

LAMPIRAN

Lampiran 1. Surat Pengantar Penelitian



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Lampiran :
Perihal : Permohonan Ijin Penelitian

Kepada Yth.

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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	: Elvina Erlan
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Program Studi	: Farmasi
Judul Penelitian	: Analisis Kandungan Asam Retinoat Pada Sediaan Krim Malam Yang Beredar Di Toko Online Kota Surakarta

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

Surakarta, 8 Mei 2023

Mengetahui,

Dekan Fakultas Sains, Teknologi, dan Kesehatan



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Tembusan :

- Arsip Fakultas.

Lampiran 2. Sampel Krim Malam



Sampel A



Sampel B



Sampel C



Sampel D



Sampel E



Sampel F



Sampel G



Sampel H



Sampel I



Sampel J



Asam Retinoat

Lampiran 3. Perhitungan

a. Perhitungan Nilai Rf Asam Retinoat dan nilai Rf Sampel

1. Nilai Rf Asam Retinoat dan Nilai Rf Sampel A

$$RF = \frac{\text{jarak yang ditempuh oleh zat yang diteliti}}{\text{jarak yang ditempuh oleh pelarut}}$$

$$RF = \frac{0,5}{1,1} = 0,45$$

2. Nilai Rf Asam Retinoat dan Nilai Rf Sampel C

$$RF = \frac{\text{jarak yang ditempuh oleh zat yang diteliti}}{\text{jarak yang ditempuh oleh pelarut}}$$

$$RF = \frac{0,5}{1,1} = 0,45$$

3. Nilai Rf Asam Retinoat dan Nilai Rf Sampel G

$$RF = \frac{\text{jarak yang ditempuh oleh zat yang diteliti}}{\text{jarak yang ditempuh oleh pelarut}}$$

$$RF = \frac{0,5}{1,1} = 0,45$$

b. Pembuatan Seri Konsentrasi Larutan Baku Asam Retinoat

1. Pembuatan larutan induk asam retinoat 1000 ppm dari larutan 10 mL

$$1000 \text{ ppm} = \frac{x \text{ mg}}{0,01 \text{ L}}$$

$$X = 1000 \text{ ppm} \times 0,01 \text{ L}$$

$$X = 10 \text{ mg}$$

2. Pembuatan larutan baku 35 ppm sebanyak 10 mL

$$M_1 \times V_1 = M_2 \times V_2$$

$$3,5 \text{ ppm} \times 10 \text{ mL} = 1000 \text{ ppm} \times V_2$$

$$35 = 1000 \text{ mL} \times V_2$$

$$V_2 = \frac{35}{1000}$$

$$V_2 = 0,035 \text{ mL} = 35 \text{ }\mu\text{L}$$

3. Pembuatan larutan baku 45 ppm sebanyak 10 mL

$$M_1 \times V_1 = M_2 \times V_2$$

$$4,5 \text{ ppm} \times 10 \text{ mL} = 1000 \text{ ppm} \times V_2$$

$$45 = 1000 \text{ mL} \times V_2$$

$$V_2 = \frac{45}{1000}$$

$$V_2 = 0,045 \text{ mL} = 45 \text{ }\mu\text{l}$$

4. Pembuatan larutan baku 55 ppm sebanyak 10 mL

$$M_1 \times V_1 = M_2 \times V_2$$

$$5,5 \text{ ppm} \times 10 \text{ mL} = 1000 \text{ ppm} \times V_2$$

$$55 = 1000 \text{ mL} \times V_2$$

$$V_2 = \frac{55}{1000}$$

$$V_2 = 0,055 \text{ mL} = 55 \text{ }\mu\text{L}$$

5. Pembuatan larutan baku 65 ppm sebanyak 10 mL

$$M_1 \times V_1 = M_2 \times V_2$$

$$6,5 \text{ ppm} \times 10 \text{ mL} = 1000 \text{ ppm} \times V_2$$

$$65 = 1000 \text{ mL} \times V_2$$

$$V_2 = \frac{65}{1000}$$

$$V_2 = 0,065 \text{ mL} = 65 \text{ } \mu\text{L}$$

6. Pembuatan larutan baku 75 ppm sebanyak 10 mL

$$M_1 \times V_1 = M_2 \times V_2$$

$$7,5 \text{ ppm} \times 10 \text{ mL} = 1000 \text{ ppm} \times V_2$$

$$75 = 1000 \text{ mL} \times V_2$$

$$V_2 = \frac{75}{1000}$$

$$V_2 = 0,075 \text{ mL} = 75 \text{ } \mu\text{L}$$

Lampiran 4. Uji Presisi

Replikasi	Konsentrasi (ppm)	Absorbansi (A)
1	4,5	0,455
2	4,5	0,454
3	4,5	0,453
4	4,5	0,458
5	4,5	0,452
6	4,5	0,456
Rata-rata		0,454
SD (%)		0,0022
RSD (%)		0,502

$$\begin{aligned}
 SD &= \sqrt{\frac{0,000026}{5}} \\
 &= \sqrt{0,0000052} \\
 &= 0,0022
 \end{aligned}$$

$$\text{RSD} = \frac{SD}{\bar{x}} \times 100\% = \frac{0,0022}{0,454} \times 100 = 0,50\%$$

Lampiran 5. Uji Akurasi

Konsentrasi (ppm)	Replikasi	Absorbansi	% <i>recovery</i>	Rata-rata %	SD	RSD
				<i>Recovery</i>		
	1	0,455	102,2			
4,5	2	0,457	102,6	102,5	0,305	0,297
	3	0,458	102,8			
	1	0,534	98,21			
5,5	2	0,538	98,96	98,77	0,493	0,499
	3	0,539	99,14			
	1	0,636	99,06			
6,5	2	0,638	99,36	99,31	0,233	0,235
	3	0,639	99,52			

Persamaan garis linier $y = 0,0984x + 0,0024$

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

a. Konsentrasi 4,5 ppm

$$\begin{aligned} \text{Replikasi 1} &= \frac{0,455 - 0,0024}{0,0984} \\ &= \frac{4,599 \text{ ppm}}{4,5} \times 100\% \\ &= 102,2\% \end{aligned}$$

$$\begin{aligned} \text{Replikasi 2} &= \frac{0,457 - 0,0024}{0,0984} \\ &= \frac{4,619 \text{ ppm}}{4,5} \times 100\% \\ &= 102,6\% \end{aligned}$$

$$\begin{aligned} \text{Replikasi 3} &= \frac{0,458 - 0,0024}{0,0984} \\ &= \frac{4,630 \text{ ppm}}{4,5} \times 100\% \\ &= 102,8\% \end{aligned}$$

b. Konsentrasi 5,5 ppm

$$\begin{aligned} \text{Replikasi 1} &= \frac{0,534 - 0,0024}{0,0984} \\ &= \frac{5,402 \text{ ppm}}{5,5} \times 100\% \\ &= 98,21\% \end{aligned}$$

$$\begin{aligned} \text{Replikasi 2} &= \frac{0,538 - 0,0024}{0,0984} \\ &= \frac{5,443 \text{ ppm}}{5,5} \times 100\% \\ &= 98,96\% \end{aligned}$$

$$\begin{aligned} \text{Replikasi 3} &= \frac{0,539 - 0,0024}{0,0984} \\ &= \frac{5,453 \text{ ppm}}{5,5} \times 100\% \\ &= 99,14\% \end{aligned}$$

c. Konsentrasi 6,5 ppm

$$\begin{aligned} \text{Replikasi 1} &= \frac{0,636 - 0,0024}{0,0984} \\ &= \frac{6,439 \text{ ppm}}{6,5} \times 100\% \\ &= 99,06\% \end{aligned}$$

$$\begin{aligned} \text{Replikasi 2} &= \frac{0,638 - 0,0024}{0,0984} \\ &= \frac{6,459 \text{ ppm}}{6,5} \times 100\% \\ &= 99,36\% \end{aligned}$$

$$\begin{aligned} \text{Replikasi 3} &= \frac{0,639 - 0,0024}{0,0984} \\ &= \frac{6,469 \text{ ppm}}{6,5} \times 100\% \\ &= 99,52\% \end{aligned}$$

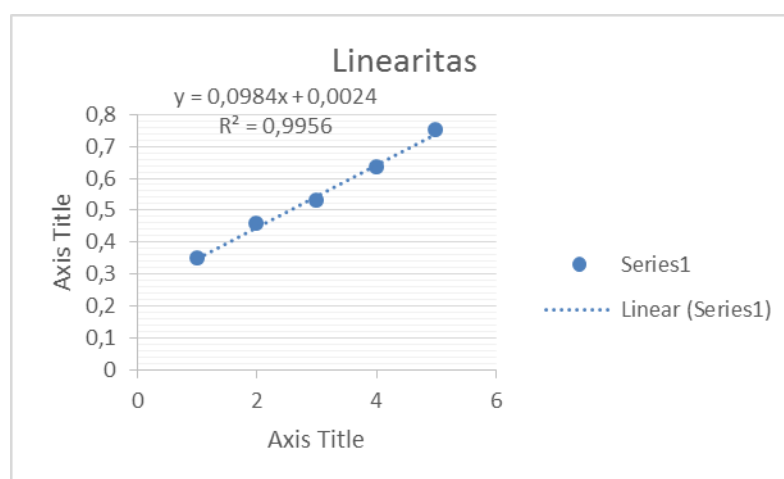
$$\text{Rata-rata konsentrasi 4,5 ppm} = \frac{102,2 + 102,6 + 102,8\%}{3} = 102,5\%$$

$$\text{Rata-rata konsentrasi 5,5 ppm} = \frac{98,21 + 98,96 + 99,14\%}{3} = 98,77\%$$

$$\text{Rata-rata konsentrasi 4,5 ppm} = \frac{99,06 + 99,36 + 99,52\%}{3} = 99,31\%$$

Lampiran 6. Uji Linearitas

Konsentrasi	Absorbansi	Persamaan Regresi Linier
3,5 ppm	0,347	$y = 0,0984x + 0,2484$
4,5 ppm	0,456	$r^2 = 0,9956$
5,5 ppm	0,531	
6,5 ppm	0,634	
7,5 ppm	0,750	



Lampiran 7. LOD dan LOQ

$$SD = 0,0022$$

$$LOD = \frac{3 \times SD}{b} = \frac{3 \times 0,0022}{0,0984} = 0,069524$$

$$LOQ = \frac{10 \times SD}{b} = \frac{10 \times 0,0022}{0,0984} = 0,231748$$

Lampiran 8. Kurva Baku

Konsentrasi (ppm)	Replikasi	Absorbansi (A)	Rata-rata Absorbansi (A)	Persamaan regresi linear
	1	0,363		
3,5	2	0,361	0,359	
	3	0,355		
	1	0,455		
4,5	2	0,450	0,455	
	3	0,460		
	1	0,528		$y = 0,0958x + 0,0189$
5,5	2	0,535	0,533	$r^2 = 0,9977$
	3	0,538		
	1	0,642		
6,5	2	0,623	0,633	
	3	0,635		
	1	0,743		
7,5	2	0,747	0,749	
	3	0,758		

Lampiran 9. Perhitungan Kadar Asam Retinoat

Sampel	Replikasi	Absorbansi (A)	Kadar Asam Retinoat ($\mu\text{g/mL}$)	Rata-rata Kadar Asam Retinoat ($\mu\text{g/mL}$) \pm SD
	1	0,375	12,50	
A	2	0,378	12,59	12,42 \pm 0,006
	3	0,366	12,17	
	1	0,460	15,48	
C	2	0,465	15,66	15,46 \pm 0,006
	3	0,453	15,24	
	1	0,471	15,76	
G	2	0,483	16,17	16,04 \pm 0,007
	3	0,484	16,21	

Persamaan regresi linear $y = 0,0958x + 0,0189$

Kadar asam retinoat % b/b = $\frac{\text{konsentrasi sampel}}{\text{konsentrasi stok sampel}} \times 100\%$

Sampel A

Replikasi 1 :

$$Y = 0,0958x + 0,0189$$

$$0,375 = 0,0958x + 0,0189$$

$$X = \frac{0,375 - 0,0189}{0,0958}$$

$$X = 3,717 \text{ ppm}$$

$$X = \frac{3,717 \text{ } \mu\text{g/mL}}{2,973 \text{ gr/10mL}} = \frac{3,717 \text{ } \mu\text{g/mL}}{0,2973 \text{ gr/mL}} = 12,50 \text{ } \mu\text{g/g} = 12,50 \text{ } \mu\text{g/mL} \sim 12,50 \text{ ppm}$$

Replikasi 2 :

$$Y = 0,0958x + 0,0189$$

$$0,378 = 0,0958x + 0,0189$$

$$X = \frac{0,378 - 0,0189}{0,0958}$$

$$X = 3,748 \text{ ppm}$$

$$X = \frac{3,748 \text{ } \mu\text{g/mL}}{2,975 \text{ gr/10mL}} = \frac{3,748 \text{ } \mu\text{g/mL}}{0,2975 \text{ gr/mL}} = 12,59 \text{ } \mu\text{g/g} = 12,59 \text{ } \mu\text{g/mL} \sim 12,59 \text{ ppm}$$

Replikasi 3 :

$$Y = 0,0958x + 0,0189$$

$$0,366 = 0,0958x + 0,0189$$

$$X = \frac{0,366 - 0,0189}{0,0958}$$

$$X = 3,623 \text{ ppm}$$

$$X = \frac{3,623 \text{ } \mu\text{g/mL}}{2,975 \text{ gr/10mL}} = \frac{3,623 \text{ } \mu\text{g/mL}}{0,2975 \text{ gr/mL}} = 12,17 \text{ } \mu\text{g/g} = 12,17 \text{ } \mu\text{g/mL} \sim 12,17 \text{ ppm}$$

Sampel C

Replikasi 1 :

$$Y = 0,0958x + 0,0189$$

$$0,460 = 0,0958x + 0,0189$$

$$X = \frac{0,460 - 0,0189}{0,0958}$$

$$X = 4,604 \text{ ppm}$$

$$X = \frac{4,604 \text{ } \mu\text{g/mL}}{2,974 \text{ gr/10mL}} = \frac{4,604 \text{ } \mu\text{g/mL}}{0,2974 \text{ gr/mL}} = 15,48 \text{ } \mu\text{g/g} = 15,48 \text{ } \mu\text{g/mL} \sim 15,48 \text{ ppm}$$

Replikasi 2 :

$$Y = 0,0958x + 0,0189$$

$$0,465 = 0,0958x + 0,0189$$

$$X = \frac{0,465 - 0,0189}{0,0958}$$

$$X = 4,656 \text{ ppm}$$

$$X = \frac{4,656 \text{ } \mu\text{g/mL}}{2,973 \text{ gr/10mL}} = \frac{4,656 \text{ } \mu\text{g/mL}}{0,2973 \text{ gr/mL}} = 15,66 \text{ } \mu\text{g/g} = 15,66 \text{ } \mu\text{g/mL} \sim 15,66 \text{ ppm}$$

Replikasi 3 :

$$Y = 0,0958x + 0,0189$$

$$0,453 = 0,0958x + 0,0189$$

$$X = \frac{0,453 - 0,0189}{0,0958}$$

$$X = 4,531 \text{ ppm}$$

$$X = \frac{4,531 \text{ } \mu\text{g/mL}}{2,972 \text{ gr/10mL}} = \frac{4,531 \text{ } \mu\text{g/mL}}{0,2972 \text{ gr/mL}} = 15,24 \text{ } \mu\text{g/g} = 15,24 \text{ } \mu\text{g/mL} \sim 15,24 \text{ ppm}$$

Sampel G

Replikasi 1 :

$$Y = 0,0958x + 0,0189$$

$$0,471 = 0,0958x + 0,0189$$

$$X = \frac{0,471 - 0,0189}{0,0958}$$

$$X = 4,719 \text{ ppm}$$

$$X = \frac{4,719 \mu\text{g/mL}}{2,994 \text{ gr} / 10 \text{ mL}} = \frac{4,719 \mu\text{g/mL}}{0,2994 \text{ gr/mL}} = 15,76 \mu\text{g/g} = 15,76 \mu\text{g/mL} \sim 15,76 \text{ ppm}$$

Replikasi 2 :

$$Y = 0,0958x + 0,0189$$

$$0,483 = 0,0958x + 0,0189$$

$$X = \frac{0,483 - 0,0189}{0,0958}$$

$$X = 4,844 \text{ ppm} \times F_p$$

$$X = \frac{4,844 \mu\text{g/mL}}{2,994 \text{ gr} / 10 \text{ mL}} = \frac{4,844 \mu\text{g/mL}}{0,2994 \text{ gr/mL}} = 16,17 \mu\text{g/g} = 16,17 \mu\text{g/mL} \sim 16,17 \text{ ppm}$$

Replikasi 3 :

$$Y = 0,0958x + 0,0189$$

$$0,484 = 0,0958x + 0,0189$$

$$X = \frac{0,484 - 0,0189}{0,0958}$$

$$X = 4,854 \text{ ppm}$$

$$X = \frac{4,854 \mu\text{g/mL}}{2,994 \text{ gr} / 10 \text{ mL}} = \frac{4,854 \mu\text{g/mL}}{0,2994 \text{ gr/mL}} = 16,21 \mu\text{g/g} = 16,21 \mu\text{g/mL} \sim 16,21 \text{ ppm}$$

$$\text{Kadar rata-rata sampel A : } \frac{12,50 + 12,59 + 12,17 \text{ } \mu\text{g/mL}}{3} = 12,42 \text{ } \mu\text{g/mL}$$

$$\text{Kadar rata-rata sampel C : } \frac{15,48 + 15,66 + 15,24 \text{ } \mu\text{g/mL}}{3} = 15,46 \text{ } \mu\text{g/mL}$$

$$\text{Kadar rata-rata sampel G : } \frac{15,76 + 16,17 + 16,21 \text{ } \mu\text{g/mL}}{3} = 16,04 \text{ } \mu\text{g/mL}$$