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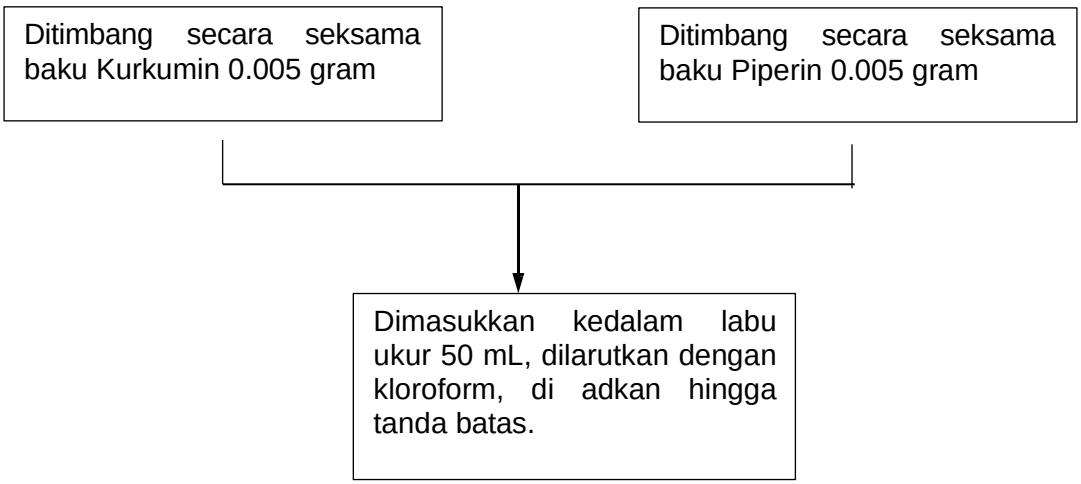
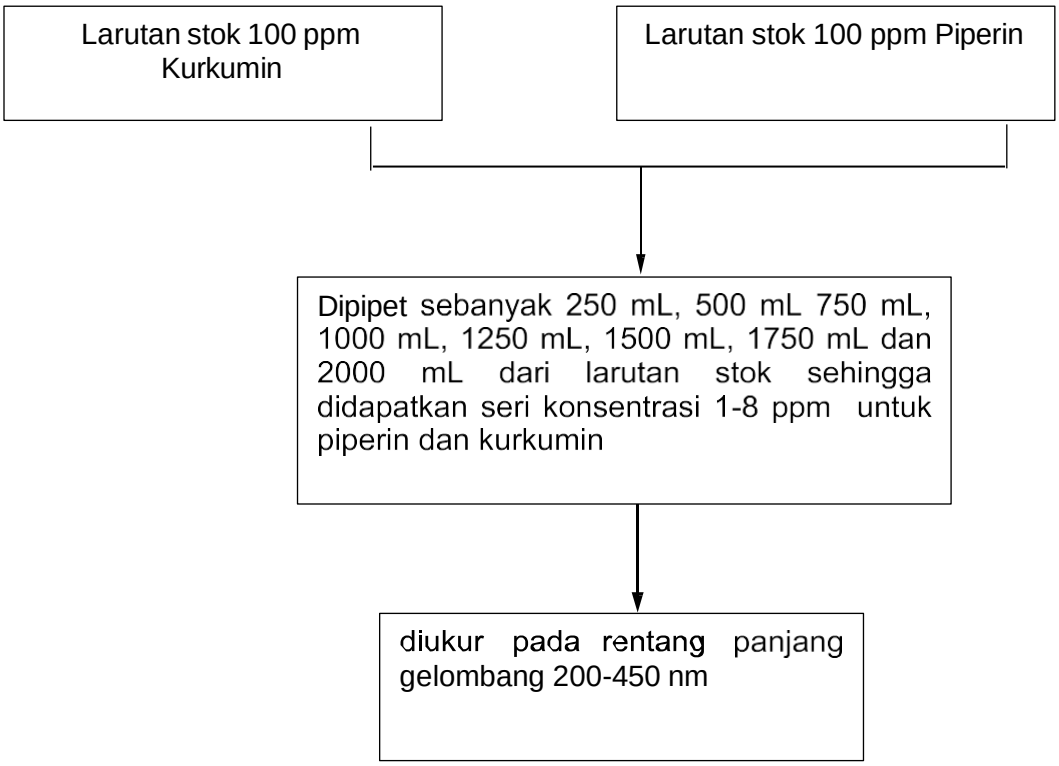
LAMPIRAN

Lampiran 1. Skema Kerja

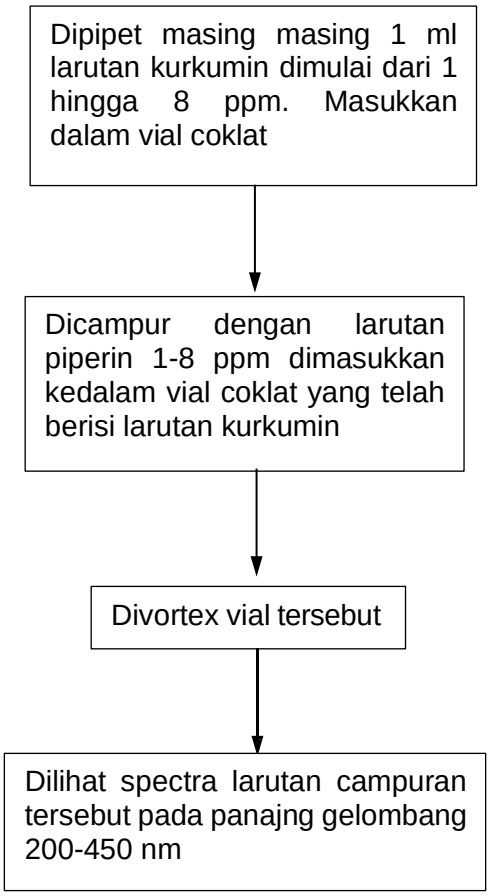
a. Pembuatan larutan baku kurkumin dan piperin



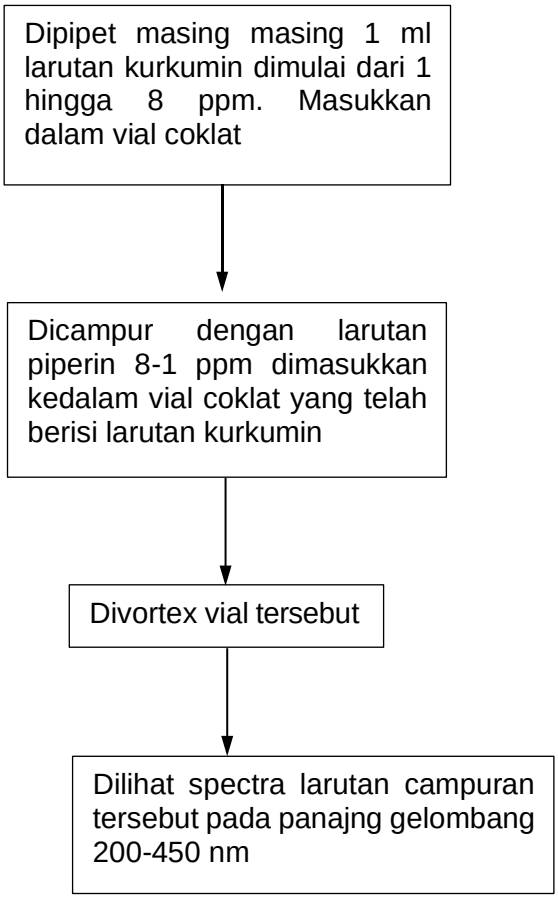
b. Pembuatan pengenceran kurkumin dan piperin



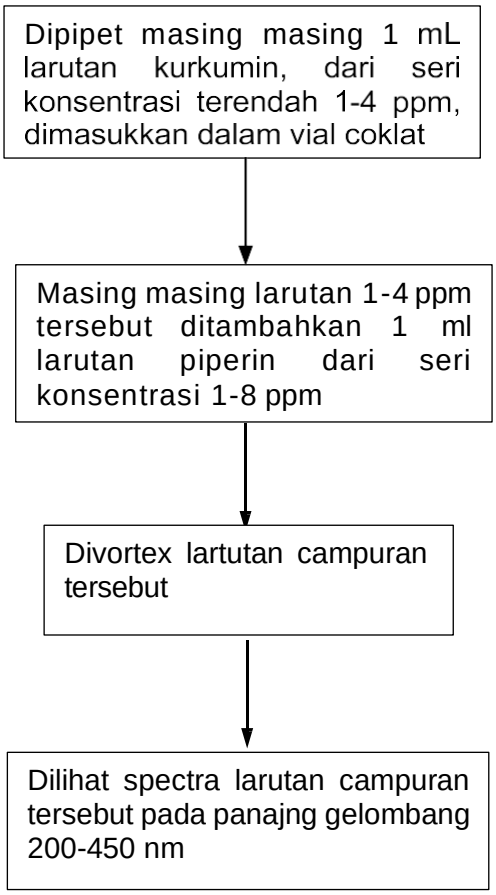
c. Metode pencampuran berbanding lurus kurkumin dan piperin



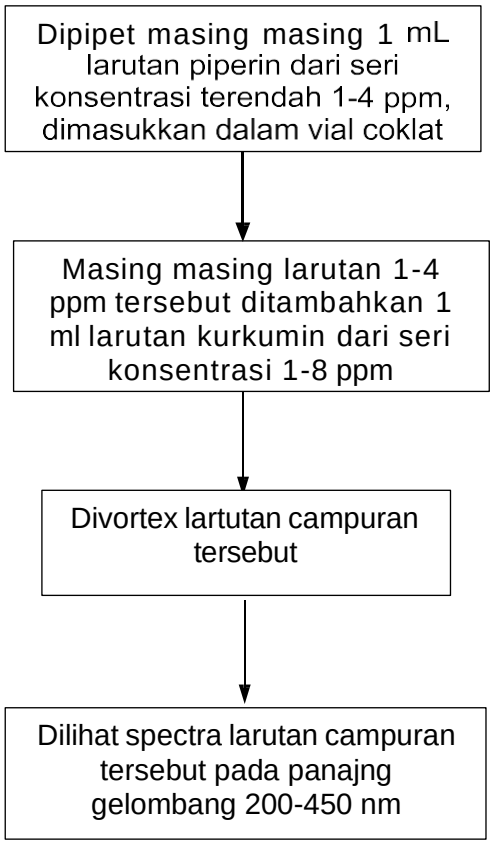
d. Metode pencampuran berbanding terbalik kurkumin dan piperin



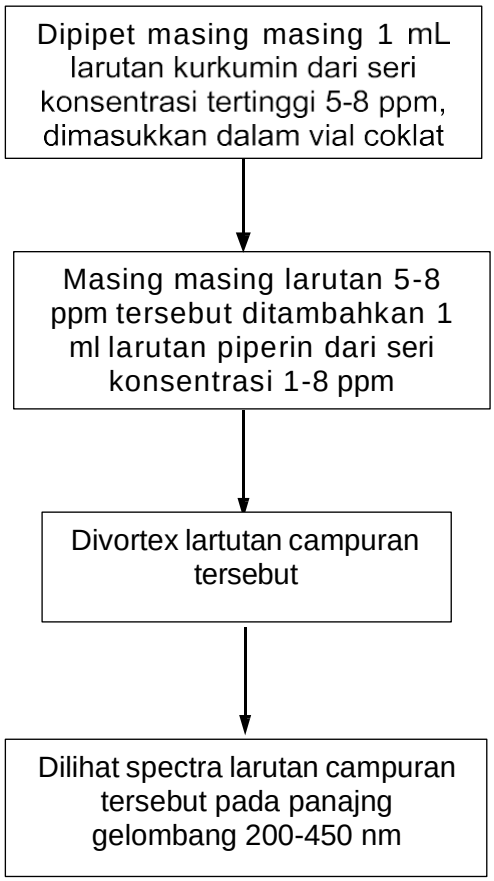
e. Metode pencampuran konsentrasi terendah kurkumin



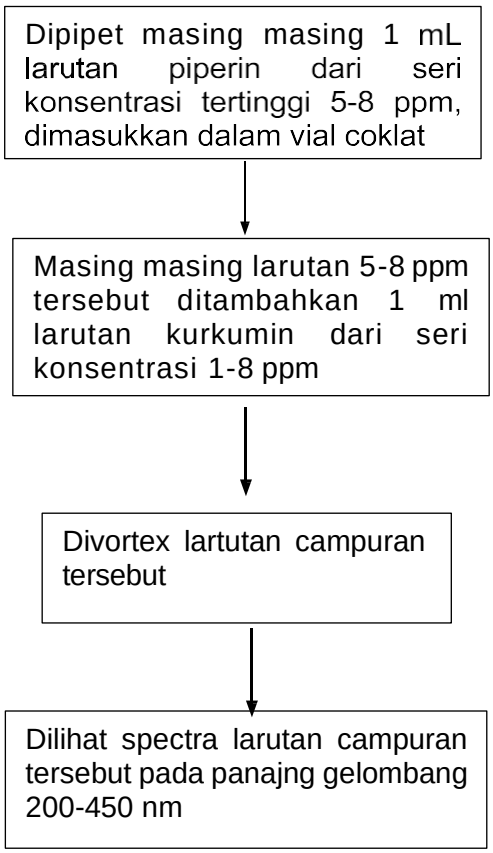
f. Metode pencampuran konsentrasi terendah piperin



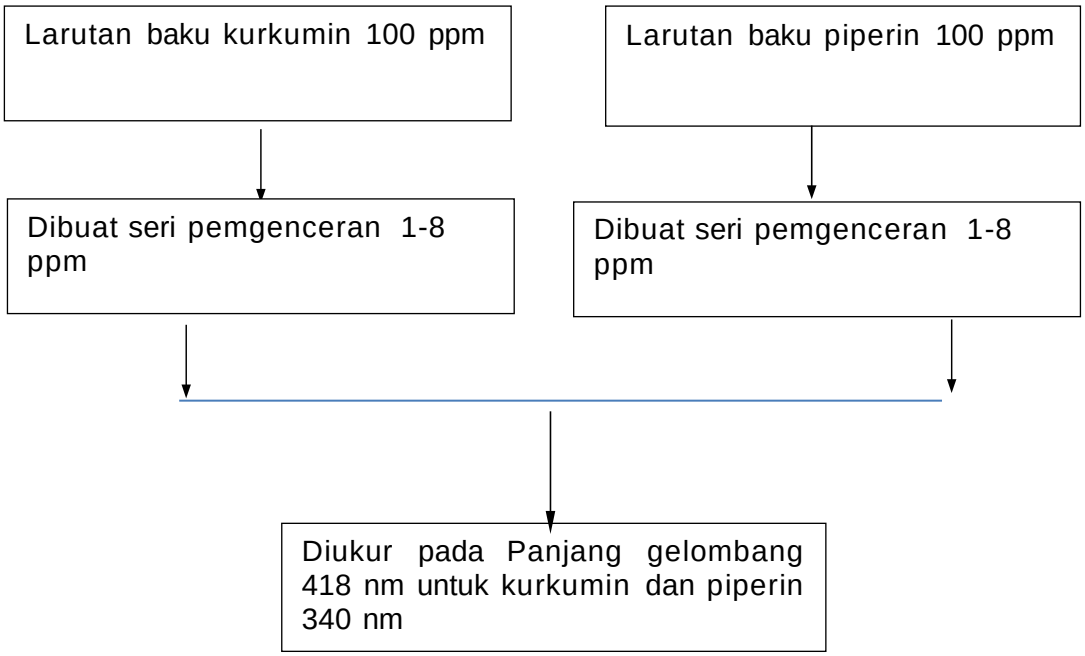
g. Metode pencampuran konsentrasi tertinggi kurkumin



h. etode pencampuran konsentrasi tertinggi piperin



i. Pengujian lineritas



Lampiran 2. Seri Konsentrasi serta Hasil Perhitungan Nilai Prediksi

Tabel I. Hasil perhitungan regresi kalibrasi multivariat secara PLS

Kurkumin			Piperin		
Aktual	Prediksi	%recovery	Aktual	Prediksi	%recovery
1	1,23	123%	1	0,984683	98%
2	1,980062	99%	2	1,981768	99%
3	2,75205	92%	3	2,848921	95%
4	3,813679	95%	4	3,66891	92%
5	4,949286	99%	5	5,017934	100%
6	5,764102	96%	6	5,986794	100%
7	7,0172	100%	7	7,035491	101%
8	8,152245	102%	8	8,09328	101%
8	6.800575	85%	1	1,074654	107%
7	6,99451	100%	2	2,042014	102%
6	5,97833	100%	3	2,972949	99%
5	5,486873	110%	4	3,778137	94%
4	4,047726	101%	5	4,973413	99%
3	2,674971	89%	6	5,796426	97%
2	1,822896	91%	7	6,910271	99%
1	1,087845	109%	8	7,95156	99%
		99%			99%

Tabel 2. Hasil perhitungan regresi kalibrasi multivariat secara PLS

Kurkumin			Piperin		
Aktual	Prediksi	%recovery	Aktual	Prediksi	%recovery
1	0,984683	98%	1	1,232449	123%
1	1,015781	102%	2	1,879805	94%
1	1,0826	108%	3	3,043798	101%
1	1,086321	109%	4	4,482834	112%
1	1,106289	111%	5	4,953458	99%
1	1,106962	111%	6	6,147638	102%
1	1,060355	106%	7	7,562186	108%
1	1,074654	107%	8	6,800575	85%
		106%			103%

Tabel 3. Hasil perhitungan regresi kalibrasi multivariat secara PLS

Kurkumin			Piperin		
Aktual	Prediksi	%recovery	Aktual	Prediksi	%recovery
2	1,872898	94%	1	1,012693	101%
2	1,874305	94%	2	1,872761	94%
2	1,985691	99%	3	2,991742	100%
2	1,947138	97%	4	4,283527	107%
2	1,997821	100%	5	5,405389	108%
2	2,062748	103%	6	6,021276	100%
2	1,915702	96%	7	6,981308	100%
2	1,957855	98%	8	7,667788	96%
		98%			101%

Tabel 4. Hasil perhitungan regresi kalibrasi multivariat secara PLS

Kurkumin			Piperin		
Aktual	Prediksi	%recovery	Aktual	Prediksi	%recovery
3	2,874782	96%	1	1,035679	104%
3	2,85425	95%	2	1,868976	93%
3	2,826944	94%	3	2,705102	90%
3	2,894128	96%	4	3,75921	94%
3	2,828374	94%	5	4,939903	99%
3	2,856283	95%	6	5,91702	99%
3	2,959831	99%	7	7,07045	101%
3	3,000248	100%	8	8,284834	104%
		96%			98%

Tabel 5. Hasil perhitungan regresi kalibrasi multivariat secara PLS

Kurkumin			Piperin		
Aktual	Prediksi	%recovery	Aktual	Prediksi	%recovery
4	3,707007	93%	1	1,130259	113%
4	3,769894	94%	2	2,23441	112%
4	3,692572	92%	3	3,06703	102%
4	3,778137	94%	4	5,486873	137%
4	3,66891	92%	5	3,813679	76%
4	3,704776	93%	6	5,873454	98%
4	3,735073	93%	7	6,847174	98%
4	3,879616	97%	8	8,285473	104%
		94%			105%

Tabel 6. Hasil perhitungan regresi kalibrasi multivariat secara PLS

Kurkumin			Piperin		
Aktual	Prediksi	%recovery	Aktual	Prediksi	%recovery
5	4,752296	95%	1	1,025824	103%
5	4,845435	97%	2	1,998077	100%
5	5,025952	101%	3	3,055233	102%
5	4,973413	99%	4	4,047726	101%
5	5,017934	100%	5	4,949286	99%
5	5,133949	103%	6	6,033296	101%
5	5,084302	102%	7	7,050442	101%
5	5,236795	105%	8	9,247646	116%
		100%			101%

Tabel 7. Hasil perhitungan regresi kalibrasi multivariat secara PLS

Kurkumin			Piperin		
Aktual	Prediksi	%recovery	Aktual	Prediksi	%recovery
6	5,889679	98%	1	1,449045	145%
6	5,937066	99%	2	1,963048	98%
6	5,796426	97%	3	3,055519	102%
6	5,925798	99%	4	3,820911	96%
6	5,979915	100%	5	5,032397	101%
6	5,986794	100%	6	5,98065	100%
6	6,129522	102%	7	7,139729	102%
6	6,127096	102%	8	8,378171	105%
		100%			106%

Tabel 8. Hasil perhitungan regresi kalibrasi multivariat secara PLS

Kurkumin			Piperin		
Aktual	Prediksi	%recovery	Aktual	Prediksi	%recovery
7	6,85445	98%	1	0,782892	78%
7	6,910271	99%	2	1,822896	91%
7	6,797842	97%	3	2,80916	94%
7	6,878066	98%	4	3,832415	96%
7	7,026039	100%	5	4,81039	96%
7	7,027414	100%	6	5,91627	99%
7	7,035491	101%	7	7,0172	100%
7	7,032202	100%	8	8,293284	104%
		99%			95%

Tabel 9. Hasil perhitungan regresi kalibrasi multivariat secara PLS

Kurkumin			Piperin		
Aktual	Prediksi	%recovery	Aktual	Prediksi	%recovery
8	7,95156	99%	1	1,087845	109%
8	8,023923	100%	2	2,248714	112%
8	7,999174	100%	3	3,045928	102%
8	8,183355	102%	4	4,107108	103%
8	8,065543	101%	5	5,077773	102%
8	8,057316	101%	6	6,058027	101%
8	8,07893	101%	7	7,477421	107%
8	8,09328	101%	8	8,152245	102%
		101%			105%

Tabel 10. Hasil perhitungan regresi kalibrasi multivariat secara PLS

Piperin			Kurkumin		
Aktual	Prediksi	%recovery	Aktual	Prediksi	%recovery
1	1,071556	107%	1	1,224933	122%
1	1,088306	109%	2	1,144185	57%
1	1,190858	119%	3	3,190732	106%
1	1,173185	117%	4	4,006564	100%
1	1,120332	112%	5	5,346696	107%
1	1,193168	119%	6	6,46268	108%
1	1,21228	121%	7	7,700332	110%
1	1,2517	125%	8	8,975054	112%
		106%			103%

Tabel 11. Hasil perhitungan regresi kalibrasi multivariat secara PLS

Piperin			Kurkumin		
Aktual	Prediksi	%recovery	Aktual	Prediksi	%recovery
2	1,979041	99%	1	1,028409	103%
2	1,940648	97%	2	1,870338	94%
2	2,084487	104%	3	3,114422	104%
2	2,139639	107%	4	3,807051	95%
2	2,301037	115%	5	4,789799	96%
2	2,161853	108%	6	5,894947	98%
2	2,181731	109%	7	7,024089	100%
2	2,248714	112%	8	8,132581	102%
		98%			101%

Tabel 4. Hasil perhitungan regresi kalibrasi multivariat secara PLS

Piperin			Kurkumin		
Aktual	Prediksi	%recovery	Aktual	Prediksi	%recovery
3	2,849842	95%	1	0,901702	90%
3	3,419326	114%	2	1,875696	94%
3	2,821584	94%	3	2,786046	93%
3	3,195213	107%	4	3,641147	91%
3	3,020992	101%	5	4,831254	97%
3	3,024335	101%	6	6,087769	101%
3	3,034479	101%	7	7,167618	102%
3	2,953461	98%	8	8,132703	102%
		101%			96%

Tabel 5. Hasil perhitungan regresi kalibrasi multivariat secara PLS

Piperin			Kurkumin		
Aktual	Prediksi	%recovery	Aktual	Prediksi	%recovery
4	3,985051	100%	1	1,176823	118%
4	3,867303	97%	2	1,974339	99%
4	4,277252	107%	3	2,9895	100%
4	4,229654	106%	4	3,737612	93%
4	4,453018	111%	5	4,735925	95%
4	3,92086	98%	6	5,777239	96%
4	4,002743	100%	7	7,053427	101%
4	3,967229	99%	8	7,987556	100%
		102%			100%

Tabel 6. Hasil perhitungan regresi kalibrasi multivariat secara PLS

Piperin			Kurkumin		
Aktual	Prediksi	%recovery	Aktual	Prediksi	%recovery
5	5,1512	103%	1	1,162959	116%
5	5,390697	108%	2	2,009011	100%
5	5,713107	114%	3	3,195834	107%
5	5,178682	104%	4	3,818373	95%
5	5,028763	101%	5	4,854765	97%
5	5,412333	108%	6	5,909572	98%
5	5,196794	104%	7	7,212142	103%
5	5,31654	106%	8	8,34099	104%
		106%			103%

Tabel 7. Hasil perhitungan regresi kalibrasi multivariat secara PLS

Piperin			Kurkumin		
Aktual	Prediksi	%recovery	Aktual	Prediksi	%recovery
6	6,054043	101%	1	1,449045	145%
6	5,957256	99%	2	1,963048	98%
6	6,071553	101%	3	3,055519	102%
6	5,999967	100%	4	3,820911	96%
6	6,394668	107%	5	5,032397	101%
6	6,227991	104%	6	5,98065	100%
6	5,966035	99%	7	7,139729	102%
6	6,585073	110%	8	8,378171	105%
		103%			106%

Tabel 8. Hasil perhitungan regresi kalibrasi multivariat secara PLS

Piperin			Kurkumin		
Aktual	Prediksi	%recovery	Aktual	Prediksi	%recovery
7	6,585641	94%	1	1,246669	125%
7	7,07556	101%	2	2,127037	106%
7	6,503912	93%	3	3,068737	102%
7	6,742864	96%	4	3,835742	96%
7	6,579599	94%	5	4,844566	97%
7	6,549487	94%	6	5,855541	98%
7	6,867521	98%	7	7,164145	102%
7	7,204336	103%	8	8,252296	103%
		99%			95%

Tabel 9. Hasil perhitungan regresi kalibrasi multivariat secara PLS

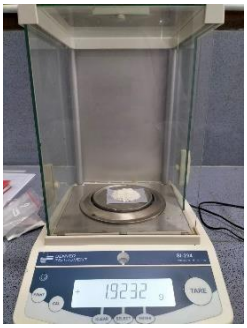
Piperin			Kurkumin		
Aktual	Prediksi	%recovery	Aktual	Prediksi	%recovery
8	7,492637	94%	1	1,31836	132%
8	7,799568	97%	2	2,185224	109%
8	7,539923	94%	3	3,031435	101%
8	7,487078	94%	4	3,74098	94%
8	7,436993	93%	5	4,843857	97%
8	7,604507	95%	6	5,937428	99%
8	7,907196	99%	7	7,125771	102%
8	7,650148	96%	8	8,144884	102%
		95%			104%

Lampiran 3. Dokumentasi Kegiatan

Avicel 10% F1

PVP 3% F1

Bahan bahan Eksipien



Laktosa ad 100% F1

Laktosa salut gula F1100%

Talk 1% F1

Mg. Stearat 1% F1

Proses penggerusan F1

CMC 10% F2

PVP 3% F2

Talk 1% F2

Mg. Stearat 1% F2

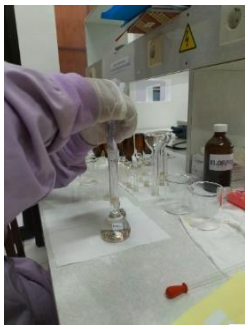
Penimbangan eksipien untuk piperin

Penimbangan eksipien untuk kurkumin

Stok kurkumin dan piperin sebelum adaeksipien

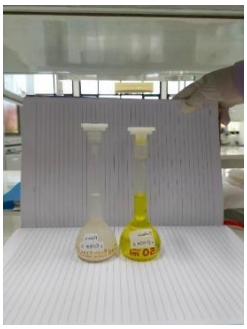
Penambahan eksipien A

Penambahan eksipien B



Penambahan eksipien

Stok berisi eksipien A



Stok berisi eksipien B

Proses sonikasi ekspiein A piperin dankurkumin

Proses sonikasi ekspiein B piperin dankurkumin

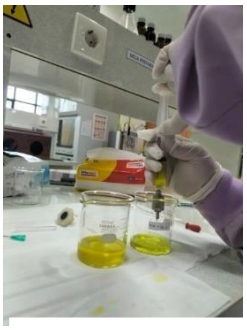
Proses sonikasi ekspiein C piperin dankurkumin

Proses penyaringan ekspiein A + piperin

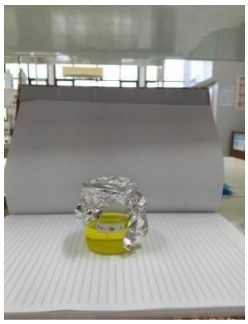
Proses penyaringan ekspiein B + piperin

Proses penyaringan ekspiein C + piperin

Proses penyaringan Kurkumin + ekspiein A



Proses penyaringan Kurkumin + ekspiein B

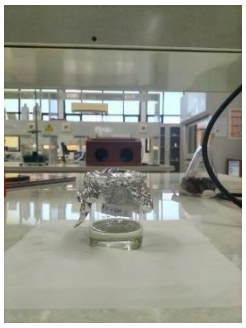


Stok Kurkumin + ekspieinA setelah penyaringan

Stok Kurkumin + ekspiein B setelah penyaringan

Stok Kurkumin + ekspiein C setelah penyaringan

Stok Piperin + ekspiein A setelah penyaringan



Lampiran 4. Perhitungan

A. Perhitungan konsentrasi senyawa uji

1. Kurkumin

   a. Larutan stok

      5 mg kurkumin dilarutkan dalam 50 ml Kloroform Konsnetrasi dalam PPM

      $PPM = \frac{mg}{L} = \frac{\mu g}{mL} = \frac{5000}{50} = 100$ ppm

   b. Perhitungan Pengenceran 1- 8 ppm dalam 25 mL kloroform

      Perhitungan pengenceran 1 ppm dalam 25 mL kloroform

      V1 x M1 = V2 x M2

      V1 x 100 = 25 x 1

      V1 x 100 = 25

      V1 = 0,25 mL = 250 µL

   c. Perhitungan pengenceran 2 ppm 25 mL kloroform

      V1 x M1 = V2 x M2

      V1 x 100 = 25 x 2

      V1 x 100 = 50

      V1 = 0,50 mL = 500 µL

   d. Perhitungan pengenceran 3 ppm 25 mL kloroform

      V1 x M1 = V2 x M2

      V1 x 100 = 25 x 3

      V1 x 100 = 75

      V1 = 0,75 mL = 750 µL

e. Perhitungan pengenceran 4 ppm 25 mL kloroform

V1 x M1 = V2 x M2

V1 x 100 = 25 x 4

V1 x 100 = 100

V1 = 0,1 mL = 1000 µL

f. Perhitungan pengenceran 5 ppm 25 mL kloroform

V1 x M1 = V2 x M2

V1 x 100 = 25 x 5

V1 x 100 = 125

V1 = 0,125 mL = 1250 µL

g. Perhitungan pengenceran 6 ppm 25 mL kloroform

V1 x M1 = V2 x M2

V1 x 100 = 25 x 6

V1 x 100 = 150

V1 = 0,150 mL = 1500 µL

h. Perhitungan pengenceran 7 ppm 25 mL kloroform

V1 x M1 = V2 x M2

V1 x 100 = 25 x 7

V1 x 100 = 175

V1 = 0,175 mL = 1750 µL

i. Perhitungan pengenceran 8 ppm 25 mL kloroform

V1 x M1 = V2 x M2

V1 x 100 = 25 x 8

V1 x 100 = 200

V1 = 0,2 mL = 2000 µL

2. Piperin

a. Larutan stok

5 mg kurkumin dilarutkan dalam 50 ml KloroformKonsnetrasi dalam PPM

PPM = $\frac{mg}{L}$ = $\frac{\mu g}{mL}$ = $\frac{5000}{100}$ = 100 ppm

b. Perhitungan Pengenceran 1- 8 ppm dalam 25 mL kloroform

Perhitungan pengenceran 1 ppm dalam 25 mL kloroform

V1 x M1 = V2 x M2

V1 x 100 = 25 x 1

V1 x 100 = 25

V1 = 0,25 mL = 250 µL

c. Perhitungan pengenceran 2 ppm 25 mL kloroform

V1 x M1 = V2 x M2

V1 x 100 = 25 x 2

V1 x 100 = 50

V1 = 0,50 mL = 500 µL

d. Perhitungan pengenceran 3 ppm 25 mL kloroform

V1 x M1 = V2 x M2

V1 x 100 = 25 x 3

V1 x 100 = 75

V1 = 0,75 mL = 750 µL

e. Perhitungan pengenceran 4 ppm 25 mL kloroform

V1 x M1 = V2 x M2

V1 x 100 = 25 x 4

V1 x 100 = 100

V1 = 0,1 mL = 1000 µL

f. Perhitungan pengenceran 5 ppm 25 mL kloroform

V1 x M1 = V2 x M2

V1 x 100 = 25 x 5

V1 x 100 = 125

V1 = 0,125 mL = 1250 µL

g. Perhitungan pengenceran 6 ppm 25 mL kloroform

V1 x M1 = V2 x M2

V1 x 100 = 25 x 6

V1 x 100 = 150

V1 = 0,150 mL = 1500 µL

h. Perhitungan pengenceran 7 ppm 25 mL kloroform

V1 x M1 = V2 x M2

V1 x 100 = 25 x 7

V1 x 100 = 175

V1 = 0,175 mL = 1750 µL

i. Perhitungan pengenceran 8 ppm 25 mL kloroform

V1 x M1 = V2 x M2

V1 x 100 = 25 x 8

V1 x 100 = 200

V1 = 0,2 mL = 2000 µL

B. Perhitungan nilai Prediksi menggunakan persamaan PLS dan PCR

a. Konsentrasi 1 ppm kurkumin dan 1 ppm piperin

- Variabel penelitian pada kurkumin :

x_1 : abs 328
x_2 : abs 334
x_3 : abs 382
x_4 : abs 392
x_5 : abs 424
x_6 : abs 442

- Model Regresi PLS dan PCR Kurkumin y_1)

	Data awal
$intercept$	0,18668
x_1	8,16522
x_2	−8,5945
x_3	31,41383
x_4	−45,35213
x_5	73,97924
x_6	−62,41535

Maka, nilai prediksi untuk kurkumin dapat dihitung menggunakan rumussebagai berikut :

y_1= (Intercept + nilai abs 328 X x_1 + abs 334 X x_2 + nilai abs 382 X x_3 + nilai abs 392 X x_4 + nilai abs 424 X x_5 + nilai abs 442 X X6)

y_1 = (0,18668 + 0,123 X 8,16522 + 0,128 X -8,5945 +0,082 X 31,41383 + 0,092 X -45,35213 + 0,102 X 73,97924 + 0,081 X -62,41535)

y_1 = 1,23

b. Konsentrasi 1 ppm Piperin dan 1 ppm Kurkumin

- Variabel penelitian pada Piperin:

  x_1 : abs 328
  x_2 : abs 33
  x_3 : abs 382
  x_4 : abs 392
  x_5 : abs 424
  x_6 : abs 442

- Model Regresi PLS dan PCR untuk Piperin (y_2)

	Data Awal
$intercept$	$-0{,}29436$
x_1	$48{,}05384$
x_2	$-28{,}259$
x_3	$-0{,}73108$
x_4	$-22{,}9491$
x_5	$57{,}19454$
x_6	$-54{,}68196$

Maka, nilai prediksi untuk piperin dapat dihitung menggunakan rumus sebagai berikut :

y_2 = (Intercept + nilai abs 328 X x_1 + abs 334 X x_2 + nilai abs 382 X x_3 + nilai abs 392 X x_4 + nilai abs 424 X x_5 + nilai abs 442 X X6)

y_2 = (-0,29436 + 0,123 X 48,05384 + 0,128 X -28,259 +0,082X -0,73108 + 0,092 X -22,9491 + 0,102 X 57,19454 +0,081 X -54,68196)

y_2 = 0,98

C. Perhitungan Formula berdasarkan berat tablet uji yaitu tablet curcuma forcesebagai berikut :

- Penimbangan bobot tablet dengan salut = 0,4356 gram = 435,6 mg (bobot 1 tablet curcuma force)
- Penimbangan bobot tablet tanpa salut = 0,317,4 gram = 317,4 mg (bobot 1 tablet curcuma force)
- Komposisi zat aktif dalam sediaan curcuma force :
  - Kurkumin 20 mg
  - Piperin 2,5 mg

- Jadi, untuk membuat formula eksipien menggunakan bobot tablet sebesar **435,6** di kurangi dengan zat aktif **(22.5 mg),** sehingga didapatkan bobot eksipien yang akan dibuat sebanyak **= (435,6 - 22.5 mg = 413,1 mg/tablet)** dengan rancangan formula eksipien sebagai berikut :

Formula 1

-	**Avicel (penghancur)**	10%	= 10% X 413,1 mg = 31,74 mg
-	PVP (Pengikat)	3%	= 3% X 413,1 mg = 9,522 mg
-	Talk (glidan)	1%	= 1% X 413,1 mg = 3,174 mg
-	Mg. Stearat (lubrikan)	1%	= 1% X 413,1 mg = 3,174 mg
-	Laktosa (pengisi)	ad 100%	= (bobot tablet – 70,11 mg = **247, 29 mg**)
2.	Formula 2		
-	**CMC (penghancur)**	10%	= 10% X 317,4 mg = 31,74 mg
-	PVP (Pengikat)	3%	= 3% X 317,4 mg = 9,522 mg
-	Talk (glidan)	1%	= 1% X 317,4 mg = 3,174 mg
-	Mg. Stearat (lubrikan)	1%	= 1% X 317,4 mg = 3,174 mg
-	Amilum (pengisi)	ad 100%	= (bobot tablet – 70,11 mg = **247, 29 mg**)
3.	Formula 3		
-	**Selulosa (penghancur)**	10%	= 10% X 317,4 mg = 31,74 mg
-	PVP (Pengikat)	3%	= 3% X 317,4 mg = 9,522 mg

- Talk (glidan) 1% = 1% X 317,4 mg = 3,174 mg
- Mg. Stearat (lubrikan) 1% = 1% X 317,4 mg = 3,174 mg
- Amilum (pengisi) ad 100% = (bobot tablet – 70,11 mg = **247, 29 mg**)

D. Perhitungan larutan uji dengan penambahan Formula A, B dan C

- Kurkumin

  ¼ tab X ½ X 413,1 mg X 2 = 103,275 mg

- Piperin

  2 X ½ X 413,1 mg X 2 = 826,2 mg.