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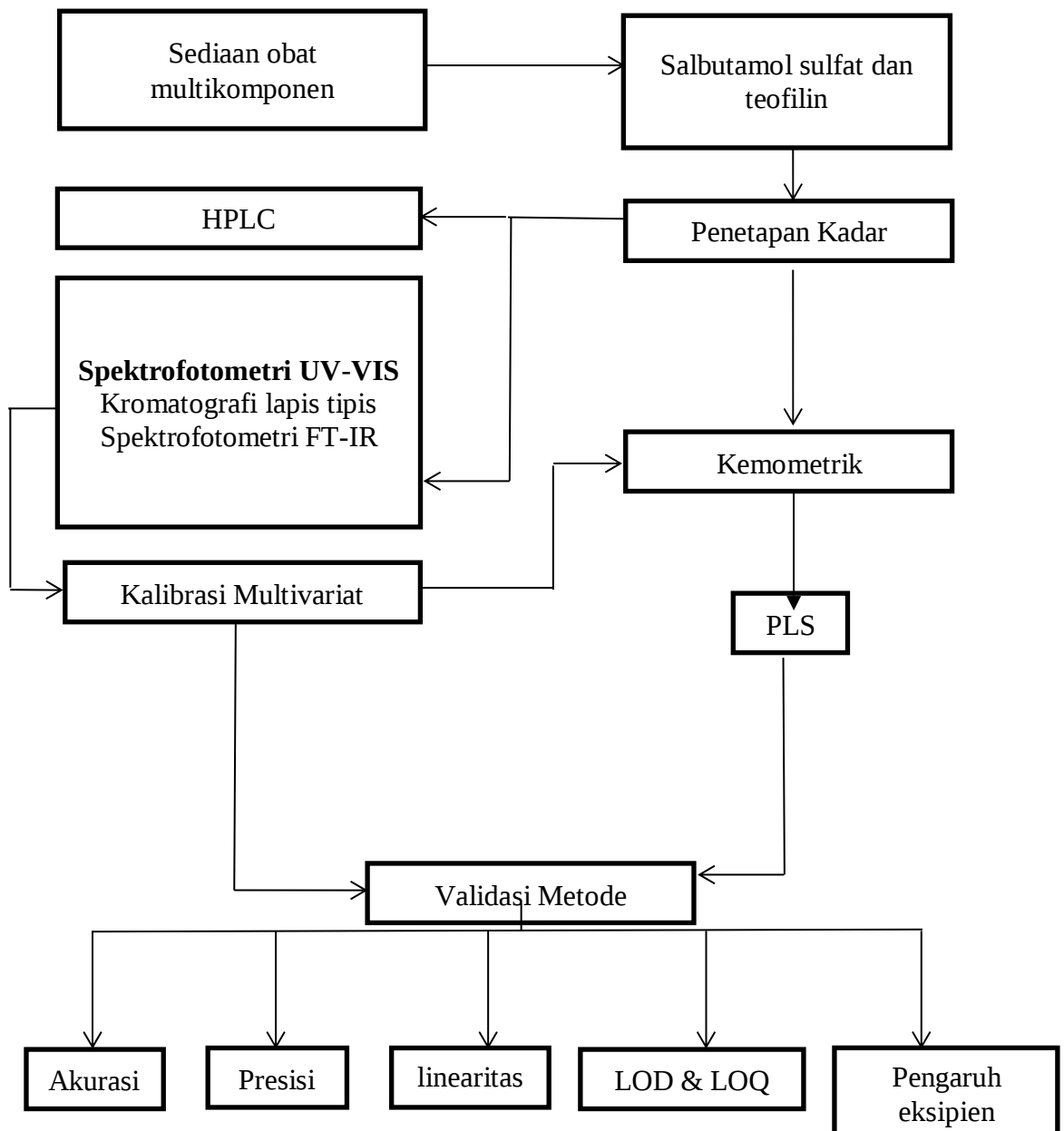
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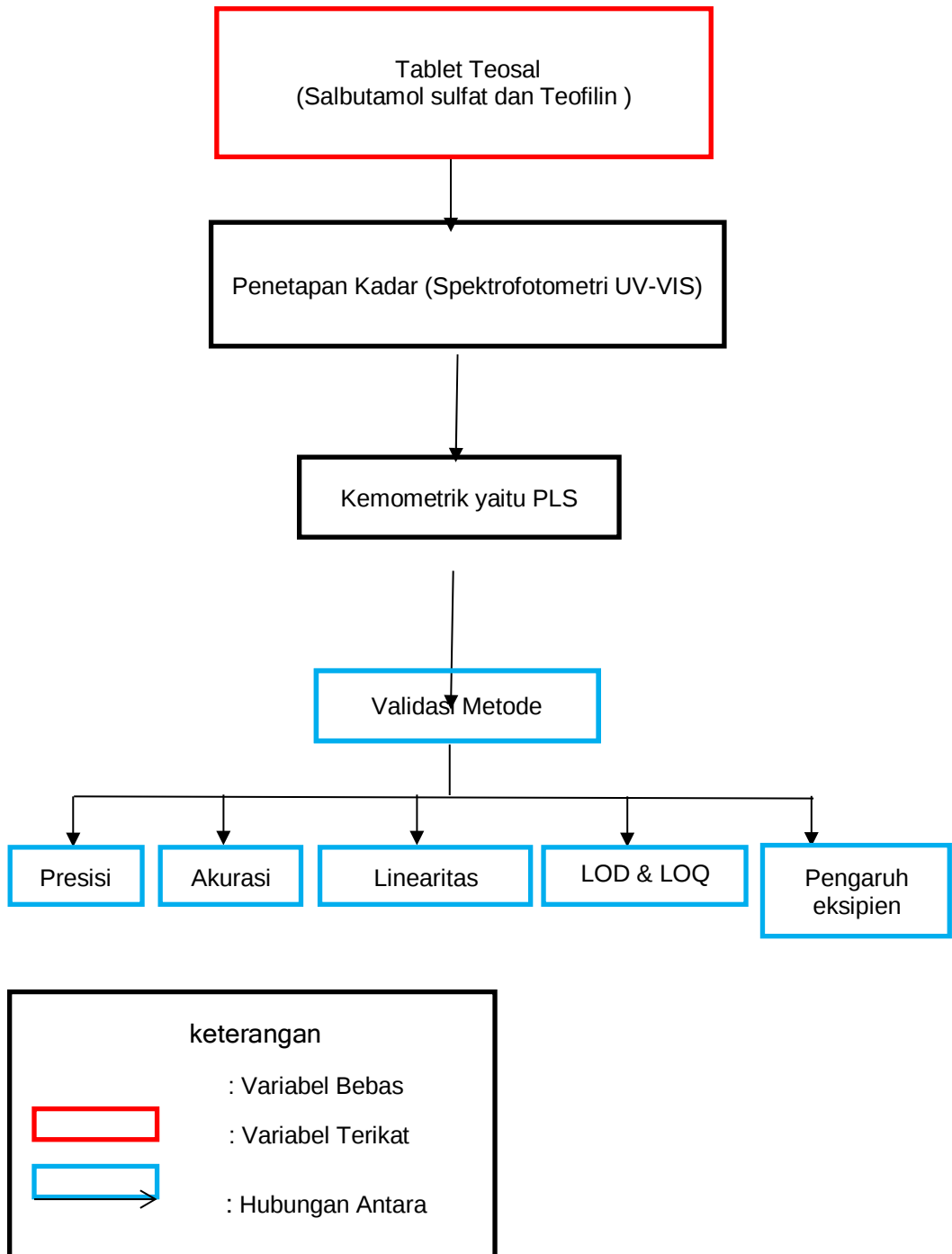
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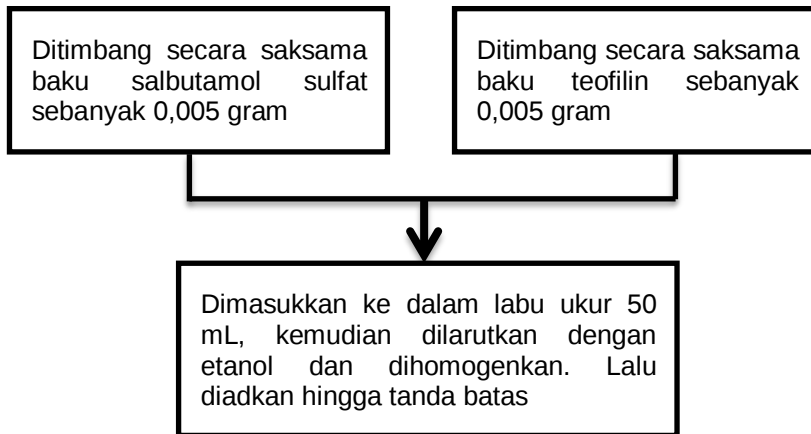
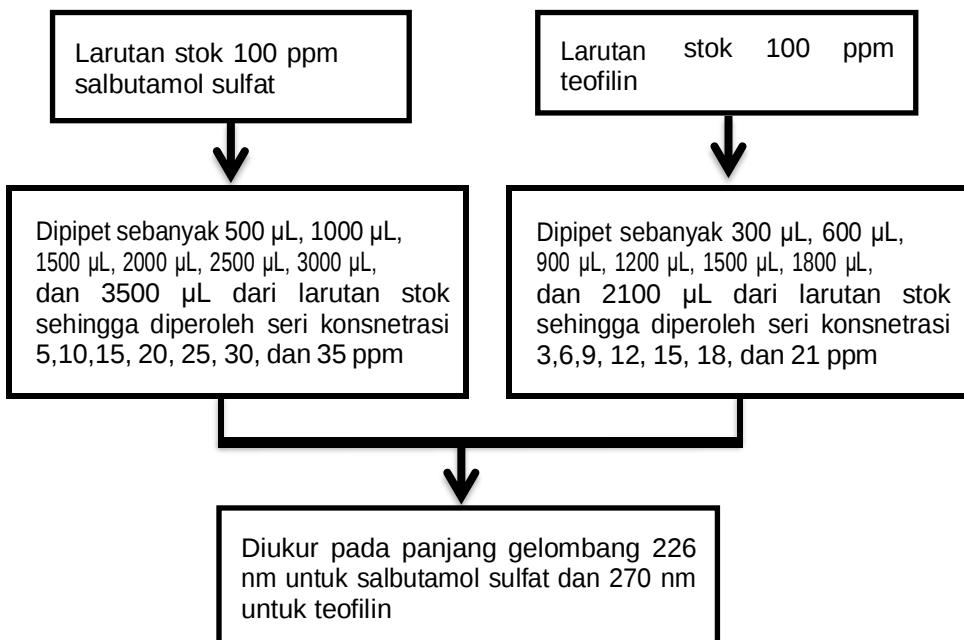
LAMPIRAN

Lampiran 1. Kerangka Teori

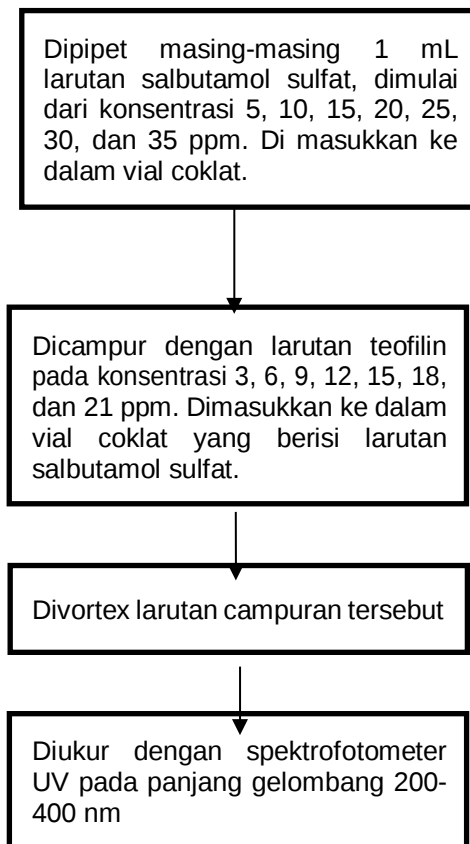


Lampiran 2. Kerangka Konsep

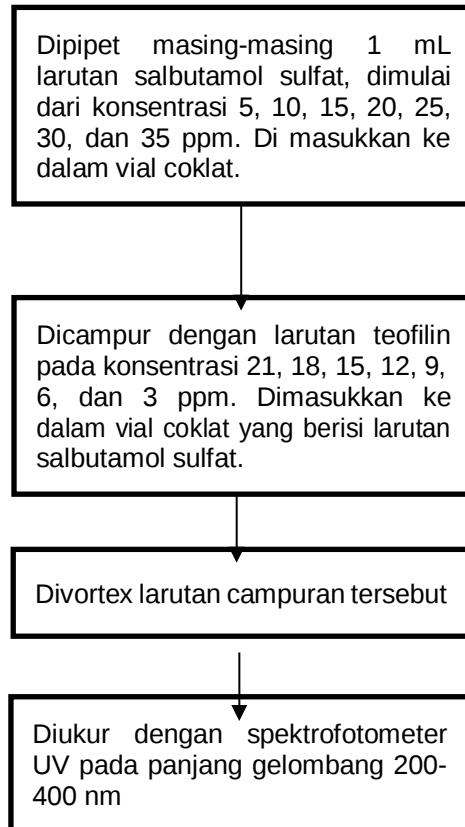


Lampiran 3 Skema Kerja Penelitian**a. Pembuatan larutan baku salbutamol sulfat dan teofilin****b. Pembuatan seri konsentrasi salbutamol sulfat dan teofilin**

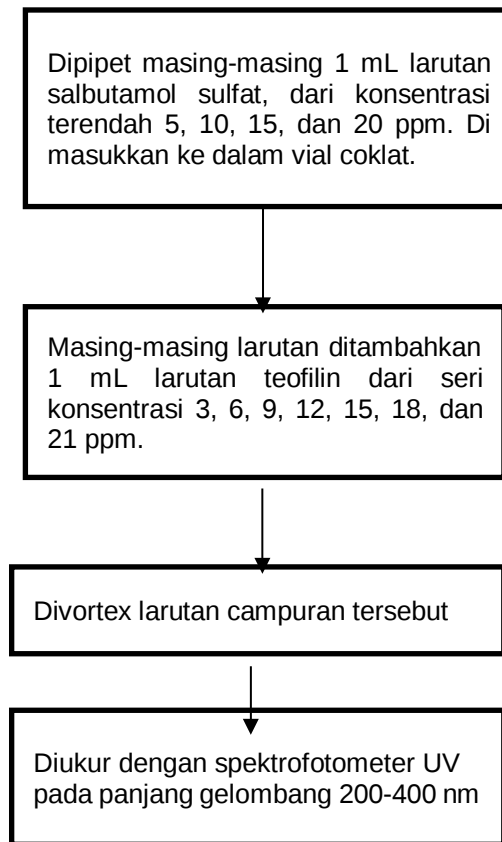
c. Metode pencampuran berbanding lurus salbutamol sulfat dan teofilin



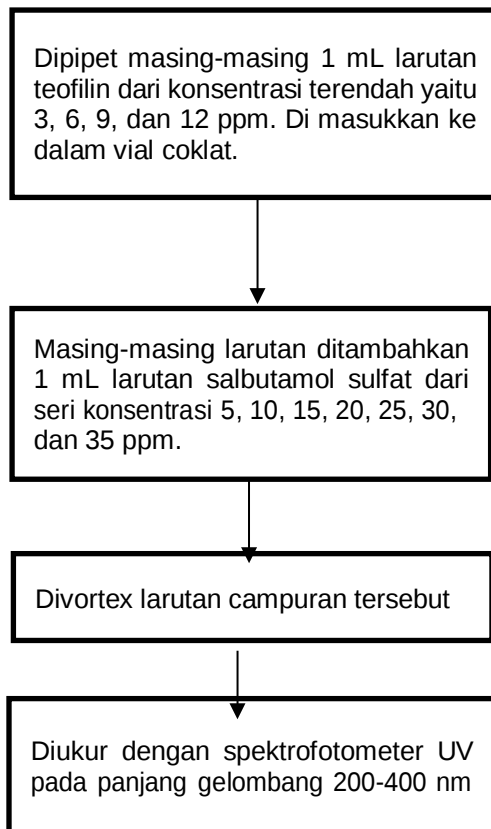
d. Metode pencampuran konsentrasi terbalik salbutamol sulfat dan teofilin



e. Metode pencampuran konsentrasi terendah salbutamol sulfat



f. Metode pencampuran konsentrasi terendah teofilin



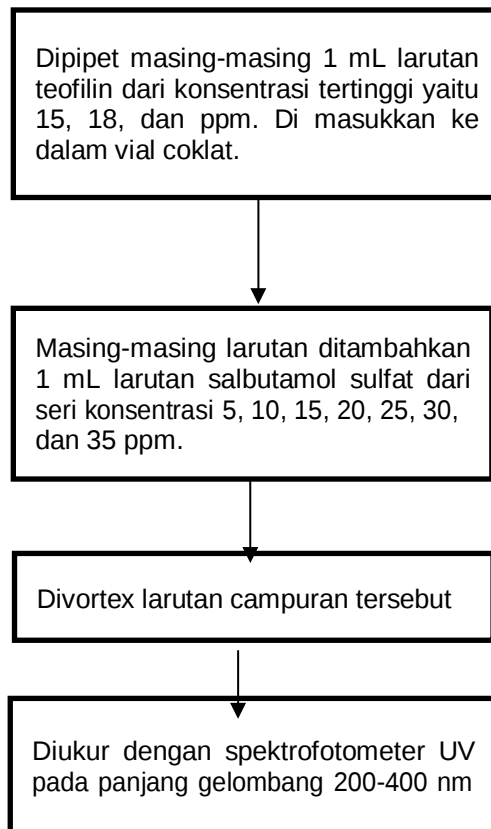
g. Metode pencampuran konsentrasi tertinggi salbutamol sulfat

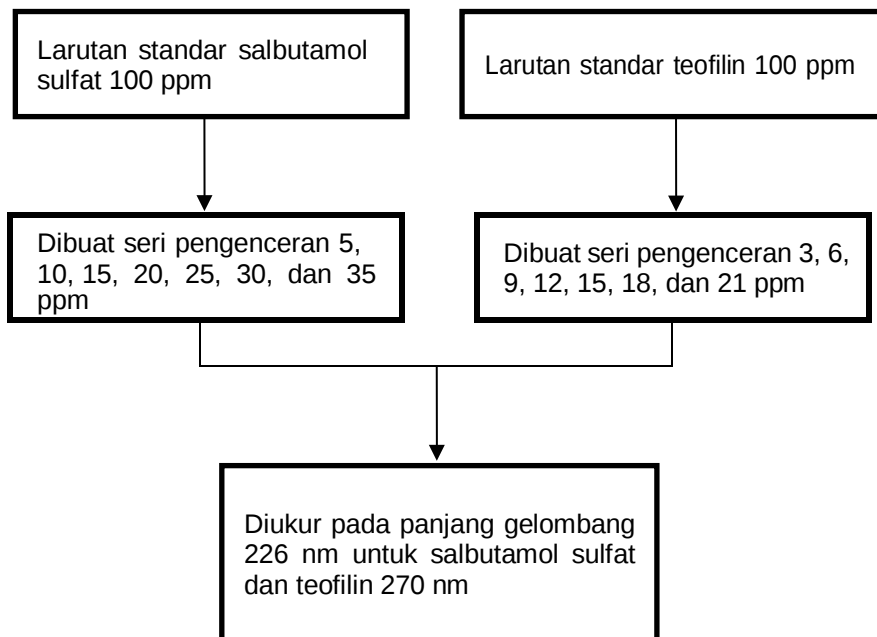
Dipipet masing-masing 1 mL larutan salbutamol sulfat dari konsentrasi tertinggi 25, 30 dan 35 ppm. Di masukkan ke dalam vial coklat.

Masing-masing larutan ditambahkan 1 mL larutan teofilin dari seri konsentrasi 3, 6, 9, 12, 15, 18, dan 21 ppm.

Divortex larutan campuran tersebut

Diukur dengan spektrofotometer UV pada panjang gelombang 200-400 nm

h. Metode pencampuran konsentrasi tertinggi teofilin

i. Pengujian linearitas

Lampiran 4. Data Set Kalibrasi

Tabel 1. Hasil perhitungan regresi kalibrasi multivariat secara PLS salbutamol sulfat dan teofilin

Salbutamol Sulfat			Teofilin		
Aktual ($\mu\text{g/mL}$)	Prediksi ($\mu\text{g/mL}$)	Recovery (%)	Aktual ($\mu\text{g/mL}$)	Prediksi ($\mu\text{g/mL}$)	Recovery (%)
5	5,326	106	3	3,007	100
10	10,922	109	6	5,681	94
15	15,395	102	9	8,999	99
20	20,092	100	12	12,000	100
25	24,477	97	15	14,872	99
30	30,464	101	18	17,924	99
35	34,644	98	21	20,205	96
35	35,699	101	3	2,810	93
30	31,178	103	6	5,895	98
25	24,719	98	9	9,311	103
20	21,940	109	12	11,471	95
15	15,256	101	15	14,938	99
10	9,761	97	18	18,308	101
5	5,064	101	21	20,906	99
101%			98%		

Tabel 2. Hasil perhitungan regresi kalibrasi multivariat secara PLS salbutamol sulfat dan teofilin

Salbutamol Sulfat			Teofilin		
Aktual ($\mu\text{g/mL}$)	Prediksi ($\mu\text{g/mL}$)	Recovery (%)	Aktual ($\mu\text{g/mL}$)	Prediksi ($\mu\text{g/mL}$)	Recovery (%)
5	5,956	119	3	3,055	101
5	5,030	100	6	6,045	100
5	4,258	85	9	9,161	101
5	5,758	115	12	11,933	99
5	6,436	128	15	14,376	95
5	4,417	88	18	18,259	101
5	5,192	103	21	20,542	97
105%			99%		

Tabel 3. Hasil perhitungan regresi kalibrasi multivariat secara PLS salbutamol sulfat dan teofilin

Salbutamol Sulfat			Teofilin		
Aktual ($\mu\text{g/mL}$)	Prediksi ($\mu\text{g/mL}$)	Recovery (%)	Aktual ($\mu\text{g/mL}$)	Prediksi ($\mu\text{g/mL}$)	Recovery (%)
10	9,946	99	3	3,417	113
10	10,004	100	6	6,143	102
10	9,891	98	9	9,112	101
10	9,728	97	12	12,134	101
10	9,942	99	15	15,112	100
10	9,431	94	18	18,651	103
10	10,287	102	21	21,084	100
98%			102%		

Tabel 4. Hasil perhitungan regresi kalibrasi multivariat secara PLS salbutamol sulfat dan teofilin

Salbutamol Sulfat			Teofilin		
Aktual ($\mu\text{g/mL}$)	Prediksi ($\mu\text{g/mL}$)	Recovery (%)	Aktual ($\mu\text{g/mL}$)	Prediksi ($\mu\text{g/mL}$)	Recovery (%)
15	14,883	99	3	3,583	119
15	14,928	99	6	6,327	105
15	14,684	97	9	9,362	104
15	14,475	96	12	12,395	103
15	15,345	102	15	14,988	99
15	16,205	108	18	18,128	100
15	15,266	101	21	21,056	100
100%			104%		

Tabel 5. Hasil perhitungan regresi kalibrasi multivariat secara PLS salbutamol sulfat dan teofilin

Salbutamol Sulfat			Teofilin		
Aktual ($\mu\text{g/mL}$)	Prediksi ($\mu\text{g/mL}$)	Recovery (%)	Aktual ($\mu\text{g/mL}$)	Prediksi ($\mu\text{g/mL}$)	Recovery (%)
20	19,653	98	3	3,315	110
20	20,049	100	6	6,152	102
20	19,590	97	9	9,155	101
20	20,303	101	12	12,110	100
20	19,992	99	15	14,996	99
20	19,934	99	18	18,372	102
20	20,303	101	21	20,681	98
99%			101%		

Tabel 6. Hasil perhitungan regresi kalibrasi multivariat secara PLS salbutamol sulfat dan teofilin

Salbutamol Sulfat			Teofilin		
Aktual ($\mu\text{g/mL}$)	Prediksi ($\mu\text{g/mL}$)	Recovery (%)	Aktual ($\mu\text{g/mL}$)	Prediksi ($\mu\text{g/mL}$)	Recovery (%)
25	24,443	97	3	3,559	118
25	24,880	99	6	6,280	104
25	25,334	101	9	9,148	101
25	25,588	102	12	12,049	100
25	25,035	100	15	15,172	101
25	24,751	99	18	18,233	101
25	24,508	98	21	21,195	100
99%			103%		

Tabel 7. Hasil perhitungan regresi kalibrasi multivariat secara PLS salbutamol sulfat dan teofilin

Salbutamol Sulfat			Teofilin		
Aktual ($\mu\text{g/mL}$)	Prediksi ($\mu\text{g/mL}$)	Recovery (%)	Aktual ($\mu\text{g/mL}$)	Prediksi ($\mu\text{g/mL}$)	Recovery (%)
30	29,845	99	3	3,468	115
30	30,368	101	6	6,293	104
30	29,290	97	9	9,417	104
30	30,265	100	12	12,255	102
30	29,968	99	15	15,249	101
30	29,694	98	18	18,407	102
30	30,305	101	21	20,913	99
99%			103%		

Tabel 8. Hasil perhitungan regresi kalibrasi multivariat secara PLS salbutamol sulfat dan teofilin

Salbutamol Sulfat			Teofilin		
Aktual ($\mu\text{g/mL}$)	Prediksi ($\mu\text{g/mL}$)	Recovery (%)	Aktual ($\mu\text{g/mL}$)	Prediksi ($\mu\text{g/mL}$)	Recovery (%)
35	33,938	96	3	3,326	110
35	34,841	99	6	6,126	102
35	34,366	98	9	9,036	100
35	34,393	98	12	12,100	100
35	34,635	98	15	14,940	99
35	34,201	98	18	18,320	101
35	34,242	97	21	20,928	99
99%			103%		

Tabel 9. Hasil perhitungan regresi kalibrasi multivariat secara PLS salbutamol sulfat dan teofilin

Teofilin			Salbutamol Sulfat		
Aktual ($\mu\text{g/mL}$)	Prediksi ($\mu\text{g/mL}$)	Recovery (%)	Aktual ($\mu\text{g/mL}$)	Prediksi ($\mu\text{g/mL}$)	Recovery (%)
3	3,139	104	5	5,292	105
3	3,169	105	10	9,546	95
3	3,061	102	15	15,468	103
3	3,421	114	20	19,704	98
3	3,151	105	25	24,498	97
3	3,133	104	30	30,498	101
3	2,833	94	35	34,923	99
104%			99%		

Tabel 10. Hasil perhitungan regresi kalibrasi multivariat secara PLS salbutamol sulfat dan teofilin

Teofilin			Salbutamol Sulfat		
Aktual ($\mu\text{g/mL}$)	Prediksi ($\mu\text{g/mL}$)	Recovery (%)	Aktual ($\mu\text{g/mL}$)	Prediksi ($\mu\text{g/mL}$)	Recovery (%)
6	5,861	97	5	5,637	112
6	6,003	100	10	10,366	103
6	6,014	100	15	15,325	102
6	5,905	98	20	20,645	103
6	6,015	100	25	24,911	99
6	6,016	100	30	30,394	101
6	6,077	101	35	34,250	97
99%			102%		

Tabel 11. Hasil perhitungan regresi kalibrasi multivariat secara PLS salbutamol sulfat dan teofilin

Teofilin			Salbutamol Sulfat		
Aktual ($\mu\text{g/mL}$)	Prediksi ($\mu\text{g/mL}$)	Recovery (%)	Aktual ($\mu\text{g/mL}$)	Prediksi ($\mu\text{g/mL}$)	Recovery (%)
9	9,227	102	5	4,656	93
9	9,356	103	10	9,117	91
9	9,073	100	15	14,855	99
9	9,123	101	20	19,263	96
9	9,100	101	25	24,184	96
9	9,090	101	30	29,610	98
9	9,151	101	35	34,449	98
101%			95%		

Tabel 12. Hasil perhitungan regresi kalibrasi multivariat secara PLS salbutamol sulfat dan teofilin

Teofilin			Salbutamol Sulfat		
Aktual ($\mu\text{g/mL}$)	Prediksi ($\mu\text{g/mL}$)	Recovery (%)	Aktual ($\mu\text{g/mL}$)	Prediksi ($\mu\text{g/mL}$)	Recovery (%)
12	13,096	109	5	4,482	89
12	12,230	101	10	9,794	97
12	12,376	103	15	14,666	97
12	12,020	100	20	20,081	100
12	11,735	97	25	25,228	100
12	11,803	98	30	30,532	101
12	11,528	96	35	35,085	100
100%			97%		

Tabel 13. Hasil perhitungan regresi kalibrasi multivariat secara PLS salbutamol sulfat dan teofilin

Teofilin			Salbutamol Sulfat		
Aktual ($\mu\text{g/mL}$)	Prediksi ($\mu\text{g/mL}$)	Recovery (%)	Aktual ($\mu\text{g/mL}$)	Prediksi ($\mu\text{g/mL}$)	Recovery (%)
15	15,057	100	5	4,810	96
15	14,985	99	10	10,120	101
15	14,921	99	15	15,042	100
15	14,986	99	20	19,751	98
15	14,722	98	25	24,876	99
15	14,912	99	30	30,126	100
15	14,557	97	35	34,306	98
98%			98%		

Tabel 14. Hasil perhitungan regresi kalibrasi multivariat secara PLS salbutamol sulfat dan teofilin

Teofilin			Salbutamol Sulfat		
Aktual ($\mu\text{g/mL}$)	Prediksi ($\mu\text{g/mL}$)	Recovery (%)	Aktual ($\mu\text{g/mL}$)	Prediksi ($\mu\text{g/mL}$)	Recovery (%)
18	18,154	100	5	4,823	96
18	18,049	100	10	9,867	98
18	17,949	99	15	15,036	100
18	18,092	100	20	20,115	100
18	17,736	98	25	25,452	101
18	17,837	99	30	30,767	102
18	17,746	98	35	35,400	101
99%			99%		

Tabel 15. Hasil perhitungan regresi kalibrasi multivariat secara PLS salbutamol sulfat dan teofilin

Teofilin			Salbutamol Sulfat		
Aktual ($\mu\text{g/mL}$)	Prediksi ($\mu\text{g/mL}$)	Recovery (%)	Aktual ($\mu\text{g/mL}$)	Prediksi ($\mu\text{g/mL}$)	Recovery (%)
21	20,732	98	5	5,200	104
21	20,504	98	10	9,715	97
21	20,672	97	15	14,728	98
21	20,534	98	20	19,929	99
21	20,537	97	25	24,553	98
21	20,438	97	30	30,295	100
21	20,207	97	35	34,819	99
97%			99%		

Tabel 16. Hasil perhitungan regresi kalibrasi multivariat secara PLS salbutamol sulfat dan teofilin

Teofilin			Salbutamol Sulfat		
Aktual ($\mu\text{g/mL}$)	Prediksi ($\mu\text{g/mL}$)	Recovery (%)	Aktual ($\mu\text{g/mL}$)	Prediksi ($\mu\text{g/mL}$)	Recovery (%)
12	12,001	100	20	22,931	115
12	12,061	101	20	22,676	113
12	12,004	100	20	22,353	112
12	12,001	100	20	22,931	115
12	12,061	101	20	22,676	113
12	12,004	100	20	22,353	112
12	12,001	100	20	22,931	115
Rata-rata		100%	113%		
SD		0%	1%		
RSD		0%	1%		

Tabel 17. Hasil perhitungan presisi secara PLS salbutamol sulfat dan teofilin

Teofilin			Salbutamol Sulfat		
Aktual ($\mu\text{g/mL}$)	Prediksi ($\mu\text{g/mL}$)	Recovery (%)	Aktual ($\mu\text{g/mL}$)	Prediksi ($\mu\text{g/mL}$)	Recovery (%)
9	9,148	102	25	25,335	101
9	9,091	101	25	25,533	102
9	9,094	101	25	25,411	102
9	9,150	102	25	25,335	101
9	9,091	101	25	25,533	102
9	9,094	101	25	25,411	102
Rata-rata		102%			101%
SD		0%			0%
RSD		0%			0%

Tabel 18. Hasil perhitungan akurasi secara PLS salbutamol sulfat dan teofilin

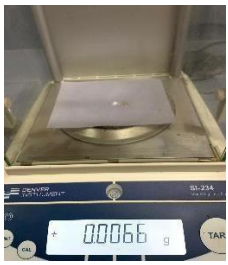
Salbutamol Sulfat			Teofilin		
Aktual ($\mu\text{g/mL}$)	Prediksi ($\mu\text{g/mL}$)	Recovery (%)	Aktual ($\mu\text{g/mL}$)	Prediksi ($\mu\text{g/mL}$)	Recovery (%)
10	10,015	100	20	17,371	87
10	9,871	99	20	17,795	89
10	9,974	100	20	17,686	88
10	10,125	101	20	17,385	87
10	9,871	99	20	17,795	89
10	9,974	100	20	17,686	88
Rata-rata		100%			88%
SD		1%			1%
RSD		1%			1%

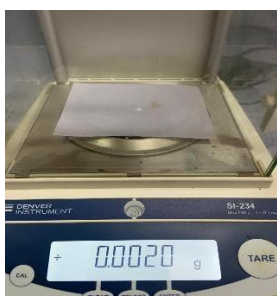
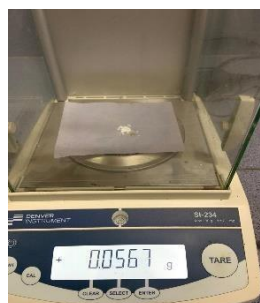
Tabel 19. Hasil perhitungan akurasi secara PLS salbutamol sulfat dan teofilin

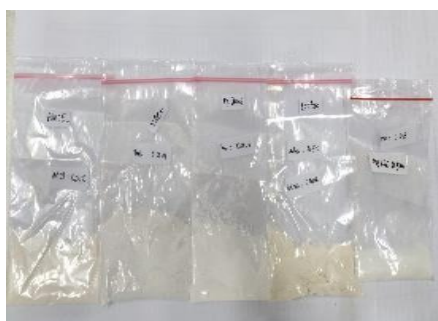
Salbutamol Sulfat			Teofilin		
Aktual ($\mu\text{g/mL}$)	Prediksi ($\mu\text{g/mL}$)	Recovery (%)	Aktual ($\mu\text{g/mL}$)	Prediksi ($\mu\text{g/mL}$)	Recovery (%)
20	20,041	100	20	18,891	94
20	19,952	100	20	19,775	99
20	19,843	99	20	19,655	98
20	19,887	99	20	19,598	98
20	20,080	100	20	18,776	94
20	20,108	101	20	18,893	94
Rata-rata		100%			96%
SD		1%			2%
RSD		1%			2%

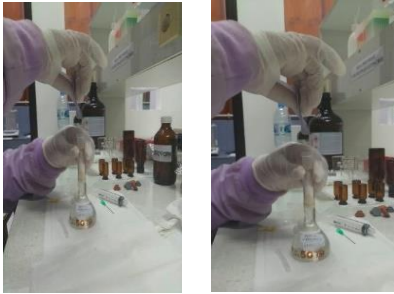
LAMPIRAN 5. DOKUMENTASI PENELITIAN

Penimbangan Bahan Baku	
	
Salbutamol Sulfat	Teofilin
Pembuatan larutan stok standar	
 Keterangan: A. Salbutamol Sulfat B. Teofilin	
Pengenceran kurva standar	
	
Salbutamol sulfat	Teofilin

Penimbangan Bahan Eksipien	
	
Avicel F1	Talk F1
	
PVP F1	Mg stearat F1
	
Laktosa F1	CMC F2

**PVP F2****Mg stearat F2****Talk F2****Amilum F2****Metil Selulosa F3****PVP F3**

**Talk F3****Mg stearate F3****Penimbangan campuran eksipien****Penimbangan campuran eksipien****Bahan eksipien****Sediaan tablet teosal**

	
Penggerusan bahan excipien dan tablet teosal	Proses pengukuran kurva baku salbutamol sulfat dan teofilin serta model pencampurannya
	
Monitoring hasil spectra untuk kurva baku maupun model pencampuran	Proses penambahan excipien kedalam larutan salbutamol sulfat dan teofilin
	
Larutan stok salbutamol sulfat dan teofilin yang berisi excipien	Proses sonikasi larutan salbutamol sulfat dan teofilin yang berisi excipien



Larutan pencampuran salbutamol sulfat dan teofilin untuk pengujian presisi



Penggerusan sediaan Teosal



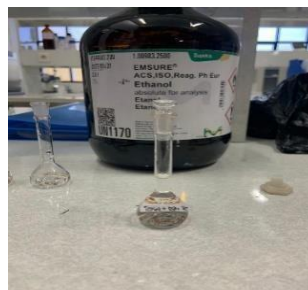
Penimbangan sediaan teosal dan baku salbutamol sulfat



Proses pengenceran larutan baku salbutamol sulfat dan larutan uji teosal



Proses penambahan larutan baku standar ke dalam larutan teosal yang telah diencerkan



Larutan siap diukur

Lampiran 6. Perhitungan

A. Perhitungan konsentrasi senyawa uji

1. Salbutamol sulfat

a. Larutan stok

5 mg salbutamol sulfat dilarutkan dalam 50 mL etanol

Konsentrasi dalam PPM

$$\text{PPM} = \frac{\text{mg}}{\text{L}} = \frac{\mu\text{g}}{\text{mL}} = \frac{5 \text{ mg}}{50 \text{ mL}} = 100 \text{ PPM}$$

b. Perhitungan pengenceran

1. 5 ppm dalam 25 mL

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

$$V_1 \times 100 \text{ ppm} = 25 \text{ mL} \times 5 \text{ ppm}$$

$$V_1 \times 100 \text{ ppm} = 125 \text{ mL.ppm}$$

$$V_1 = 1,25 \text{ mL} = 1250 \mu\text{L}$$

2. 10 ppm dalam 25 mL

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

$$V_1 \times 100 \text{ ppm} = 25 \text{ mL} \times 10 \text{ ppm}$$

$$V_1 \times 100 \text{ ppm} = 250 \text{ mL.ppm}$$

$$V_1 = 2,5 \text{ mL} = 2500 \mu\text{L}$$

3. 15 ppm dalam 25 mL

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

$$V_1 \times 100 \text{ ppm} = 25 \text{ mL} \times 15 \text{ ppm}$$

$$V_1 \times 100 \text{ ppm} = 375 \text{ mL.ppm}$$

$$V_1 = 3,75 \text{ mL} = 3750 \mu\text{L}$$

4. 20 ppm dalam 25 mL

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

$$V_1 \times 100 \text{ ppm} = 25 \text{ mL} \times 20 \text{ ppm}$$

$$V_1 \times 100 \text{ ppm} = 500 \text{ mL.ppm}$$

$$V_1 = 5 \text{ mL} = 5000 \mu\text{L}$$

5. 25 ppm dalam 25 mL

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

$$V_1 \times 100 \text{ ppm} = 25 \text{ mL} \times 25 \text{ ppm}$$

$$V_1 \times 100 \text{ ppm} = 625 \text{ mL.ppm}$$

$$V_1 = 6,25 \text{ mL} = 6250 \mu\text{L}$$

6. 30 ppm dalam 25 mL

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

$$V_1 \times 100 \text{ ppm} = 25 \text{ mL} \times 30 \text{ ppm}$$

$$V_1 \times 100 \text{ ppm} = 750 \text{ mL.ppm}$$

$$V_1 = 7,5 \text{ mL} = 7500 \mu\text{L}$$

7. 35 ppm dalam 25 mL

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

$$V_1 \times 100 \text{ ppm} = 25 \text{ mL} \times 35 \text{ ppm}$$

$$V_1 \times 100 \text{ ppm} = 875 \text{ mL.ppm}$$

$$V_1 = 8,75 \text{ mL} = 8750 \mu\text{L}$$

2. Teofilin

a. Larutan stok

5 mg teofilin dilarutkan dalam 50 mL etanol

Konsentrasi dalam PPM

$$\text{PPM} = \frac{\text{mg}}{\text{L}} = \frac{\mu\text{g}}{\text{mL}} = \frac{5 \text{ mg}}{50 \text{ mL}} = 100 \text{ PPM}$$

b. Perhitungan pengenceran

1. 3 ppm dalam 25 mL

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

$$V_1 \times 100 \text{ ppm} = 25 \text{ mL} \times 3 \text{ ppm}$$

$$V_1 \times 100 \text{ ppm} = 75 \text{ mL.ppm}$$

$$V_1 = 0,75 \text{ mL} = 750 \mu\text{L}$$

2. 6 ppm dalam 25 mL

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

$$V_1 \times 100 \text{ ppm} = 25 \text{ mL} \times 6 \text{ ppm}$$

$$V_1 \times 100 \text{ ppm} = 150 \text{ mL.ppm}$$

$$V_1 = 1,5 \text{ mL} = 1500 \mu\text{L}$$

3. 9 ppm dalam 25 mL

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

$$V_1 \times 100 \text{ ppm} = 25 \text{ mL} \times 9 \text{ ppm}$$

$$V_1 \times 100 \text{ ppm} = 225 \text{ mL.ppm}$$

$$V_1 = 2,25 \text{ mL} = 2250 \mu\text{L}$$

4. 12 ppm dalam 25 mL

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

$$V_1 \times 100 \text{ ppm} = 25 \text{ mL} \times 12 \text{ ppm}$$

$$V_1 \times 100 \text{ ppm} = 300 \text{ mL.ppm}$$

$$V_1 = 3 \text{ mL} = 3000 \mu\text{L}$$

5. 15 ppm dalam 25 mL

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

$$V_1 \times 100 \text{ ppm} = 25 \text{ mL} \times 15 \text{ ppm}$$

$$V_1 \times 100 \text{ ppm} = 375 \text{ mL.ppm}$$

$$V_1 = 3,75 \text{ mL} = 3750 \mu\text{L}$$

6. 18 ppm dalam 25 mL

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

$$V_1 \times 100 \text{ ppm} = 25 \text{ mL} \times 18 \text{ ppm}$$

$$V_1 \times 100 \text{ ppm} = 450 \text{ mL.ppm}$$

$$V_1 = 4,5 \text{ mL} = 4500 \mu\text{L}$$

7. 21 ppm dalam 25 mL

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

$$V_1 \times 100 \text{ ppm} = 25 \text{ mL} \times 21 \text{ ppm}$$

$$V_1 \times 100 \text{ ppm} = 525 \text{ mL.ppm}$$

$$V_1 = 5,25 \text{ mL} = 5250 \mu\text{L}$$

B. Perhitungan nilai prediksi menggunakan persamaan PLS

1. Konsentrasi 5 ppm salbutamol sulfat dan 3 ppm teofilin.

- Variabel penelitian pada salbutamol :

X_1 : abs 216

X_2 : abs 226

X_3 : abs 228

X_4 : abs 250

X_5 : abs 270

- Model Regresi PLS salbutamol sulfat (y_1)

	Data awal
<i>intercept</i>	-0,778
$X_1 = 216$	-55,135
$X_2 = 226$	254,757
$X_3 = 228$	-142,905
$X_4 = 250$	-109,386
$X_5 = 270$	33,852

Maka nilai prediksi untuk salbutamol sulfat dapat dihitung menggunakan rumus sebagai berikut :

$$y_1 = (\text{Intercept}) + \text{nilai abs 216} \times X_1 + \text{nilai abs 226} \times X_2 +$$

$$\text{nilai abs 228} \times X_3 + \text{nilai abs 250} \times X_4 + \text{nilai abs 270} \times X_5$$

$$y_1 = [(-0,778) + 0,298 \times (-55,135) + 0,178 \times 254,757$$

$$+ 0,163 \times (-142,905) + 0,014 \times (-109,386) + 0,067 \times 33,852$$

$$y_1 = 5,32$$

- Variabel penelitian pada teofilin

X_1 : abs 216

X_2 : abs 226

X_3 : abs 228

X_4 : abs 250

X_5 : abs 270

- Model Regresi PLS teofilin (y_2)

	Data awal
<i>intercept</i>	3,524
$X_1 = 216$	-7,062
$X_2 = 226$	-67,757
$X_3 = 228$	64,324
$X_4 = 250$	10,094
$X_5 = 270$	44,101

Maka nilai prediksi untuk teofilin dapat dihitung menggunakan rumus sebagai berikut :

$$y_2 = (\text{Intercept}) + \text{nilai abs 216} \times X_1 + \text{nilai abs 226} \times X_2 +$$

$$\text{nilai abs 228} \times X_3 + \text{nilai abs 250} \times X_4 + \text{nilai abs 270} \times X_5$$

$$y_2 = (3,524) + 0,298 \times (-7,062) + 0,178 \times (-67,757) + 0,163 \times 64,324$$

$$+ 0,014 \times 10,094 + 0,067 \times 44,101$$

$$y_2 = 3,00$$

C. Perhitungan formula berdasarkan berat tablet uji yaitu tablet teosal sebagai berikut:

1. Komposisi zat aktif

Salbutamol sulfat 1,2 mg

Teofilin 130 mg

2. Berat bobot rata-rata = 0,198 gram = 198 mg

Jadi, untuk membuat formula excipien menggunakan bobot tablet sebesar 198 mg di kurangi dengan zat aktif (131,2 mg), sehingga didapatkan bobot excipien yang akan dibuat sebanyak = (198 – 131,2 mg = 66,8 mg/tablet) dengan rancangan formula excipien sebagai berikut :

Formula

Avicel (penghancur)	10%	= 10% X 66,8 mg = 6,68 mg
PVP (Pengikat)	3%	= 3% X 66,8 mg = 2,004 mg
Talk (glidan)	1%	= 1% X 66,8 mg = 0,668 mg
Mg. Stearat (lubrikan)	1%	= 1% X 66,8 mg = 0,668 mg
Laktosa (pengisi)	ad 100%	= 66,8 mg – 10,02 mg = 56,78 mg

D. Perhitungan larutan uji dengan penambahan excipien

1. Salbutamol sulfat

$$\frac{1}{4} \text{ tab} \times \frac{1}{2} \times 66,8 \text{ mg} = 8,35 \text{ mg} = 0,00835 \text{ gram}$$

2. Teofilin

$$\frac{1}{2} \times 66,8 \text{ mg} = 33,4 \text{ mg} = 0,0334 \text{ gram}$$

E. Perhitungan batas deteksi (LOD) dan batas kuantitas (LOQ)

$$\text{LOD} = \frac{3,3 \times SD}{Slope}$$

$$\text{LOQ} = \frac{10 \times SD}{Slope}$$

a. Salbutamol sulfat

Konsentrasi (µg/mL)	Absorbansi salbutamol sulfat
5	0,280
10	0,427
15	0,572
20	0,701
25	0,830
30	0,953
35	1,061

Persamaan regresi dari kurva baku : $Y = 0,0261 x + 0,1677$

Y1 diperoleh dari persamaan regresi,

Contoh: $X = 5$

$$Y1 = 0,0261 (5) + 0,1677$$

$$Y1 = 0,2982$$

No.	Konsentrasi (x)	Absorbansi (Y)	Y1	Y-Y1	(Y-Y1) ²
1.	5	0,280	0,298	-0,0182	0,00033124
2.	10	0,427	0,429	-0,0017	2,89E-06
3.	15	0,572	0,559	0,0128	0,00016384
4.	20	0,701	0,690	0,0113	0,00012769
5.	25	0,830	0,820	0,0098	9,604E-05
6.	30	0,953	0,951	0,0023	5,29E06
7.	35	1,061	1,081	-0,0202	0,00040804
Rata-rata					0,000162147
SD					0,000155233

$$\begin{aligned}
 SD &= \sqrt{\frac{(y-y_1)^2}{N-2}} \\
 &= \sqrt{\frac{0,000162147}{7-2}} \\
 &= \sqrt{\frac{0,000162147}{5}} \\
 &= 0,000155233
 \end{aligned}$$

$$\begin{aligned}
 LOD &= \frac{3,3 \times SD}{Slope} \\
 &= \frac{3,3 \times 0,000155233}{0,1677} \\
 &= 0,003 \mu\text{g/mL}
 \end{aligned}$$

$$\begin{aligned}
 LOQ &= \frac{10 \times SD}{Slope} \\
 &= \frac{10 \times 0,000155233}{0,1677} \\
 &= 0,009 \mu\text{g/mL}
 \end{aligned}$$

b. Teofilin

Konsentrasi ($\mu\text{g/mL}$)	Absorbansi Teofilin
5	0,101
10	0,236
15	0,378
20	0,515
25	0,679
30	0,805
35	0,948

Persamaan regresi dari kurva baku : $Y = 0,0474 x - 0,0449$

Y1 diperoleh dari persamaan regresi,

Contoh: $X = 3$

$$Y1 = 0,0474 (3) - 0,0449$$

$$Y1 = 0,0973$$

No.	Konsentrasi (x)	Absorbansi (Y)	Y1	Y-Y1	(Y-Y1) ²
1.	3	0,101	0,097	0,004	0,000016
2.	6	0,236	0,240	-0,004	0,000016
3.	9	0,378	0,382	-0,004	0,000016
4.	12	0,515	0,524	-0,009	0,000081
5.	15	0,679	0,666	0,013	0,000169
6.	18	0,805	0,808	-0,003	0,000009
7.	21	0,948	0,951	-0,002	0,000004
Rata-rata					0,00004443
SD					6,07861E-05

$$\begin{aligned}
 SD &= \sqrt{\frac{(y-y_1)^2}{N-2}} \\
 &= \sqrt{\frac{0,00004443}{7-2}} \\
 &= \sqrt{\frac{0,000162147}{5}} \\
 &= 0,0000607861
 \end{aligned}$$

$$\begin{aligned}\text{LOD} &= \frac{3,3 \times SD}{\text{Slope}} \\ &= \frac{3,3 \times 0,0000607861}{0,0449} \\ &= 0,004 \mu\text{g/mL}\end{aligned}$$

$$\begin{aligned}\text{LOQ} &= \frac{10 \times SD}{\text{Slope}} \\ &= \frac{10 \times 0,0000607861}{0,0449} \\ &= 0,0135 \mu\text{g/mL}\end{aligned}$$

F. Perhitungan kadar

a. Salbutamol sulfat

No.	Konsentrasi ($\mu\text{g/mL}$)	Kadar Total ($\mu\text{g/mL}$)	Baku yang ditambahkan ($\mu\text{g/mL}$)	Kadar Terukur ($\mu\text{g/mL}$)	Kadar Sebenarnya ($\mu\text{g/mL}$)	Recovery (%)
1.	6	5,986	5,82	0,166	0,18	92%
2.	6	5,875	5,82	0,157	0,18	87%
3.	6	6,060	5,82	0,24	0,18	133%
4.	10	10,015	9,82	0,195	0,18	108%
5.	10	9,974	9,82	0,154	0,18	85%
6.	10	10,061	9,82	0,241	0,18	133%
7.	20	20,020	19,82	0,20	0,18	111%
8.	20	20,012	19,82	0,192	0,18	106%
9.	20	20,041	19,82	0,221	0,18	122%

Model regresi PLS untuk salbutamol sulfat

	Data awal
<i>intercept</i>	-0,778
$X_1 = 216$	-55,135
$X_2 = 226$	254,757
$X_3 = 228$	-142,905
$X_4 = 250$	-109,386
$X_5 = 270$	33,852

Contoh perhitungan persen kadar salbutamol sulfat pada konsentrasi 6 $\mu\text{g/mL}$ replikasi 1:

$$\begin{aligned}y &= (\text{Intercept} + \text{nilai abs } 216 \times X_1 + \text{nilai abs } 226 \times X_2 + \\ &\quad \text{nilai abs } 228 \times X_3 + \text{nilai abs } 250 \times X_4 + \text{nilai abs } 270 \times X_5) \\ y &= (-0,778) + 0,966 \times (-55,135) + 0,541 \times 254,757 + 0,485 \times (-142,905) \\ &\quad + 0,241 \times (-109,386) + 0,528 \times 33,852 \\ y &= 5,986\end{aligned}$$

- Kadar yang terukur

Kadar = kadar total – baku yang ditambahkan

$$= 5,986 \mu\text{g/mL} - 5,82 \mu\text{g/mL}$$

$$= 0,125 \mu\text{g/mL}$$

- Kadar sebenarnya

$$\text{Kadar} = \frac{1,2 \text{ mg}}{130 \text{ mg}} \times 20 \text{ } \mu\text{g/mL}$$

$$= 0,18 \text{ } \mu\text{g/mL}$$

- Perhitungan persen kadar

$$\% \text{ kadar} = \frac{\text{kadar terukur}}{\text{kadar sebenarnya}} \times 100\%$$

$$\% \text{ kadar} = \frac{0,166}{0,18} \times 100\%$$

$$= 92 \%$$

b. Teofilin

No.	Kadar Sebenarnya ($\mu\text{g/mL}$)	Kadar Terukur ($\mu\text{g/mL}$)	Recovery (%)
1.	20	16,961	85%
2.	20	17,021	85%
3.	20	17,238	86%
4.	20	17,371	87%
5.	20	17,686	88%
6.	20	17,795	89%
7.	20	19,775	99%
8.	20	18,688	93%
9.	20	18,891	94%

Model regresi PLS untuk teofilin

	Data awal
<i>intercept</i>	3,524
$X_1 = 216$	-7,062
$X_2 = 226$	-67,757
$X_3 = 228$	64,324
$X_4 = 250$	10,094
$X_5 = 270$	44,101

Contoh perhitungan persen kadar teofilin pada konsentrasi 20 $\mu\text{g/mL}$ replikasi 1:

$$y = (\text{Intercept} + \text{nilai abs } 216 \times X_1 + \text{nilai abs } 226 \times X_2 + \text{nilai abs } 228 \times X_3 + \text{nilai abs } 250 \times X_4 + \text{nilai abs } 270 \times X_5)$$

$$y = (3,524) + 0,966 \times (-7,062) + 0,541 \times (-67,757) + 0,485 \times 64,324 + 0,241 \times 10,094 + 0,528 \times 44,101$$

$$y = 16,961$$

- Perhitungan persen kadar

$$\% \text{ kadar} = \frac{\text{kadar terukur}}{\text{kadar sebenarnya}} \times 100\%$$

$$\% \text{ kadar} = \frac{16,961}{20} \times 100\%$$

$$= 85\%$$