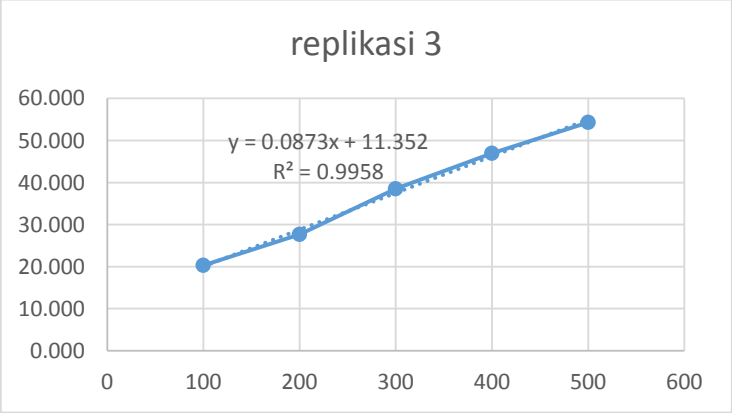
KFT = 27,15 mgQE/g ekstrak

Dari replikasi 1, 2, dan 3 maka didapatkan rata-rata kadar flavonoid total sebesar 27,1 mgQE/g ekstrak.

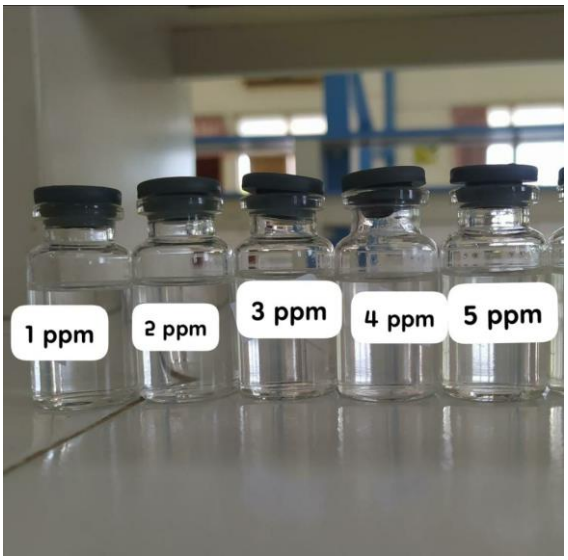
Lampiran 5 Hubungan antara konsentrasi dan %inhibisi pada replikasi 1

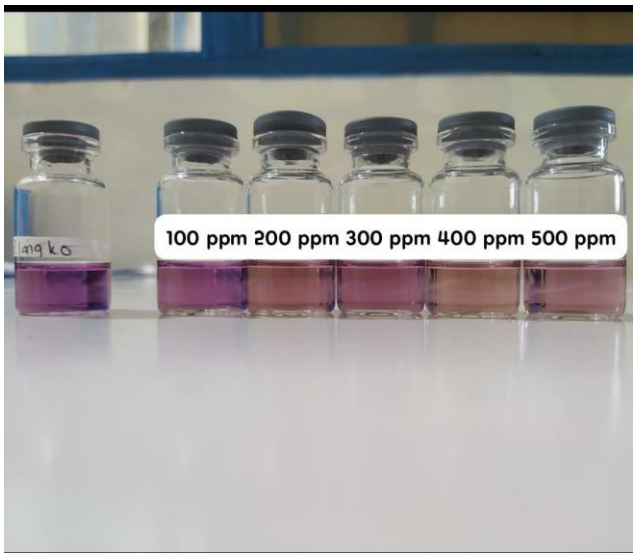





replikasi 3
60.000
50.000
40.000
30.000
20.000
10.000
0.000
0
100
200
300
400
500
600
y = 0.0873x + 11.352
R² = 0.9958

Lampiran 6 Uji DPPH





Lampiran 7 Uji Statistik

Tests of Normality

	Kelompok	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
		Statistic	df	Sig.	Statistic	df	Sig.
konsentrasi	100 ppm	,385	3	.	,750	3	,000
	200 ppm	,292	3	.	,923	3	,463
	300 ppm	,314	3	.	,893	3	,363
	400 ppm	,253	3	.	,964	3	,637
	500 ppm	,292	3	.	,923	3	,464

Uji Homogenitas

Test of Homogeneity of Variances

Konsentrasi

Levene Statistic	df1	df2	Sig.
1,769	4	10	,212

Uji Anova

ANOVA

Konsentrasi

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	2267,547	4	566,887	3684,119	,000
Within Groups	1,539	10	,154		
Total	2269,086	14			

Multiple Comparisons

Dependent Variable: konsentrasi

	(I) Kelompok	(J) Kelompok	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Tukey HSD	100 ppm	200 ppm	-6,83033*	,32028	,000	-7,8844	-5,7763
		300 ppm	-18,57933*	,32028	,000	-19,6334	-17,5253
		400 ppm	-26,22900*	,32028	,000	-27,2831	-25,1749
		500 ppm	-33,60633*	,32028	,000	-34,6604	-32,5523
	200 ppm	100 ppm	6,83033*	,32028	,000	5,7763	7,8844
		300 ppm	-11,74900*	,32028	,000	-12,8031	-10,6949
		400 ppm	-19,39867*	,32028	,000	-20,4527	-18,3446
		500 ppm	-26,77600*	,32028	,000	-27,8301	-25,7219
	300 ppm	100 ppm	18,57933*	,32028	,000	17,5253	19,6334

LSD	300 ppm	200 ppm	11,74900*	,32028	,000	10,6949	12,8031
		400 ppm	-7,64967*	,32028	,000	-8,7037	-6,5956
		500 ppm	-15,02700*	,32028	,000	-16,0811	-13,9729
	400 ppm	100 ppm	26,22900*	,32028	,000	25,1749	27,2831
		200 ppm	19,39867*	,32028	,000	18,3446	20,4527
		300 ppm	7,64967*	,32028	,000	6,5956	8,7037
		500 ppm	-7,37733*	,32028	,000	-8,4314	-6,3233
	500 ppm	100 ppm	33,60633*	,32028	,000	32,5523	34,6604
		200 ppm	26,77600*	,32028	,000	25,7219	27,8301
		300 ppm	15,02700*	,32028	,000	13,9729	16,0811
		400 ppm	7,37733*	,32028	,000	6,3233	8,4314
	100 ppm	200 ppm	-6,83033*	,32028	,000	-7,5440	-6,1167
		300 ppm	-18,57933*	,32028	,000	-19,2930	-17,8657
		400 ppm	-26,22900*	,32028	,000	-26,9426	-25,5154
		500 ppm	-33,60633*	,32028	,000	-34,3200	-32,8927
	200 ppm	100 ppm	6,83033*	,32028	,000	6,1167	7,5440
		300 ppm	-11,74900*	,32028	,000	-12,4626	-11,0354
		400 ppm	-19,39867*	,32028	,000	-20,1123	-18,6850
		500 ppm	-26,77600*	,32028	,000	-27,4896	-26,0624
	300 ppm	100 ppm	18,57933*	,32028	,000	17,8657	19,2930
		200 ppm	11,74900*	,32028	,000	11,0354	12,4626
		400 ppm	-7,64967*	,32028	,000	-8,3633	-6,9360
		500 ppm	-15,02700*	,32028	,000	-15,7406	-14,3134
	400 ppm	100 ppm	26,22900*	,32028	,000	25,5154	26,9426
		200 ppm	19,39867*	,32028	,000	18,6850	20,1123
		300 ppm	7,64967*	,32028	,000	6,9360	8,3633
		500 ppm	-7,37733*	,32028	,000	-8,0910	-6,6637
	500 ppm	100 ppm	33,60633*	,32028	,000	32,8927	34,3200
		200 ppm	26,77600*	,32028	,000	26,0624	27,4896
		300 ppm	15,02700*	,32028	,000	14,3134	15,7406
		400 ppm	7,37733*	,32028	,000	6,6637	8,0910
	100 ppm	200 ppm	-6,83033*	,32028	,000	-7,9774	-5,6833
		300 ppm	-18,57933*	,32028	,000	-19,7264	-17,4323
		400 ppm	-26,22900*	,32028	,000	-27,3761	-25,0819
		500 ppm	-33,60633*	,32028	,000	-34,7534	-32,4593
	200 ppm	100 ppm	6,83033*	,32028	,000	5,6833	7,9774
		300 ppm	-11,74900*	,32028	,000	-12,8961	-10,6019
		400 ppm	-19,39867*	,32028	,000	-20,5457	-18,2516
		500 ppm	-26,77600*	,32028	,000	-27,9231	-25,6289
Bonferroni	300 ppm	100 ppm	18,57933*	,32028	,000	17,4323	19,7264
		200 ppm	11,74900*	,32028	,000	10,6019	12,8961
		400 ppm	-7,64967*	,32028	,000	-8,7967	-6,5026
		500 ppm	-15,02700*	,32028	,000	-16,1741	-13,8799
	400 ppm	100 ppm	26,22900*	,32028	,000	25,0819	27,3761
		200 ppm	19,39867*	,32028	,000	18,2516	20,5457
		300 ppm	7,64967*	,32028	,000	6,5026	8,7967
		500 ppm	-7,37733*	,32028	,000	-8,5244	-6,2303
	500 ppm	100 ppm	33,60633*	,32028	,000	32,4593	34,7534
		200 ppm	26,77600*	,32028	,000	25,6289	27,9231
		300 ppm	15,02700*	,32028	,000	13,8799	16,1741
		400 ppm	7,37733*	,32028	,000	6,2303	8,5244

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

Lampiran 8 Hasil Perhitungan %inhibisi

Replikasi 1

1. Konsentrasi 100

   %peredaman DPPH $= \frac{(\text{Absorban kontrol} - \text{absorban sampel})}{\text{Absorban kontrol}}$ x 100%

   %peredaman DPPH $= \frac{(0{,}488 - 0{,}389)}{0{,}488}$ x 100%

   = 20,287 %

2. Konsentrasi 200

   %peredaman DPPH $= \frac{(\text{Absorban kontrol} - \text{absorban sampel})}{\text{Absorban kontrol}}$ x 100%

   %peredaman DPPH $= \frac{(0{,}488 - 0{,}357)}{0{,}488}$ x 100%

   = 26,844 %

3. Konsentrasi 300

   %peredaman DPPH $= \frac{(\text{Absorban kontrol} - \text{absorban sampel})}{\text{Absorban kontrol}}$ x 100%

   %peredaman DPPH $= \frac{(0{,}488 - 0{,}295)}{0{,}488}$ x 100%

   = 39,549 %

4. Konsentrasi 400

   %peredaman DPPH $= \frac{(\text{Absorban kontrol} - \text{absorban sampel})}{\text{Absorban kontrol}}$ x 100%

   %peredaman DPPH $= \frac{(0{,}488 - 0{,}261)}{0{,}488}$ x 100%

   = 46,516 %

5. Konsentrasi 500

$$\%\text{peredaman DPPH} = \frac{(\text{Absorban kontrol} - \text{absorban sampel})}{\text{Absorban kontrol}} \text{ x } 100\%$$

$$\%\text{peredaman DPPH} = \frac{(0{,}488 - 0{,}277)}{0{,}488} \text{ x } 100\%$$

$$= 53{,}484\ \%$$

Replikasi 2

1. Konsentrasi 100

$$\%\text{peredaman DPPH} = \frac{(\text{Absorban kontrol} - \text{absorban sampel})}{\text{Absorban kontrol}} \text{ x } 100\%$$

$$\%\text{peredaman DPPH} = \frac{(0{,}488 - 0{,}388)}{0{,}488} \text{ x } 100\%$$

$$= 20{,}492\ \%$$

2. Konsentrasi 200

$$\%\text{peredaman DPPH} = \frac{(\text{Absorban kontrol} - \text{absorban sampel})}{\text{Absorban kontrol}} \text{ x } 100\%$$

$$\%\text{peredaman DPPH} = \frac{(0{,}488 - 0{,}356)}{0{,}488} \text{ x } 100\%$$

$$= 27{,}049\ \%$$

3. Konsentrasi 300

$$\%\text{peredaman DPPH} = \frac{(\text{Absorban kontrol} - \text{absorban sampel})}{\text{Absorban kontrol}} \text{ x } 100\%$$

$$\%\text{peredaman DPPH} = \frac{(0{,}488 - 0{,}299)}{0{,}488} \text{ x } 100\%$$

$$= 38{,}730\ \%$$

4. Konsentrasi 400

$$\%\text{peredaman DPPH} = \frac{(\text{Absorban kontrol} - \text{absorban sampel})}{\text{Absorban kontrol}} \text{ x } 100\%$$

$$\%\text{peredaman DPPH} = \frac{(0{,}488 - 0{,}262)}{0{,}488} \text{ x } 100\%$$

= 46,311 %

5. Konsentrasi 500

%peredaman DPPH $= \frac{(\text{Absorban kontrol} - \text{absorban sampel})}{\text{Absorban kontrol}}$ x 100%

%peredaman DPPH $= \frac{(0{,}488 - 0{,}224)}{0{,}488}$ x 100%

= 54,098 %

Replikasi 3

1. Konsentrasi 100

%peredaman DPPH $= \frac{(\text{Absorban kontrol} - \text{absorban sampel})}{\text{Absorban kontrol}}$ x 100%

%peredaman DPPH $= \frac{(0{,}488 - 0{,}389)}{0{,}488}$ x 100%

= 20,287 %

2. Konsentrasi 200

%peredaman DPPH $= \frac{(\text{Absorban kontrol} - \text{absorban sampel})}{\text{Absorban kontrol}}$ x 100%

%peredaman DPPH $= \frac{(0{,}488 - 0{,}353)}{0{,}488}$ x 100%

= 27,664 %

3. Konsentrasi 300

%peredaman DPPH $= \frac{(\text{Absorban kontrol} - \text{absorban sampel})}{\text{Absorban kontrol}}$ x 100%

%peredaman DPPH $= \frac{(0{,}488 - 0{,}3)}{0{,}488}$ x 100%

= 38,525 %

4. Konsentrasi 400

%peredaman DPPH $= \frac{(\text{Absorban kontrol} - \text{absorban sampel})}{\text{Absorban kontrol}}$ x 100%

%peredaman DPPH $= \frac{(0,488-0,259)}{0,488}$ x 100%

= 46,926 %

5. Konsentrasi 500

%peredaman DPPH $= \frac{(\text{Absorban kontrol}-\text{absorban sampel})}{\text{Absorban kontrol}}$ x 100%

%peredaman DPPH $= \frac{(0,488-0,223)}{0,488}$ x 100%

= 54,303 %