LAMPIRAN

Lampiran 1 Determinasi Tanaman

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	: Annisa Dyah Irtamelia
NIM	: 051191141
Prodi/Fak	: S1 Farmasi/Kesehatan
Perguruan Tinggi	: Universitas Ngudi Waluyo
Judul Penelitian	: Uji Antioksidan Minyak Biji Sacha Ichi (*Plukenetia 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
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

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 Sertifikat Serbuk DPPH

Sigma-Aldrich.

3050 Spruce Street, Saint Louis, MO 63103, USA
Website: www.sigma-aldrich.com
Email USA: techserv@sial.com
Outside USA: eurtechserv@sial.com

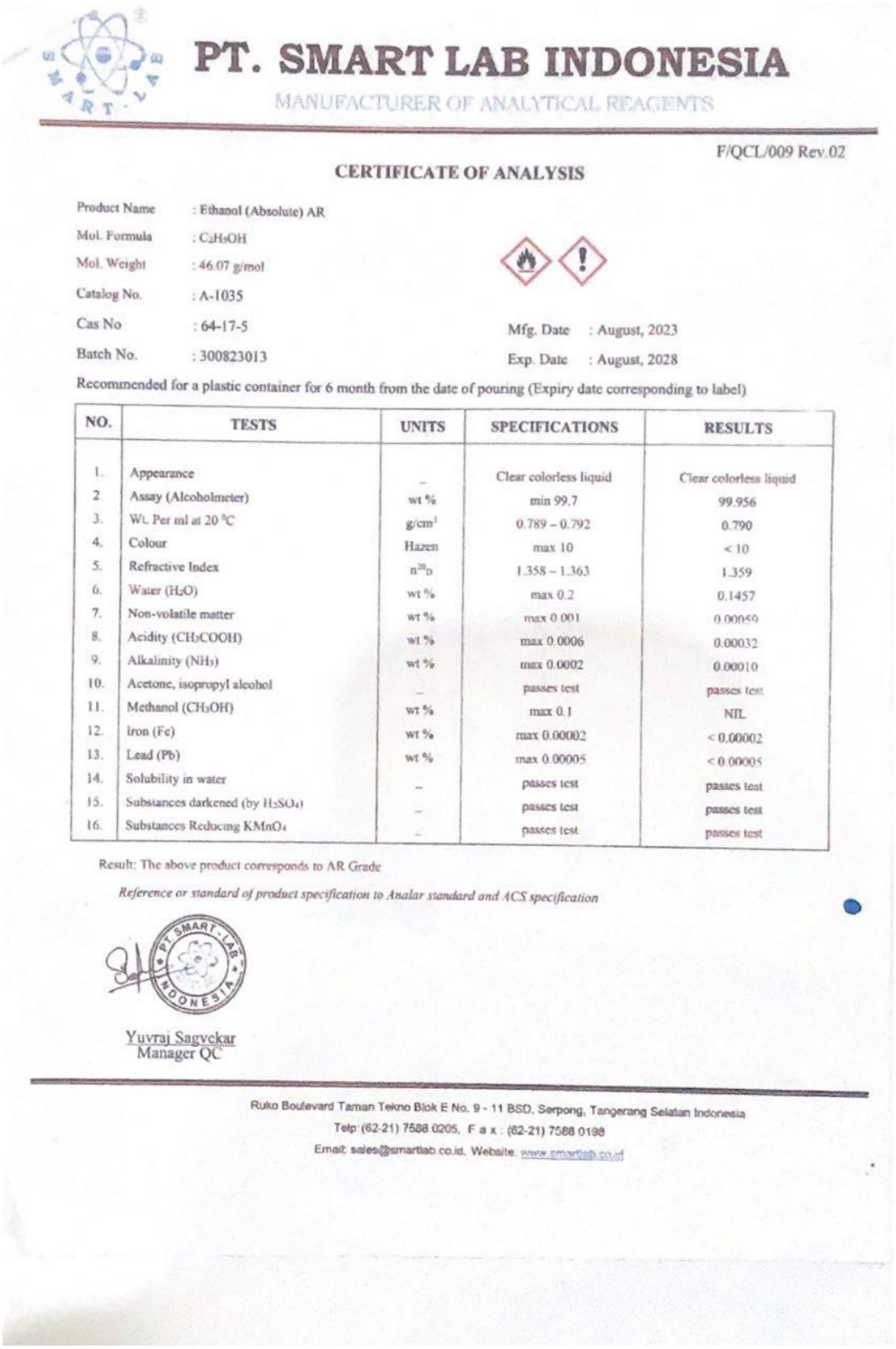
Certificate of Analysis

Product Name :	**2,2-Diphenyl-1-picrylhydrazyl**
Product Number :	**D9132-1G**
Batch Number :	**0000176113**
Source Batch :	0000163336
CAS Number :	1898-66-4
Storage Temperature :	Cooler/Refrigerated
Molecular Formula :	$C_{18}H_{12}N_5O_6$
Formula Weight :	394.32
Recommended Retest Date :	Apr 2025
Quality Release Date :	**13 Apr 2022**

Test	Specification	Result
Appearance (Color) Green to Very Dark Green and Black	Conforms to Requirements	Black
Appearance (Form)	Powder	Powder
Solubility (Color) 50MG/ML, CHCL3	Dark Purple	Dark Purple
Carbon Content	51,5 - 58,1 %	53,0 %
Nitrogen Content	15,8 - 18,8 %	16,9 %
Infrared Spectrum	Conforms to Structure	Conforms
Recommended Retest Period 3 YEARS	------	------

Pramod Kadam(PhD),Manager
Analytical
Bangalore
IN

Lampiran 3 Sertifikat Ethanol p.a



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/cm³	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 4 Pembuatan Simplisia Biji Sacha Inchi

a. Sortasi Kering

b. Biji Sacha Inchi

b. Pengeringan biji

d. Serbuk Biji Scha Inchi

Lampiran 5 Proses Ekstraksi Dengan Metode Sokletasi

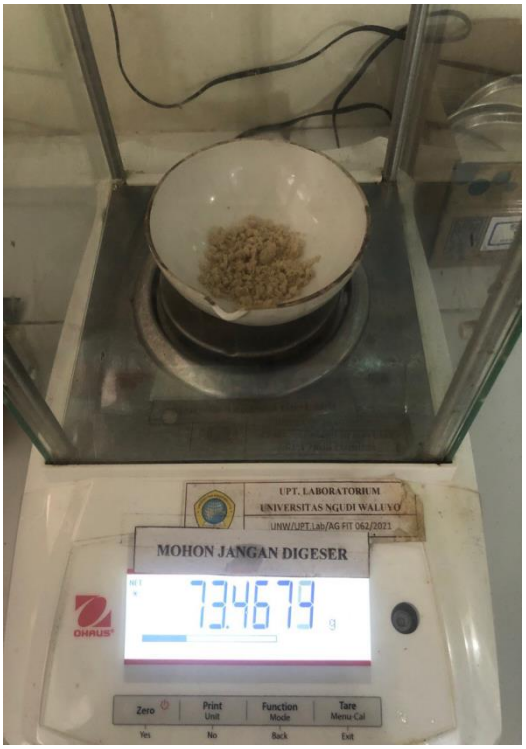
a. Sokletasi

b. Ekstrak Biji Sacha Inchi + N-Heksan

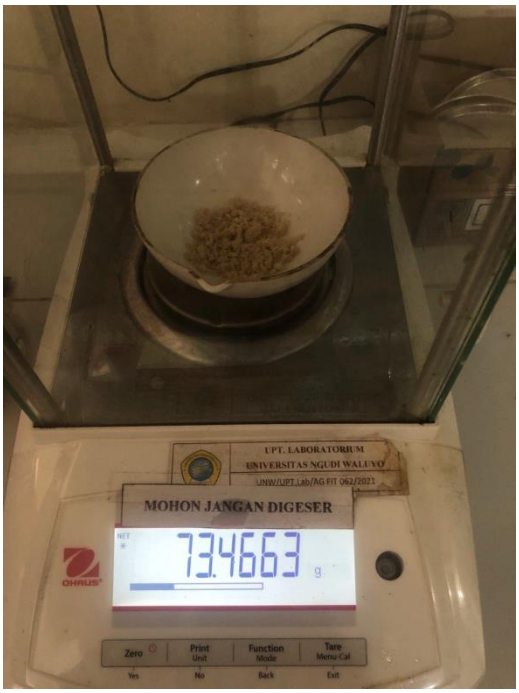
c. Penguapan N-Heksan

Lampiran 6 Uji Kadar Air Simplisia

a. Cawan Kosong



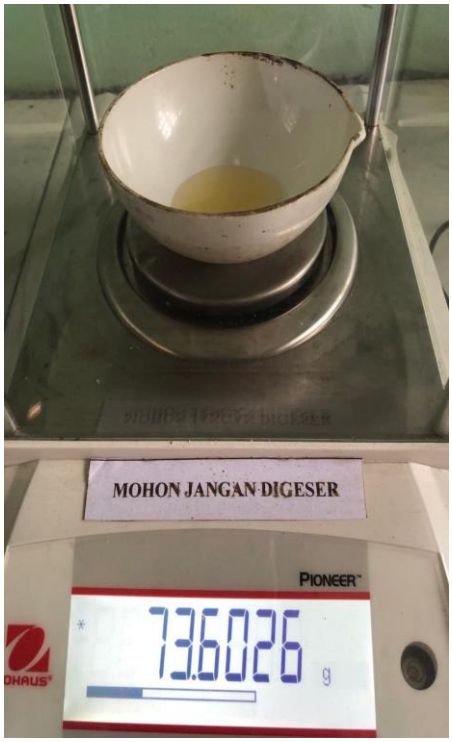
c. Sebelum Pemanasan



b. Sesudah Pemanasan

Lampiran 7 Uji Kadar Air Minyak

a. Cawan Kosong

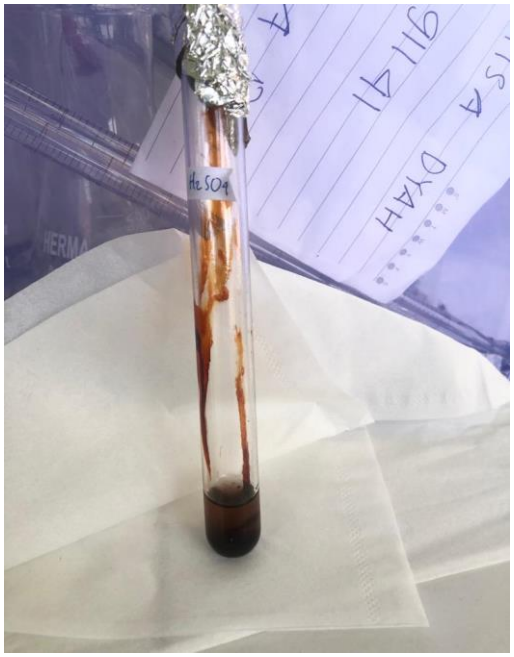


c. Sebelum Pemanasan

b. Sesudah Pemanasan

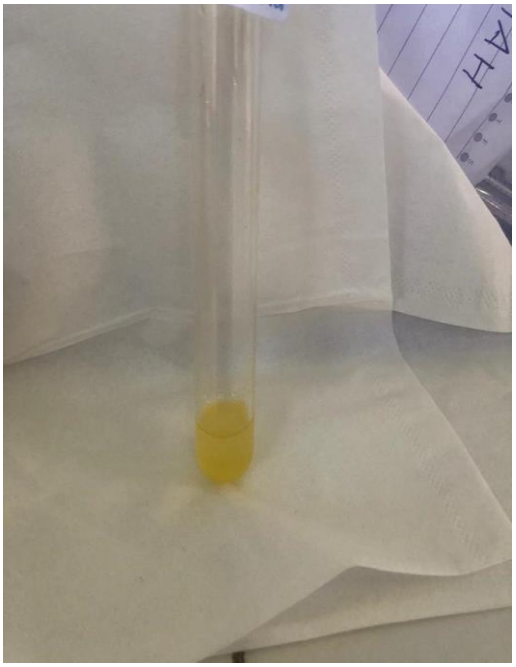
Lampiran 8 Uji Bebas N-Heksana

Lampiran 9 Uji Identifikasi Senyawa Metabolit



a. Alkaloid

c. Flavonoid



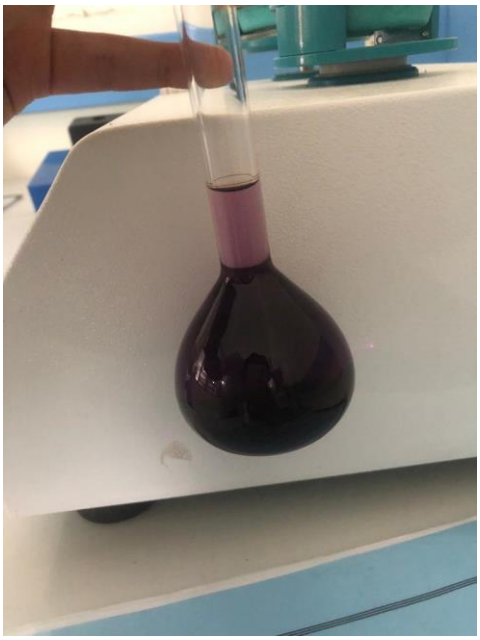
b. Saponin

d. Tanin

Lampiran 10 Uji Aktivitas Antioksidan

1. Pembuatan Larutan DPPH

a. Penimbangan DPPH

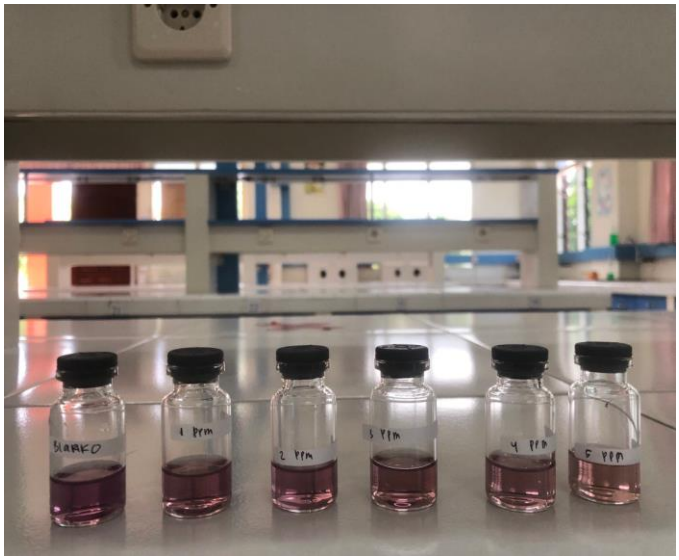


b. Larutan Stok DPPH

2. Pembuatan Larutan Kuersetin

a. Larutan Kuersetin

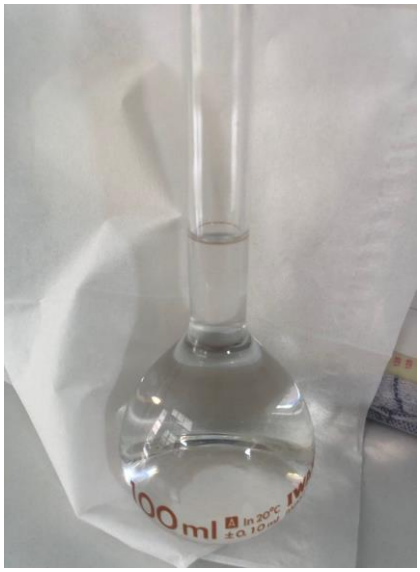
b. Larutan Seri Kuersetin



c. Kuersetin + DPPH

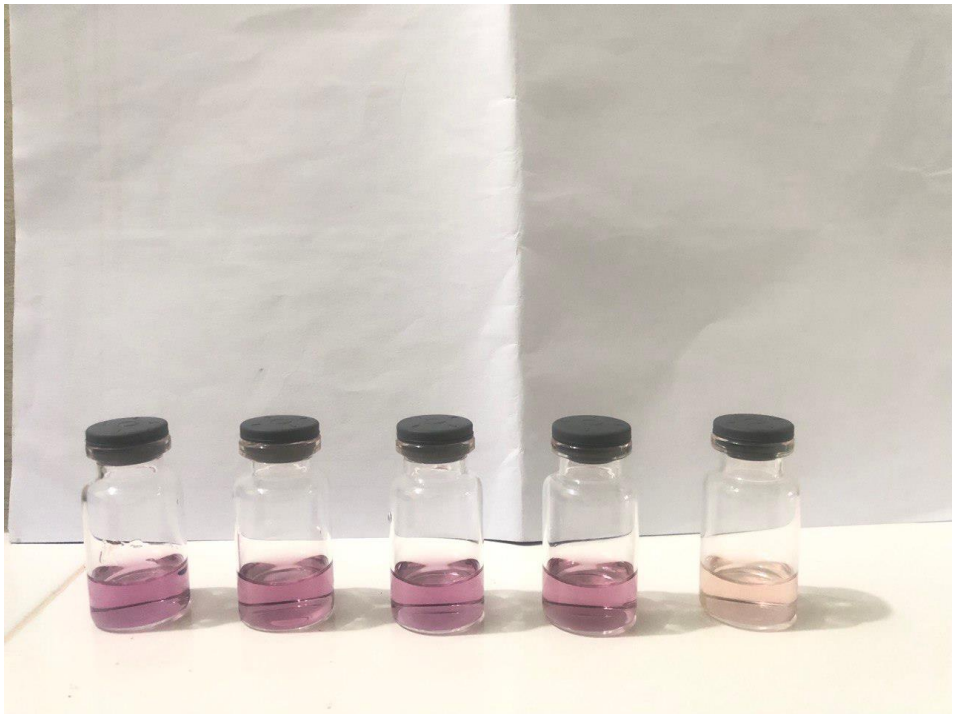
3. Pembuatan Larutan Sampel

a. Penimbangan Sampel



b. Larutan Stok

b.Larutan seri kosentrasi sampel



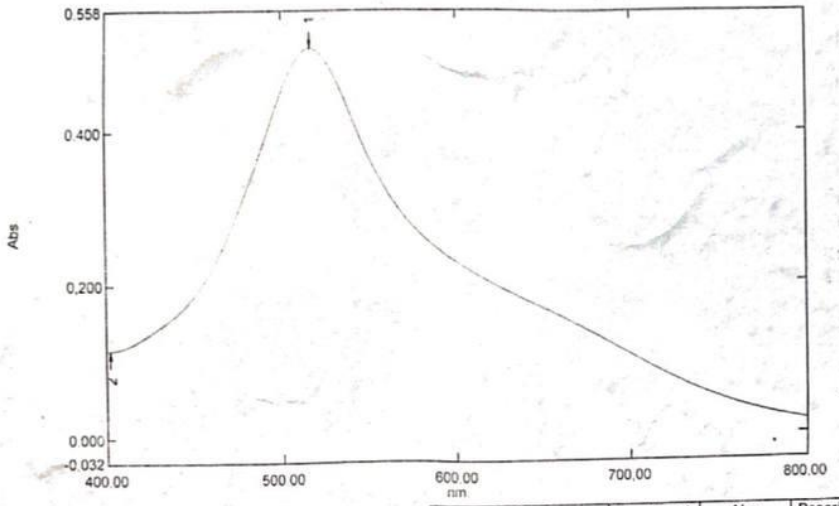
b. Sampel + DPPH

Lampiran 11 Pengukuran Panjang Gelombang

Spectrum Peak Pick Report

14/12/2023 14:19:43

Data Set: Panjang gelombang DPPH_134600 - RawData



No.	P/V	Wavelength	Abs.	Description
1	⊕	516.50	0.509	

[Measurement Properties]
Wavelength Range (nm): 400.00 to 800.00
Scan Speed: Fast
Sampling Interval: 0.5
Auto Sampling Interval: Enabled
Scan Mode: Auto

[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: 1
InterPolate: Disabled
Average: Disabled

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

Lampiran 12 Penentuan *Operating Time* DPPH

Kinetics Data Print Report

14/12/2023 14:18:20

Time (Minute)	RawData ...
1.000	0.509
2.000	0.509
3.000	0.510
4.000	0.510
5.000	0.510
6.000	0.510
7.000	0.510
8.000	0.510
9.000	0.510
10.000	0.510
11.000	0.509
12.000	0.509
13.000	0.509
14.000	0.509
15.000	0.509
16.000	0.509
17.000	0.509
18.000	0.509
19.000	0.509
20.000	0.509
21.000	0.509
22.000	0.509
23.000	0.509
24.000	0.509
25.000	0.509
26.000	0.508
27.000	0.509
28.000	0.508
29.000	0.508
30.000	0.508

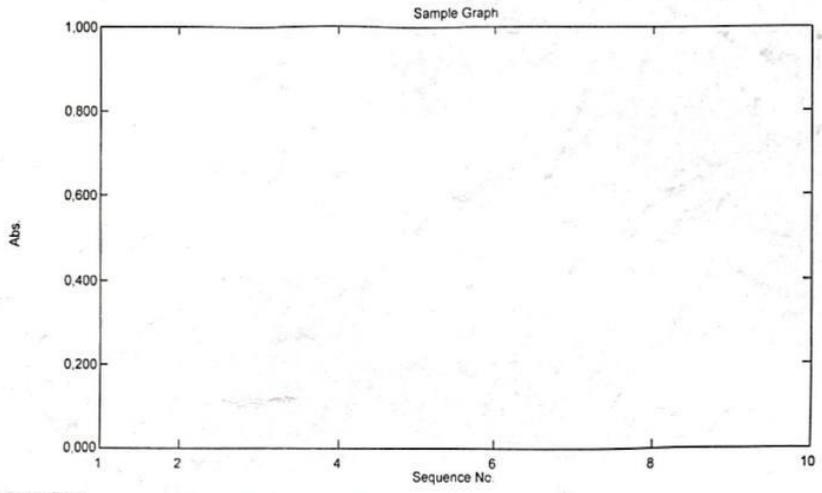
Lampiran 13 Pengujian Kurva Baku Kuersetin

a. Blangko

Sample Table Report

14/12/2023 14:57:44

File Name: C:\Users\HP\Documents\Annisa Dyah\Blangko DPPH 1.pho



Sample Table

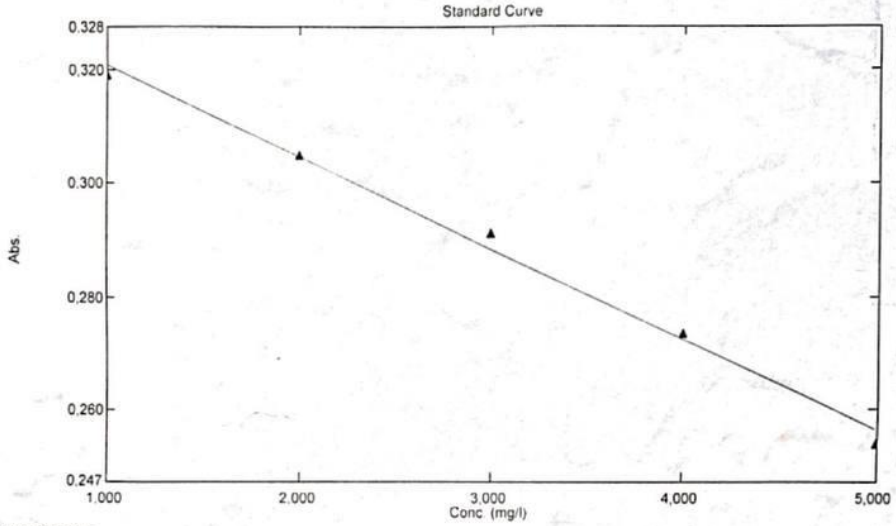
	Sample ID	Type	Ex	Conc	WL516,5	Comments
1	Blangko1	Unknown		*****	0.577	
2						

b. Pengujian Kurva Baku Kuersetin Replikasi 1

Standard Table Report

14/12/2023 14:37:52

File Name: C:\Users\HP\Documents\Annisa Dyah\Replikasi 1.pho



Standard Table

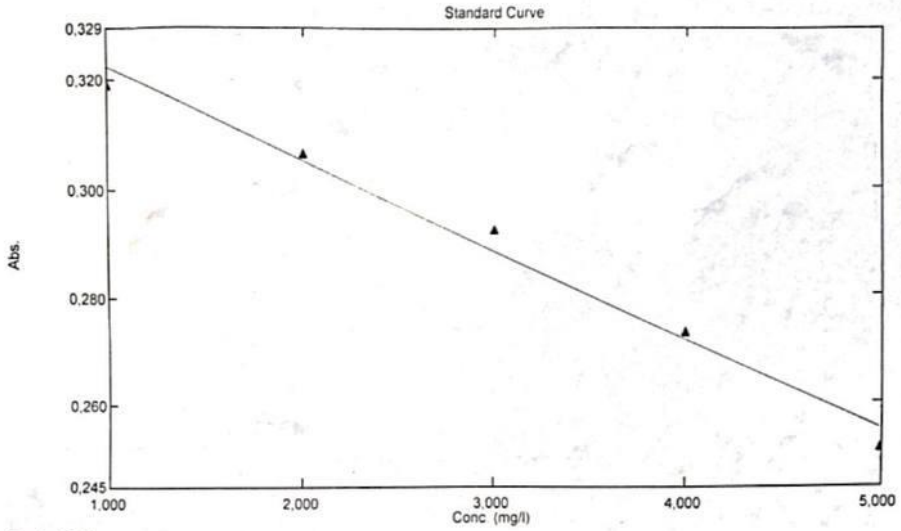
	Sample ID	Type	Ex	Conc	WL516,5	Wgt.Factor	Comments
1	Kuersetin1 1	Standard		1.000	0.319	1.000	
2	Kuersetin1 2	Standard		2.000	0.305	1.000	
3	Kuersetin1 3	Standard		3.000	0.291	1.000	
4	Kuersetin1 4	Standard		4.000	0.274	1.000	
5	Kuersetin1 5	Standard		5.000	0.254	1.000	
6							

c. Pengujian Kurva Baku Kuersetin Replikasi 2

Standard Table Report

14/12/2023 14:40:47

File Name: C:\Users\HP\Documents\Annisa Dyah\Replikasi 2.pho



Standard Table

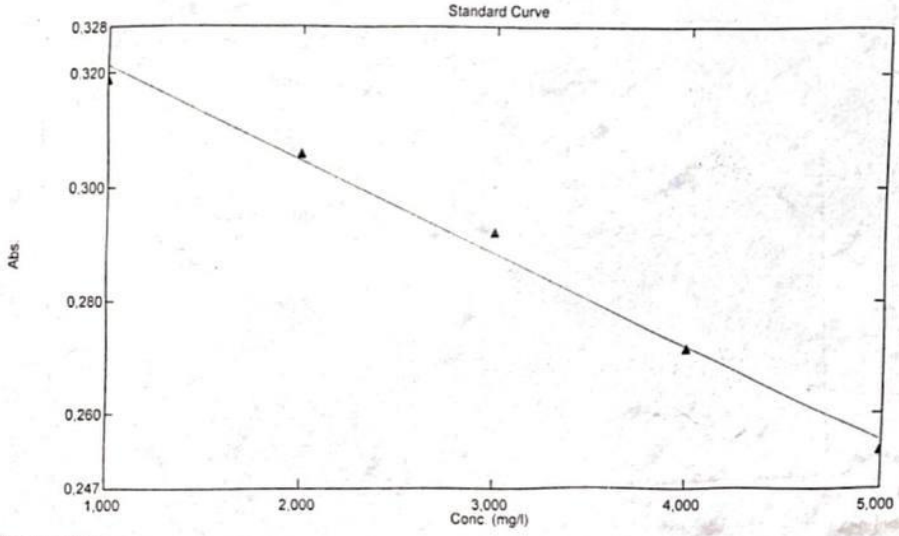
	Sample ID	Type	Ex	Conc	WL516,5	Wgt.Factor	Comments
1	Kuersetin2 1	Standard		1.000	0.319	1.000	
2	Kuersetin2 2	Standard		2.000	0.307	1.000	
3	Kuersetin2 3	Standard		3.000	0.293	1.000	
4	Kuersetin2 4	Standard		4.000	0.273	1.000	
5	Kuersetin2 5	Standard		5.000	0.252	1.000	
6							

d. Pengujian Kurva Baku Kuersetin Replikasi 3

Standard Table Report

14/12/2023 14:41:12

File Name: C:\Users\HP\Documents\Annisa Dyah\Replikasi 3.pho



Standard Table

	Sample ID	Type	Ex	Conc	WL516,5	Wgt.Factor	Comments
1	Kuersetin3 1	Standard		1 000	0 319	1 000	
2	Kuersetin3 2	Standard		2 000	0 306	1 000	
3	Kuersetin3 3	Standard		3 000	0 292	1 000	
4	Kuersetin4 3	Standard		4 000	0 271	1 000	
5	Kuersetin5 3	Standard		5 000	0 253	1 000	
6							

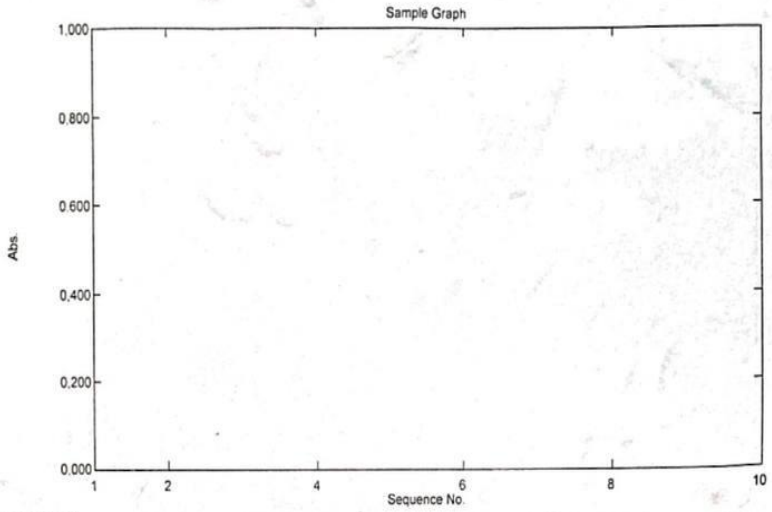
Lampiran 14 Pengujian Serapan Sampel Ektrak Minyak Biji Sacha Inchi

a. Blangko

Sample Table Report

18/12/2023 14:20:54

File Name: C:\Users\HP\Documents\Annisa Dyah\Blangko DPPH 2.pho



Sample Table

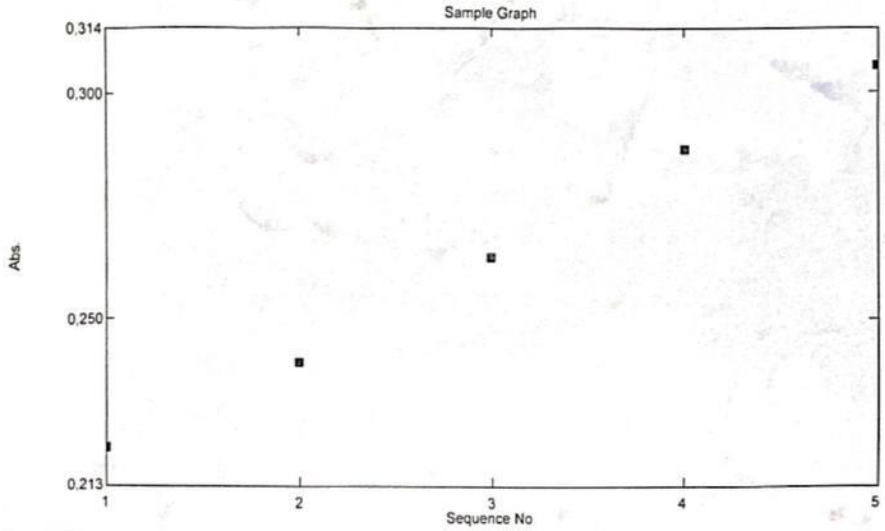
	Sample ID	Type	Ex	Conc	WL516,5	Comments
1	Blangko2	Unknown		*****	0.346	
2						

b. Pengujian Serapan 1

Sample Table Report

18/12/2023 14:08:54

File Name: C:\Users\HP\Documents\Annisa Dyah\Replikasi 1.pho



Sample Table

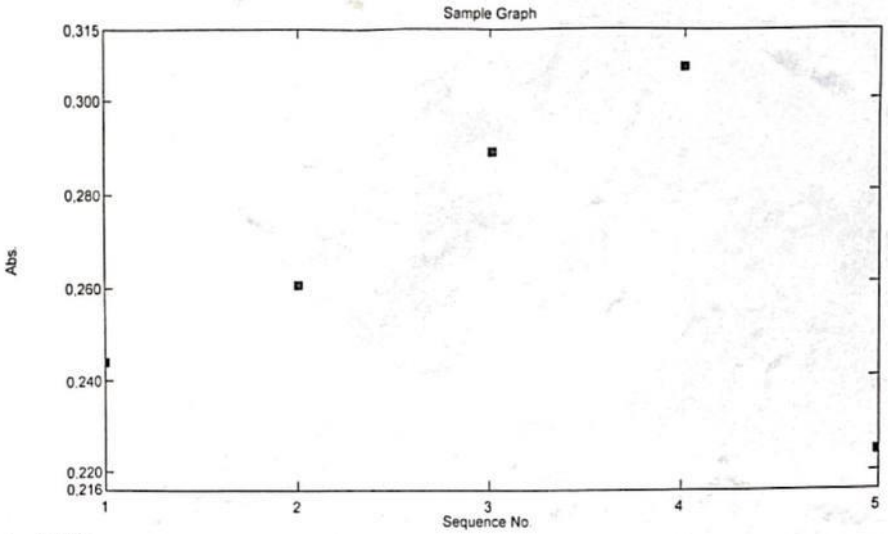
	Sample ID	Type	Ex	Conc	WL516,5	Comments
1	sampel500	Unknown		7.172	0.221	
2	sampel400	Unknown		5.994	0.240	
3	sampel300	Unknown		4.549	0.264	
4	sampel200	Unknown		3.065	0.288	
5	sampel100	Unknown		1.928	0.306	
6						

c. Pengujian Serapan 2

Sample Table Report

18/12/2023 14:18:14

File Name: C:\Users\HP\Documents\Annisa Dyah\Replikasi 2.pho



Sample Table

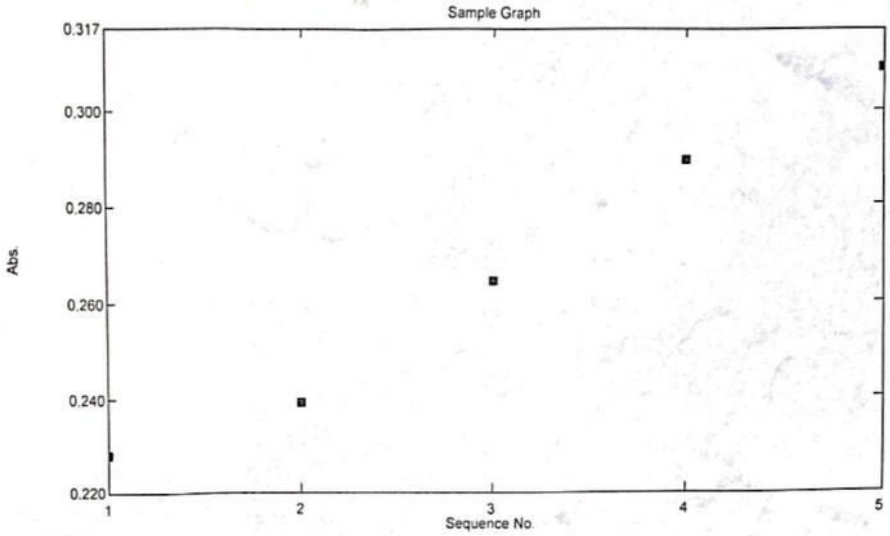
	Sample ID	Type	Ex	Conc	WL516,5	Comments
1	sampel400	Unknown		5.659	0.244	
2	sampel300	Unknown		4.678	0.260	
3	sampel200	Unknown		2.999	0.289	
4	sampel100	Unknown		1.937	0.307	
5	Sampel500	Unknown		6.825	0.224	
6						

d. Pengujian Serapan 3

Sample Table Report

18/12/2023 14:19:40

File Name: C:\Users\HP\Documents\Annisa Dyah\Replikasi 3.pho



Sample Table

	Sample ID	Type	Ex	Conc	WL516,5	Comments
1	sampel500	Unknown		6.646	0.228	
2	sampel400	Unknown		5.990	0.239	
3	sampel300	Unknown		4.443	0.264	
4	sampel200	Unknown		2.941	0.289	
5	sampel100	Unknown		1.770	0.309	
6						

Lampiran 15 Perhitungan

1. **Randemen minyak biji sacha inchi**

   Berat ekstrak = 81,78 gram

   Berat simplisia = 300 gram

   $\frac{\text{Berat ektrak}}{\text{Berat simplisia}}$ x 100%

   = $\frac{81,78}{300}$ x 100%

   = 27,26%

2. **Kadar air simplisia**

   $\frac{(B-C)}{(B-A)}$ x 100%

   A = Cawan kosong = 68,5488

   B = berat sampel dalam cawan sebelum pemanasan = 73, 6844

   C = berat sampel dalam cawan sesudah pemanasan = 73,4663

   $\frac{(73,6944-73,4663)}{(73,6944-68,5488)}$ x 100%

   = 4,4%

3. **Kadar air minyak biji sacha inchi**

   $\frac{(B-C)}{(B-A)}$ x 100%

   A = Cawan kosong = 68,5535

   B = berat sampel dalam cawan sebelum pemanasan = 73, 6026

   C = berat sampel dalam cawan sesudah pemanasan = 73, 5241

   $\frac{(73,6026-73,5241)}{(73,6026-68,5535)}$ x 100%

   = 1,5%

4. **Pembuatan larutan DPPH 30 ppm dalam 100 ml**

   30 ppm = 30 mg / 1000 ml

   = 3 mg / 100 ml

5. **Pembuatan seri larutan pembanding kuersetin dari larutan stok 100 ppm**

   1) 1 ppm = V_1 x C_1 = V_2 x C_2

      10 ml x 1 ppm = V_2 x 100 ppm

10 = 100 ppm x V_2

V_2 = $\frac{10}{100}$ = 0,1 ml + etanol p.a ad 10 ml

2) 2 ppm = V_1 x C_1 = V_2 x C_2

10 ml x 2 ppm = V_2 x 100 ppm

20 = 100 ppm x V_2

V_2 = $\frac{20}{100}$ = 0,2 ml + etanol p.a ad 10 ml

3) 3 ppm = V_1 x C_1 = V_2 x C_2

10 ml x 3 ppm = V_2 x 100 ppm

30 = 100 ppm x V_2

V_2 = $\frac{30}{100}$ = 0,3 ml + etanol p.a ad 10 ml

4) 4 ppm = V_1 x C_1 = V_2 x C_2

10 ml x 4 ppm = V_2 x 100 ppm

40 = 100 ppm x V_2

V_2 = $\frac{40}{100}$ = 0,4 ml + etanol p.a 10 ml

5) 5 ppm = V_1 x C_1 = V_2 x C_2

10 ml x 5 ppm = V_2 x 100 ppm

50 = 100 ppm x V_2

V_2 = $\frac{50}{100}$ = 0,5ml + etanol p.a 10 ml

6. Pembuatan seri larutan sampel minyak biji sacha inchi dari stok 1000 ppm

1) 100 ppm = V_1 x C_1 = V_2 x C_2

5 ml x 100 ppm = V_2 x 1000 ppm

500 = 1000 ppm x V_2

V_2 = $\frac{500}{1000}$ = 0,5 ml + etanol p.a ad 5 ml

2) 200 ppm = V_1 x C_1 = V_2 x C_2

5 ml x 200 ppm = V_2 x 1000 ppm

1000 = 1000 ppm x V_2

V_2 $= \frac{1000}{1000}$ = 1 ml + etanol p.a ad 5 ml

3) 300 ppm = V_1 x C_1 = V_2 x C_2

5 ml x 300 ppm = V_2 x 1000 ppm

1500 = 1000 ppm x V_2

V_2 $= \frac{1500}{1000}$ = 1,5 ml + etanol p.a ad 5 ml

4) 400 ppm = V_1 x C_1 = V_2 x C_2

5 ml x 400 ppm = V_2 x 1000 ppm

2000 = 1000 ppm x V_2

V_2 $= \frac{2000}{1000}$ = 2 ml + etanol p.a ad 5 ml

5) 500 ppm = V_1 x C_1 = V_2 x C_2

5 ml x 500 ppm = V_2 x 1000 ppm

2500 = 1000 ppm x V_2

V_2 $= \frac{2500}{1000}$ = 2,5ml + etanol p.a ad 5ml

7. Perhitungan %Inhibisi Kuersetin

1 ppm $= \frac{a\ blanko - a\ sampel}{a\ blanko}\ x\ 100\%$

$= \frac{0{,}377 - 0{,}319}{0{,}377}\ x\ 100\%$

= 15,385 %

2 ppm $= \frac{a\ blanko - a\ sampel}{a\ blanko}\ x\ 100\%$

$= \frac{0{,}377 - 0{,}306}{0{,}377}\ x\ 100\%$

= 19,098 %

3 ppm $= \frac{a\ blanko - a\ sampel}{a\ blanko}\ x\ 100\%$

$= \frac{0{,}377 - 0{,}292}{0{,}377}\ x\ 100\%$

= 22,812 %

4 ppm $= \frac{a\ blanko - a\ sampel}{a\ blanko}\ x\ 100\%$

$= \frac{0{,}377 - 0{,}273}{0{,}377}\ x\ 100\%$

= 27,321 %

5 ppm $= \frac{a\ blanko - a\ sampel}{a\ blanko}\ x\ 100\%$

$= \frac{0{,}377 - 0{,}253}{0{,}377}\ x\ 100\%$

= 32,626 %

Minyak sacha inchi

100 ppm $= \frac{a\ blanko - a\ sampel}{a\ blanko}\ x\ 100\%$

$= \frac{0{,}346 - 0{,}307}{0{,}346}\ x\ 100\%$

= 11,561%

200 ppm $= \frac{a\ blanko - a\ sampel}{a\ blanko}\ x\ 100\%$

$= \frac{0{,}346 - 0{,}289}{0{,}346}\ x\ 100\%$

= 16,763 %

300 ppm $= \frac{a\ blanko - a\ sampel}{a\ blanko}\ x\ 100\%$

$= \frac{0{,}346 - 0{,}263}{0{,}346}\ x\ 100\%$

= 23,699 %

400 ppm $= \frac{a\ blanko - a\ sampel}{a\ blanko}\ x\ 100\%$

$= \frac{0,346-0,241}{0,346} \; x \; 100\%$

= 30,636 %

500 ppm $= \frac{a\ blanko - a\ sampel}{a\ blanko} \; x \; 100\%$

$= \frac{0,346-0,224}{0,346} \; x \; 100\%$

= 36,127 %

8. Perhitungan IC_{50}

Kuersetin

Y = 4,2709x + 10,635

50 = 4,2709x + 10,635

50 – 10,635 = 4,2709x

39,365 = 4,2709x

X = 9,217 ppm

Minyak biji sacha inchi

Y = 0,0618x + 4,9713

50 = 0,0618x + 4,9713

50 – 4,9713 = 0,0618x

45,0287 = 0,0618x

X = 238,619 ppm