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LAMPIRAN

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Lampiran 1. Hasil Determinasi Tanaman



**LEMBAGA ILMU PENGETAHUAN INDONESIA
(INDONESIAN INSTITUTE OF SCIENCES)
PUSAT PENELITIAN BIOLOGI
(RESEARCH CENTER FOR BIOLOGY)**

Cibinong Science Center, Jl. Raya Jakarta - Bogor KM. 46 Cibinong 16911
Telp. (+62 21) 87907636 - 87907604, Fax. 87907612
Website : www.biologi.lipi.go.id



Cibinong, 7 April 2021

Nomor : B-477/IV/DI.01/4/2021
Lampiran : -
Perihal : Hasil identifikasi/determinasi tumbuhan

Kepada Yth.
Epic./Ibu/Sdr(i). **Erika Noviyanti**
NIM : 20170311034
Universitas Esa Unggul
Jl. Arjuna Utara 9, Kebun Jeruk
Jakarta 11510

Dengan hormat,

Bersama ini kami sampaikan hasil identifikasi/determinasi tumbuhan yang Saudara kirimkan ke "Herbarium Bogoriense", Bidang Botani Pusat Penelitian Biologi-LIPI Bogor, adalah sebagai berikut :

No.	No. Kol.	Jenis	Suku
1.	Mahkota Dewa	<i>Phaleria macrocarpa</i> (Scheff.) Boerl.	Thymelaeaceae

Demikian, semoga berguna bagi Saudara.

Koordinator Program Penelitian Botani




Dr. Himmah Rustiarni, S.P., M.Sc.
NIP.197106052000032005



Dr. Mira Kanti, S.Si, M.Sc.
NIP.198811021994032002

D:\Identifikasi Mahasiswa 2021\Erika Noviyanti.docx\Anne-Michael

Lampiran 2. Sertifikat Analisis Enzim Tirosinase

SIGMA-ALDRICH		sigmaaldrich.com
3050 Spruce Street, Saint Louis, MO 63103 USA		
Website: www.sigmaaldrich.com		
Email USA: support@sigmaaldrich.com		
Outside USA: support@sigmaaldrich.com		
Certificate of Analysis		
Product Name:	Tyrosinase from mushroom lyophilized powder > 1000 unit/mg solid	
Product Number:	T3824	
Batch Number:	MBZ0072	
Brand:	SIGMA	
CAS Number:	9002-19-2	
MDL Number:	MFCD00082118	
Storage Temperature:	Store at 20 °C	
Quality Release Date:	01 Oct 2018	
Recommended Retest Date:	Oct 2021	
Storage Temperature:	Store at 20 °C	
Quality Release Date:	01 Oct 2018	
Recommended Retest Date:	Oct 2021	
Test	Specification	Result
unit/mg Solid	> 1000	7184
Tyrosinase Activity Unit Definition: One unit will cause an increase in A280 of 0.001 per minute at pH 6.5 at 25 deg C in a 3 mL reaction mix containing L-Tyrosine		
unit/mg Solid	> 30000	149182
Polyphenol Oxidase Activity Unit Definition: One unit will cause a decrease in A295 of 0.001 per minute at pH 6.5 at 25 deg C in a 3 mL reaction mixture containing L-Beta-3,4-dihydroxyphenyl-alanine (L-DOPA)		
unit/mg Solid	> 30000	1431095
Catechol Oxidase Activity Unit Definition: One unit will cause a decrease in A285 of 0.001 per minute at pH 6.5 at 25 deg C in a 3 mL reaction mixture containing catechol and ascorbic acid		
minute at pH 6.5 at 25 deg C in a 3 mL reaction mixture containing catechol and ascorbic acid		
		
Rodney Rubach, Manager Analytical Services St. Louis, Missouri US		
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 SigmaAldrich.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.		
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Lampiran 3. Sertifikat Analisis Substrat L-DOPA

SIGMA-ALDRICH[®] sigmaaldrich.com

3050 Spruce Street, Saint Louis, MO 63103, USA
 Website: www.sigmaaldrich.com
 Email USA: techserv@sls1.com
 Outside USA: eurtechserv@sls1.com

Certificate of Analysis

Product Name:
3,4-Dihydroxy-L-phenylalanine – ≥98% (TLC)

Product Number: D9628
 Batch Number: SLES0817V
 Brand: SIGMA
 CAS Number: 59-92-7
 MDL Number: MFCD00022598
 Formula: C₉H₁₁NO₄
 Formula Weight: 197.19 g/mol
 Quality Release Date: 12 SEP 2018



Test	Specification	Result
Appearance (Color)	White to Off-White	Off-White
Appearance (Form)	Powder	Powder
Solubility (Color)	Colorless to Light Yellow	Faint Yellow
Solubility (Turbidity)	Clear to Slightly Hazy	Clear
50 mg/mL, 0.5 M HCl		
Infrared Spectrum	Conforms to Structure:	Conforms
Carbon	53.7 - 55.9 %	54.5 %
Nitrogen	8.6 - 7.4 %	7.1 %
Specific Rotation	-12.5 - -10.5 °	-12.4 °
C = 1 in 1 M HCl, 25 deg C		
Purity (TLC)	≥ 98 %	100 %

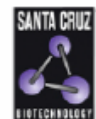
Robyn Buelach

Robyn Buelach, Manager
 Analytical Services
 St. Louis, Missouri, US

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.

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Lampiran 4. Sertifikat Analisis Asam Kojat



CERTIFICATE OF ANALYSIS

Catalog Number: sc-255228
 Lot Number: E1517
 Product Name: Kojic acid
 CAS Number: 501-30-4
 Molecular Formula: $C_6H_6O_4$
 Molecular Weight: 142.11

Test	Result
Appearance	Pale yellow crystalline powder
Purity	99.8%
Melting Point	152.8 - 154.7 °C
Residue on Ignition	0.04%
Heavy Metals (Pb)	< 20 ppm
Loss on Drying	0.37%
Arsenic	< 2 ppm

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Santa Cruz Biotechnology, Inc. 800.457.3801 | 831.457.3800 | fax 831.457.3801 | Europe +0080 04573 8000 | 49 62221 4503 0 | www.scbt.com

Lampiran 5. Alat dan Bahan



Grinder



Waterbath



pH meter



Neraca
Analitik



Spektrofotometer
UV-VIS



Rotary
Evaporator



Timbangan

Lanjutan Lampiran 5.



Aquadets



NaOH



KH₂PO₄



Enzim
Tirosinase



Asam Kojat



L-DOPA



Propilenglikol



TEA



Methyl Paraben

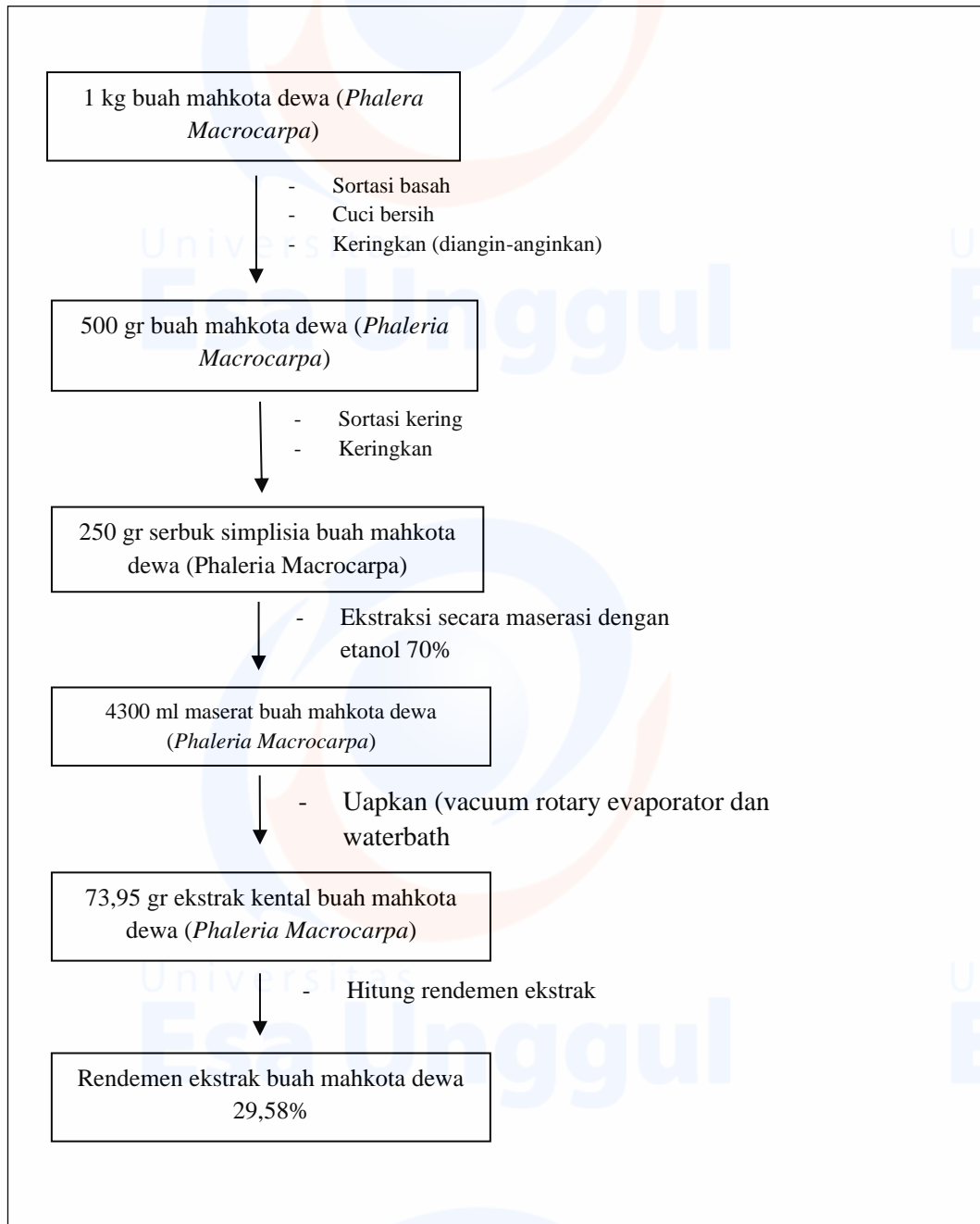


Propil Paraben

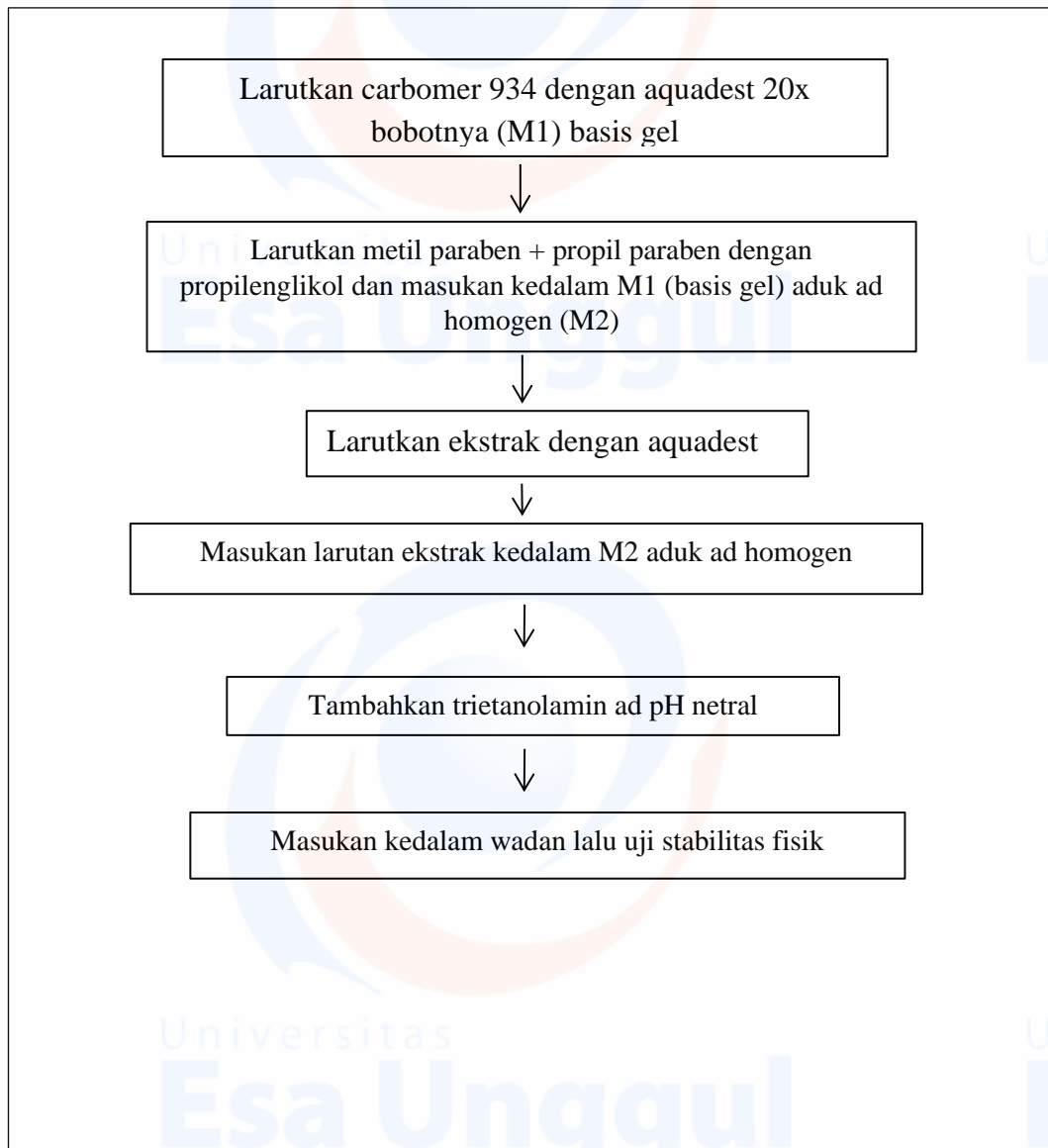


Karbomer

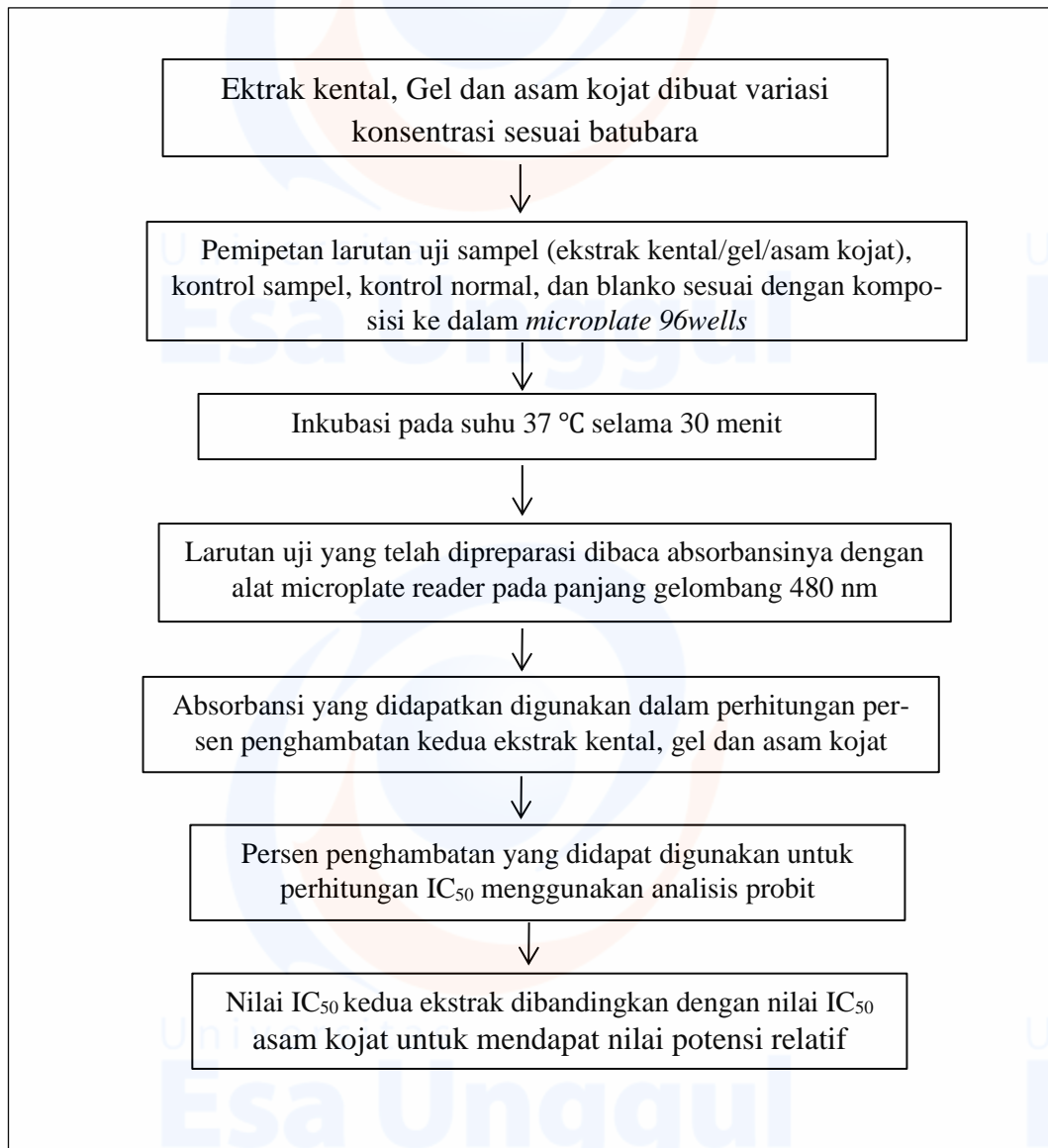
Lampiran 6. Skema Persiapan Simplisia



Lampiran 7. Skema Pembuatan Sediaan Gel



Lampiran 8. Skema Uji Aktivitas Penghambatan Enzim Tirosinase



Lampiran 9. Perhitungan Rendemen Ekstrak Buah Mahkota Dewa

$$\% \text{ Rendemen} = \frac{\text{Bobot Ekstrak yang Diperoleh}}{\text{Bobot Simplisia yang Digunakan}} \times 100\%$$

Diketahui :

Bobot ekstrak kental buah mahkota dewa = 73,95 gram

Bobot simplisia buah mahkota dewa = 250 gram

$$\begin{aligned} \% \text{ Rendemen} &= \frac{73,95 \text{ gram ekstrak}}{250 \text{ gram simplisia}} \times 100\% \\ &= 29,58\% \end{aligned}$$

Lampiran 10. Hasil Penapsian Fitokimia Ekstrak Buah Mahkota Dewa



Lampiran 11. Perhitungan Sediaan Gel

Perhitungan bahan:

$$F1 = \text{Ekstrak buah mahkota dewa} = \frac{1,25 \text{ gr}}{100 \text{ gr}} \times 100 \text{ gr} = 1,25 \text{ gram}$$

$$\text{Karbomer 934} = \frac{1 \text{ gr}}{100 \text{ gr}} \times 100 \text{ gr} = 1 \text{ gram}$$

$$\text{Trietanolamin} = \text{ad pH netral}$$

$$\text{Propilenglikol} = \frac{5 \text{ gr}}{100 \text{ gr}} \times 100 \text{ gr} = 5 \text{ gram}$$

$$\text{Metil paraben} = \frac{0,18 \text{ gr}}{100 \text{ gr}} \times 100 \text{ gr} = 0,18 \text{ gram}$$

$$\text{Propil paraben} = \frac{0,02 \text{ gr}}{100 \text{ gr}} \times 100 \text{ gr} = 0,02 \text{ gram}$$

$$\begin{aligned} \text{Air suling ad} &= 100 - (1,25+1+0+5+0,18+0,02) \\ &= 92,55 \text{ gram} \end{aligned}$$

$$F2 = \text{Ekstrak buah mahkota dewa} = \frac{2,5 \text{ gr}}{100 \text{ gr}} \times 100 \text{ gr} = 2,5 \text{ gram}$$

$$\text{Karbomer 934} = \frac{1 \text{ gr}}{100 \text{ gr}} \times 100 \text{ gr} = 1 \text{ gram}$$

$$\text{Trietanolamin} = \text{ad pH netral}$$

$$\text{Propilenglikol} = \frac{5 \text{ gr}}{100 \text{ gr}} \times 100 \text{ gr} = 5 \text{ gram}$$

$$\text{Metil paraben} = \frac{0,18 \text{ gr}}{100 \text{ gr}} \times 100 \text{ gr} = 0,18 \text{ gram}$$

$$\text{Propil paraben} = \frac{0,02 \text{ gr}}{100 \text{ gr}} \times 100 \text{ gr} = 0,02 \text{ gram}$$

$$\begin{aligned} \text{Air suling ad} &= 100 - (2,5+1+0+5+0,18+0,02) \\ &= 91,3 \text{ gram} \end{aligned}$$

Lanjutan Lampiran 11.

Perhitungan bahan:

$$F3 = \text{Ekstrak buah mahkota dewa} = \frac{5 \text{ gr}}{100 \text{ gr}} \times 100 \text{ gr} = 5 \text{ gram}$$

$$\text{Karbomer 934} = \frac{1 \text{ gr}}{100 \text{ gr}} \times 100 \text{ gr} = 1 \text{ gram}$$

$$\text{Trietanolamin} = \text{ad pH netral}$$

$$\text{Propilenglikol} = \frac{5 \text{ gr}}{100 \text{ gr}} \times 100 \text{ gr} = 5 \text{ gram}$$

$$\text{Metil paraben} = \frac{0,18 \text{ gr}}{100 \text{ gr}} \times 100 \text{ gr} = 0,18 \text{ gram}$$

$$\text{Propil paraben} = \frac{0,02 \text{ gr}}{100 \text{ gr}} \times 100 \text{ gr} = 0,02 \text{ gram}$$

$$\begin{aligned} \text{Air suling} \quad \text{ad} &= 100 - (5+1+0+5+0,18+0,02) \\ &= 88,8 \text{ gram} \end{aligned}$$

Lampiran 12. Perhitungan Uji Sineresis Pada Evaluasi Fisik Sediaan Gel

$$\text{Rumus: Sineresis (\%)} = \frac{\text{berat awal} - \text{berat akhir}}{\text{berat awal}} \times 100\%$$

24 jam :

$$F1 = \text{Sineresis (\%)} = \frac{40,2762 - 40,0532}{40,2762} \times 100\% = 0,55\%$$

$$F2 = \text{Sineresis (\%)} = \frac{34,0170 - 33,7708}{34,0170} \times 100\% = 0,45\%$$

$$F3 = \text{Sineresis (\%)} = \frac{32,9874 - 32,7717}{32,9874} \times 100\% = 0,65\%$$

48 jam :

$$F1 = \text{Sineresis (\%)} = \frac{40,0532 - 39,6376}{40,0532} \times 100\% = 0,94\%$$

$$F2 = \text{Sineresis (\%)} = \frac{33,7708 - 33,6169}{33,7708} \times 100\% = 0,45\%$$

$$F3 = \text{Sineresis (\%)} = \frac{32,7717 - 32,5340}{32,7717} \times 100\% = 0,72\%$$

72 jam :

$$F1 = \text{Sineresis (\%)} = \frac{39,6736 - 39,3635}{39,6736} \times 100\% = 0,80\%$$

$$F2 = \text{Sineresis (\%)} = \frac{33,6169 - 33,5022}{33,6169} \times 100\% = 0,28\%$$

$$F3 = \text{Sineresis (\%)} = \frac{32,5340 - 32,5418}{32,5340} \times 100\% = 0,02\%$$

Lampiran 13. Perhitungan Larutan Substrat L-DOPA 2 mM

Konsentrasi Substrat L-DOPA 2 mM :

$$M = \frac{\text{gram}}{\text{BM}} \times \frac{1000 \text{ ml}}{V}$$

Diketahui :

M : Molaritas (2 mM)

BM Substrat L-DOPA = 197,19

V = volume yang diinginkan (10 ml)

$$\begin{aligned} \text{Bobot substrat L-DOPA yang harus ditimbang} &= \frac{M \times \text{BM} \times V}{1000 \text{ ml}} = \frac{2 \text{ mM} \times 197,19 \times 10 \text{ ml}}{1000 \text{ ml}} \\ &= 3,94 \text{ mg} \end{aligned}$$

Lampiran 14. Perhitungan Larutan Enzim Tirosinase 333 Unit/ml

- a. Pembuatan larutan induk enzim tirosinase:

Diketahui:

Aktivitas enzim dalam sediaan 7164 Unit/mg

Aktivitas induk yang akan dibuat 716,4 Unit/ml

Volume larutan enzim yang akan dibuat 10 ml

Perhitungan larutan induk enzim tirosinase:

$$\text{Unit/ml} = \frac{\text{bobot (mg)} \times \text{Unit/mg}}{\text{volume (ml)}}$$

$$\text{Bobot enzim yang ditimbang} = \frac{716,4 \frac{\text{Unit}}{\text{ml}} \times 10 \text{ ml}}{7164 \frac{\text{Unit}}{\text{mg}}} = 1 \text{ mg}$$

- b. Pembuatan larutan enzim tirosinase 333 Unit/ml

Diketahui:

Aktivitas induk enzim tirosinase 7164 Unit/ml

Aktivitas enzim yang akan dibuat dalam pengujian 333 Unit/ml

Volume larutan enzim yang akan dibuat dalam pengujian 10 ml

Perhitungan pengenceran larutan enzim tirosinase dalam pengujian:

$$= \frac{333 \frac{\text{Unit}}{\text{ml}}}{7164 \frac{\text{Unit}}{\text{ml}}} \times 10 \text{ ml} = 4,6 \text{ ml (yang dipipet dari larutan baku)}$$

Lampiran 15. Perhitungan Pembuatan Larutan Asam Kojat

1. Pembuatan larutan induk asam kojat 500 µg/ml

Diketahui :

Konsentrasi larutan induk asam kojat yang akan dibuat = 500 µg/ml

Volume larutan induk yang akan dibuat = 10 ml

Perhitungan bobot asam kojat yang ditimbang :

$$\frac{500 \mu\text{g}}{\text{ml}} \times 10 \text{ ml} = 5000 = 5 \text{ mg}$$

2. Pembuatan variasi konsententrasi larutan asam kojat 250, 125, 62,5, 31,25, 15,625 dan 7,8125 µg/ml dalam labu ukur 10 ml

a. $250 \mu\text{g/ml} = \frac{250 \mu\text{g/ml}}{500 \mu\text{g/ml}} \times 10 \text{ ml} = 5 \text{ ml}$, diambil dari konsentrasi 500 µg/ml

b. $125 \mu\text{g/ml} = \frac{125 \mu\text{g/ml}}{250 \mu\text{g/ml}} \times 10 \text{ ml} = 5 \text{ ml}$, diambil dari konsentrasi 250 µg/ml

c. $62,5 \mu\text{g/ml} = \frac{62,5 \mu\text{g/ml}}{125 \mu\text{g/ml}} \times 10 \text{ ml} = 5 \text{ ml}$, diambil dari konsentrasi 125 µg/ml

d. $31,25 \mu\text{g/ml} = \frac{31,25 \mu\text{g/ml}}{62,5 \mu\text{g/ml}} \times 10 \text{ ml} = 5 \text{ ml}$, diambil dari konsentrasi 62,5 µg/ml

e. $15,625 \mu\text{g/ml} = \frac{15,625 \mu\text{g/ml}}{31,25 \mu\text{g/ml}} \times 10 \text{ ml} = 5 \text{ ml}$, diambil dari konsentrasi 31,25 µg/ml

f. $7,8125 \mu\text{g/ml} = \frac{7,8125 \mu\text{g/ml}}{15,625 \mu\text{g/ml}} \times 10 \text{ ml} = 5 \text{ ml}$, diambil dari konsentrasi 15,625 µg/ml

Seri konsentrasi yang digunakan dalam pengujian adalah konsentrasi 7,8125 – 125 µg/ml

Lampiran 16. Perhitungan Pembuatan Larutan Ekstrak Buah Mahkota Dewa

1. Pembuatan larutan induk ekstrak buah mahkota dewa

Konsentrasi larutan induk ekstrak yang akan dibuat 2000 µg/ml

Volume larutan induk yang akan dibuat = 10 ml

Perhitungan seri konsentrasi ekstrak yang ditimbang

$$\frac{2000 \mu\text{g}}{\text{ml}} \times 10 \text{ ml} = 20000 \mu\text{g} = 20 \text{ mg}$$

2. Pembuatan variasi konsentrasi ekstrak buah mahkota dewa 2000, 1000, 500, 250 dan 125 µg/ml dalam labu ukur

a. 2000 µg/ml = sesuai pada pembuatan larutan induk

b. $1000 \mu\text{g/ml} = \frac{1000 \mu\text{g/ml}}{2000 \mu\text{g/ml}} \times 10 \text{ ml} = 5 \text{ ml}$, diambil dari konsentrasi 2000 µg/ml

c. $500 \mu\text{g/ml} = \frac{500 \mu\text{g/ml}}{1000 \mu\text{g/ml}} \times 10 \text{ ml} = 5 \text{ ml}$, diambil dari konsentrasi 1000 µg/ml

d. $250 \mu\text{g/ml} = \frac{250 \mu\text{g/ml}}{500 \mu\text{g/ml}} \times 10 \text{ ml} = 5 \text{ ml}$, diambil dari konsentrasi 500 µg/ml

e. $125 \mu\text{g/ml} = \frac{125 \mu\text{g/ml}}{250 \mu\text{g/ml}} \times 10 \text{ ml} = 5 \text{ ml}$, diambil dari konsentrasi 250 µg/ml

f. $62,5 \mu\text{g/ml} = \frac{62,5 \mu\text{g/ml}}{125 \mu\text{g/ml}} \times 10 \text{ ml} = 5 \text{ ml}$, diambil dari konsentrasi 125 µg/ml

g. $31,25 \mu\text{g/ml} = \frac{31,25 \mu\text{g/ml}}{62,5 \mu\text{g/ml}} \times 10 \text{ ml} = 5 \text{ ml}$, diambil dari konsentrasi 62,5 µg/ml

h. $15,625 \mu\text{g/ml} = \frac{15,625 \mu\text{g/ml}}{31,25 \mu\text{g/ml}} \times 10 \text{ ml} = 5 \text{ ml}$, diambil dari konsentrasi 31,25 µg/ml

i. $7,8125 \mu\text{g/ml} = \frac{7,8125 \mu\text{g/ml}}{15,625 \mu\text{g/ml}} \times 10 \text{ ml} = 5 \text{ ml}$, diambil dari konsentrasi 15,625 µg/ml

Lampiran 17. Pemetaan Sumuran Saat Uji Aktivitas Inhibitor Tirosinase

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

Keterangan:

A9 : Sampel (Ekstrak Buah Mahkota Dewa)

B9 : Kontrol Sampel (Ekstrak)

C9 : Sampel (Gel F1)

D₉ : Kontrol Sampel (Gel F1)

E9 : Sampel (Gel F2)

F9 : Kontrol Sampel (Gel F2)

G9: Sampel (Gel F3)

H9 : Kontrol Sampel (Gel F3)

A10-G10 : Asam Kojat

A11-G11 : Kontrol Asam Kojat

A12-C12 : Blanko

D12-F12 : Kontrol Blanko

Lampiran 18. Hasil Uji Aktivitas Enzim Tirosinase Asam Kojat

B	KB	(B-KB)	Konsentrasi As.Kojat	S	KS	(S-KS)	Rata-rata (S-KS)	% inhibisi
0,1121	0,0419	0,0702	7,8125	0,0946 0,0997 0,1010	0,0482 0,0485 0,0480	0,0464 0,0499 0,0530	0,0497	55,3459
0,2404	0,0495	0,1945	15,625	0,0702 0,0723 0,0731	0,0421 0,0426 0,0423	0,0291 0,0297 0,0308	0,0298	73,2255
0,1115	0,0422	0,0693	31,25	0,0670 0,0631 0,0695	0,0425 0,0419 0,0418	0,0245 0,0266 0,0277	0,0262	76,4600
		0,1113	62,5	0,0668 0,0661 0,0675	0,0517 0,0520 0,0523	0,0151 0,0141 0,0152	0,0148	86,7026
			125	0,0606 0,0607 0,0609	0,0481 0,0479 0,0476	0,0125 0,0128 0,0133	0,0129	88,4097

Keterangan :

- B : Absorbansi larutan blanko (dengan enzim)
 KB : Absorbansi larutan kontrol blanko (tanpa enzim)
 S : Absorbansi larutan sampel (dengan enzim)
 KS : Absorbansi larutan kontrol sampel (tanpa enzim)

Lanjutan lampiran 18. Perhitungan Persen Inhibisi dan IC₅₀ Asam Kojat

1. Persen Inhibisi

$$\text{Persen Penghambatan (\%)} = \frac{A_1 - A_2}{A_1} \times 100\%$$

$$\text{b. Konsentrasi } 7,8125 \text{ } \mu\text{g/ml} = \frac{0,1113 - 0,0497}{0,1113} \times 100 \% = 55,3459 \%$$

$$\text{c. Konsentrasi } 15,625 \text{ } \mu\text{g/ml} = \frac{0,1113 - 0,0298}{0,1113} \times 100 \% = 73,2255 \%$$

$$\text{d. Konsentrasi } 31,25 \text{ } \mu\text{g/ml} = \frac{0,1113 - 0,0262}{0,1113} \times 100 \% = 76,4600 \%$$

$$\text{e. Konsentrasi } 62,5 \text{ } \mu\text{g/ml} = \frac{0,1113 - 0,0148}{0,1113} \times 100 \% = 86,7026 \%$$

$$\text{f. Konsentrasi } 125 \text{ } \mu\text{g/ml} = \frac{0,1113 - 0,0129}{0,1113} \times 100 \% = 88,4097 \%$$

2. IC₅₀

Konsentrasi (ppm)	X (Log Kons)	Persen Penghambatan %	Y (Probit)	IC ₅₀
7,8125	0,8927	55,3459	5,1332	4,22
15,625	1,1938	73,2255	5,6189	
31,25	1,4948	76,4600	5,7192	
62,5	1,7958	86,7026	6,1123	
125	2,0969	88,4097	6,1952	
a = 4,4561 b = 0,8695 r = 0,9701				
Regresi Linier = Y = a+bx Y = a + bx 5 = 4,4561 + 0,8695 x $x = \frac{5 - 4,4561}{0,8695}$ x = 0,6255 Anti log = 4,22 IC ₅₀				

Lampiran 19. Hasil Uji Aktivitas Enzim Ekstrak Buah Mahkota Dewa

B	KB	B-KB	Konsentrasi Ekstrak	S	KS	S-KS	Rata- rata (S-KS)	%inhibsi
0,2544	0,0411	0,213	62,5	0,2232 0,2234 0,2054	0,0477 0,0481 0,0477	0,1755 0,1753 0,1577	0,1700	20,6749
0,2557	0,0404	0,215	125	0,2404 0,2412 0,2253	0,0695 0,0697 0,0698	0,1709 0,1715 0,1555	0,1660	22,5721
	Rata-rata	0,2144	250	0,2190 0,2188 0,2059	0,0736 0,0740 0,0731	0,1454 0,1448 0,1328	0,1410	34,2197
			500	0,2354 0,2356 0,2338	0,1289 0,1275 0,1287	0,1065 0,1081 0,1051	0,1070	55,6060
			1000	0,2435 0,2455 0,2430	0,1550 0,1467 0,1438	0,0885 0,0988 0,0992	0,0955	55,4467

Keterangan :

- B : Absorbansi larutan blanko (dengan enzim)
 KB : Absorbansi larutan kontrol blanko (tanpa enzim)
 S : Absorbansi larutan sampel (dengan enzim)
 KS : Absorbansi larutan kontrol sampel (tanpa enzim)

Lanjutan lampiran 19. Perhitungan Persen Inhibisi dan Nilai IC₅₀ Ekstrak Buah Mahkota Dewa

1. Persen Inhibisi

$$\text{Persen Penghambatan (\%)} = \frac{A_1 - A_2}{A_1} \times 100\%$$

$$\text{a. Konsentrasi } 62,5 \text{ } \mu\text{g/ml} = \frac{0,2144 - 0,1700}{0,2144} \times 100 \% = 20,6749 \%$$

$$\text{b. Konsentrasi } 125 \text{ } \mu\text{g/ml} = \frac{0,2144 - 0,1660}{0,2144} \times 100 \% = 22,5721 \%$$

$$\text{c. Konsentrasi } 250 \text{ } \mu\text{g/ml} = \frac{0,2144 - 0,1410}{0,2144} \times 100 \% = 34,2197 \%$$

$$\text{d. Konsentrasi } 500 \text{ } \mu\text{g/ml} = \frac{0,2144 - 0,1267}{0,2144} \times 100 \% = 40,8755 \%$$

$$\text{e. Konsentrasi } 1000 \text{ } \mu\text{g/ml} = \frac{0,2144 - 0,0955}{0,2144} \times 100 \% = 55,4467 \%$$

2. IC₅₀

Konsentrasi (ppm)	Log Kons (X)	Penghambatan inhibisi %	Y (probit)	IC ₅₀
62,5	1,7958	20,6749	4,1796	816.77
125	2,0969	22,5721	4,2446	
250	2,3979	34,2197	4,5930	
500	2,6989	40,8755	4,7673	
1000	3	55,4467	5,1358	
a = 2,6444 b = 0,8089 r = 0,9612 Regresi Linier = Y = a+bx Y = a + bx 5 = 2,6444 + 0,8089 x $x = \frac{5 - 2,6444}{0,8089}$ x = 2,9121 Anti log = 816.77 IC ₅₀				

Lampiran 20. Hasil Uji Aktivitas Enzim Tirosinase Formula I

B	KB	(B-KB)	Konsentrasi Formula I	S	KS	(S-KS)	Rata-rata (S-KS)	% Inhibisi
0,2850	0,0401	0,2449	31,25	0,2378 0,2569 0,2361	0,0622 0,0621 0,0624	0,1756 0,1948 0,1737	0,1813	24,4897
0,2762	0,0410	0,2352	62,5	0,2500 0,2497 0,2506	0,0860 0,0870 0,0850	0,1640 0,1627 0,1656	0,1641	31,6534
	Rata-rata	0,2401	125	0,2325 0,2555 0,2554	0,0980 0,0970 0,0975	0,1345 0,1585 0,1579	0,1503	37,4010
			250	0,2372 0,2506 0,2502	0,1150 0,1152 0,1155	0,1222 0,1354 0,1347	0,13076	45,5393
			500	0,2354 0,2356 0,2338	0,1289 0,1275 0,1287	0,1065 0,1081 0,1051	0,1070	55,6060

Keterangan :

- B : Absorbansi larutan blanko (dengan enzim)
 KB : Absorbansi larutan kontrol blanko (tanpa enzim)
 S : Absorbansi larutan sampel (dengan enzim)
 KS : Absorbansi larutan kontrol sampel (tanpa enzim)

Lanjutan lampiran 20. Perhitungan Persen Inhibisi dan Nilai IC₅₀ Formula 1**1. Persen Inhibisi**

Persen Penghambatan

$$\text{Persen Penghambatan (\%)} = \frac{A_1 - A_2}{A_1} \times 100\%$$

$$\text{a. Konsentrasi 31,25 } \mu\text{g/ml} = \frac{0,2401 - 0,1813}{0,2401} \times 100\% = 24,4897\%$$

$$\text{b. Konsentrasi 62,5 } \mu\text{g/ml} = \frac{0,2401 - 0,1641}{0,2401} \times 100\% = 31,6534\%$$

$$\text{c. Konsentrasi 125 } \mu\text{g/ml} = \frac{0,2401 - 0,1503}{0,2401} \times 100\% = 37,4010\%$$

$$\text{d. Konsentrasi 250 } \mu\text{g/ml} = \frac{0,2401 - 0,1307}{0,2401} \times 100\% = 45,5393\%$$

$$\text{e. Konsentrasi 500 } \mu\text{g/ml} = \frac{0,2401 - 0,1070}{0,2401} \times 100\% = 55,6060\%$$

2. Nilai IC₅₀

Konsentrasi (ppm)	Log Kons (X)	Persen Penghambatan	Probit (Y)	IC ₅₀
31,25	1,4948	24,4897	4,3065	340.01
62,5	1,7958	31,6534	4,5211	
125	2,0969	37,4010	4,6761	
250	2,3979	45,5393	4,8870	
500	2,6989	55,6060	5,1408	
a: 3,2892 b: 0,6758 r: 0,9938				
$Y = a + bx$ $5 = 3,2892 + 0,6758 x$ $x = \frac{5 - 3,2892}{0,6758}$ $x = 2,5315$ Anti log = 340.01 IC ₅₀				

Lampiran 21. Hasil Uji Aktivitas Enzim Tirosinase Formula II

B	KB	(B-KB)	Konsentrasi Formula II	S	KS	(S-KS)	Rata-rata (s-ks)	% Inhibisi
0,2850	0,0401	0,2449	31,25	0,2377 0,2378 0,2390	0,0415 0,0418 0,0413	0,1962 0,1960 0,1977	0,1966	18,1174
0,2762	0,0410	0,2352	62,5	0,2358 0,2350 0,2340	0,0511 0,0483 0,0511	0,1847 0,1867 0,1829	0,1848	23,0299
	Rata-rata	0,2401	125	0,2545 0,2537 0,2541	0,1027 0,1025 0,1023	0,1518 0,1512 0,1518	0,1516	36,8596
			250	0,2536 0,2527 0,2521	0,1265 0,1267 0,1260	0,1271 0,1260 0,1261	0,1264	48,1049
			500	0,2527 0,2533 0,2323	0,1327 0,1355 0,1338	0,1155 0,1180 0,0990	0,1110	53,9263

Keterangan :

- B : Absorbansi larutan blanko (dengan enzim)
 KB : Absorbansi larutan kontrol blanko (tanpa enzim)
 S : Absorbansi larutan sampel (dengan enzim)
 KS : Absorbansi larutan kontrol sampel (tanpa enzim)

Lanjutan Lampiran 21. Perhitungan Persen Inhibisi dan Nilai IC₅₀ Formula II

1. Persen Inhibisi

Persen Penghambatan

$$\text{Persen Penghambatan (\%)} = \frac{A_1 - A_2}{A_1} \times 100\%$$

$$\text{a. Konsentrasi 31,25 } \mu\text{g/ml} = \frac{0,2401 - 0,1966}{0,2401} \times 100\% = 18,1174\%$$

$$\text{b. Konsentrasi 62,5 } \mu\text{g/ml} = \frac{0,2401 - 0,1848}{0,2401} \times 100\% = 23,0299\%$$

$$\text{c. Konsentrasi 125 } \mu\text{g/ml} = \frac{0,2401 - 0,1516}{0,2401} \times 100\% = 36,8596\%$$

$$\text{d. Konsentrasi 250 } \mu\text{g/ml} = \frac{0,2401 - 0,1264}{0,2401} \times 100\% = 48,1049\%$$

$$\text{e. Konsentrasi 500 } \mu\text{g/ml} = \frac{0,2401 - 0,1110}{0,2401} \times 100\% = 53,9263\%$$

2. Nilai IC₅₀

Konsentrasi (ppm)	Log Kons (X)	Persen Penghambatan	Probit (Y)	IC ₅₀
31,25	1,4948	18,1174	4,0884	368.60
62,5	1,7958	23,0299	4,2162	
125	2,0969	36,8596	4,6628	
250	2,3979	48,1049	4,9524	
500	2,6989	53,9263	5,0279	
a = 2,8084 b = 0,8538 r = 0,9604 Y = a + bx 5 = 2,8084 + 0,8538 x $x = \frac{5 - 2,8084}{0,8538}$ x = 2,5668 Anti log = 368.80 IC ₅₀				

Lampiran 22. Hasil Uji Aktivitas Enzim Tirosinase Formula III

B	KB	(B-KB)	Konsentrasi Gel III	S	KS	(S-KS)	% inhibisi	Rata-rata % inhibisi
0,2850	0,0401	0,2449	31,25	0,2333 0,2337 0,2337	0,0508 0,0504 0,0501	0,1825 0,1833 0,1836	0,1831	23,7401
0,2762	0,0410	0,2352	62,5	0,2328 0,2335 0,2164	0,0609 0,0649 0,0609	0,1719 0,1686 0,1555	0,1653	31,5368
	Rata-rata	0,2401	125	0,2282 0,2288 0,2161	0,0857 0,0854 0,0852	0,1425 0,1434 0,1309	0,1389	42,1491
			250	0,2370 0,2366 0,2193	0,0975 0,0971 0,0967	0,1395 0,1395 0,1226	0,1338	44,2732
			500	0,2219 0,2219 0,2039	0,0983 0,0965 0,0991	0,1236 0,1254 0,1048	0,1179	50,8731

Keterangan :

- B : Absorbansi larutan blanko (dengan enzim)
 KB : Absorbansi larutan kontrol blanko (tanpa enzim)
 S : Absorbansi larutan sampel (dengan enzim)
 KS : Absorbansi larutan kontrol sampel (tanpa enzim)

Lanjutan Lampiran 22. Perhitungan Persen Inhibisi dan Nilai IC50 Formula III

1. Persen Inhibisi

Persen Penghambatan :

$$\text{Persen Penghambatan (\%)} = \frac{A_1 - A_2}{A_1} \times 100\%$$

a. Konsentrasi 31,25 µg/ml = $\frac{0,2401 - 0,1831}{0,2401} \times 100\% = 23,7401\%$

b. Konsentrasi 62,5 µg/ml = $\frac{0,2401 - 0,1653}{0,2401} \times 100\% = 31,5368\%$

c. Konsentrasi 125 µg/ml = $\frac{0,2401 - 0,1389}{0,2401} \times 100\% = 42,1491\%$

d. Konsentrasi 250 µg/ml = $\frac{0,2401 - 0,1338}{0,2401} \times 100\% = 44,2732\%$

e. Konsentrasi 500 µg/ml = $\frac{0,2401 - 0,1179}{0,2401} \times 100\% = 50,8731\%$

2. IC₅₀

Konsentrasi (ppm)	Log Kons (X)	Penghambatan inhibisi %	Y (probit)	IC ₅₀
31,25	1,4948	23,7401	4,2840	410.01
62,5	1,7958	31,5368	4,5183	
125	2,0969	42,1491	4,8007	
250	2,3979	44,2732	4,8541	
500	2,6989	50,8710	5,0201	
a = 3,4208 b = 0,6044 r = 0,9694 Y = a + bx 5 = 3,4208 + 0,6044 x x = $\frac{5 - 3,4208}{0,6044}$ x = 2,6128 Anti log = 410.01 IC ₅₀				

Lampiran 23. Potensi Relatif

$$\text{Potensi Relatif} = \frac{\text{Nilai IC 50 asam Kojat}}{\text{Nilai IC 50 ekstrak etanol buah mahkota dewa}}$$

Diketahui :

$$\text{Nilai IC}_{50} \text{ asam kojat} = 4,22 \mu\text{g/ml}$$

$$\text{Nilai IC}_{50} \text{ Ekstrak buah mahkota dewa} = 816.77 \mu\text{g/ml}$$

Potensi Relatif Ekstrak Buah Mahkota Dewa

$$= \frac{4,22 \mu\text{g/ml}}{816.77 \mu\text{g/ml}}$$

$$= 5,167 \times 10^{-3} \text{ kali}$$

Potensi Relatif Gel F1

$$= \frac{4,22 \mu\text{g/ml}}{340.01 \mu\text{g/ml}}$$

$$= 0,0124 \text{ kali}$$

Potensi Relatif Gel F2

$$= \frac{4,22 \mu\text{g/ml}}{368,60 \mu\text{g/ml}}$$

$$= 0,0114 \text{ kali}$$

Potensi Relatif Gel F3

$$= \frac{4,22 \mu\text{g/ml}}{410.01 \mu\text{g/ml}}$$

$$= 0,0102 \text{ kali}$$

Lampiran 24. Dokumentasi

