

## LAMPIRAN

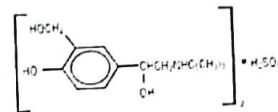
## Lampiran 1. Sertifikat Analisis Salbutamol Sulfat



BADAN POM RI

## SERTIFIKAT ANALISIS

NAMA ZAT : SALBUTAMOL SULFAT BPEI  
 NO KONTROL : 113030  
 FORMULA :  $(C_{13}H_{27}NO_3)_2 \cdot H_2SO_4$   
 BOBOT MOLEKUL : 576.70 g/mol



TUJUAN PENGGUNAAN : - identifikasi secara spektrofotometri inframerah  
 - identifikasi secara spektrofotometri ultraviolet  
 - uji senyawa sejenis secara kromatografi cair kinerja tinggi  
 - penetapan kadar secara kromatografi cair kinerja tinggi

WADAH DAN PENYIMPANAN : dalam wadah tertutup rapat, terlindung dari cahaya

PENGUJIAN	ACUAN/METODE	SPESIFIKASI	HASIL
Pemerian		Serbuk hablur, putih atau hampir putih	Memenuhi syarat
Identifikasi	Spektrofotometri Inframerah (BP 2009)	Sesuai dengan baku primer <i>Salbutamol Sulphate</i> Dr. Ehrenstorfer no. Lot 80424	Memenuhi syarat
	Spektrofotometri Ultraviolet (BP 2009)	Sesuai dengan baku primer <i>Salbutamol Sulphate</i> Dr. Ehrenstorfer no. Lot 80424	Memenuhi syarat
Susut pengeringan	(BP 2009)	$\leq 0,5\%$	0,17%
Senyawa sejenis	Kromatografi Cair Kinerja Tinggi (BP 2009)	Area cemaran F (RT relatif = 6,2) $\leq (0,3\%)$ Masing- masing cemaran A, B, C, D, E, G, H dan I $\leq (0,3\%)$ Jumlah cemaran $\leq 1,0\%$	cemaran B = 0,06% cemaran F = 0,01% Jumlah cemaran selain B dan F = 0,31% Jumlah cemaran = 0,38%
Penetapan kadar	Kromatografi Cair Kinerja Tinggi (BP 2009)	98,0 – 101,0 %	98,32 $\pm$ 2,41%

Kepala Pusat Pengujian Obat dan Makanan Nasional  
 U.b. Manajer Teknis Laboratorium Bahan Baku Pembanding

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## Lampiran 2. Pembagian Sampel

Minggu	Evaluasi			Analisa Kadar									
	2 – 8° C	15 – 30° C	30-39° C	Suhu 2 – 8° C			Suhu 15 – 30° C			Suhu 30-39° C			
				(R1)	(R2)	(R3)	(R1)	(R2)	(R3)	(R1)	(R2)	(R3)	
0	100	100	100	5	5	5	5	5	5	5	5	5	5
1	100	100	100	5	5	5	5	5	5	5	5	5	5
2	100	100	100	5	5	5	5	5	5	5	5	5	5
3	100	100	100	5	5	5	5	5	5	5	5	5	5
Cadangan (mL)	200	200	200	180	180	180	180	180	180	180	180	180	180
Jumlah (mL)	600	600	600	200	200	200	200	200	200	200	200	200	200
Jumlah (botol)	6	6	6	2	2	2	2	2	2	2	2	2	2
Total per uji	6 botol	6 botol	6 botol	6 botol			6 botol			6 botol			
Total kebutuhan	36 Botol												

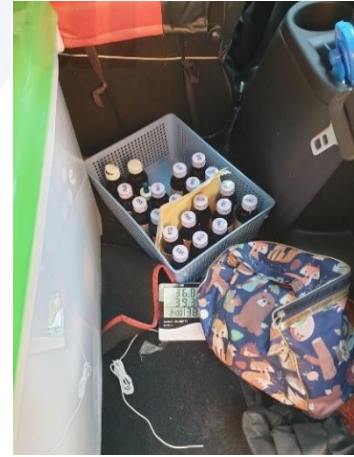
**Lampiran 3. Kondisi Penyimpanan Sampel**



Penyimpanan pada Suhu Dingin (2-8°C)



Penyimpanan pada Suhu Ruang (15-30°C)



Penyimpanan pada Suhu Mobil (30-39°C)

**Lampiran 4.** Perhitungan Pembuatan Reagen**1. Pembuatan Larutan HCl 2 N dalam 100 mL**

$$V_1 \cdot N_1 = V_2 \cdot N_2$$

$$V_1 \cdot 12.04 \text{ N} = 100 \text{ mL} \cdot 2 \text{ N}$$

$$V_1 = 16,6 \text{ mL}$$

**2. Pembuatan Larutan HCl 1 N dalam 100 mL**

$$V_1 \cdot N_1 = V_2 \cdot N_2$$

$$V_1 \cdot 12.04 \text{ N} = 100 \text{ mL} \cdot 1 \text{ N}$$

$$V_1 = 8,3 \text{ mL}$$

**3. Pembuatan Larutan HCl 0,1 N dalam 100 mL**

$$V_1 \cdot N_1 = V_2 \cdot N_2$$

$$V_1 \cdot 12.04 \text{ N} = 100 \text{ mL} \cdot 0,1 \text{ N}$$

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

**4. Pembuatan Larutan Stok Salbutamol Sulfat 1000  $\mu\text{g/mL}$  dalam 5 mL**

$$\mu\text{g/mL} = \frac{\text{mg}}{L}$$

$$1000 \mu\text{g/mL} = \frac{\text{mg}}{0,005 L}$$

$$\text{mg} = 5 \text{ mg}$$

**5. Pembuatan Larutan Standar Salbutamol Sulfat 100  $\mu\text{g/mL}$  dalam 25 mL**

$$V_1 \cdot M_1 = V_2 \cdot M_2$$

$$V_1 \cdot 1000 \mu\text{g/mL} = 25 \text{ mL} \cdot 100 \mu\text{g/mL}$$

$$V_1 = 2,5 \text{ mL}$$

**6. Pengenceran Larutan Standar Salbutamol Sulfat untuk Validasi Metode**a. 5  $\mu\text{g/mL}$ 

$$V_1 \cdot M_1 = V_2 \cdot M_2$$

$$V_1 \cdot 100 \mu\text{g/mL} = 5 \text{ mL} \cdot 5 \mu\text{g/mL}$$

$$V_1 = 0,25 \text{ mL}$$

b. 10  $\mu\text{g/mL}$ 

$$V_1 \cdot M_1 = V_2 \cdot M_2$$

$$V_1 \cdot 100 \mu\text{g/mL} = 5 \text{ mL} \cdot 10 \mu\text{g/mL}$$

$$V_1 = 0,5 \text{ mL}$$

c.  $15 \mu\text{g/mL}$

$$V_1 \cdot M_1 = V_2 \cdot M_2$$

$$V_1 \cdot 100 \mu\text{g/mL} = 5 \text{ mL} \cdot 15 \mu\text{g/mL}$$

$$V_1 = 0,75 \text{ mL}$$

d.  $20 \mu\text{g/mL}$

$$V_1 \cdot M_1 = V_2 \cdot M_2$$

$$V_1 \cdot 100 \mu\text{g/mL} = 5 \text{ mL} \cdot 20 \mu\text{g/mL}$$

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

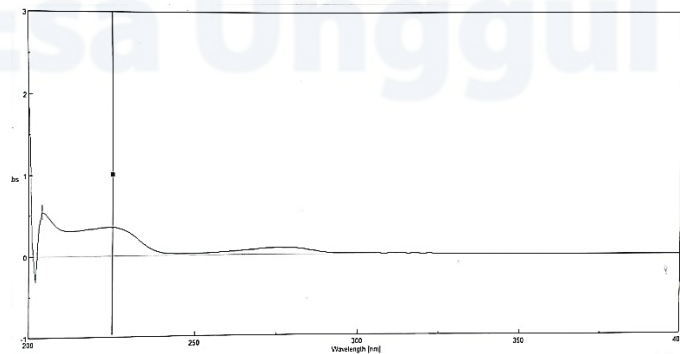
e.  $25 \mu\text{g/mL}$

$$V_1 \cdot M_1 = V_2 \cdot M_2$$

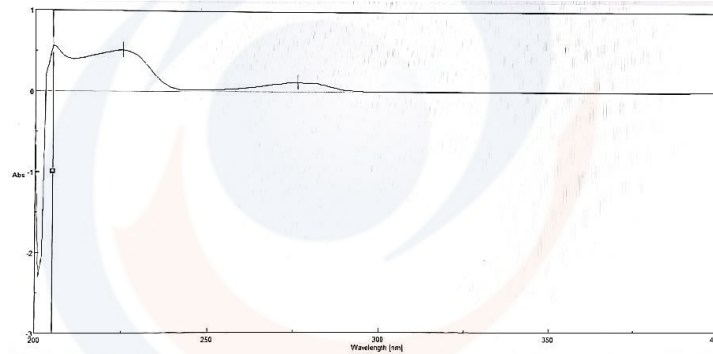
$$V_1 \cdot 100 \mu\text{g/mL} = 5 \text{ mL} \cdot 25 \mu\text{g/mL}$$

$$V_1 = 1,25 \text{ mL}$$

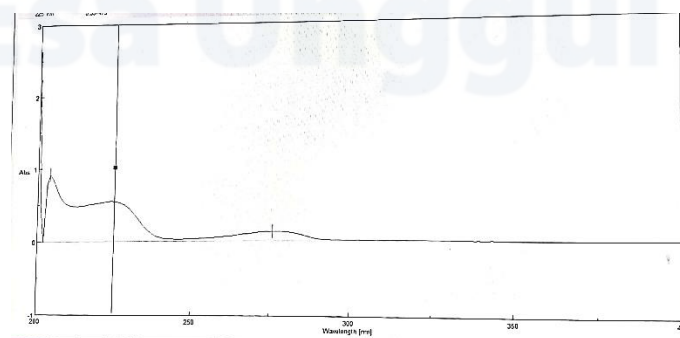
Lampiran 5. Dokumentasi Optimasi Pelarut



Spektrum Standar Salbutamol Sulfat Konsentrasi 5 µg/mL dengan Pelarut HCl 1 N



Spektrum Standar Salbutamol Sulfat Konsentrasi 10 µg/mL dengan Pelarut HCl 1 N



Spektrum Standar Salbutamol Sulfat Konsentrasi 15 µg/mL dengan Pelarut HCl 1 N

**Lampiran 6.** Perhitungan Preparasi Sampel

Persamaan Regresi :  $y = 0,0231x + 0,1948$

$$\% Recovery = \frac{\text{hasil analisis}}{\text{nilai sesungguhnya}} \times 100\%$$

**1. Perhitungan Konsentrasi Sampel**

mg/L = ppm =  $\mu\text{g/mL}$

$$\mu\text{g/mL} = \frac{mg}{L}$$

$$\mu\text{g/mL} = \frac{2 mg}{0,05 L}$$

$$\mu\text{g/mL} = 40$$

**2. Perhitungan %Recovery Ekstrak Cair Kloroform dengan Lama Vortex 10 detik**

Rerata absorbansi : 1.1174

$$y = 0,0231x + 0,1948$$

$$1,1174 = 0,0231x + 0,1948$$

$$0,0231x = 1,1174 - 0,1948$$

$$x = 39,9380 \mu\text{g/mL}$$

$$\% Recovery = \frac{\text{hasil analisis}}{\text{nilai sesungguhnya}} \times 100\%$$

$$= \frac{39,9380 \mu\text{g/mL}}{40 \mu\text{g/mL}} \times 100\%$$

$$= 99,8449\%$$

**3. Perhitungan %Recovery Ekstrak Cair Kloroform dengan Lama Vortex 60 detik**

Rerata absorbansi : 3,0678

$$y = 0,0231x + 0,1948$$

$$3,0678 = 0,0231x + 0,1948$$

$$0,0231x = 3,0678 - 0,1948$$

$$x = 124,3709 \mu\text{g/mL}$$

$$\% Recovery = \frac{\text{hasil analisis}}{\text{nilai sesungguhnya}} \times 100\%$$

$$= \frac{124.3709 \mu\text{g/mL}}{40 \mu\text{g/mL}} \times 100\%$$

$$= 310,9271 \%$$

#### 4. Perhitungan %Recovery Ekstrak Cair Kloroform dengan Lama Vortex 180 detik

Rerata absorbansi : 2,5805

$$y = 0,0231x + 0,1948$$

$$2,5805 = 0,0231x + 0,1948$$

$$0,0231x = 2,5805 - 0,1948$$

$$x = 103,2771 \mu\text{g/mL}$$

$$\% \text{ Recovery} = \frac{\text{hasil analisis}}{\text{nilai sesungguhnya}} \times 100\%$$

$$= \frac{103,2771 \mu\text{g/mL}}{40 \mu\text{g/mL}} \times 100\%$$

$$= 258,1926\%$$

#### 5. Perhitungan %Recovery Ekstrak Cair Kloroform dengan Lama Vortex 300 detik

Rerata absorbansi : 3,1086

$$y = 0,0231x + 0,1948$$

$$3,1086 = 0,0231x + 0,1948$$

$$0,0231x = 3,1086 - 0,1948$$

$$x = 126,1400 \mu\text{g/mL}$$

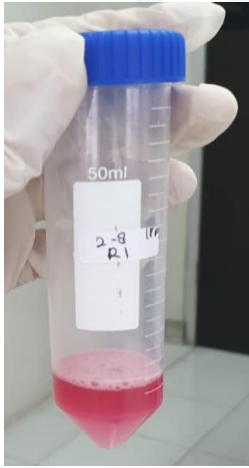
$$\% \text{ Recovery} = \frac{\text{hasil analisis}}{\text{nilai sesungguhnya}} \times 100\%$$

$$= \frac{126,1400 \mu\text{g/mL}}{40 \mu\text{g/mL}} \times 100\%$$

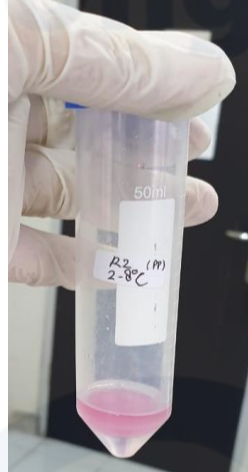
$$= 315,3499 \%$$



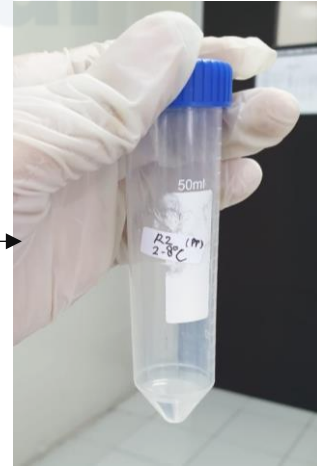
Lampiran 7. Dokumentasi Preparasi Sampel



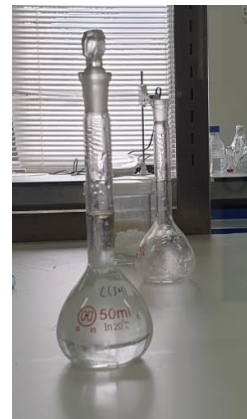
Ekstraksi sampel menggunakan pelarut kloroform 2 mL yang di *vortex* 10 detik dan diambil fase bawah untuk dilakukan ekstraksi ke-2



Fase bawah dari ekstraksi ke-1 diambil kemudian, ditambahkan kloroform 2 mL dan di *vortex* 10 detik. Pisahkan lapisan jernih



Lapisan jernih hasil ekstraksi



Tambahkan Pelarut HCl 1 N di Labu Ukur 50 mL (40 µg/mL)

**Lampiran 8. Perhitungan Akurasi**

Persamaan Regresi :  $y = 0,0231x + 0,1948$

$$\% \text{ Recovery} = \frac{\text{hasil analisis}}{\text{nilai sesungguhnya}} \times 100\%$$

**1. Pengenceran sampel 40 µg /mL ke 10 µg /mL**

$$V1 \cdot M1 = V2 \cdot M2$$

$$V1 \cdot 40 \mu\text{g/mL} = 5 \text{ mL} \cdot 10 \mu\text{g/mL}$$

$$V1 = 1,25 \text{ mL}$$

**2. Level Adisi Standar 80%**

$$\begin{aligned} \text{Konsentrasi adisi standar} &= \frac{80}{100} \times 10 \mu\text{g/mL} \\ &= 8 \mu\text{g/mL} \end{aligned}$$

$$V1 \cdot M1 = V2 \cdot M2$$

$$V1 \cdot 100 \mu\text{g/mL} = 5 \text{ mL} \cdot 8 \mu\text{g/mL}$$

$$V1 = 0,4 \text{ mL (diambil dari larutan standar } 100 \mu\text{g/mL)}$$

Rerata absorbansi : 0,6112

$$y = 0,0231x + 0,1948$$

$$0,6112 = 0,0231x + 0,1948$$

$$0,0231x = 0,6112 - 0,1948$$

$$x = 18,0274 \mu\text{g /mL}$$

$$\begin{aligned} \% \text{ Recovery} &= \frac{\text{hasil analisis}}{\text{nilai sesungguhnya}} \times 100\% \\ &= \frac{18,0274 \mu\text{g /mL}}{18 \mu\text{g /mL}} \times 100\% \\ &= 100,1523 \% \end{aligned}$$

**3. Level Adisi Standar 100%**

$$\begin{aligned} \text{Konsentrasi adisi standar} &= \frac{100}{100} \times 10 \mu\text{g/mL} \\ &= 10 \mu\text{g/mL} \end{aligned}$$

$$V1 \cdot M1 = V2 \cdot M2$$

$$V1 \cdot 100 \mu\text{g/mL} = 5 \text{ mL} \cdot 10 \mu\text{g/mL}$$

$$V1 = 0,5 \text{ mL (diambil dari larutan standar } 100 \mu\text{g/mL)}$$

Rerata absorbansi : 0,6562

$$y = 0,0231x + 0,1948$$

$$\begin{aligned}
 0,6562 &= 0,0231x + 0,1948 \\
 0,0231x &= 0,6562 - 0,1948 \\
 x &= 19,9755 \mu\text{g /mL} \\
 \% \text{ Recovery} &= \frac{\text{hasil analisis}}{\text{nilai sesungguhnya}} \times 100\% \\
 &= \frac{19,9755 \mu\text{g /mL}}{20 \mu\text{g /mL}} \times 100\% \\
 &= 99,8773 \%
 \end{aligned}$$

#### 4. Level Adisi Standar 120%

$$\begin{aligned}
 \text{Konsentrasi adisi standar} &= \frac{120}{100} \times 10 \mu\text{g/mL} \\
 &= 12 \mu\text{g/mL}
 \end{aligned}$$

$$V1 \cdot M1 = V2 \cdot M2$$

$$V1 \cdot 100 \mu\text{g/mL} = 5 \text{ mL} \cdot 12 \mu\text{g/mL}$$

$$V1 = 0,6 \text{ mL (diambil dari larutan standar } 100 \mu\text{g/mL)}$$

Rerata absorbansi : 0,7023

$$y = 0,0231x + 0,1948$$

$$0,7023 = 0,0231x + 0,1948$$

$$0,0231x = 0,7023 - 0,1948$$

$$x = 21,9697 \mu\text{g /mL}$$

$$\begin{aligned}
 \% \text{ Recovery} &= \frac{\text{hasil analisis}}{\text{nilai sesungguhnya}} \times 100\% \\
 &= \frac{21,9697 \mu\text{g /mL}}{22 \mu\text{g /mL}} \times 100\% \\
 &= 99,8623 \%
 \end{aligned}$$

**Lampiran 9. Perhitungan Presisi**

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

$$\% \text{ RSD} = \frac{\text{Standar deviasi}}{\text{rata-rata}} \times 100\%$$

**1. Perhitungan Presisi Intraday**

Presisi *Intraday* pukul 09.00 (5 µg /mL)

Rerata konsentrasi sebenarnya : 5,01 µg /mL

$$\begin{aligned} \text{SD} &= \sqrt{\frac{\sum (x_i - \bar{x})^2}{(n-1)}} \\ &= \sqrt{\frac{\sum (5,01 - 5,01)^2 + (5,00 - 5,01)^2 + (5,01 - 5,01)^2}{(3-1)}} \\ &= 0,0050 \end{aligned}$$

$$\begin{aligned} \% \text{ RSD} &= \frac{\text{Standar deviasi}}{\text{rata-rata}} \times 100\% \\ &= \frac{0,0050}{5,01} \times 100\% \\ &= 0,10 \% \end{aligned}$$

**2. Perhitungan Presisi Interday**

Presisi *Interday* Hari Ke-1 (5 µg /mL)

Rerata konsentrasi sebenarnya : 5,01 µg /mL

$$\begin{aligned} \text{SD} &= \sqrt{\frac{\sum (x_i - \bar{x})^2}{(n-1)}} \\ &= \sqrt{\frac{\sum (5,01 - 5,01)^2 + (5,00 - 5,01)^2 + (5,01 - 5,01)^2}{(3-1)}} \\ &= 0,0050 \end{aligned}$$

$$\begin{aligned} \% \text{ RSD} &= \frac{\text{Standar deviasi}}{\text{rata-rata}} \times 100\% \\ &= \frac{0,0050}{5,01} \times 100\% \\ &= 0,10 \% \end{aligned}$$

**Lampiran 10. Perhitungan LOD dan LOQ****1. Standar Deviasi**

$$\begin{aligned} \text{SD} &= \sqrt{\frac{\sum(Y - Y_r)^2}{n-2}} \\ &= \sqrt{\frac{0,000107}{3}} \\ &= 0,0060 \end{aligned}$$

**2. Batas Deteksi (LOD)**

$$\begin{aligned} \text{LOD} &= 3.3 \sigma/S \\ &= 3,3 \frac{0,0060}{0,0232} \\ &= 0,85 \mu\text{g /mL} \end{aligned}$$

**3. Batas Kuantitasi (LOQ)**

$$\begin{aligned} \text{LOQ} &= 10 \sigma/S \\ &= 10 \frac{0,0060}{0,0232} \\ &= 2,57 \mu\text{g /mL} \end{aligned}$$

Lampiran 11. Dokumentasi Uji Kejernihan



Lampiran 12. Dokumentasi Uji pH



Lampiran 13. Dokumentasi Uji Viskositas





**Lampiran 14.** Perhitungan Penetapan Kadar Salbutamol Sulfat Sirup**1. Penetapan Kadar Minggu ke-0**

$$y = 0,0231x + 0,1955$$

## a. Suhu 2-8°C

## • Apotek Resmi

Replikasi 1 : 1,1236

Replikasi 2 : 1,1257

Replikasi 3 : 1,1114

$$\begin{aligned} \text{Rerata Absorbansi} &= \frac{1,1236 + 1,1257 + 1,1114}{3} \\ &= 1,1202 \end{aligned}$$

$$1,1202 = 0,0231x + 0,1955$$

$$0,0231x = 1,1202 - 0,1955$$

$$x = 40,03 \mu\text{g/mL}$$

$$\% \text{ Recovery} = \frac{\text{hasil analisis}}{\text{nilai sesungguhnya}} \times 100\%$$

$$= \frac{40,03 \mu\text{g/mL}}{40 \mu\text{g/mL}} \times 100\%$$

$$= 100,08 \%$$

## • Pasar Pramuka

Replikasi 1 : 1,0860

Replikasi 2 : 1,1056

Replikasi 3 : 1,1106

$$\begin{aligned} \text{Rerata Absorbansi} &= \frac{1,0860 + 1,1056 + 1,1106}{3} \\ &= 1,1007 \end{aligned}$$

$$1,1007 = 0,0231x + 0,1955$$

$$0,0231x = 1,1007 - 0,1955$$

$$x = 39,19 \mu\text{g/mL}$$

$$\% \text{ Recovery} = \frac{\text{hasil analisis}}{\text{nilai sesungguhnya}} \times 100\%$$

$$= \frac{39,19 \mu\text{g/mL}}{40 \mu\text{g/mL}} \times 100\%$$

$$= 97,97 \%$$

## b. Suhu 15-30°C

## • Apotek Resmi

Replikasi 1 : 1,1104

Replikasi 2 : 1,1104

Replikasi 3 : 1,1105

$$\begin{aligned} \text{Rerata Absorbansi} &= \frac{1,1104 + 1,1104 + 1,1105}{3} \\ &= 1,1104 \end{aligned}$$

$$\begin{aligned}
 1,1104 &= 0,0231x + 0,1955 \\
 0,0231x &= 1,1104 - 0,1955 \\
 x &= 39,61 \mu\text{g} / \text{mL} \\
 \% \text{ Recovery} &= \frac{\text{hasil analisis}}{\text{nilai sesungguhnya}} \times 100\% \\
 &= \frac{39,61 \mu\text{g} / \text{mL}}{40 \mu\text{g} / \text{mL}} \times 100\% \\
 &= 99,02 \%
 \end{aligned}$$

- Pasar Pramuka

$$\begin{aligned}
 \text{Replikasi 1} &: 1,0621 \\
 \text{Replikasi 2} &: 1,0707 \\
 \text{Replikasi 3} &: 1,0970 \\
 \text{Rerata Absorbansi} &= \frac{1,0621 + 1,0707 + 1,0970}{3} \\
 &= 1,0766 \\
 1,0766 &= 0,0231x + 0,1955 \\
 0,0231x &= 1,0766 - 0,1955 \\
 x &= 38,14 \mu\text{g} / \text{mL} \\
 \% \text{ Recovery} &= \frac{\text{hasil analisis}}{\text{nilai sesungguhnya}} \times 100\% \\
 &= \frac{38,14 \mu\text{g} / \text{mL}}{40 \mu\text{g} / \text{mL}} \times 100\% \\
 &= 95,36 \%
 \end{aligned}$$

c. Suhu 30-39°C (mobil)

- Apotek Resmi

$$\begin{aligned}
 \text{Replikasi 1} &: 1,1143 \\
 \text{Replikasi 2} &: 1,1147 \\
 \text{Replikasi 3} &: 1,1135 \\
 \text{Rerata Absorbansi} &= \frac{1,1143 + 1,1147 + 1,1135}{3} \\
 &= 1,1142 \\
 1,1142 &= 0,0231x + 0,1955 \\
 0,0231x &= 1,1142 - 0,1955 \\
 x &= 39,77 \mu\text{g} / \text{mL} \\
 \% \text{ Recovery} &= \frac{\text{hasil analisis}}{\text{nilai sesungguhnya}} \times 100\% \\
 &= \frac{39,77 \mu\text{g} / \text{mL}}{40 \mu\text{g} / \text{mL}} \times 100\% \\
 &= 99,42 \%
 \end{aligned}$$

- Pasar Pramuka

$$\begin{aligned}
 \text{Replikasi 1} &: 1,0684 \\
 \text{Replikasi 2} &: 1,0707
 \end{aligned}$$

$$\begin{aligned}
 \text{Replikasi 3} & : 1,0690 \\
 \text{Rerata Absorbansi} & = \frac{1,0684 + 1,0707 + 1,0690}{3} \\
 & = 1,0694 \\
 1,0694 & = 0,0231x + 0,1955 \\
 0,0231x & = 1,0694 - 0,1955 \\
 x & = 37,83 \mu\text{g /mL} \\
 \% \text{ Recovery} & = \frac{\text{hasil analisis}}{\text{nilai sesungguhnya}} \times 100\% \\
 & = \frac{37,83 \mu\text{g /mL}}{40 \mu\text{g /mL}} \times 100\% \\
 & = 94,57 \%
 \end{aligned}$$

## 2. Penetapan Kadar Minggu ke-1

$$y = 0.0231x + 0.1955$$

a. Suhu 2-8°C

- Apotek Resmi

$$\begin{aligned}
 \text{Replikasi 1} & : 1,0721 \\
 \text{Replikasi 2} & : 1,0718 \\
 \text{Replikasi 3} & : 1,0706 \\
 \text{Rerata Absorbansi} & = \frac{1,0721 + 1,0718 + 1,0706}{3} \\
 & = 1,0715 \\
 1,0715 & = 0,0231x + 0,1955 \\
 0,0231x & = 1,0715 - 0,1955 \\
 x & = 37,92 \mu\text{g /mL}
 \end{aligned}$$

$$\begin{aligned}
 \% \text{ Recovery} & = \frac{\text{hasil analisis}}{\text{nilai sesungguhnya}} \times 100\% \\
 & = \frac{37,92 \mu\text{g /mL}}{40 \mu\text{g /mL}} \times 100\% \\
 & = 94,81 \%
 \end{aligned}$$

- Pasar Pramuka

$$\begin{aligned}
 \text{Replikasi 1} & : 1,0443 \\
 \text{Replikasi 2} & : 1,0447 \\
 \text{Replikasi 3} & : 1,0538 \\
 \text{Rerata Absorbansi} & = \frac{1,0443 + 1,0447 + 1,0538}{3} \\
 & = 1,0476 \\
 1,0476 & = 0,0231x + 0,1955 \\
 0,0231x & = 1,0476 - 0,1955 \\
 x & = 36,89 \mu\text{g /mL}
 \end{aligned}$$

$$\begin{aligned}
 \% \text{ Recovery} &= \frac{\text{hasil analisis}}{\text{nilai sesungguhnya}} \times 100\% \\
 &= \frac{36,89 \mu\text{g /mL}}{40 \mu\text{g /mL}} \times 100\% \\
 &= 92,22 \%
 \end{aligned}$$

## b. Suhu 15-30°C

## • Apotek Resmi

Replikasi 1 : 1,0825

Replikasi 2 : 1,0826

Replikasi 3 : 1,0823

$$\begin{aligned}
 \text{Rerata Absorbansi} &= \frac{1,0825 + 1,0826 + 1,0823}{3} \\
 &= 1,0825
 \end{aligned}$$

$$1,0825 = 0,0231x + 0,1955$$

$$0,0231x = 1,0825 - 0,1955$$

$$x = 38,40 \mu\text{g /mL}$$

$$\% \text{ Recovery} = \frac{\text{hasil analisis}}{\text{nilai sesungguhnya}} \times 100\%$$

$$= \frac{38,40 \mu\text{g /mL}}{40 \mu\text{g /mL}} \times 100\%$$

$$= 95,99 \%$$

## • Pasar Pramuka

Replikasi 1 : 1,0397

Replikasi 2 : 1,0392

Replikasi 3 : 1,0395

$$\begin{aligned}
 \text{Rerata Absorbansi} &= \frac{1,0397 + 1,0392 + 1,0395}{3} \\
 &= 1,0395
 \end{aligned}$$

$$1,0395 = 0,0231x + 0,1955$$

$$0,0231x = 1,0395 - 0,1955$$

$$x = 36,54 \mu\text{g /mL}$$

$$\% \text{ Recovery} = \frac{\text{hasil analisis}}{\text{nilai sesungguhnya}} \times 100\%$$

$$= \frac{36,54 \mu\text{g /mL}}{40 \mu\text{g /mL}} \times 100\%$$

$$= 91,34 \%$$

## c. Suhu 30-39°C (mobil)

## • Apotek Resmi

Replikasi 1 : 1,0309

Replikasi 2 : 1,0315

Replikasi 3 : 1,0362

$$\begin{aligned}
 \text{Rerata Absorbansi} &= \frac{1,0309 + 1,0315 + 1,0362}{3} \\
 &= 1,0329 \\
 1,0329 &= 0,0231x + 0,1955 \\
 0,0231x &= 1,0329 - 0,1955 \\
 x &= 36,25 \mu\text{g /mL} \\
 \% \text{ Recovery} &= \frac{\text{hasil analisis}}{\text{nilai sesungguhnya}} \times 100\% \\
 &= \frac{36,25 \mu\text{g /mL}}{40 \mu\text{g /mL}} \times 100\% \\
 &= 90,62 \%
 \end{aligned}$$

- Pasar Pramuka

$$\begin{aligned}
 \text{Replikasi 1} &: 0,9663 \\
 \text{Replikasi 2} &: 0,9658 \\
 \text{Replikasi 3} &: 0,9872 \\
 \text{Rerata Absorbansi} &= \frac{0,9963 + 0,9658 + 0,9872}{3} \\
 &= 0,9731 \\
 0,9731 &= 0,0231x + 0,1955 \\
 0,0231x &= 0,9731 - 0,1955 \\
 x &= 33,66 \mu\text{g /mL} \\
 \% \text{ Recovery} &= \frac{\text{hasil analisis}}{\text{nilai sesungguhnya}} \times 100\% \\
 &= \frac{33,66 \mu\text{g /mL}}{40 \mu\text{g /mL}} \times 100\% \\
 &= 84,16 \%
 \end{aligned}$$

### 3. Penetapan Kadar Minggu ke-2

$$y = 0,0231x + 0,1956$$

a. Suhu 2-8°C

- Apotek Resmi

$$\begin{aligned}
 \text{Replikasi 1} &: 1,0344 \\
 \text{Replikasi 2} &: 1,0345 \\
 \text{Replikasi 3} &: 1,0342 \\
 \text{Rerata Absorbansi} &= \frac{1,0344 + 1,0345 + 1,0342}{3} \\
 &= 1,0344 \\
 1,0344 &= 0,0231x + 0,1956 \\
 0,0231x &= 1,0344 - 0,1956 \\
 x &= 36,31 \mu\text{g /mL} \\
 \% \text{ Recovery} &= \frac{\text{hasil analisis}}{\text{nilai sesungguhnya}} \times 100\%
 \end{aligned}$$

$$= \frac{36,31 \mu\text{g/mL}}{40 \mu\text{g/mL}} \times 100\%$$

$$= 90,78 \%$$

- Pasar Pramuka

Replikasi 1 : 1,0082

Replikasi 2 : 1,0087

Replikasi 3 : 1,0088

$$\text{Rerata Absorbansi} = \frac{1,0082 + 1,0087 + 1,0088}{3}$$

$$= 1,0086$$

$$1,0086 = 0,0231x + 0,1956$$

$$0,0231x = 1,0086 - 0,1956$$

$$x = 35,19 \mu\text{g/mL}$$

$$\% \text{ Recovery} = \frac{\text{hasil analisis}}{\text{nilai sesungguhnya}} \times 100\%$$

$$= \frac{35,19 \mu\text{g/mL}}{40 \mu\text{g/mL}} \times 100\%$$

$$= 87,98 \%$$

b. Suhu 15-30°C

- Apotek Resmi

Replikasi 1 : 1,0545

Replikasi 2 : 1,0543

Replikasi 3 : 1,0542

$$\text{Rerata Absorbansi} = \frac{1,0545 + 1,0543 + 1,0542}{3}$$

$$= 1,0543$$

$$1,0543 = 0,0231x + 0,1956$$

$$0,0231x = 1,0543 - 0,1956$$

$$x = 37,17 \mu\text{g/mL}$$

$$\% \text{ Recovery} = \frac{\text{hasil analisis}}{\text{nilai sesungguhnya}} \times 100\%$$

$$= \frac{37,17 \mu\text{g/mL}}{40 \mu\text{g/mL}} \times 100\%$$

$$= 92,94\%$$

- Pasar Pramuka

Replikasi 1 : 1,0028

Replikasi 2 : 1,0029

Replikasi 3 : 1,0027

$$\text{Rerata Absorbansi} = \frac{1,0028 + 1,0029 + 1,0027}{3}$$

$$= 1,0028$$

$$1,0028 = 0,0231x + 0,1956$$

$$0,0231x = 1,0028 - 0,1956$$

$$\begin{aligned}
 x &= 34,94 \text{ } \mu\text{g /mL} \\
 \% \text{ Recovery} &= \frac{\text{hasil analisis}}{\text{nilai sesungguhnya}} \times 100\% \\
 &= \frac{34,94 \text{ } \mu\text{g /mL}}{40 \text{ } \mu\text{g /mL}} \times 100\% \\
 &= 87,36 \%
 \end{aligned}$$

## c. Suhu 30-39°C (mobil)

## • Apotek Resmi

$$\text{Replikasi 1} : 0,9692$$

$$\text{Replikasi 2} : 0,9695$$

$$\text{Replikasi 3} : 0,9698$$

$$\begin{aligned}
 \text{Rerata Absorbansi} &= \frac{0,9692 + 0,9695 + 0,9698}{3} \\
 &= 0,9695
 \end{aligned}$$

$$0,9695 = 0,0231x + 0,1956$$

$$0,0231x = 0,9695 - 0,1956$$

$$x = 33,50 \text{ } \mu\text{g /mL}$$

$$\begin{aligned}
 \% \text{ Recovery} &= \frac{\text{hasil analisis}}{\text{nilai sesungguhnya}} \times 100\% \\
 &= \frac{33,50 \text{ } \mu\text{g /mL}}{40 \text{ } \mu\text{g /mL}} \times 100\% \\
 &= 83,76 \%
 \end{aligned}$$

## • Pasar Pramuka

$$\text{Replikasi 1} : 0,9061$$

$$\text{Replikasi 2} : 0,9065$$

$$\text{Replikasi 3} : 0,9068$$

$$\begin{aligned}
 \text{Rerata Absorbansi} &= \frac{0,9061 + 0,9065 + 0,9068}{3} \\
 &= 0,9065
 \end{aligned}$$

$$0,9065 = 0,0231x + 0,1956$$

$$0,0231x = 0,9065 - 0,1956$$

$$x = 30,77 \text{ } \mu\text{g /mL}$$

$$\begin{aligned}
 \% \text{ Recovery} &= \frac{\text{hasil analisis}}{\text{nilai sesungguhnya}} \times 100\% \\
 &= \frac{30,77 \text{ } \mu\text{g /mL}}{40 \text{ } \mu\text{g /mL}} \times 100\% \\
 &= 76,93 \%
 \end{aligned}$$

**4. Penetapan Kadar Minggu ke-3**

$$y = 0.0231x + 0.1955$$

## a. Suhu 2-8°C

## • Apotek Resmi

$$\text{Replikasi 1} : 0,9972$$

$$\begin{aligned}
 \text{Replikasi 2} & : 0,9970 \\
 \text{Replikasi 3} & : 0,9972 \\
 \text{Rerata Absorbansi} & = \frac{0,9972 + 0,9970 + 0,9972}{3} \\
 & = 0,9971 \\
 0,9971 & = 0,0231x + 0,1955 \\
 0,0231x & = 0,9971 - 0,1955 \\
 x & = 34,70 \mu\text{g /mL} \\
 \% \text{ Recovery} & = \frac{\text{hasil analisis}}{\text{nilai sesungguhnya}} \times 100\% \\
 & = \frac{34,70 \mu\text{g /mL}}{40 \mu\text{g /mL}} \times 100\% \\
 & = 86,76 \%
 \end{aligned}$$

- Pasar Pramuka

$$\begin{aligned}
 \text{Replikasi 1} & : 0,9460 \\
 \text{Replikasi 2} & : 0,9466 \\
 \text{Replikasi 3} & : 0,9453 \\
 \text{Rerata Absorbansi} & = \frac{0,9460 + 0,9466 + 0,9453}{3} \\
 & = 0,9460 \\
 0,9460 & = 0,0231x + 0,1955 \\
 0,0231x & = 0,9460 - 0,1955 \\
 x & = 32,49 \mu\text{g /mL} \\
 \% \text{ Recovery} & = \frac{\text{hasil analisis}}{\text{nilai sesungguhnya}} \times 100\% \\
 & = \frac{32,49 \mu\text{g /mL}}{40 \mu\text{g /mL}} \times 100\% \\
 & = 81,22\%
 \end{aligned}$$

b. Suhu 15-30°C

- Apotek Resmi

$$\begin{aligned}
 \text{Replikasi 1} & : 1,0260 \\
 \text{Replikasi 2} & : 1,0258 \\
 \text{Replikasi 3} & : 1,0258 \\
 \text{Rerata Absorbansi} & = \frac{1,0260 + 1,0258 + 1,0258}{3} \\
 & = 1,0259 \\
 1,0259 & = 0,0231x + 0,1955 \\
 0,0231x & = 1,0259 - 0,1955 \\
 x & = 35,95 \mu\text{g /mL} \\
 \% \text{ Recovery} & = \frac{\text{hasil analisis}}{\text{nilai sesungguhnya}} \times 100\%
 \end{aligned}$$



$$= \frac{35,95 \mu\text{g/mL}}{40 \mu\text{g/mL}} \times 100\%$$

$$= 89,87 \%$$

- Pasar Pramuka

Replikasi 1 : 0,9658

Replikasi 2 : 0,9659

Replikasi 3 : 0,9665

$$\text{Rerata Absorbansi} = \frac{0,9658 + 0,9659 + 0,9665}{3}$$

$$= 0,9661$$

$$0,9661 = 0,0231x + 0,1955$$

$$0,0231x = 0,9661 - 0,1955$$

$$x = 83,39 \mu\text{g/mL}$$

$$\% \text{ Recovery} = \frac{\text{hasil analisis}}{\text{nilai sesungguhnya}} \times 100\%$$

$$= \frac{83,39 \mu\text{g/mL}}{40 \mu\text{g/mL}} \times 100\%$$

$$= 83,39 \%$$

c. Suhu 30-39°C (mobil)

- Apotek Resmi

Replikasi 1 : 0,9055

Replikasi 2 : 0,9057

Replikasi 3 : 0,9060

$$\text{Rerata Absorbansi} = \frac{0,9055 + 0,9057 + 0,9060}{3}$$

$$= 0,9057$$

$$0,9057 = 0,0231x + 0,1955$$

$$0,0231x = 0,9057 - 0,1955$$

$$x = 30,75 \mu\text{g/mL}$$

$$\% \text{ Recovery} = \frac{\text{hasil analisis}}{\text{nilai sesungguhnya}} \times 100\%$$

$$= \frac{30,75 \mu\text{g/mL}}{40 \mu\text{g/mL}} \times 100\%$$

$$= 76,87 \%$$

- Pasar Pramuka

Replikasi 1 : 0,8111

Replikasi 2 : 0,8111

Replikasi 3 : 0,8124

$$\text{Rerata Absorbansi} = \frac{0,8111 + 0,8111 + 0,8124}{3}$$

$$\begin{aligned}
 &= 0,8115 \\
 0,8115 &= 0,0231x + 0,1955 \\
 0,0231x &= 0,8115 - 0,1955 \\
 x &= 26,67 \mu\text{g /mL}
 \end{aligned}$$

$$\begin{aligned}
 \% \text{ Recovery} &= \frac{\text{hasil analisis}}{\text{nilai sesungguhnya}} \times 100\% \\
 &= \frac{26,67 \mu\text{g /mL}}{40 \mu\text{g /mL}} \times 100\% \\
 &= 66,67 \%
 \end{aligned}$$

**Lampiran 15. Uji Statistik Menggunakan SPSS 25****1. Uji Normalitas pada Sampel Apotek Resmi****Tests of Normality**

	Statistic	Shapiro-Wilk	
		df	Sig.
Lama Penyimpanan	.993	4	.972
Suhu Dingin	.993	4	.972
Suhu Ruang	.992	4	.970
Suhu Mobil	.993	4	.974

a. Lilliefors Significance Correction

**2. Uji Normalitas pada Sampel Pasar Pramuka****Tests of Normality**

	Statistic	Shapiro-Wilk	
		df	Sig.
Lama Penyimpanan	.993	4	.972
Suhu Dingin	.998	4	.994
Suhu Ruang	.993	4	.971
Suhu Mobil	1.000	4	.999

a. Lilliefors Significance Correction

**3. Uji Pearson pada Sampel Apotek Resmi****Correlations**

		Lama Penyimpanan	Suhu Dingin	Suhu Ruang	Suhu Mobil
Lama Penyimpanan	Pearson Correlation	1	-.998**	-1.000**	-.998**
	Sig. (2-tailed)		.002	.000	.002
	N	4	4	4	4

\*\*. Correlation is significant at the 0.01 level (2-tailed).

#### 4. Uji Pearson pada Sampel Pasar Pramuka

		Correlations			
		Lama Penyimpanan	Suhu Dingin	Suhu Ruang	Suhu Mobil
Lama Penyimpanan	Pearson Correlation	1	-.996**	-1.000**	-.998**
	Sig. (2-tailed)		.004	.000	.002
	N	4	4	4	4

\*\* . Correlation is significant at the 0.01 level (2-tailed).