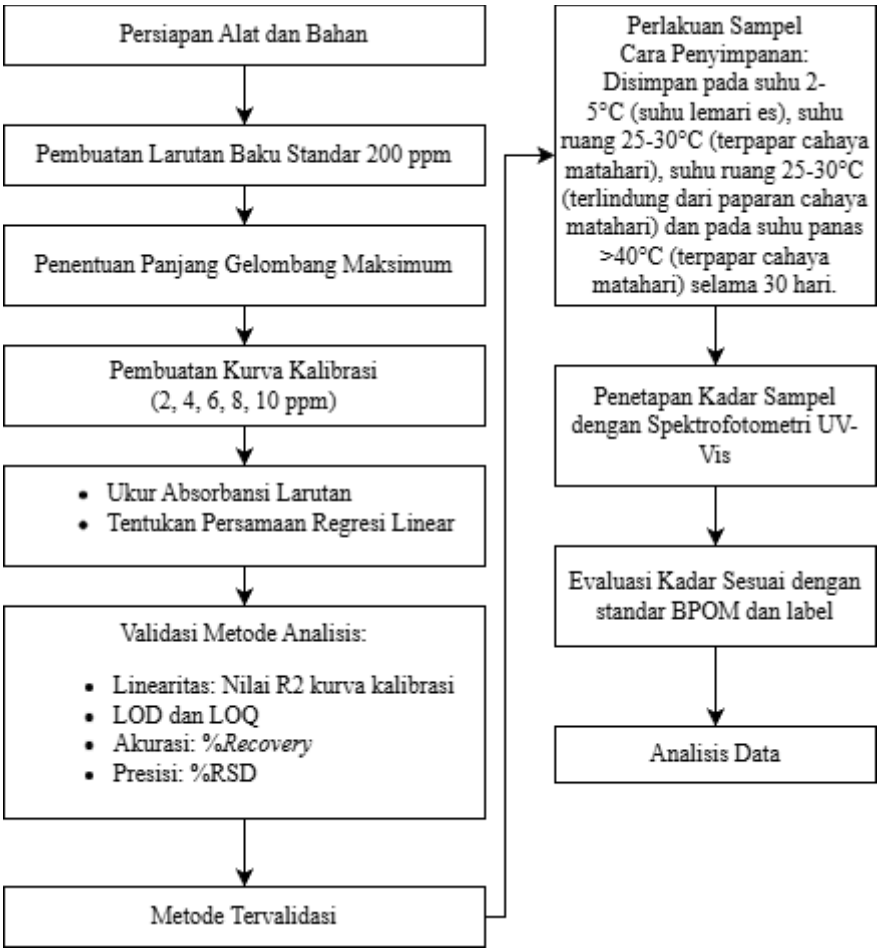
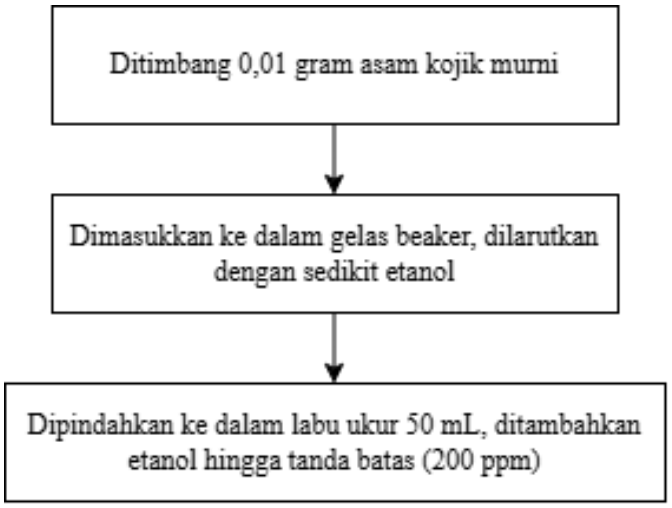
LAMPIRAN

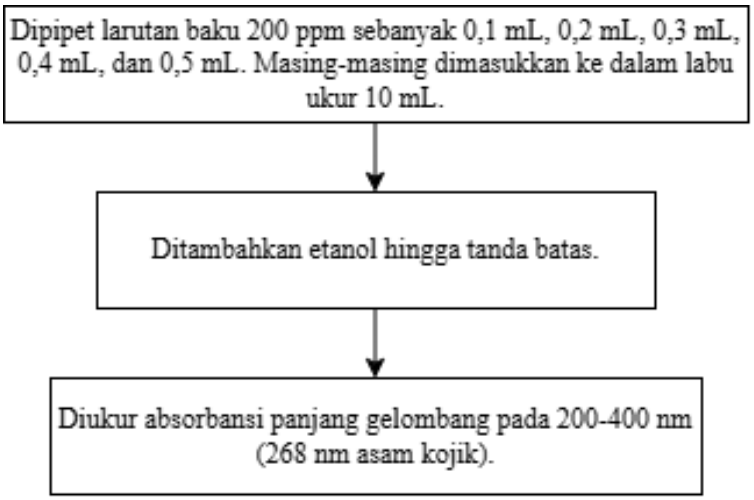
Lampiran 1. Skema Alur Penelitian



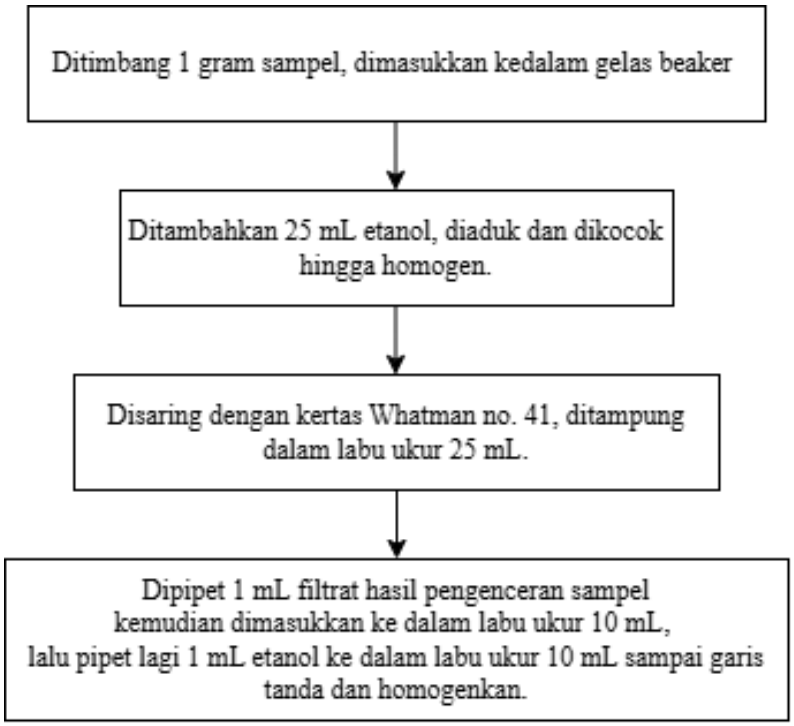
Lampiran 2. Skema Pembuatan Larutan Baku Standar



Lampiran 3. Skema Pembuatan Larutan Kurva Kalibrasi



Lampiran 4. Skema Preparasi Sampel



Lampiran 5. Surat Keterangan Kode Etik Penelitian

YAYASAN HARAPAN BUNDA BATAM
INSTITUT KESEHATAN MITRA BUNDA
KOMITE ETIK PENELITIAN
Jl. Seraya No 1 KOTA BATAM Telp/Fax (0778) 429431, website : http:\\ikmb.ac.id
SURAT KEPUTUSAN MENTERI PENDIDIKAN DAN KEBUDAYAAN REPUBLIK INDONESIA No. 284/M/2020

KOMITE ETIK PENELITIAN
INSTITUT KESEHATAN MITRA BUNDA
THE RESEARCH ETHICAL COMMITTEE INSTITUT KESEHATAN MITRA BUNDA

SURAT KETERANGAN
ETHICAL APPROVAL
No. 125/K/KEP/IKMB/VI/2026

Komite Etik Penelitian Institut Kesehatan Mitra Bunda, menyatakan dengan ini bahwa penelitian dengan judul :
The Research Ethical Committee of Institut Kesehatan Mitra Bunda states hereby that the following proposal :

"Pengaruh Cara Penyimpanan terhadap Stabilitas Asam Kojik dalam Produk *Skincare Whitening* Sediaan Gel dan Krim"
"The Effect of Storage Conditions on the Stability of Kojic Acid in Whitening Skincare Products in Gel and Cream Formulations"

Peneliti Utama : Nashwa Putri Fajria
Principal Investigato

Lokasi Penelitian : Laboratorium Kimia Farmasi
Research Location

Waktu Penelitian : April - Juli 2026
Time Schedule

Responden/Subjek Penelitian : 2 Sampel
Respondent/Research Subject

Telah melalui prosedur kaji etik dan dinyatakan layak untuk dilaksanakan
Has proceeded the ethichal assessment procedure and been approved fot implementation

Batam, 20 Juni 2026
Ketua / *Chairman,*

dr. Ibnu Rushd, M.K.M

Lampiran 6. Sertifikat Analisis Asam Kojik

SHAANXI RAINWOOD BIOTECH CO.,LTD.
Rm 218, Tangxing Digital Bld, # 6 Tangxing Rd Xi'an, Shaanxi, China, 710000
+86 (0)29 81871346 +86 17791258855 www.rainwoodbio.com info@rainwoodbio.com

Certificate of Analysis

Product Name	Kojic Acid	**CAS**	501-30-4
Batch No.	RWKA251117	**Manufacture Date**	Nov 17, 2025
Expiration Date	Nov 16, 2027	**Country of Origin**	Shaanxi, China

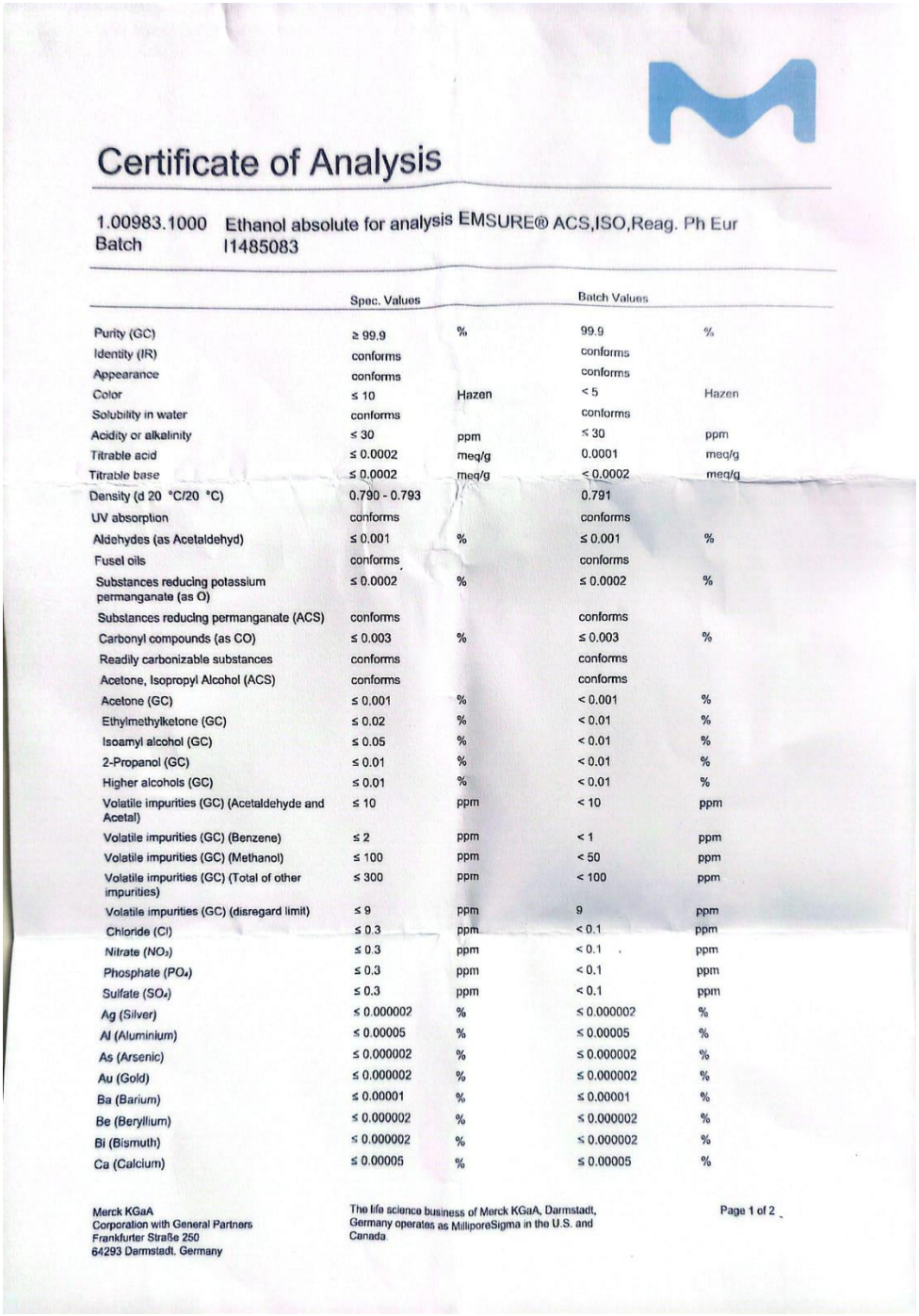
Items	Specification	Result
Assay	99%	99.3%
Characteristics	Almost white crystalline powder	Conforms
Melt point	152-156	153.6-154.7
Loss on Drying	≤0.5%	0.39%
Ash content	≤0.1%	0.09%
Total Heavy Metals	≤10ppm	Conforms
Arsenic(As)	≤2ppm	Conforms
Lead(Pb)	≤2ppm	Conforms
Mercury(Hg)	≤0.1ppm	Conforms
Total plate count	NMT 1000cfu/g	Conforms
Yeast	NMT 100cfu/g	Conforms
Mould	NMT 100cfu/g	Conforms
Salmonella	Absent	Conforms
E.Coli.	Absent	Conforms

Conclusion	Complies with the enterprise standard.
Storage	According to customer needs, all analyzed items are qualified.
Shelf life	2 years when properly stored.
Packing	25KG/Drum, packed with 2-tier polyethylene bag as inner.

检1 检2

SHAANXI RAINWOOD BIOTECH CO.,LTD. 质检专用章

Lampiran 7. Sertifikat Analisis Etanol



Certificate of Analysis

1.00983.1000 Ethanol absolute for analysis EMSURE® ACS,ISO,Reag. Ph Eur
Batch I1485083

	Spec. Values		Batch Values	
Purity (GC)	≥ 99.9	%	99.9	%
Identity (IR)	conforms		conforms	
Appearance	conforms		conforms	
Color	≤ 10	Hazen	< 5	Hazen
Solubility in water	conforms		conforms	
Acidity or alkalinity	≤ 30	ppm	≤ 30	ppm
Titrable acid	≤ 0.0002	meq/g	0.0001	meq/g
Titrable base	≤ 0.0002	meq/g	< 0.0002	meq/g
Density (d 20 °C/20 °C)	0.790 - 0.793		0.791	
UV absorption	conforms		conforms	
Aldehydes (as Acetaldehyd)	≤ 0.001	%	≤ 0.001	%
Fusel oils	conforms		conforms	
Substances reducing potassium permanganate (as O)	≤ 0.0002	%	≤ 0.0002	%
Substances reducing permanganate (ACS)	conforms		conforms	
Carbonyl compounds (as CO)	≤ 0.003	%	≤ 0.003	%
Readily carbonizable substances	conforms		conforms	
Acetone, Isopropyl Alcohol (ACS)	conforms		conforms	
Acetone (GC)	≤ 0.001	%	< 0.001	%
Ethylmethylketone (GC)	≤ 0.02	%	< 0.01	%
Isoamyl alcohol (GC)	≤ 0.05	%	< 0.01	%
2-Propanol (GC)	≤ 0.01	%	< 0.01	%
Higher alcohols (GC)	≤ 0.01	%	< 0.01	%
Volatile impurities (GC) (Acetaldehyde and Acetal)	≤ 10	ppm	< 10	ppm
Volatile impurities (GC) (Benzene)	≤ 2	ppm	< 1	ppm
Volatile impurities (GC) (Methanol)	≤ 100	ppm	< 50	ppm
Volatile impurities (GC) (Total of other impurities)	≤ 300	ppm	< 100	ppm
Volatile impurities (GC) (disregard limit)	≤ 9	ppm	9	ppm
Chloride (Cl)	≤ 0.3	ppm	< 0.1	ppm
Nitrate (NO_3)	≤ 0.3	ppm	< 0.1	ppm
Phosphate (PO_4)	≤ 0.3	ppm	< 0.1	ppm
Sulfate (SO_4)	≤ 0.3	ppm	< 0.1	ppm
Ag (Silver)	≤ 0.000002	%	≤ 0.000002	%
Al (Aluminium)	≤ 0.00005	%	≤ 0.00005	%
As (Arsenic)	≤ 0.000002	%	≤ 0.000002	%
Au (Gold)	≤ 0.000002	%	≤ 0.000002	%
Ba (Barium)	≤ 0.00001	%	≤ 0.00001	%
Be (Beryllium)	≤ 0.000002	%	≤ 0.000002	%
Bi (Bismuth)	≤ 0.000002	%	≤ 0.000002	%
Ca (Calcium)	≤ 0.00005	%	≤ 0.00005	%

Merck KGaA
Corporation with General Partners
Frankfurter Straße 250
64293 Darmstadt, Germany

The life science business of Merck KGaA, Darmstadt, Germany operates as MilliporeSigma in the U.S. and Canada.

Page 1 of 2

Certificate of Analysis

1.00983.1000 Ethanol absolute for analysis EMSURE® ACS,ISO,Reag. Ph Eur
Batch I1485083

Cd (Cadmium)	≤ 0.000005	%	≤ 0.000005	%
Co (Cobalt)	≤ 0.000002	%	≤ 0.000002	%
Cr (Chromium)	≤ 0.000002	%	≤ 0.000002	%
Cu (Copper)	≤ 0.000002	%	≤ 0.000002	%
Fe (Iron)	≤ 0.00001	%	≤ 0.00001	%
Ga (Gallium)	≤ 0.000002	%	≤ 0.000002	%
In (Indium)	≤ 0.000002	%	≤ 0.000002	%
Li (Lithium)	≤ 0.000002	%	≤ 0.000002	%
Mg (Magnesium)	≤ 0.00001	%	≤ 0.00001	%
Mn (Manganese)	≤ 0.000002	%	≤ 0.000002	%
Mo (Molybdenum)	≤ 0.000002	%	≤ 0.000002	%
Ni (Nickel)	≤ 0.000002	%	≤ 0.000002	%
Pb (Lead)	≤ 0.00001	%	≤ 0.00001	%
Pt (Platinum)	≤ 0.000002	%	≤ 0.000002	%
Sb (Antimony)	≤ 0.000002	%	≤ 0.000002	%
Sn (Tin)	≤ 0.00001	%	≤ 0.00001	%
Ti (Titanium)	≤ 0.000002	%	≤ 0.000002	%
Tl (Thallium)	≤ 0.000002	%	≤ 0.000002	%
V (Vanadium)	≤ 0.000002	%	≤ 0.000002	%
Zn (Zinc)	≤ 0.00001	%	≤ 0.00001	%
Zr (Zirconium)	≤ 0.000002	%	≤ 0.000002	%
Evaporation residue	≤ 0.0005	%	0.0001	%
Water	≤ 0.1	%	< 0.1	%

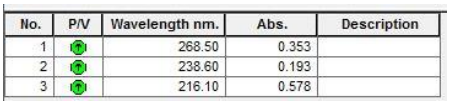
Date of release (DD.MM.YYYY) 25.03.2026
Minimum shelf life (DD.MM.YYYY) 31.03.2031

Jeannette David
Responsible laboratory manager quality control

This document has been produced electronically and is valid without a signature.

Lampiran 8. Kegiatan Perlakuan

No.	Gambar	Keterangan
1.	 	Kojie san Krim dan Gel merupakan sampel yang digunakan dalam penelitian ini. Masing-masing sampel diberikan 4 perlakuan cara penyimpanan yaitu penyimpanan dalam lemari es (2-5°C), suhu ruang terpapar cahaya matahari (20-30°C), suhu ruang terlindung dari paparan cahaya matahari (20-30°C) dan pada suhu panas (>40°C) dengan waktu simpan selama 30 hari. Wadah dibuka satu kali sehari untuk mensimulasikan penggunaan konsumen.
2.		Alat dan bahan utama yang digunakan dalam penelitian ini meliputi etanol p.a, asam kojik murni, gelas kimia, labu erlenmeyer, labu ukur, corong, pipet volume, pipet tetes, pipet mikro, batang pengaduk, kertas saring Whatman No. 41, aluminium foil, dan timbangan analitik.
3.		Proses penimbangan standar murni asam kojik dengan timbangan analitik.

No.	Gambar	Keterangan
4.		Larutan seri asam kojik 2 ppm, 4 ppm, 6 ppm, 8 ppm dan 10 ppm.
5.	 No. P/V Wavelength nm. Abs. Description 1 268.50 0.353 2 238.60 0.193 3 216.10 0.578	Penetapan panjang gelombang standar asam kojik murni didapatkan pada panjang gelombang 268 nm.
6.	 3 268.00 1.028	Penetapan panjang gelombang sampel krim asam kojik didapatkan panjang gelombang 268.00 nm.
7.	 3 268.80 0.940	Penetapan panjang gelombang sampel gel asam kojik didapatkan panjang gelombang 268.00 nm.

No.	Gambar	Keterangan
8.	Standard Table - [Active] y = 0.0543480 x + 0.265652 Correlation Coefficient r2 = 0.99948	Pengukuran absorbansi larutan seri/kurva kalibrasi asam kojik, didapatkan persamaan regresi yakni y = 0,0543480x + 0,265652
9.		Penyimpanan dalam lemari es (2-5°C).
10.		Penyimpanan pada suhu ruang terpapar cahaya matahari (20-30°C).
11.		Penyimpanan pada suhu ruang terlindung dari paparan cahaya matahari (20-30°C).

Sample ID	Type	Ex	Conc	Wt.260.0	Wgt.Factor	Comments
2 ppm	Std-Repeat		2.000	0.373	1.000	
2 ppm-2	Std-Repeat		2.000	0.372	1.000	
2 ppm-3	Std-Repeat		2.000	0.371	1.000	
2 ppm-Avg	Average		2.000	0.372	1.000	Avg of preceding 3 Samples
4 ppm	Std-Repeat		4.000	0.489	1.000	
4 ppm-2	Std-Repeat		4.000	0.487	1.000	
4 ppm-3	Std-Repeat		4.000	0.491	1.000	
4 ppm-Avg	Average		4.000	0.489	1.000	Avg of preceding 3 Samples
6 ppm	Std-Repeat		6.000	0.592	1.000	
6 ppm-2	Std-Repeat		6.000	0.591	1.000	
6 ppm-3	Std-Repeat		6.000	0.587	1.000	
6 ppm-Avg	Average		6.000	0.590	1.000	Avg of preceding 3 Samples
8 ppm	Std-Repeat		8.000	0.695	1.000	
8 ppm-2	Std-Repeat		8.000	0.696	1.000	
8 ppm-3	Std-Repeat		8.000	0.696	1.000	
8 ppm-Avg	Average		8.000	0.697	1.000	Avg of preceding 3 Samples
10 ppm	Std-Repeat		10.000	0.809	1.000	
10 ppm-2	Std-Repeat		10.000	0.813	1.000	
10 ppm-3	Std-Repeat		10.000	0.812	1.000	
10 ppm-Avg	Average		10.000	0.811	1.000	Avg of preceding 3 Samples

No.	Gambar	Keterangan
12.		Penyimpanan pada suhu panas (>40°C).
13.		Penimbangan sampel dengan timbangan analitik.
14.		Pengadukan sampel dengan pelarut.
15.		Proses penyaringan larutan sampel.

No.	Gambar	Keterangan
16.		Larutan sampel sebelum diencerkan ke labu ukur 10 mL.
17.		Larutan sampel siap diukur dengan alat spektrofotometri UV-Vis.

Lampiran 9. Perhitungan Pembuatan Larutan Baku Asam Kojik

1. Pembuatan Larutan Baku Standar Asam Kojik 200 ppm

   Konsentrasi (ppm) = $\frac{Massa\ (mg)}{Volume\ (L)} = \frac{10\ mg}{0{,}05\ L}$ = 200 ppm

Lampiran 10. Pembuatan Larutan Kurva Baku/Seri Asam Kojik

1. Larutan Seri 2 ppm

   C_1 x V_1 = C_2 x V_2

   $V_1 = \frac{C2 \text{ x } V2}{C1}$

   $V_1 = \frac{2 \text{ x } 10}{200}$ = 0,1 mL

2. Larutan Seri 4 ppm

   C_1 x V_1 = C_2 x V_2

   $V_1 = \frac{C2 \text{ x } V2}{C1}$

   $V_1 = \frac{4 \text{ x } 10}{200}$ = 0,2 mL

3. Larutan Seri 6 ppm

   C_1 x V_1 = C_2 x V_2

   $V_1 = \frac{C2 \text{ x } V2}{C1}$

   $V_1 = \frac{6 \text{ x } 10}{200}$ = 0,3 mL

4. Larutan Seri 8 ppm

   C_1 x V_1 = C_2 x V_2

   $V_1 = \frac{C2 \text{ x } V2}{C1}$

   $V_1 = \frac{8 \text{ x } 10}{200}$ = 0,4 mL

5. Larutan Seri 10 ppm

   C_1 x V_1 = C_2 x V_2

   $V_1 = \frac{C2 \text{ x } V2}{C1}$

   $V_1 = \frac{10 \text{ x } 10}{200}$ = 0,5 mL

Lampiran 11. Perhitungan Preparasi Sampel

1. Faktor Pengenceran Total
   a. Volume sampel awal = 25 mL/g
   b. Pengenceran pertama (FP_1)

      $FP_1 = \frac{10}{1} = 10$ kali

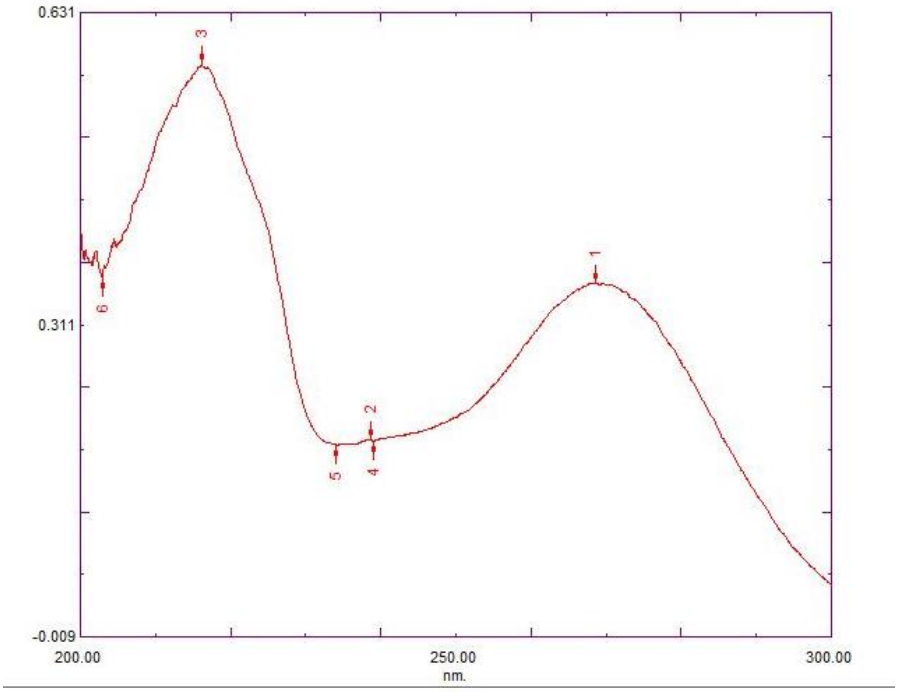
   c. Pengenceran pertama (FP_2)

      $FP_2 = \frac{10}{1} = 10$ kali

   d. Faktor Pengenceran Total

      $FP_{larutan} = 10 \times 10 = 100$ kali

Lampiran 12. Spektrum Panjang Gelombang Maksimum Asam Kojik



Lampiran 13. Perhitungan LOD dan LOQ

Istilah	Perhitungan
LOD (*Limit of Detection*)	$\text{LOD} = \frac{3{,}3 \times Sy/x}{b}$ $\text{LOD} = \frac{3{,}3 \times 0{,}004446}{0.0543480} = \frac{0{,}0146619}{0.0543480} = 0{,}269778$ ppm
LOQ (*Limit of Quantification*)	$\text{LOQ} = \frac{10 \times Sy/x}{b}$ $\text{LOQ} = \frac{10 \times 0{,}004446}{0.0543480} = \frac{0{,}04443}{0.0543480} = 0{,}817509$ ppm

Lampiran 14. Perhitungan Uji Akurasi

Level Spike	Absorbansi	Perhitungan
80%	0,527	y = 0,0543480x + 0,265652 $x = \frac{0{,}527 - 0.265652}{0.0543480} = 4{,}8066$ ppm $\text{Recovery} = \frac{4{,}8066}{4{,}80} \times 100 = 100{,}14\%$
100%	0,590	y = 0,0543480x + 0,265652 $x = \frac{0{,}590 - 0.265652}{0.0543480} = 5{,}9668$ ppm $\text{Recovery} = \frac{5{,}9668}{6} \times 100 = 99{,}45\%$
120%	0,655	y = 0,0543480x + 0,265652 $x = \frac{0{,}655 - 0.265652}{0.0543480} = 7{,}1639$ ppm $\text{Recovery} = \frac{7{,}1639}{7{,}20} \times 100 = 99{,}50\%$

Lampiran 15. Perhitungan Uji Presisi

$$\%RSD = \frac{SD}{Rata-rata\ Absorbansi} \times 100\%$$

$$\%RSD = \frac{0,002251}{0,590} \times 100\% = 0,38\%$$

Lampiran 16. Perhitungan Kadar Sampel Krim

Krim Asam Kojik		
Cara Penyimpanan	**Batch**	**Perhitungan**
Kontrol	013	• **013 R1** Absorbansi rata-rata = 0.664 Konsentrasi terukur (C): $\mathbf{x} = \frac{0,664-0,265652}{0,0543480} = 7.334$ Kadar: Kadar = $\frac{7,334\times0,025\times100}{1000} \times 100\% = 1,83\%$ • **013 R2** Absorbansi rata-rata = 0.645 Konsentrasi terukur (C): $\mathbf{x} = \frac{0.645-0,265652}{0,0543480} = 6.981$ Kadar: Kadar = $\frac{6.981\times0,025\times100}{1000} \times 100\% = 1,74\%$ • **013 R3** Absorbansi rata-rata = 0.633 Konsentrasi terukur (C): $\mathbf{x} = \frac{0.633-0,265652}{0,0543480} = 6.768$ Kadar: Kadar = $\frac{6.768\times0,025\times100}{1000} \times 100\% = 1,69\%$
	018	• **018 R1** Absorbansi rata-rata = 0.561 Konsentrasi terukur (C): $\mathbf{x} = \frac{0.561-0,265652}{0,0543480} = 5.443$ Kadar:

		Kadar = $\frac{5.443 \times 0,025 \times 100}{1000}$ x 100% = 1,36% • **018 R2** Absorbansi rata-rata = 0.558 Konsentrasi terukur (C): **x** = $\frac{0.558 - 0,265652}{0,0543480}$ = 5.381 Kadar: Kadar = $\frac{5.381 \times 0,025 \times 100}{1000}$ x 100% = 1,34% • **018 R3** Absorbansi rata-rata = 0.537 Konsentrasi terukur (C): **x** = $\frac{0.537 - 0,265652}{0,0543480}$ = 4.986 Kadar: Kadar = $\frac{4.986 \times 0,025 \times 100}{1000}$ x 100% = 1,24%
	029	• **029 R1** Absorbansi rata-rata = 0.626 Konsentrasi terukur (C): **x** = $\frac{0.626 - 0,265652}{0,0543480}$ = 6.630 Kadar: Kadar = $\frac{6.630 \times 0,025 \times 100}{1000}$ x 100% = 1,65% • **029 R2** Absorbansi rata-rata = 0.649 Konsentrasi terukur (C): **x** = $\frac{0.649 - 0,265652}{0,0543480}$ = 7.051 Kadar: Kadar = $\frac{7.051 \times 0,025 \times 100}{1000}$ x 100% = 1,76% • **029 R3** Absorbansi rata-rata = 0.64 Konsentrasi terukur (C): **x** = $\frac{0.64 - 0,265652}{0,0543480}$ = 6.888 Kadar: Kadar = $\frac{6.888 \times 0,025 \times 100}{1000}$ x 100% = 1,72%

Suhu lemari es (2-5℃)	013	• **013 R1** Absorbansi rata-rata = 0.649 Konsentrasi terukur (C): **x** = $\frac{0.649-0,265652}{0,0543480}$ = 7.052 Kadar: Kadar = $\frac{7.052\times0,025\times100}{1000}$ x 100% = 1,76% • **013 R2** Absorbansi rata-rata = 0.636 Konsentrasi terukur (C): **x** = $\frac{0.636-0,265652}{0,0543480}$ = 6.807 Kadar: Kadar = $\frac{6.807\times0,025\times100}{1000}$ x 100% = 1,70% • **013 R3** Absorbansi rata-rata = 0.625 Konsentrasi terukur (C): **x** = $\frac{0.625-0,265652}{0,0543480}$ = 6.633 Kadar: Kadar = $\frac{6.633\times0,025\times100}{1000}$ x 100% = 1,65%
	018	• 018 R1 Absorbansi rata-rata = 0.554 Konsentrasi terukur (C): **x** = $\frac{0.554-0,265652}{0,0543480}$ = 5.301 Kadar: Kadar = $\frac{5.301\times0,025\times100}{1000}$ x 100% = 1,32% • **018 R2** Absorbansi rata-rata = 0.565 Konsentrasi terukur (C): **x** = $\frac{0.565-0,265652}{0,0543480}$ = 5.512 Kadar: Kadar = $\frac{5.512\times0,025\times100}{1000}$ x 100% = 1,37% • **018 R3** Absorbansi rata-rata = 0.535 Konsentrasi terukur (C):

		$\mathbf{x} = \frac{0.535-0,265652}{0,0543480} = 4.957$ Kadar: Kadar = $\frac{4.957\times0,025\times100}{1000}$ x 100% = 1,23%
	029	• **029 R1** Absorbansi rata-rata = 0.610 Konsentrasi terukur (C): $\mathbf{x} = \frac{0.610-0,265652}{0,0543480} = 6.327$ Kadar: Kadar = $\frac{6.327\times0,025\times100}{1000}$ x 100% = 1,58% • **029 R2** Absorbansi rata-rata = 0.636 Konsentrasi terukur (C): $\mathbf{x} = \frac{0.636-0,265652}{0,0543480} = 6.809$ Kadar: Kadar = $\frac{6.809\times0,025\times100}{1000}$ x 100% = 1,70% • **029 R3** Absorbansi rata-rata = 0.619 Konsentrasi terukur (C): $\mathbf{x} = \frac{0.619-0,265652}{0,0543480} = 6.504$ Kadar: Kadar = $\frac{6.504\times0,025\times100}{1000}$ x 100% = 1,62%
Suhu ruang terpapar cahaya matahari (25-30℃)	013	• **013 R1** Absorbansi rata-rata = 0.554 Konsentrasi terukur (C): $\mathbf{x} = \frac{0.554-0,265652}{0,0543480} = 5.302$ Kadar: Kadar = $\frac{5.302\times0,025\times100}{1000}$ x 100% = 1,32% • **013 R2** Absorbansi rata-rata = 0.531 Konsentrasi terukur (C): $\mathbf{x} = \frac{0.531-0,265652}{0,0543480} = 4.879$ Kadar:

		Kadar = $\frac{4.879 \times 0,025 \times 100}{1000}$ x 100% = 1,22% • **013 R3** Absorbansi rata-rata = 0.555 Konsentrasi terukur (C): **x** = $\frac{0.555 - 0,265652}{0,0543480}$ = 5.326 Kadar: Kadar = $\frac{5.326 \times 0,025 \times 100}{1000}$ x 100% = 1,33%
	018	• **018 R1** Absorbansi rata-rata = 0.524 Konsentrasi terukur (C): **x** = $\frac{0.524 - 0,265652}{0,0543480}$ = 4.755 Kadar: Kadar = $\frac{4.755 \times 0,025 \times 100}{1000}$ x 100% = 1,18 % • **018 R2** Absorbansi rata-rata = 0.516 Konsentrasi terukur (C): **x** = $\frac{0.516 - 0,265652}{0,0543480}$ = 4.604 Kadar: Kadar = $\frac{4.604 \times 0,025 \times 100}{1000}$ x 100% = 1,15% • **018 R3** Absorbansi rata-rata = 0.558 Konsentrasi terukur (C): **x** = $\frac{0.558 - 0,265652}{0,0543480}$ = 5.382 Kadar: Kadar = $\frac{5.382 \times 0,025 \times 100}{1000}$ x 100% = 1,34%
	029	• **029 R1** Absorbansi rata-rata = 0.558 Konsentrasi terukur (C): **x** = $\frac{0.558 - 0,265652}{0,0543480}$ = 5.371 Kadar: Kadar = $\frac{5.371 \times 0,025 \times 100}{1000}$ x 100% = 1,34% • **029 R2**

		Absorbansi rata-rata = 0.600 Konsentrasi terukur (C): $\mathbf{x} = \frac{0.600 - 0{,}265652}{0{,}0543480} = 6.158$ Kadar: Kadar = $\frac{6.158 \times 0{,}025 \times 100}{1000}$ x 100% = 1,54% • **029 R3** Absorbansi rata-rata = 0.552 Konsentrasi terukur (C): $\mathbf{x} = \frac{0.552 - 0{,}265652}{0{,}0543480} = 5.276$ Kadar: Kadar = $\frac{5.276 \times 0{,}025 \times 100}{1000}$ x 100% = 1,31%
Suhu ruang terhindar dari paparan cahaya matahari (25-30℃)	013	• **013 R1** Absorbansi rata-rata = 0.655 Konsentrasi terukur (C): $\mathbf{x} = \frac{0.655 - 0{,}265652}{0{,}0543480} = 7.166$ Kadar: Kadar = $\frac{7.166 \times 0{,}025 \times 100}{1000}$ x 100% = 1,79% • **013 R2** Absorbansi rata-rata = 0.618 Konsentrasi terukur (C): $\mathbf{x} = \frac{0.618 - 0{,}265652}{0{,}0543480} = 6.488$ Kadar: Kadar = $\frac{6.488 \times 0{,}025 \times 100}{1000}$ x 100% = 1,62% • **013 R3** Absorbansi rata-rata = 0.610 Konsentrasi terukur (C): $\mathbf{x} = \frac{0.610 - 0{,}265652}{0{,}0543480} = 6.328$ Kadar: Kadar = $\frac{6.328 \times 0{,}025 \times 100}{1000}$ x 100% = 1,58%
	018	• **018 R1** Absorbansi rata-rata = 0.524 Konsentrasi terukur (C):

		$\mathbf{x} = \frac{0.524-0,265652}{0,0543480} = 4.725$ Kadar: Kadar = $\frac{4.725\times0,025\times100}{1000}$ x 100% = 1,18% • **018 R2** Absorbansi rata-rata = 0.516 Konsentrasi terukur (C): $\mathbf{x} = \frac{0.516-0,265652}{0,0543480} = 4.605$ Kadar: Kadar = $\frac{4.605\times0,025\times100}{1000}$ x 100% = 1,15% • **018 R3** Absorbansi rata-rata = 0.573 Konsentrasi terukur (C): $\mathbf{x} = \frac{0.573-0,265652}{0,0543480} = 5.651$ Kadar: Kadar = $\frac{5.651\times0,025\times100}{1000}$ x 100% = 1,41%
	029	• **029 R1** Absorbansi rata-rata = 0.601 Konsentrasi terukur (C): $\mathbf{x} = \frac{0.601-0,265652}{0,0543480} = 6.160$ Kadar: Kadar = $\frac{6.160\times0,025\times100}{1000}$ x 100% = 1,54% • **029 R2** Absorbansi rata-rata = 0.531 Konsentrasi terukur (C): $\mathbf{x} = \frac{0.531-0,265652}{0,0543480} = 4.880$ Kadar: Kadar = $\frac{4.880\times0,025\times100}{1000}$ x 100% = 1,22% • **029 R3** Absorbansi rata-rata = 0.555 Konsentrasi terukur (C): $\mathbf{x} = \frac{0.555-0,265652}{0,0543480} = 5.328$ Kadar:

		Kadar = $\frac{5.328 \times 0,025 \times 100}{1000}$ x 100% = 1,33%
Suhu ≥ 40℃	013	• **013 R1** Absorbansi rata-rata = 0.516 Konsentrasi terukur (C): **x** = $\frac{0,516 - 0,265652}{0,0543480}$ = 4.606 Kadar: Kadar = $\frac{4.606 \times 0,025 \times 100}{1000}$ x 100% = 1,15% • **013 R2** Absorbansi rata-rata = 0.472 Konsentrasi terukur (C): **x** = $\frac{0.472 - 0,265652}{0,0543480}$ = 3.797 Kadar: Kadar = $\frac{3.797 \times 0,025 \times 100}{1000}$ x 100% = 0,94% • **013 R3** Absorbansi rata-rata = 0.466 Konsentrasi terukur (C): **x** = $\frac{0.466 - 0,265652}{0,0543480}$ = 3.690 Kadar: Kadar = $\frac{3.690 \times 0,025 \times 100}{1000}$ x 100% = 0,92%
	018	• **018 R1** Absorbansi rata-rata = 0.457 Konsentrasi terukur (C): **x** = $\frac{0.457 - 0,265652}{0,0543480}$ = 3.526 Kadar: Kadar = $\frac{3.526 \times 0,025 \times 100}{1000}$ x 100% = 0,88% • **018 R2** Absorbansi rata-rata = 0.469 Konsentrasi terukur (C): **x** = $\frac{0.469 - 0,265652}{0,0543480}$ = 3.750 Kadar: Kadar = $\frac{3.750 \times 0,025 \times 100}{1000}$ x 100% = 0,93% • **018 R3**

		Absorbansi rata-rata = 0.411 Konsentrasi terukur (C): $\mathbf{x} = \frac{0.411 - 0{,}265652}{0{,}0543480} = 2.670$ Kadar: Kadar = $\frac{2.670 \times 0{,}025 \times 100}{1000}$ x 100% = 0,66%
	029	• **029 R1** Absorbansi rata-rata = 0.466 Konsentrasi terukur (C): $\mathbf{x} = \frac{0.466 - 0{,}265652}{0{,}0543480} = 3.680$ Kadar: Kadar = $\frac{3.680 \times 0{,}025 \times 100}{1000}$ x 100% = 0,92% • **029 R2** Absorbansi rata-rata = 0.459 Konsentrasi terukur (C): $\mathbf{x} = \frac{0.459 - 0{,}265652}{0{,}0543480} = 3.553$ Kadar: Kadar = $\frac{3.553 \times 0{,}025 \times 100}{1000}$ x 100% = 0,88% • **029 R3** Absorbansi rata-rata = 0.455 Konsentrasi terukur (C): $\mathbf{x} = \frac{0.455 - 0{,}265652}{0{,}0543480} = 3.476$ Kadar: Kadar = $\frac{3.476 \times 0{,}025 \times 100}{1000}$ x 100% = 0,86%

Lampiran 17. Perhitungan Kadar Sampel Gel

<table>
<tr><th colspan="3">Gel Asam Kojik</th></tr>
<tr><th>Cara Penyimpanan</th><th>Batch</th><th>Perhitungan</th></tr>
<tr><td rowspan="2">Kontrol</td><td>251</td><td>

- **251 R1**

Absorbansi rata-rata = 0.621

Konsentrasi terukur (C):

$\mathbf{x} = \frac{0.621 - 0{,}265652}{0{,}0543480} = 6.543$

Kadar:

Kadar = $\frac{6.543 \times 0{,}025 \times 100}{1000}$ x 100% = 1,63%

- **251 R2**

Absorbansi rata-rata = 0.609

Konsentrasi terukur (C):

$\mathbf{x} = \frac{0.609 - 0{,}265652}{0{,}0543480} = 6.321$

Kadar:

Kadar = $\frac{6.321 \times 0{,}025 \times 100}{1000}$ x 100% = 1,58%

- **251 R3**

Absorbansi rata-rata = 0.611

Konsentrasi terukur (C):

$\mathbf{x} = \frac{0.611 - 0{,}265652}{0{,}0543480} = 6.361$

Kadar:

Kadar = $\frac{6.361 \times 0{,}025 \times 100}{1000}$ x 100% = 1,59%

</td></tr>
<tr><td>204</td><td>

- **204 R1**

Absorbansi rata-rata = 0.573

Konsentrasi terukur (C):

$\mathbf{x} = \frac{0.573 - 0{,}265652}{0{,}0543480} = 5.652$

Kadar:

Kadar = $\frac{5.652 \times 0{,}025 \times 100}{1000}$ x 100% = 1,41%

- **204 R2**

Absorbansi rata-rata = 0.565

Konsentrasi terukur (C):

$\mathbf{x} = \frac{0.565 - 0{,}265652}{0{,}0543480} = 5.511$

Kadar:

</td></tr>
</table>

		Kadar = $\frac{5.511 \times 0,025 \times 100}{1000}$ x 100% = 1,37% • **204 R3** Absorbansi rata-rata = 0.558 Konsentrasi terukur (C): **x** = $\frac{0.558 - 0,265652}{0,0543480}$ = 5.375 Kadar: Kadar = $\frac{5.375 \times 0,025 \times 100}{1000}$ x 100% = 1,34%
	194	• **194 R1** Absorbansi rata-rata = 0.600 Konsentrasi terukur (C): **x** = $\frac{0.600 - 0,265652}{0,0543480}$ = 6.157 Kadar: Kadar = $\frac{6.157 \times 0,025 \times 100}{1000}$ x 100% = 1,54% • **194 R2** Absorbansi rata-rata = 0.605 Konsentrasi terukur (C): **x** = $\frac{0.605 - 0,265652}{0,0543480}$ = 6.236 Kadar: Kadar = $\frac{6.236 \times 0,025 \times 100}{1000}$ x 100% = 1,55% • **194 R3** Absorbansi rata-rata = 0.585 Konsentrasi terukur (C): **x** = $\frac{0.585 - 0,265652}{0,0543480}$ = 5.870 Kadar: Kadar = $\frac{5.870 \times 0,025 \times 100}{1000}$ x 100% = 1,46%
Suhu lemari es (2-5°C)	251	• **251 R1** Absorbansi rata-rata = 0.64 Konsentrasi terukur (C): **x** = $\frac{0.64 - 0,265652}{0,0543480}$ = 6.887 Kadar: Kadar = $\frac{6.887 \times 0,025 \times 100}{1000}$ x 100% = 1,72% • **251 R2**

		Absorbansi rata-rata = 0.618 Konsentrasi terukur (C): $\mathbf{x} = \frac{0.618-0,265652}{0,0543480} = 6.489$ Kadar: Kadar = $\frac{6.489\times0,025\times100}{1000}$ x 100% = 1,62% • **251 R3** Absorbansi rata-rata = 0.649 Konsentrasi terukur (C): $\mathbf{x} = \frac{0.649-0,265652}{0,0543480} = 7.049$ Kadar: Kadar = $\frac{7.049\times0,025\times100}{1000}$ x 100% = 1,76%
	204	• **204 R1** Absorbansi rata-rata = 0.589 Konsentrasi terukur (C): $\mathbf{x} = \frac{0.589-0,265652}{0,0543480} = 5.950$ Kadar: Kadar = $\frac{5.950\times0,025\times100}{1000}$ x 100% = 1,48% • **204 R2** Absorbansi rata-rata = 0.545 Konsentrasi terukur (C): $\mathbf{x} = \frac{0.545-0,265652}{0,0543480} = 5.143$ Kadar: Kadar = $\frac{5.143\times0,025\times100}{1000}$ x 100% = 1,28% • **204 R3** Absorbansi rata-rata = 0.573 Konsentrasi terukur (C): $\mathbf{x} = \frac{0.573-0,265652}{0,0543480} = 5.654$ Kadar: Kadar = $\frac{5.654\times0,025\times100}{1000}$ x 100% = 1,41%
	194	• **194 R1** Absorbansi rata-rata = 0.617 Konsentrasi terukur (C):

		$\mathbf{x} = \frac{0.617-0,265652}{0,0543480} = 6.461$ Kadar: Kadar = $\frac{6.461\times0,025\times100}{1000}$ x 100% = 1,61% • **194 R2** Absorbansi rata-rata = 0.618 Konsentrasi terukur (C): $\mathbf{x} = \frac{0.618-0,265652}{0,0543480} = 6.480$ Kadar: Kadar = $\frac{6.480\times0,025\times100}{1000}$ x 100% = 1,62% • **194 R3** Absorbansi rata-rata = 0.645 Konsentrasi terukur (C): $\mathbf{x} = \frac{0.645-0,265652}{0,0543480} = 6.977$ Kadar: Kadar = $\frac{6.977\times0,025\times100}{1000}$ x 100% = 1,74%
Suhu ruang terpapar cahaya matahari (25-30℃)	251	• **251 R1** Absorbansi rata-rata = 0.561 Konsentrasi terukur (C): $\mathbf{x} = \frac{0.561-0,265652}{0,0543480} = 5.444$ Kadar: Kadar = $\frac{5.444\times0,025\times100}{1000}$ x 100% = 1,36% • **251 R2** Absorbansi rata-rata = 0.558 Konsentrasi terukur (C): $\mathbf{x} = \frac{0.558-0,265652}{0,0543480} = 5.383$ Kadar: Kadar = $\frac{5.383\times0,025\times100}{1000}$ x 100% = 1,34% • **251 R3** Absorbansi rata-rata = 0.552 Konsentrasi terukur (C): $\mathbf{x} = \frac{0.552-0,265652}{0,0543480} = 5.275$ Kadar:

		Kadar = $\frac{5.275 \times 0,025 \times 100}{1000}$ x 100% = 1,31%
	204	• **204 R1** Absorbansi rata-rata = 0.457 Konsentrasi terukur (C): **x =** $\frac{0.457 - 0,265652}{0,0543480}$ = 3.527 Kadar: Kadar = $\frac{3.527 \times 0,025 \times 100}{1000}$ x 100% = 0,88% • **204 R2** Absorbansi rata-rata = 0.481 Konsentrasi terukur (C): **x =** $\frac{0.481 - 0,265652}{0,0543480}$ = 3.963 Kadar: Kadar = $\frac{3.963 \times 0,025 \times 100}{1000}$ x 100% = 0,99% • **204 R3** Absorbansi rata-rata = 0.466 Konsentrasi terukur (C): **x =** $\frac{0.466 - 0,265652}{0,0543480}$ = 3.678 Kadar: Kadar = $\frac{3.678 \times 0,025 \times 100}{1000}$ x 100% = 0,92%
	194	• **194 R1** Absorbansi rata-rata = 0.561 Konsentrasi terukur (C): **x =** $\frac{0.561 - 0,265652}{0,0543480}$ = 5.441 Kadar: Kadar = $\frac{5.441 \times 0,025 \times 100}{1000}$ x 100% = 1,36% • **194 R2** Absorbansi rata-rata = 0.455 Konsentrasi terukur (C): **x =** $\frac{0.455 - 0,265652}{0,0543480}$ = 3.477 Kadar: Kadar = $\frac{3.477 \times 0,025 \times 100}{1000}$ x 100% = 0,86%

		• **194 R3** Absorbansi rata-rata = 0.457 Konsentrasi terukur (C): **x** = $\frac{0.457-0,265652}{0,0543480}$ = 3.525 Kadar: Kadar = $\frac{3.525\times0,025\times100}{1000}$ x 100% = 0,88%
Suhu ruang terhindar dari paparan cahaya matahari (25-30°C)	251	• **251 R1** Absorbansi rata-rata = 0.636 Konsentrasi terukur (C): **x** = $\frac{0.636-0,265652}{0,0543480}$ = 6.808 Kadar: Kadar = $\frac{6.808\times0,025\times100}{1000}$ x 100% = 1,70% • **251 R2** Absorbansi rata-rata = 0.573 Konsentrasi terukur (C): **x** = $\frac{0.573-0,265652}{0,0543480}$ = 5.653 Kadar: Kadar = $\frac{5.653\times0,025\times100}{1000}$ x 100% = 1,41% • **251 R3** Absorbansi rata-rata = 0.600 Konsentrasi terukur (C): **x** = $\frac{0.600-0,265652}{0,0543480}$ = 6.159 Kadar: Kadar = $\frac{6.159\times0,025\times100}{1000}$ x 100% = 1,54%
	204	• **204 R1** Absorbansi rata-rata = 0.552 Konsentrasi terukur (C): **x** = $\frac{0.552-0,265652}{0,0543480}$ = 5.274 Kadar: Kadar = $\frac{5.274\times0,025\times100}{1000}$ x 100% = 1,31% • **204 R2** Absorbansi rata-rata = 0.561

		Konsentrasi terukur (C): $\mathbf{x} = \frac{0.561 - 0,265652}{0,0543480} = 5.442$ Kadar: Kadar = $\frac{5.442 \times 0,025 \times 100}{1000}$ x 100% = 1,36% • **204 R3** Absorbansi rata-rata = 0.566 Konsentrasi terukur (C): $\mathbf{x} = \frac{0.566 - 0,265652}{0,0543480} = 5.518$ Kadar: Kadar = $\frac{5.518 \times 0,025 \times 100}{1000}$ x 100% = 1,38%
	194	• **194 R1** Absorbansi rata-rata = 0.649 Konsentrasi terukur (C): $\mathbf{x} = \frac{0.649 - 0,265652}{0,0543480} = 7.054$ Kadar: Kadar = $\frac{7.054 \times 0,025 \times 100}{1000}$ x 100% = 1,76% • **194 R2** Absorbansi rata-rata = 0.638 Konsentrasi terukur (C): $\mathbf{x} = \frac{0.638 - 0,265652}{0,0543480} = 6.860$ Kadar: Kadar = $\frac{6.860 \times 0,025 \times 100}{1000}$ x 100% = 1,71% • **194 R3** Absorbansi rata-rata = 0.650 Konsentrasi terukur (C): $\mathbf{x} = \frac{0.650 - 0,265652}{0,0543480} = 7.078$ Kadar: Kadar = $\frac{7.078 \times 0,025 \times 100}{1000}$ x 100% = 1,77%
Suhu >40℃	251	• **251 R1** Absorbansi rata-rata = 0.466 Konsentrasi terukur (C):

		$\mathbf{x} = \frac{0.466-0,265652}{0,0543480} = 3.679$ Kadar: Kadar = $\frac{3.679\times0,025\times100}{1000}$ x 100% = 0,92% • **251 R2** Absorbansi rata-rata = 0.400 Konsentrasi terukur (C): $\mathbf{x} = \frac{0.400-0,265652}{0,0543480} = 2.470$ Kadar: Kadar = $\frac{2.470\times0,025\times100}{1000}$ x 100% = 0,61% • **251 R3** Absorbansi rata-rata = 0.339 Konsentrasi terukur (C): $\mathbf{x} = \frac{0.339-0,265652}{0,0543480} = 1.354$ Kadar: Kadar = $\frac{1.354\times0,025\times100}{1000}$ x 100% = 0,33%
	204	• **204 R1** Absorbansi rata-rata = 0.401 Konsentrasi terukur (C): $\mathbf{x} = \frac{0.401-0,265652}{0,0543480} = 2.482$ Kadar: Kadar = $\frac{2.482\times0,025\times100}{1000}$ x 100% = 0,62% • **204 R2** Absorbansi rata-rata = 0.398 Konsentrasi terukur (C): $\mathbf{x} = \frac{0.398-0,265652}{0,0543480} = 2.434$ Kadar: Kadar = $\frac{2.434\times0,025\times100}{1000}$ x 100% = 0,60% • **204 R3** Absorbansi rata-rata = 0.411 Konsentrasi terukur (C): $\mathbf{x} = \frac{0.411-0,265652}{0,0543480} = 2.671$ Kadar:

		Kadar = $\frac{2.671 \times 0,025 \times 100}{1000}$ x 100% = 0,66%
	194	• **194 R1** Absorbansi rata-rata = 0.558 Konsentrasi terukur (C): **x** = $\frac{0.558 - 0,265652}{0,0543480}$ = 5.372 Kadar: Kadar = $\frac{5.372 \times 0,025 \times 100}{1000}$ x 100% = 1,34% • **194 R2** Absorbansi rata-rata = 0.469 Konsentrasi terukur (C): **x** = $\frac{0.469 - 0,265652}{0,0543480}$ = 3.737 Kadar: Kadar = $\frac{3.737 \times 0,025 \times 100}{1000}$ x 100% = 0,93% • **194 R3** Absorbansi rata-rata = 0.469 Konsentrasi terukur (C): **x** = $\frac{0.469 - 0,265652}{0,0543480}$ = 3.749 Kadar: Kadar = $\frac{3.749 \times 0,025 \times 100}{1000}$ x 100% = 0,93%

Lampiran 18. Perhitungan Perbandingan Kadar

Jenis Sediaan	Cara Penyimpanan	Perhitungan
Krim	Suhu Lemari Es (3–5 °C)	$\frac{1,55 - 1,59}{1,59}$ x 100% = 2,52%
	Suhu ruang terpapar cahaya matahari (25-30℃)	$\frac{1,31 - 1,59}{1,59}$ x 100% = 17,61%
	Suhu ruang terhindar dari paparan cahaya matahari (25-30℃)	$\frac{1,43 - 1,59}{1,59}$ x 100% = 10,06%
	Suhu ≥ 40 °C	$\frac{0,91 - 1,59}{1,59}$ x 100% = 42,77%

Gel	Suhu Lemari Es (3–5 °C)	$\frac{1,56-1,54}{1,54}$ x 100% = 1,29%
	Suhu ruang terpapar cahaya matahari (25-30°C)	$\frac{1,1-1,54}{1,54}$ x 100% = 28,57%
	Suhu ruang terhindar dari paparan cahaya matahari (25-30°C)	$\frac{1,55-1,54}{1,54}$ x 100% = 0,64%
	Suhu ≥ 40 °C	$\frac{0,77-1,54}{1,54}$ x 100% = 50%

Lampiran 19. Hasil Uji Normalitas

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Standardized Residual for Stabilitas	.081	90	.197	.977	90	.115

Lampiran 20. Hasil Uji Homogenitas

Levene's Test of Equality of Error Variances[a,b]

		Levene Statistic	df1	df2	Sig.[c]
Konsentrasi ppm	Based on Mean	3.414	9	80	.135
	Based on Median	1.540	9	80	.148
	Based on Median and with adjusted df	1.540	9	51.990	.159
	Based on trimmed mean	3.251	9	80	.002

Lampiran 21. Hasil Uji Analisis Varians

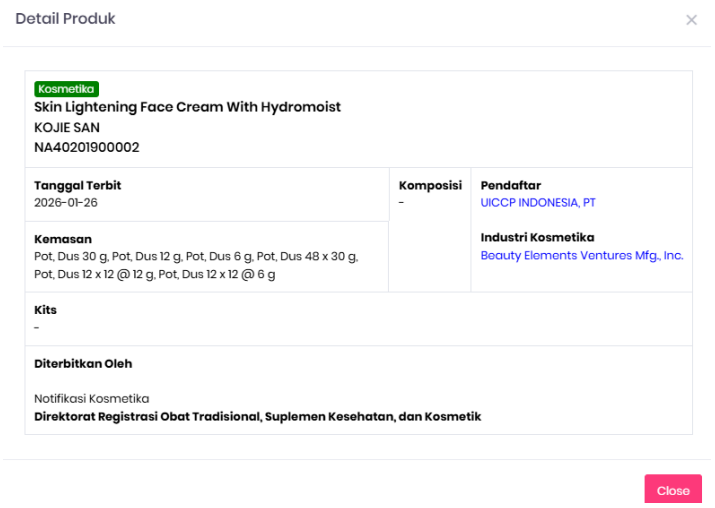
Tests of Between-Subjects Effects

Dependent Variable: Konsentrasi ppm

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	116.446[a]	9	12.938	21.805	<.001
Intercept	2550.877	1	2550.877	4298.978	<.001
Kondisi_Penyimpanan	110.320	4	27.580	46.481	<.001
Jenis_Sediaan	1.089	1	1.089	1.835	.179
Kondisi_Penyimpanan * Jenis_Sediaan	5.037	4	1.259	2.122	.086
Error	47.469	80	.593		
Total	2714.792	90			
Corrected Total	163.915	89			

a. R Squared = .710 (Adjusted R Squared = .678)

Lampiran 22. Daftar Produk Krim Asam Kojik BPOM



Lampiran 23. Daftar Produk Gel Asam Kojik BPOM

