

LAMPIRAN I

PERHITUNGAN HARGA KOEFISIEN KORELASI (r)
DAN PERSAMAAN REGRESI ($y = b x + a$)
DARI KURVA SERAPAN HASIL REAKSI NATRIUM LAURIL SULFAT
DENGAN BIRU METILEN (y) TERHADAP KADAR (x) PADA REPLIKASI I

Replikasi	Kadar (x)	Serapan (y)	x^2	y^2	xy
I	0,2596	0,085	0,0674	0,0072	0,0221
	0,3634	0,136	0,1321	0,0185	0,0494
	0,5192	0,169	0,2696	0,0286	0,0877
	0,6230	0,207	0,3881	0,0428	0,1290
	0,7788	0,267	0,6065	0,0713	0,2079
Σ	2,5440	0,864	1,4637	0,1684	0,4961

$$r = \frac{\sum xy - \frac{(\sum x)(\sum y)}{n}}{\sqrt{(\sum x^2 - \frac{(\sum x)^2}{n})(\sum y^2 - \frac{(\sum y)^2}{n})}} = \frac{0,4961 - \frac{2,5440 \times 0,864}{5}}{\sqrt{(1,4637 - \frac{2,5440^2}{5})(0,1684 - \frac{0,864^2}{5})}}$$

$$= \frac{0,0565}{0,0569} = 0,993$$

$$b = \frac{\sum xy - \frac{(\sum x)(\sum y)}{n}}{\sum x^2 - \frac{(\sum x)^2}{n}} = \frac{0,4961 - \frac{2,5440 \times 0,864}{5}}{1,4637 - \frac{2,5440^2}{5}}$$

$$= \frac{0,0565}{0,1693} = 0,3337$$

$$a = \frac{\sum y - b \cdot \sum x}{n} = \frac{0,864 - 0,3337 \times 2,5440}{5}$$

$$= \frac{0,0151}{5} = 3,02 \cdot 10^{-3}$$

Persamaan garis regresi : $y = 0,3337 x + 3,02 \cdot 10^{-3}$

LAMPIRAN II

PERHITUNGAN HARGA KOEFISIEN KORELASI (r)
 DAN PERSAMAAN REGRESI ($y = b x + a$)
 DARI KURVA SERAPAN HASIL REAKSI NATRIUM LAURIL SULFAT
 DENGAN BIRU METILEN (y) TERHADAP KADAR (x) PADA REPLIKASI II

Replikasi	Kadar (x)	Serapan (y)	x^2	y^2	xy
II	0,2610	0,087	0,0681	0,0076	0,0227
	0,3654	0,135	0,1335	0,0182	0,0493
	0,5220	0,169	0,2725	0,0286	0,0882
	0,6264	0,208	0,3924	0,0433	0,1303
	0,7830	0,269	0,6131	0,0724	0,2106
Σ	2,5578	0,868	1,4796	0,1701	0,5011

$$r = \frac{\sum xy - \frac{(\sum x)(\sum y)}{n}}{\sqrt{(\sum x^2 - \frac{(\sum x)^2}{n})(\sum y^2 - \frac{(\sum y)^2}{n})}} = \frac{0,5011 - \frac{2,5578 \times 0,868}{5}}{\sqrt{(1,4796 - \frac{2,5578^2}{5})(0,1701 - \frac{0,868^2}{5})}}$$

$$= \frac{0,0571}{0,0576} = 0,991$$

$$b = \frac{\sum xy - \frac{(\sum x)(\sum y)}{n}}{\sum x^2 - \frac{(\sum x)^2}{n}} = \frac{0,5011 - \frac{2,5578 \times 0,868}{5}}{1,4796 - \frac{2,5578^2}{5}}$$

$$= \frac{0,0571}{0,1711} = 0,3337$$

$$a = \frac{\sum y - b \cdot \sum x}{n} = \frac{0,868 - 0,3337 \times 2,5578}{5}$$

$$= \frac{0,0145}{5} = 2,90 \cdot 10^{-3}$$

Persamaan garis regresi : $y = 0,3337 x + 2,90 \cdot 10^{-3}$

LAMPIRAN III

PERHITUNGAN HARGA KOEFISIEN KORELASI (r)
 DAN PERSAMAAN REGRESI ($y = b x + a$)
 DARI KURVA SERAPAN HASIL REAKSI NATRIUM LAURIL SULFAT
 DENGAN BIRU METILEN (y) TERHADAP KADAR (x) PADA REPLIKASI III

Replikasi	Kadar (x)	Serapan (y)	x^2	y^2	xy
III	0,2600	0,086	0,0676	0,0074	0,0224
	0,3640	0,137	0,1325	0,0188	0,0499
	0,5200	0,168	0,2704	0,0282	0,0874
	0,6240	0,207	0,3894	0,0428	0,1292
	0,7800	0,269	0,6084	0,0724	0,2098
Σ	2,5480	0,867	1,4683	0,1696	0,4987

$$r = \frac{\sum xy - \frac{(\sum x)(\sum y)}{n}}{\sqrt{(\sum x^2 - \frac{(\sum x)^2}{n})(\sum y^2 - \frac{(\sum y)^2}{n})}} = \frac{0,4987 - \frac{2,5480 \times 0,867}{5}}{\sqrt{(1,4683 - \frac{2,5480^2}{5})(0,1696 - \frac{0,867^2}{5})}}$$

$$= \frac{0,0569}{0,0572} = 0,995$$

$$b = \frac{\sum xy - \frac{(\sum x)(\sum y)}{n}}{\sum x^2 - \frac{(\sum x)^2}{n}} = \frac{0,4987 - \frac{2,5480 \times 0,867}{5}}{1,4683 - \frac{2,5480^2}{5}}$$

$$= \frac{0,0569}{0,1698} = 0,3351$$

$$a = \frac{\sum y - b \cdot \sum x}{n} = \frac{0,867 - 0,3351 \times 2,5480}{5}$$

$$= \frac{0,0132}{5} = 2,64 \cdot 10^{-3}$$

Persamaan garis regresi : $y = 0,3351 x + 2,64 \cdot 10^{-3}$

LAMPIRAN IV

**CONTOH PERHITUNGAN AKSEPTABILITAS HARGA INTERSEP (a)
PADA UJI LINEARITAS DENGAN PEREAKSI BIRU METILEN REPLIKASI I**

Persamaan regresi linear ($y = b x + a$) dengan pereaksi biru metilen pada replikasi I (lampiran I) :

$$y = 0,3337 x + 3,02.10^{-3}$$

Bila harga kadar (x) disubstitusikan dengan 0,5 bpj, maka harga serapan (y) :

$$y = 0,3337 \cdot 0,5 + 3,02.10^{-3}$$

$$y = 0,16685 + 3,02.10^{-3}$$

$$y = 0,16987$$

Harga intersep (a) yang dipersyaratkan untuk uji linearitas adalah $\leq 2 \%$ dari respon analit / serapan (y) pada kadar 0,5 bpj.

$$\begin{aligned} 2 \% \text{ dari harga serapan pada kadar } 0,5 \text{ bpj} &= 2 \% \times 0,16987 \\ &= 3,40.10^{-3} \end{aligned}$$

Harga intersep (a) dari persamaan regresi linear dengan pereaksi biru metilen pada replikasi I (lampiran I) $= 3,02.10^{-3} < 3,40.10^{-3}$

LAMPIRAN V

PERHITUNGAN HARGA KOEFISIEN KORELASI (r)
 DAN PERSAMAAN REGRESI ($y = b x + a$)
 DARI KURVA SERAPAN HASIL REAKSI NATRIUM LAURIL SULFAT
 DENGAN KRISTAL VIOLET (y) TERHADAP KADAR (x) PADA REPLIKASI I

Replikasi	Kadar (x)	Serapan (y)	x^2	y^2	xy
I	0,2610	0,098	0,0681	0,0096	0,0256
	0,3654	0,136	0,1335	0,0185	0,0497
	0,5220	0,210	0,2725	0,0441	0,1096
	0,6264	0,225	0,3924	0,0506	0,1409
	0,7830	0,293	0,6131	0,0858	0,2294
Σ	2,5578	0,962	1,4796	0,2086	0,5552

$$r = \frac{\sum xy - \frac{(\sum x)(\sum y)}{n}}{\sqrt{(\sum x^2 - \frac{(\sum x)^2}{n})(\sum y^2 - \frac{(\sum y)^2}{n})}} = \frac{0,5552 - \frac{2,5578 \times 0,962}{5}}{\sqrt{(1,4796 - \frac{2,5578^2}{5})(0,2086 - \frac{0,962^2}{5})}}$$

$$= \frac{0,0631}{0,0634} = 0,995$$

$$b = \frac{\sum xy - \frac{(\sum x)(\sum y)}{n}}{\sum x^2 - \frac{(\sum x)^2}{n}} = \frac{0,5552 - \frac{2,5578 \times 0,962}{5}}{1,4796 - \frac{2,5578^2}{5}}$$

$$= \frac{0,0631}{0,1711} = 0,3688$$

$$a = \frac{\sum y - b \cdot \sum x}{n} = \frac{0,962 - 0,3688 \times 2,5578}{5}$$

$$= \frac{0,0187}{5} = 3,74 \cdot 10^{-3}$$

Persamaan garis regresi : $y = 0,3688 x + 3,74 \cdot 10^{-3}$

LAMPIRAN VI

PERHITUNGAN HARGA KOEFISIEN KORELASI (r)
 DAN PERSAMAAN REGRESI ($y = b x + a$)
 DARI KURVA SERAPAN HASIL REAKSI NATRIUM LAURIL SULFAT
 DENGAN KRISTAL VIOLET (y) TERHADAP KADAR (x) PADA REPLIKASI II

Replikasi	Kadar (x)	Serapan (y)	x^2	y^2	xy
II	0,2556	0,097	0,0653	0,0094	0,0248
	0,3578	0,129	0,1280	0,0166	0,0462
	0,5112	0,205	0,2613	0,0420	0,1048
	0,6134	0,221	0,3763	0,0488	0,1356
	0,7668	0,284	0,5880	0,0807	0,2178
Σ	2,5048	0,936	1,4189	0,1975	0,5292

$$r = \frac{\sum xy - \frac{(\sum x)(\sum y)}{n}}{\sqrt{(\sum x^2 - \frac{(\sum x)^2}{n})(\sum y^2 - \frac{(\sum y)^2}{n})}} = \frac{0,5292 - \frac{2,5048 \times 0,936}{5}}{\sqrt{(1,4189 - \frac{2,5048^2}{5})(0,1975 - \frac{0,936^2}{5})}}$$

$$= \frac{0,0603}{0,0605} = 0,997$$

$$b = \frac{\sum xy - \frac{(\sum x)(\sum y)}{n}}{\sum x^2 - \frac{(\sum x)^2}{n}} = \frac{0,5292 - \frac{2,5048 \times 0,936}{5}}{1,4189 - \frac{2,5048^2}{5}}$$

$$= \frac{0,0603}{0,1641} = 0,3675$$

$$a = \frac{\sum y - b \cdot \sum x}{n} = \frac{0,936 - 0,3675 \times 2,5048}{5}$$

$$= \frac{0,0155}{5} = 3,10 \cdot 10^{-3}$$

Persamaan garis regresi : $y = 0,3675 x + 3,10 \cdot 10^{-3}$

LAMPIRAN VII

**PERHITUNGAN HARGA KOEFISIEN KORELASI (r)
DAN PERSAMAAN REGRESI (y = b x + a)
DARI KURVA SERAPAN HASIL REAKSI NATRIUM LAURIL SULFAT
DENGAN KRISTAL VIOLET (y) TERHADAP KADAR (x) PADA REPLIKASI III**

Replikasi	Kadar (x)	Serapan (y)	x ²	y ²	xy
III	0,2508	0,096	0,0629	0,0092	0,0241
	0,3511	0,127	0,1233	0,0161	0,0446
	0,5016	0,206	0,2516	0,0424	0,1033
	0,6019	0,222	0,3623	0,0493	0,1336
	0,7524	0,281	0,5661	0,0790	0,2114
Σ	2,4578	0,932	1,3662	0,1960	0,5170

$$r = \frac{\sum xy - \frac{(\sum x)(\sum y)}{n}}{\sqrt{(\sum x^2 - \frac{(\sum x)^2}{n})(\sum y^2 - \frac{(\sum y)^2}{n})}} = \frac{0,5170 - \frac{2,4578 \times 0,932}{5}}{\sqrt{(1,3662 - \frac{2,4578^2}{5})(0,1960 - \frac{0,932^2}{5})}}$$

$$= \frac{0,0589}{0,0593} = 0,993$$

$$b = \frac{\sum xy - \frac{(\sum x)(\sum y)}{n}}{\sum x^2 - \frac{(\sum x)^2}{n}} = \frac{0,5170 - \frac{2,4578 \times 0,932}{5}}{1,3662 - \frac{2,4578^2}{5}}$$

$$= \frac{0,0589}{0,1580} = 0,3728$$

$$a = \frac{\sum y - b \cdot \sum x}{n} = \frac{0,932 - 0,3728 \times 2,4578}{5}$$

$$= \frac{0,0157}{5} = 3,14 \cdot 10^{-3}$$

Persamaan garis regresi : $y = 0,3728 x + 3,14 \cdot 10^{-3}$

LAMPIRAN VIII

PERHITUNGAN PERBANDINGAN PERSAMAAN REGRESI LINEAR
YANG DIHASILKAN PADA UJI LINEARITAS
DENGAN PEREAKSI BIRU METILEN

	Σx^2	Σxy	Σy^2	n	Residual SS	Residual DF
Persamaan regresi I	1,4637	0,4961	0,1684	5	$2,54 \cdot 10^{-4}$	3
Persamaan regresi II	1,4796	0,5011	0,1701	5	$3,91 \cdot 10^{-4}$	3
Persamaan regresi III	1,4683	0,4987	0,1696	5	$2,19 \cdot 10^{-4}$	3
<i>Pooled regression</i>					$8,64 \cdot 10^{-4}$	9
<i>Common regression</i>	4,4116	1,4959	0,5081		$8,65 \cdot 10^{-4}$	11

$$SS_I = \Sigma y_1 - \frac{\Sigma xy_1^2}{\Sigma x_1} = 0,1684 - \frac{0,4961^2}{1,4637} = 2,54 \cdot 10^{-4}$$

$$SS_2 = \Sigma y_2 - \frac{\Sigma xy_2^2}{\Sigma x_2} = 0,1701 - \frac{0,5011^2}{1,4796} = 3,91 \cdot 10^{-4}$$

$$SS_3 = \Sigma y_3 - \frac{\Sigma xy_3^2}{\Sigma x_3} = 0,1696 - \frac{0,4987^2}{1,4683} = 2,19 \cdot 10^{-4}$$

$$SS_p = SS_1 + SS_2 + SS_3 = 2,54 \cdot 10^{-4} + 3,91 \cdot 10^{-4} + 2,19 \cdot 10^{-4} = 8,64 \cdot 10^{-4}$$

$$\Sigma x_c = \Sigma x_1 + \Sigma x_2 + \Sigma x_3 = 1,4637 + 1,4796 + 1,4683 = 4,4116$$

$$\Sigma xy_c = \Sigma xy_1 + \Sigma xy_2 + \Sigma xy_3 = 0,4961 + 0,5011 + 0,4987 = 1,4959$$

$$\Sigma y_c = \Sigma y_1 + \Sigma y_2 + \Sigma y_3 = 0,1684 + 0,1701 + 0,1696 = 0,5081$$

$$SS_c = \Sigma y_c - \frac{\Sigma xy_c^2}{\Sigma x_c} = 0,5081 - \frac{1,4959^2}{4,4116} = 8,65 \cdot 10^{-4}$$

$$F = \frac{\frac{SS_c - SS_p}{k-1}}{\frac{SS_p}{DF_p}} = \frac{\frac{8,65 \cdot 10^{-4} - 8,64 \cdot 10^{-4}}{3-1}}{\frac{8,64 \cdot 10^{-4}}{9}}$$

$$= \frac{5 \cdot 10^{-7}}{9,60 \cdot 10^{-5}} = 5,21 \cdot 10^{-3}$$

$$F_{hitung} = 0,005 < F_{tabel 0,05 (2;9)} = 4,26$$

LAMPIRAN IX

PERHITUNGAN BATAS DETEKSI DAN BATAS KUANTITASI
PADA PENETAPAN KADAR NATRIUM LAURIL SULFAT
DENGAN PEREAKSI BIRU METILEN

Data serapan blanko

Serapan (x)	$(x - \bar{x})$	$(x - \bar{x})^2$
0,007	$-5,0 \cdot 10^{-4}$	$2,50 \cdot 10^{-7}$
0,007	$-5,0 \cdot 10^{-4}$	$2,50 \cdot 10^{-7}$
0,008	$5,0 \cdot 10^{-4}$	$2,50 \cdot 10^{-7}$
0,006	$-1,5 \cdot 10^{-3}$	$2,25 \cdot 10^{-6}$
0,007	$-5,0 \cdot 10^{-4}$	$2,50 \cdot 10^{-7}$
0,008	$5,0 \cdot 10^{-4}$	$2,50 \cdot 10^{-7}$
0,008	$5,0 \cdot 10^{-4}$	$2,50 \cdot 10^{-7}$
0,006	$-1,5 \cdot 10^{-3}$	$2,25 \cdot 10^{-6}$
0,009	$1,5 \cdot 10^{-3}$	$2,25 \cdot 10^{-6}$
0,009	$1,5 \cdot 10^{-3}$	$2,25 \cdot 10^{-6}$
$\bar{x} = 0,0075$		$\Sigma = 1,05 \cdot 10^{-5}$

$$SB = \sqrt{\frac{\sum(x-\bar{x})^2}{n-1}} = \sqrt{\frac{1,05 \cdot 10^{-5}}{10-1}} = 1,08 \cdot 10^{-3}$$

Dari data penentuan linieritas (pada lampiran I) didapatkan persamaan garis regresi :

$$y = 0,3337 x + 3,02 \cdot 10^{-3}$$

maka dapat dihitung :

$$\text{Batas deteksi} = k \cdot \frac{SB}{S} = 3 \times \frac{1,08 \cdot 10^{-3}}{0,3337} = 0,0097 \text{ bpj}$$

$$\text{Batas kuantitasi} = k \cdot \frac{SB}{S} = 10 \times \frac{1,08 \cdot 10^{-3}}{0,3337} = 0,0324 \text{ bpj}$$

LAMPIRAN X

PERHITUNGAN PERBANDINGAN PERSAMAAN REGRESI LINEAR
YANG DIHASILKAN PADA UJI LINEARITAS
DENGAN PEREAKSI KRISTAL VIOLET

	Σx^2	Σxy	Σy^2	n	Residual SS	Residual DF
Persamaan regresi I	1,4796	0,5552	0,2086	5	$2,69 \cdot 10^{-4}$	3
Persamaan regresi II	1,4189	0,5292	0,1975	5	$1,27 \cdot 10^{-4}$	3
Persamaan regresi III	1,3662	0,5170	0,1960	5	$3,56 \cdot 10^{-4}$	3
<i>Pooled regression</i>					$7,52 \cdot 10^{-4}$	9
<i>Common regression</i>	4,2647	1,6014	0,6021		$7,72 \cdot 10^{-4}$	11

$$SS_1 = \Sigma y_1 - \frac{\Sigma xy_1^2}{\Sigma x_1} = 0,2086 - \frac{0,5552^2}{1,4796} = 2,69 \cdot 10^{-4}$$

$$SS_2 = \Sigma y_2 - \frac{\Sigma xy_2^2}{\Sigma x_2} = 0,1975 - \frac{0,5292^2}{1,4189} = 1,27 \cdot 10^{-4}$$

$$SS_3 = \Sigma y_3 - \frac{\Sigma xy_3^2}{\Sigma x_3} = 0,1960 - \frac{0,5170^2}{1,3662} = 3,56 \cdot 10^{-4}$$

$$SS_p = SS_1 + SS_2 + SS_3 = 2,69 \cdot 10^{-4} + 1,27 \cdot 10^{-4} + 3,56 \cdot 10^{-4} = 7,52 \cdot 10^{-4}$$

$$\Sigma x_c = \Sigma x_1 + \Sigma x_2 + \Sigma x_3 = 1,4796 + 1,4189 + 1,3662 = 4,2647$$

$$\Sigma xy_c = \Sigma xy_1 + \Sigma xy_2 + \Sigma xy_3 = 0,5552 + 0,5292 + 0,5170 = 1,6014$$

$$\Sigma y_c = \Sigma y_1 + \Sigma y_2 + \Sigma y_3 = 0,2086 + 0,1975 + 0,1960 = 0,6021$$

$$SS_c = \Sigma y_c - \frac{\Sigma xy_c^2}{\Sigma x_c} = 0,6021 - \frac{1,6014^2}{4,2647} = 7,72 \cdot 10^{-4}$$

$$F = \frac{\frac{SS_c - SS_p}{k-1}}{\frac{SS_p}{DF_p}} = \frac{\frac{7,72 \cdot 10^{-4} - 7,52 \cdot 10^{-4}}{3-1}}{\frac{7,52 \cdot 10^{-4}}{9}}$$

$$= \frac{1 \cdot 10^{-5}}{8,36 \cdot 10^{-5}} = 0,120$$

$$F_{hitung} = 0,120 < F_{tabel 0,05 (2;9)} = 4,26$$

LAMPIRAN XI

**PERHITUNGAN BATAS DETEKSI DAN BATAS KUANTITASI
PADA PENETAPAN KADAR NATRIUM LAURIL SULFAT
DENGAN PEREAKSI KRISTAL VIOLET**

Data serapan blanko

Serapan (x)	(x - $\bar{x}$)	(x - $\bar{x}$) ²
0,263	-2,2.10 ⁻³	4,84.10 ⁻⁶
0,263	-2,2.10 ⁻³	4,84.10 ⁻⁶
0,265	-2,0.10 ⁻⁴	4,00.10 ⁻⁸
0,264	-1,2.10 ⁻³	1,44.10 ⁻⁶
0,264	-1,2.10 ⁻³	1,44.10 ⁻⁶
0,267	1,8.10 ⁻³	3,24.10 ⁻⁶
0,266	8,0.10 ⁻⁴	6,40.10 ⁻⁷
0,267	1,8.10 ⁻³	3,24.10 ⁻⁶
0,267	1,8.10 ⁻³	3,24.10 ⁻⁶
0,266	8,0.10 ⁻⁴	6,40.10 ⁻⁶
x = 0,2652		$\Sigma = 2,36.10^{-5}$

$$SB = \sqrt{\frac{\sum(x-\bar{x})^2}{n-1}} = \sqrt{\frac{2,36.10^{-5}}{10-1}} = 1,62.10^{-3}$$

Dari data penentuan linieritas (pada lampiran V) didapatkan persamaan garis regresi :

$$y = 0,3688 x + 3,74.10^{-3}$$

maka dapat dihitung :

$$\begin{aligned} \text{Batas deteksi} &= k \cdot \frac{SB}{S} = 3 \times \frac{1,62.10^{-3}}{0,3688} = 0,0132 \text{ bpj} \\ \text{Batas kuantitasi} &= k \cdot \frac{SB}{S} = 10 \times \frac{1,62.10^{-3}}{0,3688} = 0,0439 \text{ bpj} \end{aligned}$$

LAMPIRAN XII

PERHITUNGAN KETEPATAN
PENETAPAN KADAR NATRIUM LAURIL SULFAT
DALAM MATRIK SAMPEL DENGAN PEREAKSI BIRU METILEN
MENGUNAKAN UJI "t" SATU SAMPEL

Replikasi	Kadar sebenarnya (bpj)	Serapan	Kadar yang diperoleh (bpj)	% perolehan kembali
1	0,4012	0,138	0,4045	100,82
2	0,4180	0,145	0,4255	101,79
3	0,4413	0,150	0,4405	99,82
4	0,4598	0,157	0,4614	100,35
5	0,5016	0,171	0,5034	100,36
6	0,5224	0,173	0,5094	97,51
7	0,5420	0,186	0,5483	101,16
8	0,5644	0,192	0,5663	100,34
9	0,6019	0,212	0,6263	104,05
10	0,6269	0,209	0,6173	98,47
rata - rata				100,47
SD				1,7759

$$t = \frac{|\bar{x} - \mu|}{\frac{SD}{\sqrt{N}}} = \frac{|100,47 - 100|}{\frac{1,7759}{\sqrt{10}}}$$

$$= \frac{0,47}{0,5616} = 0,837$$

$$t_{hitung} = 0,837 < t_{tabel\ 0,05(9)} = 2,262$$

LAMPIRAN XIII

PERHITUNGAN KETEPATAN
PENETAPAN KADAR NATRIUM LAURIL SULFAT
DALAM MATRIK SAMPEL DENGAN PEREAKSI KRISTAL VIOLET
MENGUNAKAN UJI "t" SATU SAMPEL

Replikasi	Kadar sebenarnya (bpj)	Serapan	Kadar yang diperoleh (bpj)	% perolehan kembali
1	0,4012	0,146	0,3857	96,14
2	0,4180	0,153	0,4047	96,82
3	0,4413	0,158	0,4183	94,79
4	0,4598	0,174	0,4617	100,41
5	0,5016	0,183	0,4861	96,91
6	0,5224	0,195	0,5186	99,27
7	0,5420	0,204	0,5430	100,18
8	0,5644	0,207	0,5511	97,64
9	0,6019	0,225	0,5999	99,67
10	0,6269	0,227	0,6054	96,57
rata - rata				97,84
SD				1,9214

$$t = \frac{|\bar{x} - \mu|}{\frac{SD}{\sqrt{n}}} = \frac{|97,84 - 100|}{\frac{1,9214}{\sqrt{10}}}$$

$$= \frac{2,16}{0,6076} = 3,555$$

$$t_{hitung} = 3,555 > t_{tabel 0,05(9)} = 2,262$$

LAMPIRAN XIV

PERHITUNGAN KETELITIAN INSTRUMEN
PADA PENETAPAN KADAR NATRIUM LAURIL SULFAT
DENGAN PEREAKSI BIRU METILEN

Serapan (x)	$(x-\bar{x})$	$(x-\bar{x})^2$
0,169	$-5,0 \cdot 10^{-4}$	$2,50 \cdot 10^{-7}$
0,170	$5,0 \cdot 10^{-4}$	$2,50 \cdot 10^{-7}$
0,168	$-1,5 \cdot 10^{-3}$	$2,25 \cdot 10^{-6}$
0,168	$-1,5 \cdot 10^{-3}$	$2,25 \cdot 10^{-6}$
0,169	$-5,0 \cdot 10^{-4}$	$2,50 \cdot 10^{-7}$
0,168	$-1,5 \cdot 10^{-3}$	$2,25 \cdot 10^{-6}$
0,170	$5,0 \cdot 10^{-4}$	$2,50 \cdot 10^{-7}$
0,172	$2,5 \cdot 10^{-3}$	$6,25 \cdot 10^{-6}$
0,171	$1,5 \cdot 10^{-3}$	$2,25 \cdot 10^{-6}$
0,170	$5,0 \cdot 10^{-4}$	$2,50 \cdot 10^{-7}$
$\bar{x} = 0,1695$		$\Sigma = 1,65 \cdot 10^{-5}$

$$SD = \sqrt{\frac{\sum (x-\bar{x})^2}{n-1}} = \sqrt{\frac{1,65 \cdot 10^{-5}}{10-1}}$$

$$= 1,35 \cdot 10^{-3}$$

$$KV = \frac{SD}{\bar{x}} \times 100 \%$$

$$= \frac{1,35 \cdot 10^{-3}}{0,1695} \times 100 \%$$

$$= 0,80 \%$$

LAMPIRAN XV

PERHITUNGAN KETELITIAN ANTAR PENETAPAN KADAR
PADA PENETAPAN KADAR NATRIUM LAURIL SULFAT
DENGAN PEREAKSI BIRU METILEN

% perolehan kembali (x)	(x- $\bar{x}$)	(x- $\bar{x}$) ²
100,82	0,35	0,1225
101,79	1,32	1,7424
99,82	-0,65	0,4225
100,35	-0,12	0,0144
100,36	-0,11	0,0121
97,51	-2,96	8,7616
101,16	0,69	0,4761
100,34	-0,13	0,0169
104,05	3,58	12,8164
98,47	-2,00	4,0000
$\bar{x} = 100,47$		$\Sigma = 28,3849$

$$SD = \sqrt{\frac{\sum(x-\bar{x})^2}{n-1}} = \sqrt{\frac{28,3849}{10-1}}$$

$$= 1,7759$$

$$KV = \frac{SD}{\bar{x}} \times 100 \%$$

$$= \frac{1,7759}{100,47} \times 100 \%$$

$$= 1,77 \%$$

LAMPIRAN XVI

PERHITUNGAN KETELITIAN INSTRUMEN
PADA PENETAPAN KADAR NATRIUM LAURIL SULFAT
DENGAN PEREAKSI KRISTAL VIOLET

Serapan (x)	$(x-\bar{x})$	$(x-\bar{x})^2$
0,210	$-3,1 \cdot 10^{-3}$	$9,61 \cdot 10^{-6}$
0,210	$-3,1 \cdot 10^{-3}$	$9,61 \cdot 10^{-6}$
0,212	$-1,1 \cdot 10^{-3}$	$1,21 \cdot 10^{-6}$
0,214	$9,0 \cdot 10^{-4}$	$8,10 \cdot 10^{-7}$
0,215	$1,9 \cdot 10^{-3}$	$3,61 \cdot 10^{-6}$
0,213	$-1,0 \cdot 10^{-4}$	$1,00 \cdot 10^{-8}$
0,214	$9,0 \cdot 10^{-4}$	$8,10 \cdot 10^{-7}$
0,215	$1,9 \cdot 10^{-3}$	$3,61 \cdot 10^{-6}$
0,215	$1,9 \cdot 10^{-3}$	$3,61 \cdot 10^{-6}$
0,213	$-1,0 \cdot 10^{-4}$	$1,00 \cdot 10^{-8}$
$\bar{x} = 0,2131$		$\Sigma = 3,29 \cdot 10^{-5}$

$$SD = \sqrt{\frac{\sum (x-\bar{x})^2}{n-1}} = \sqrt{\frac{3,29 \cdot 10^{-5}}{10-1}}$$

$$= 1,91 \cdot 10^{-3}$$

$$KV = \frac{SD}{\bar{x}} \times 100 \%$$

$$= \frac{1,91 \cdot 10^{-3}}{0,2131} \times 100 \%$$

$$= 0,90 \%$$

LAMPIRAN XVII

PERHITUNGAN KETELITIAN ANTAR PENETAPAN KADAR
PADA PENETAPAN KADAR NATRIUM LAURIL SULFAT
DENGAN PEREAKSI KRISTAL VIOLET

% perolehan kembali (x)	(x- $\bar{x}$)	(x- $\bar{x}$) ²
96,14	-1,70	2,8900
96,82	-1,02	1,0404
94,79	-3,05	9,3025
100,41	2,57	6,6049
96,91	-0,93	0,8649
99,27	1,43	2,0449
100,18	2,34	5,4756
97,64	-0,20	0,0400
99,67	1,83	3,3489
96,57	-1,27	1,6129
$\bar{x} = 97,84$		$\Sigma = 33,2250$

$$SD = \sqrt{\frac{\sum (x-\bar{x})^2}{n-1}} = \sqrt{\frac{33,2250}{10-1}}$$

$$= 1,9214$$

$$KV = \frac{SD}{\bar{x}} \times 100 \%$$

$$= \frac{1,9214}{97,84} \times 100 \%$$

$$= 1,96 \%$$

LAMPIRAN XVIII

PERHITUNGAN PERBANDINGAN KETEPATAN PENETAPAN KADAR
NATRIUM LAURIL SULFAT DALAM MATRIK SAMPEL
DENGAN PEREAKSI BIRU METILEN (A) DAN KRISTAL VIOLET (B)
MENGUNAKAN UJI "t" SEPASANG

Replikasi	x_A	x_B	$d = x_A - x_B$	d^2
1	100,82	96,14	4,68	21,9024
2	101,79	96,82	4,97	24,7009
3	99,82	94,79	5,03	25,3009
4	100,35	100,41	-0,06	0,0036
5	100,36	96,91	3,45	11,9025
6	97,51	99,27	-1,76	3,0976
7	101,16	100,18	0,98	0,9604
8	100,34	97,64	2,70	7,2900
9	104,05	99,67	4,38	19,1844
10	98,47	96,57	1,90	3,6100
Σ			26,27	117,9527

$$\bar{d} = \frac{\Sigma d}{n} = \frac{26,27}{10} = 2,627$$

$$S_d = \sqrt{\frac{n \cdot \Sigma d^2 - (\Sigma d)^2}{n(n-1)}} = \sqrt{\frac{10 \cdot 117,9527 - 26,27^2}{10(10-1)}} = 2,3319$$

$$S_{\bar{d}} = \frac{S_d}{\sqrt{n}} = \frac{2,3319}{\sqrt{10}} = 0,7374$$

$$t = \frac{\bar{d}}{S_{\bar{d}}} = \frac{2,627}{0,7374} = 3,563$$

$$t_{hitung} = 3,563 > t_{tabel 0,05 (9)} = 2,262$$

LAMPIRAN XIX

PERHITUNGAN PERBANDINGAN
KETELITIAN ANTAR PENETAPAN KADAR NATRIUM LAURIL SULFAT
DALAM MATRIK SAMPEL DENGAN PEREAKSI
BIRU METILEN DAN KRISTAL VIOLET MENGGUNAKAN UJI "F"

Replikasi	% perolehan kembali	
	Biru metilen	Kristal violet
1	100,82	96,14
2	101,79	96,82
3	99,82	94,79
4	100,35	100,41
5	100,36	96,91
6	97,51	99,27
7	101,16	100,18
8	100,34	97,64
9	104,05	99,67
10	98,47	96,57
rata - rata	100,47	97,84
SD	1,7759	1,9214

$$F = \frac{s_1^2}{s_2^2} = \frac{1,9214^2}{1,7759^2} = 1,17$$

$$F_{hitung} = 1,17 < F_{tabel\ 0,05\ (9;9)} = 3,18$$

LAMPIRAN XX

PERHITUNGAN PERBANDINGAN KETELITIAN INSTRUMEN
 PADA PENETAPAN KADAR NATRIUM LAURIL SULFAT
 DENGAN PEREAKSI BIRU METILEN DAN KRISTAL VIOLET
 MENGGUNAKAN UJI "F"

Replikasi	Biru metilen	Kristal violet
1	0,169	0,210
2	0,170	0,210
3	0,168	0,212
4	0,168	0,214
5	0,169	0,215
6	0,168	0,213
7	0,170	0,214
8	0,172	0,215
9	0,171	0,215
10	0,170	0,213
rata - rata	0,1695	0,2131
SD	$1,35 \cdot 10^{-3}$	$1,91 \cdot 10^{-3}$

$$F = \frac{s_1^2}{s_2^2} = \frac{(1,91 \cdot 10^{-3})^2}{(1,35 \cdot 10^{-3})^2} = 2,00$$

$$F_{hitung} = 2,00 < F_{tabel\ 0,05(9;9)} = 3,18$$

LAMPIRAN XXI

TABEL t

Degrees of freedom	Level of Significance for One - Tailed Test				
	0,005	0,010	0,025	0,050	0,100
	Level of Significance for Two - Tailed Test				
	0,010	0,020	0,050	0,100	0,200
1	63,657	31,821	12,706	6,314	3,078
2	9,925	6,965	4,303	2,920	1,886
3	5,841	4,541	3,182	2,353	1,638
4	4,604	3,747	2,776	2,132	1,533
5	4,032	3,365	2,571	2,015	1,476
6	3,707	3,143	2,447	1,943	1,440
7	3,499	2,998	2,365	1,895	1,415
8	3,355	2,896	2,306	1,860	1,397
9	3,250	2,821	2,262	1,833	1,383
10	3,169	2,764	2,228	1,812	1,372
11	3,106	2,718	2,201	1,796	1,363
12	3,055	2,681	2,179	1,782	1,356
13	3,012	2,650	2,160	1,771	1,350
14	2,977	2,624	2,145	1,761	1,345
15	2,947	2,602	2,131	1,753	1,341
16	2,921	2,583	2,120	1,746	1,337
17	2,898	2,567	2,110	1,740	1,333
18	2,878	2,552	2,101	1,734	1,330
19	2,861	2,539	2,093	1,729	1,328
20	2,845	2,528	2,086	1,725	1,325

Dikutip dari : Fisher, R. A., Statistical Tables For Biological, Agricultural and Medical Research, 6th ed., Oliver and Boyd, Edinburgh, 1963.

LAMPIRAN XXII

TABEL F

$\frac{DB_2}{DB_1}$	1	2	3	4	5	6	7	8	9	10
1	161	200	216	225	230	234	237	239	241	242
2	18,51	19,00	19,16	19,25	19,30	19,33	19,33	19,36	19,38	19,39
3	10,13	9,55	9,28	8,12	9,01	8,94	8,94	8,88	8,81	8,78
4	7,71	6,94	6,59	6,39	6,26	6,16	6,16	6,09	6,00	5,96
5	6,61	5,79	5,41	5,19	5,05	4,95	4,95	4,88	4,78	4,74
6	5,99	5,14	4,76	4,53	4,39	4,28	4,28	4,21	4,10	4,06
7	5,59	4,74	4,35	4,12	3,97	3,87	3,87	3,79	3,68	3,63
8	5,32	4,46	4,07	3,84	3,69	3,58	3,58	3,50	3,39	3,34
9	5,12	4,26	3,86	3,63	3,48	3,37	3,37	3,29	3,18	3,13
10	4,96	4,10	3,71	3,48	3,33	3,22	3,22	3,14	3,02	2,97

Keterangan :

DB_1 = Derajat bebas yang berhubungan dengan variansi yang terbesar ($p = 0,05$)

DB_2 = Derajat bebas yang berhubungan dengan variansi yang terkecil ($p = 0,05$)

Dikutip dari : Introductory Statistics for Behavioral Sciences, Harcourt Brace Jonanovic Publisher, New York, 1988.