

LAMPIRAN

Lampiran 1. Surat Keterangan Penelitian



**FAKULTAS SAINS, TEKNOLOGI, DAN KESEHATAN
UNIVERSITAS SAHID SURAKARTA**

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Nomor : 433/FSTK/D/Usahid-Ska/XII/2023
Lampiran :
Perihal : **Permohonan Pengantar Penelitian**

Kepada Yth.

Bapak/Ibu Pimpinan Laboratorium Kimia Farmasi Usahid

Jl. Adi Sucipto No.154, Jajar, Kec. Laweyan, Kota Surakarta, Jawa Tengah 57144

Dengan hormat,

Guna memenuhi persyaratan perkuliahan Program S1 di Universitas Sahid Surakarta, mahasiswa diwajibkan untuk menempuh skripsi / tugas akhir.

Dalam rangka melaksanakan kegiatan tersebut, bersama ini kami menyampaikan permohonan izin bagi mahasiswa kami untuk dapat melaksanakan penelitian di instansi yang Bapak/Ibu pimpin. Adapun data mahasiswa tersebut adalah sebagai berikut:

Nama : Tiara Kusuma Wardani
Nomor Induk Mahasiswa : 2020142012
Program Studi : Farmasi
Waktu Penelitian : 13 Desember 2023 s/d 5 Januari 2024
Judul Penelitian : Penetapan Kadar Kuersetin Ekstrak Etanol Pada Daun Jambu
Biji dengan Metode Spektrofotometri Uv-Vis dan Profil Kromatografi Lapis Tipis

Demikian atas perhatian dan kerja sama yang baik, kami mengucapkan terima kasih.

Surakarta, 12 Desember 2023

Mengetahui,

Dekan Fakultas Sains, Teknologi, dan Kesehatan



[Handwritten Signature]

Firdhaus Hari Saputro Al Haris, S.T., M.Eng.
NIDN. 0614068201

Tembusan :
- Arsip Fakultas.

Lampiran 2. Surat Hasil Determinasi



KEMENTERIAN KESEHATAN REPUBLIK INDONESIA
DIREKTORAT JENDERAL PELAYANAN KESEHATAN
RUMAH SAKIT UMUM PUSAT Dr. SARDJITO
LABORATORIUM PENGUJIAN - UPF PELAYANAN KESEHATAN TRADISIONAL TAWANGMANGU
Jl. Raya Lawu No. 11 Tawangmangu, Karanganyar Jawa Tengah 57792
Telepon (0271) 697010 Faksimili (0271) 697451



Kepada
Tiara Kusuma Wardani
Prodi S1 Farmasi, Fakultas Sains, Teknologi dan Kesehatan, Universitas Sahid Surakarta
Jalan Adi Sucipto No. 154 Jajar, Solo 57144

LAPORAN HASIL UJI

Nomor : TL.02.04/D.XI.6/133.024/2024
Nomor permohonan : PE/I/2024/11
Tanggal terbit : 4 Januari 2024
Halaman : 1 dari 2

IDENTITAS SAMPEL

Nama sampel : Jambu Biji (Daun)
Merek : -
Bentuk sampel : Daun Segar
Keterangan sampel : -

Tanggal Penerimaan : 2 Januari 2024
Tanggal Pelaksanaan : 3 Januari 2024
Jenis Pengujian : Fisika/Kimia/Mikrobiologi
Hasil Pengujian : Terlampir

HASIL PENGUJIAN

Nomor : TL.02.04/D.XI.6/133.024/2024
Nomor pengujian : PE/I/2024/11
Halaman : 2 dari 2

Parameter	Satuan	Hasil	Metode Uji / Teknik
Determinasi Tanaman			Organoleptik
Famili	-	Myrtaceae	
Spesies	-	<i>Psidium guajava</i> L.	
Sinonim	-	<i>Guajava pyrifer</i> Kuntze	

Kepala Instalasi Penunjang,
Penelitian, dan Penyediaan Produk,

Santoso, S.Farm.
NIP. 198204092006041003



Lampiran 3. Sampel Ekstrak Etanol Daun Jambu Biji



Lampiran 4. Perhitungan Pembuatan Larutan Baku Kuersetin

a. Larutan Baku Kuersetin

$$\begin{aligned}\text{ppm} &= \frac{mg}{L} \\ &= \frac{10 \text{ mg}}{0,1 L} \\ &= 100 \text{ ppm}\end{aligned}$$



Lampiran 5. Perhitungan Seri Konsentrasi Larutan Baku Kuersetin

- a. Pembuatan larutan seri konsentrasi 2 ppm

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

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

$$V_1 = \frac{20}{100}$$

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

- b. Pembuatan larutan seri konsentrasi 4 ppm

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

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

$$V_1 = \frac{40}{100}$$

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

- c. Pembuatan larutan seri konsentrasi 6 ppm

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

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

$$V_1 = \frac{60}{100}$$

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

- d. Pembuatan larutan seri konsentrasi 8 ppm

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

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

$$V_1 = \frac{80}{100}$$

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

- e. Pembuatan larutan seri konsentrasi 10 ppm

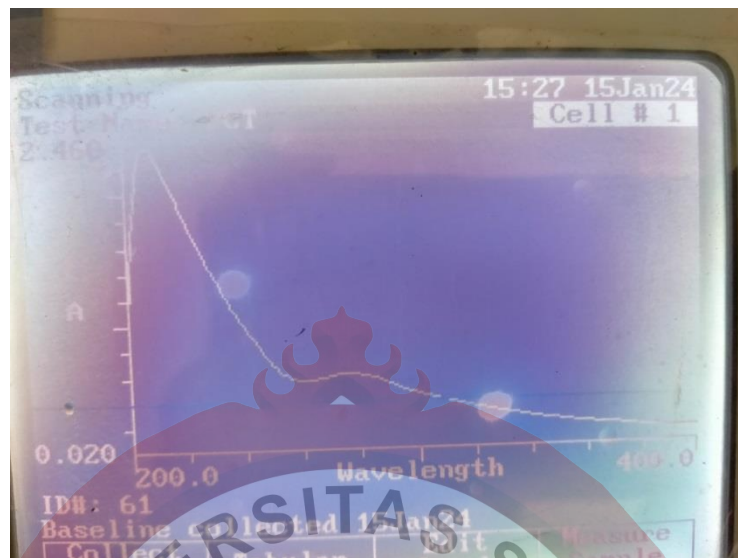
$$V_1 \times C_1 = V_2 \times C_2$$

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

$$V_1 = \frac{100}{100}$$

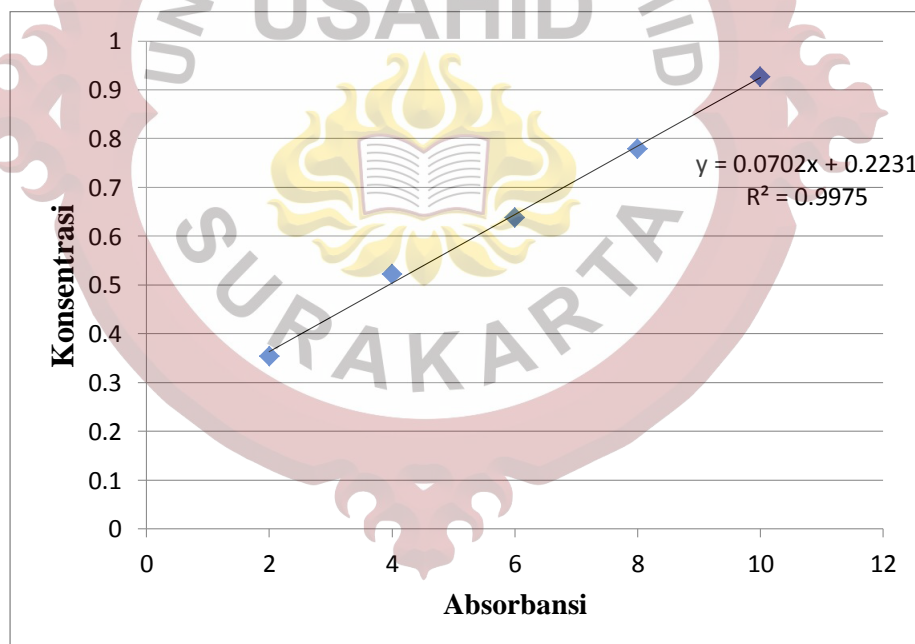
$$V_1 = 1 \text{ mL}$$

Lampiran 6. Grafik Penentuan Panjang Gelombang Maksimal



Lampiran 7. Uji Linieritas

Konsentrasi (ppm)	Replikasi	Absorbansi	Rata-Rata Absorbansi	Persamaan Regresi Linier
2	1	0,351	0,354	$y = 0,0702x + 0,2231$ $R^2 = 0,9975$
	2	0,359		
	3	0,354		
4	1	0,523	0,522	
	2	0,520		
	3	0,525		
6	1	0,646	0,638	
	2	0,631		
	3	0,638		
8	1	0,784	0,779	
	2	0,787		
	3	0,788		
0,30	1	0,924	0,927	
	2	0,927		
	3	0,931		



Lampiran 8. Uji Ketelitian (*Precision*)

Konsentrasi	Replikasi	Absorbansi	Rata-Rata	SD (%)	RSD (%)
2 ppm	1	0,348	0,347	0,0014	0,403
	2	0,347			
	3	0,349			
	4	0,350			
	5	0,346			
	6	0,347			

$$SD = \sqrt{\frac{\sum (x-\bar{x})^2}{n-1}}$$

$$= 0,0014$$

$$\%RSD = \frac{SD}{\text{rata-rata absorbansi}} \times 100 \%$$

$$= \frac{0,0014}{0,347} \times 100 \%$$

$$= 0,403 \%$$

$$\text{Ketelitian alat} = 100\% - \% RSD$$

$$= 100\% - 0,403 \%$$

$$= 99,59 \%$$

Lampiran 9. Uji Ketepatan (*Accuracy*)

Konsentrasi (ppm)	Replikasi	Absorbansi	% Recovery	Rata-Rata % Recovery	SD (%)	RSD (%)
2	1	0,363	99,6	104,8	6,74	6,4
	2	0,381	112,4			
	3	0,367	102,4			
4	1	0,526	107,8	107,8	3,56	3,3
	2	0,516	104,3			
	3	0,536	111,4			
6	1	0,664	104,6	103,6	1,39	1,3
	2	0,653	102,0			
	3	0,662	104,2			

Persamaan regresi linier $y = 0,0702x + 0,2231$

$$\% \text{ Recovery} = \frac{\text{Konsentrasi yang diperoleh}}{\text{Konsentrasi yang sebenarnya}} \times 100\%$$

1) Konsentrasi 2 ppm

a) Replikasi 1

$$0,363 = 0,0702x + 0,2231$$

$$x = \frac{0,363 - 0,2231}{0,0702}$$

$$x = 1,992 \text{ ppm}$$

$$\% \text{ recovery} = \frac{1,992 \text{ ppm}}{2 \text{ ppm}} \times 100 \%$$

$$= 99,6 \%$$

b) Replikasi 2

$$0,381 = 0,0702x + 0,2231$$

$$x = \frac{0,381 - 0,2231}{0,0702}$$

$$x = 2,24 \text{ ppm}$$

$$\% \text{ recovery} = \frac{2,24 \text{ ppm}}{2 \text{ ppm}} \times 100 \%$$

$$= 112 \%$$

c) Replikasi 3

$$\begin{aligned}
 0,367 &= 0,0702x + 0,2231 \\
 x &= \frac{0,367 - 0,2231}{0,0702} \\
 x &= 2,04 \text{ ppm} \\
 \% \text{ recovery} &= \frac{2,04 \text{ ppm}}{2 \text{ ppm}} \times 100 \% \\
 &= 102 \%
 \end{aligned}$$

$$\text{Rata-rata \% recovery konsentrasi 2 ppm} = \frac{99,6 \% + 112 \% + 102 \%}{3} = 104,5 \%$$

$$\begin{aligned}
 \text{SD} &= \sqrt{\frac{\sum (x - \bar{x})^2}{n-1}} \\
 &= 6,74
 \end{aligned}$$

$$\begin{aligned}
 \% \text{RSD} &= \frac{\text{SD}}{\text{rata-rata \% recovery}} \times 100 \% \\
 &= \frac{6,74}{104,5} \times 100 \% \\
 &= 6,4 \%
 \end{aligned}$$

2) Konsentrasi 4 ppm

a) Replikasi 1

$$\begin{aligned}
 0,526 &= 0,0702x + 0,2231 \\
 x &= \frac{0,526 - 0,2231}{0,0702} \\
 x &= 4,3 \text{ ppm} \\
 \% \text{ recovery} &= \frac{4,3 \text{ ppm}}{4 \text{ ppm}} \times 100 \% \\
 &= 107,5 \%
 \end{aligned}$$

b) Replikasi 2

$$\begin{aligned}
 0,516 &= 0,0702x + 0,2231 \\
 x &= \frac{0,516 - 0,2231}{0,0702} \\
 x &= 4,2 \text{ ppm} \\
 \% \text{ recovery} &= \frac{4,2 \text{ ppm}}{4 \text{ ppm}} \times 100 \% \\
 &= 105 \%
 \end{aligned}$$

c) Replikasi 3

$$0,536 = 0,0702x + 0,2231$$

$$x = \frac{0,536 - 0,2231}{0,0702}$$

$$x = 4,4 \text{ ppm}$$

$$\% \text{ recovery} = \frac{4,4 \text{ ppm}}{4 \text{ ppm}} \times 100 \%$$

$$= 110 \%$$

$$\text{Rata-rata \% recovery konsentrasi 4 ppm} = \frac{107,5 \% + 105 \% + 110 \%}{3} = 107,5 \%$$

$$\text{SD} = \sqrt{\frac{\sum (x - \bar{x})^2}{n-1}}$$

$$= 2,5$$

$$\% \text{ RSD} = \frac{\text{SD}}{\text{rata-rata \% recovery}} \times 100 \%$$

$$= \frac{2,5}{107,5} \times 100 \%$$

$$= 2,3 \%$$

3) Konsentrasi 6 ppm

a) Replikasi 1

$$0,664 = 0,0702x + 0,2231$$

$$x = \frac{0,664 - 0,2231}{0,0702}$$

$$x = 6,2 \text{ ppm}$$

$$\% \text{ recovery} = \frac{6,2 \text{ ppm}}{6 \text{ ppm}} \times 100 \%$$

$$= 104,6 \%$$

b) Replikasi 2

$$0,653 = 0,0702x + 0,2231$$

$$x = \frac{0,653 - 0,2231}{0,0702}$$

$$x = 6,1 \text{ ppm}$$

$$\begin{aligned}\% \text{ recovery} &= \frac{6,1 \text{ ppm}}{6 \text{ ppm}} \times 100 \% \\ &= 101,6 \%\end{aligned}$$

c) Replikasi 3

$$\begin{aligned}0,662 &= 0,0702x + 0,2231 \\ x &= \frac{0,662 - 0,2231}{0,0702} \\ x &= 6,2 \text{ ppm} \\ \% \text{ recovery} &= \frac{6,2 \text{ ppm}}{6 \text{ ppm}} \times 100 \% \\ &= 104,6 \%\end{aligned}$$

$$\text{Rata-rata \% recovery konsentrasi 6 ppm} = \frac{104,6 \% + 103,6 \% + 104,6 \%}{3} = 104,2 \%$$

$$\begin{aligned}\text{SD} &= \sqrt{\frac{\sum (x - \bar{x})^2}{n-1}} \\ &= 1,39\end{aligned}$$

$$\begin{aligned}\% \text{ RSD} &= \frac{\text{SD}}{\text{rata-rata \% recovery}} \times 100 \% \\ &= \frac{1,39}{104,2} \times 100 \% \\ &= 1,3 \%\end{aligned}$$

Lampiran 10. Uji Batas Deteksi (*Limit of Detection*) dan Batas Kuantitasi
(*Limit of Quantitation*)

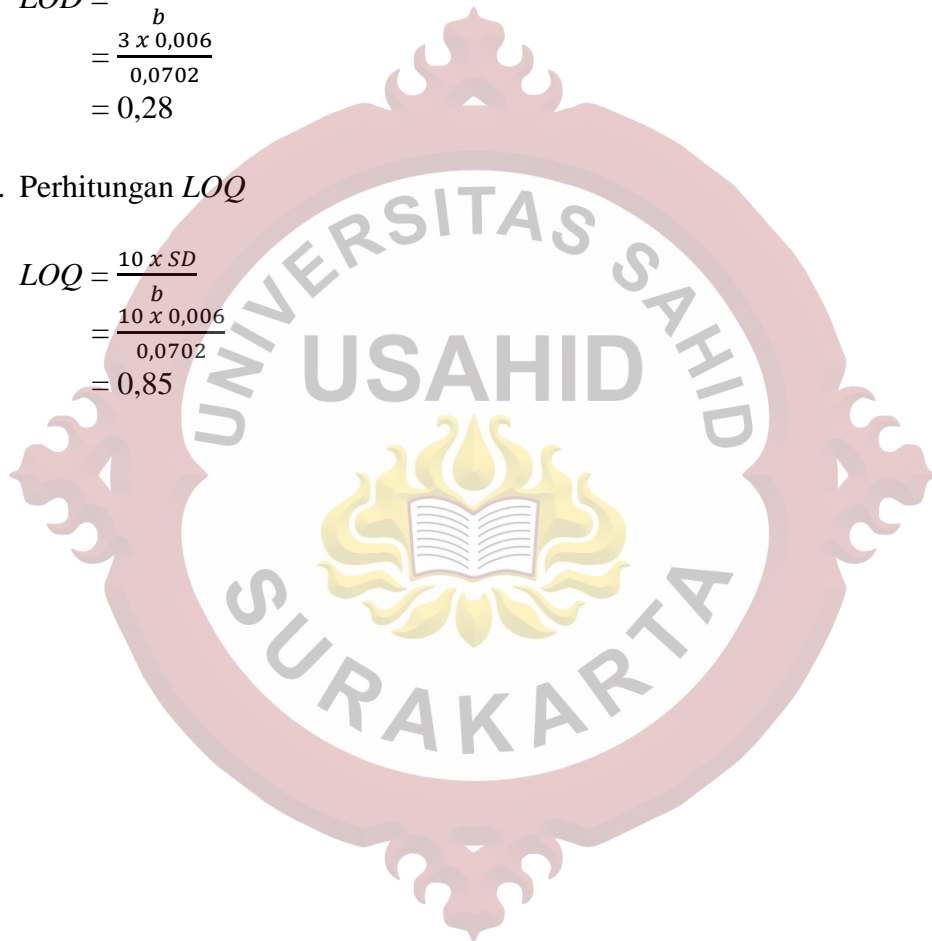
Konsentrasi (ppm)	Rata-rata absorbansi	SD (%)	LOD (ppm)	LOQ (ppm)
6	0,636	0,006	0,28	0,85

a. Perhitungan *LOD* :

$$\begin{aligned} LOD &= \frac{3 \times SD}{b} \\ &= \frac{3 \times 0,006}{0,0702} \\ &= 0,28 \end{aligned}$$

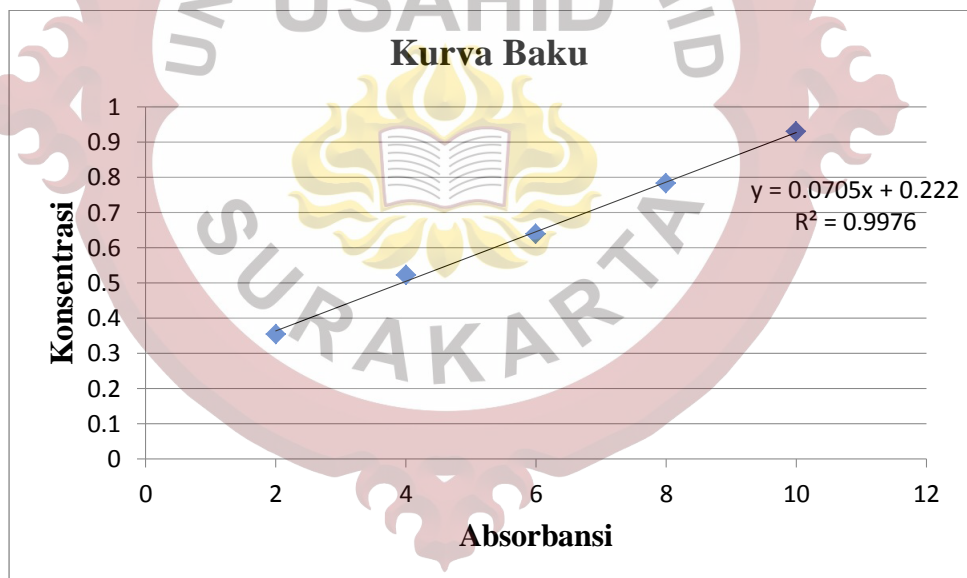
b. Perhitungan *LOQ*

$$\begin{aligned} LOQ &= \frac{10 \times SD}{b} \\ &= \frac{10 \times 0,006}{0,0702} \\ &= 0,85 \end{aligned}$$



Lampiran 11. Data Kurva Baku

Konsentrasi (ppm)	Replikasi	Absorbansi	Rata-Rata Absorbansi	Persamaan Regresi Linier
2	1	0,351	0,354	$y = 0,0705x + 0,222$ $R^2 = 0,9976$
	2	0,354		
	3	0,357		
4	1	0,528	0,522	
	2	0,519		
	3	0,520		
6	1	0,635	0,638	
	2	0,642		
	3	0,638		
8	1	0,785	0,782	
	2	0,784		
	3	0,778		
10	1	0,928	0,929	
	2	0,926		
	3	0,932		



Lampiran 12. Uji Kuantitatif Perhitungan Kadar Kuersetin Pada Sampel

Sampel	Replikasi	Absorbansi	Kadar (% b/v)	Rata-Rata Kadar (% b/v)	SD (%)	RSD (%)
A	1	0,784	1,59	1,42	0,14	10,3
	2	0,703	1,36			
	3	0,687	1,31			
B	1	0,576	1	5,98	4,3	73,0
	2	0,545	9,1			
	3	0,497	7,8			
C	1	0,755	1,51	1,23	0,25	20,7
	2	0,636	1,17			
	3	0,784	1,01			

Persamaan regresi linier $y = 0,0705x + 0,222$

$$\% \text{ Kadar} = \frac{\text{Cregresi } \left(\frac{\text{mg}}{\text{L}}\right) \times \text{Volume sampel (L)} \times fp}{\text{Berat sampel (kg)}}$$

1) Sampel A1

a) Replikasi 1

$$0,784 = 0,0705x + 0,222$$

$$x = \frac{0,784 - 0,222}{0,0705}$$

$$x = 7,97 \text{ mg/L}$$

$$\% \text{ Kadar} = \frac{7,97 \text{ mg/L} \times 0,05 \text{ L} \times 100}{0,00025 \text{ kg}}$$

$$= 1594 \text{ mg/kg}$$

$$= 0,1594 \text{ g/1000 ml}$$

$$= 1,594 \text{ g/100 mL}$$

$$= 1,594 \%$$

b) Replikasi 2

$$0,703 = 0,0705x + 0,222$$

$$x = \frac{0,703 - 0,222}{0,0705}$$

$$x = 6,822 \text{ mg/L}$$

$$\% \text{ Kadar} = \frac{6,822 \text{ mg/L} \times 0,05 \text{ L} \times 100}{0,00025 \text{ kg}}$$

$$= 13644 \text{ mg/kg}$$

$$= 0,13644 \text{ g/mL}$$

$$= 1,3644 \text{ g/100 mL}$$

$$= 1,3644 \%$$

c) Replikasi 3

$$0,687 = 0,0705x + 0,222$$

$$x = \frac{0,687 - 0,222}{0,0705}$$

$$x = 6,59 \text{ mg/L}$$

$$\% \text{ Kadar} = \frac{6,59 \text{ mg/L} \times 0,05 \text{ L} \times 100}{0,00025 \text{ kg}}$$

$$= 1319 \text{ mg/kg}$$

$$= 0,131 \text{ g/1000 mL}$$

$$= 1,319 \text{ g/100 mL}$$

$$= 1,319 \%$$

$$\text{Rata-rata \% kadar A1} = \frac{1,594 \% + 1,364 \% + 1,319 \%}{3} = 1,42\%$$

$$\text{SD} = \sqrt{\frac{\sum (x - \bar{x})^2}{n-1}}$$

$$= 0,147$$

$$\% \text{ RSD} = \frac{\text{SD}}{\text{rata-rata \% kadar}} \times 100 \%$$

$$= \frac{0,147}{1,42} \times 100 \%$$

$$= 10,3 \%$$

2) Sampel B

a) Replikasi 1

$$0,576 = 0,0705x + 0,222$$

$$x = \frac{0,576 - 0,222}{0,0705}$$

$$x = 5,02 \text{ mg/L}$$

$$\% \text{ Kadar} = \frac{5,02 \text{ mg/L} \times 0,05 \text{ L} \times 100}{0,00025 \text{ kg}}$$

$$= 10042 \text{ mg/kg}$$

$$= 0,1 \text{ g/1000 mL}$$

$$= 1 \text{ g/100 mL}$$

$$= 1 \%$$

b) Replikasi 2

$$0,545 = 0,0705x + 0,222$$

$$x = \frac{0,545 - 0,222}{0,0705}$$

$$x = 4,58 \text{ mg/L}$$

$$\% \text{ Kadar} = \frac{4,58 \text{ mg/L} \times 0,05 \text{ L} \times 100}{0,00025 \text{ kg}}$$

$$= 9162 \text{ mg/kg}$$

$$= 0,916 \text{ g/1000 mL}$$

$$= 9,16 \text{ g/100 mL}$$

$$= 9,16 \%$$

c) Replikasi 3

$$0,497 = 0,0705x + 0,222$$

$$x = \frac{0,497 - 0,222}{0,0705}$$

$$x = 3,9 \text{ mg/L}$$

$$\% \text{ Kadar} = \frac{3,9 \text{ mg/L} \times 0,05 \text{ L} \times 100}{0,00025 \text{ kg}}$$

$$= 7800 \text{ mg/kg}$$

$$= 0,78 \text{ g/1000 mL}$$

$$= 7,8 \text{ g/100 mL}$$

$$= 7,8 \%$$

$$\text{Rata-rata \% kadar B} = \frac{1\% + 9,16\% + 7,8\%}{3} = 5,98 \%$$

$$\text{SD} = \sqrt{\frac{\sum (x - \bar{x})^2}{n-1}}$$

$$= 4,37$$

$$\% \text{ RSD} = \frac{\text{SD}}{\text{rata-rata \% kadar}} \times 100 \%$$

$$= \frac{4,37}{5,98} \times 100 \%$$

$$= 73 \%$$

3) Sampel C

a) Replikasi 1

$$0,755 = 0,0705x + 0,222$$

$$x = \frac{0,755 - 0,222}{0,0705}$$

$$x = 7,56 \text{ mg/L}$$

$$\% \text{ Kadar} = \frac{7,56 \text{ mg/L} \times 0,05 \text{ L} \times 100}{0,00025 \text{ kg}}$$

$$= 151200 \text{ mg/kg}$$

$$= 0,151 \text{ g/1000 mL}$$

$$= 1,51 \text{ g/100 mL}$$

$$= 1,51 \%$$

b) Replikasi 2

$$0,636 = 0,0705x + 0,222$$

$$x = \frac{0,636 - 0,222}{0,0705}$$

$$x = 5,872 \text{ mg/L}$$

$$\% \text{ Kadar} = \frac{5,872 \text{ mg/L} \times 0,05 \text{ L} \times 100}{0,00025 \text{ kg}}$$

$$= 11744 \text{ mg/kg}$$

$$= 0,117 \text{ g/1000 mL}$$

$$= 1,17 \text{ g/100 mL}$$

$$= 1,17 \%$$

c) Replikasi 3

$$0,580 = 0,0705x + 0,222$$

$$x = \frac{0,580 - 0,222}{0,0705}$$

$$x = 5,078 \text{ mg/L}$$

$$\begin{aligned}\% \text{ Kadar} &= \frac{5,078 \text{ mg/L} \times 0,05 \text{ L} \times 100}{0,00025 \text{ kg}} \\ &= 10156 \text{ mg/kg} \\ &= 0,101 \text{ g/1000 mL} \\ &= 1,01 \text{ g/100 mL} \\ &= 1,01 \%\end{aligned}$$

$$\text{Rata-rata \% kadar C} = \frac{1,51 \% + 1,1 \% + 1,01 \%}{3} = 1,23 \%$$

$$\begin{aligned}\text{SD} &= \sqrt{\frac{\sum (x - \bar{x})^2}{n-1}} \\ &= 0,255\end{aligned}$$

$$\begin{aligned}\% \text{ RSD} &= \frac{\text{SD}}{\text{rata-rata \% kadar}} \times 100 \% \\ &= \frac{0,255}{1,23} \times 100 \% \\ &= 20,7 \%\end{aligned}$$