

## 7. LAMPIRAN



## Lampiran 1. Pembagian Jumlah Data Ikan Mujair

~ Pembagian jumlah data ikan mujair berdasarkan berat

\*Range (R) = Nilai data terbesar – Nilai data terkecil

$$= 304,78 - 33,58$$

$$\text{Range (R)} = 271,2$$

\*Interval (i) = R /  $\Sigma$  kelas

$$= 271,2 / 3$$

$$= 90,4$$

$33,58 \leq$  kelompok kecil  $\leq 123,98$  (35 data)

$123,99 \leq$  kelompok sedang  $\leq 214,38$  (29 data)

$214,39 \leq$  kelompok besar  $\leq 304,78$  (26 data)

	Kelompok	Mean	Standar deviasi
Berat	Kecil	67,75	27,07
	Sedang	174,92	22,69
	Besar	258,85	25,05
Konsentrasi Pb	Kecil	0,77	0,27
	Sedang	1,42	0,21
	Besar	1,57	0,17
Konsentrasi Cu	Kecil	0,19	0,05
	Sedang	0,24	0,07
	Besar	0,35	0,08
Kandungan Pb	Kecil	57,38	39,29
	Sedang	250,31	57,37
	Besar	406,01	63,83
Kandungan Cu	Kecil	12,68	6,67
	Sedang	42,57	14,41
	Besar	89,35	19,37

~ Pembagian jumlah data ikan mujair berdasarkan panjang

\*Range (R) = Nilai data terbesar – Nilai data terkecil

$$= 24,5 - 13,3$$

$$\text{Range (R)} = 11,2$$

\*Interval (i) = R /  $\Sigma$  kelas

$$= 11,2 / 3$$

$$= 3,73$$

13,3  $\leq$  kelompok kecil  $\leq$  17,03 (25 data)

17,04  $\leq$  kelompok sedang  $\leq$  20,77 (31 data)

20,78  $\leq$  kelompok besar  $\leq$  24,5 (34 data)

	Kelompok	Mean	Standar deviasi
Panjang	Kecil	15,14	1,21
	Sedang	19,15	0,92
	Besar	22,46	0,99
Konsentrasi Pb	Kecil	0,68	0,24
	Sedang	1,27	0,28
	Besar	1,55	0,18
Konsentrasi Cu	Kecil	0,19	0,04
	Sedang	0,23	0,08
	Besar	0,32	0,09
Kandungan Pb	Kecil	38,03	21,48
	Sedang	193,40	79,37
	Besar	378,75	76,21
Kandungan Cu	Kecil	9,90	3,40
	Sedang	34,10	17,14
	Besar	79,32	25,18

## Lampiran 2. Data SPSS Hubungan Ukuran Ikan – Kandungan Logam

~ Data SPSS berat ikan berukuran kecil dengan logam Pb

### Power

**Model Summary**

R	R Square	Adjusted R Square	Std. Error of the Estimate
.901	.811	.805	.321

The independent variable is berat.

**ANOVA**

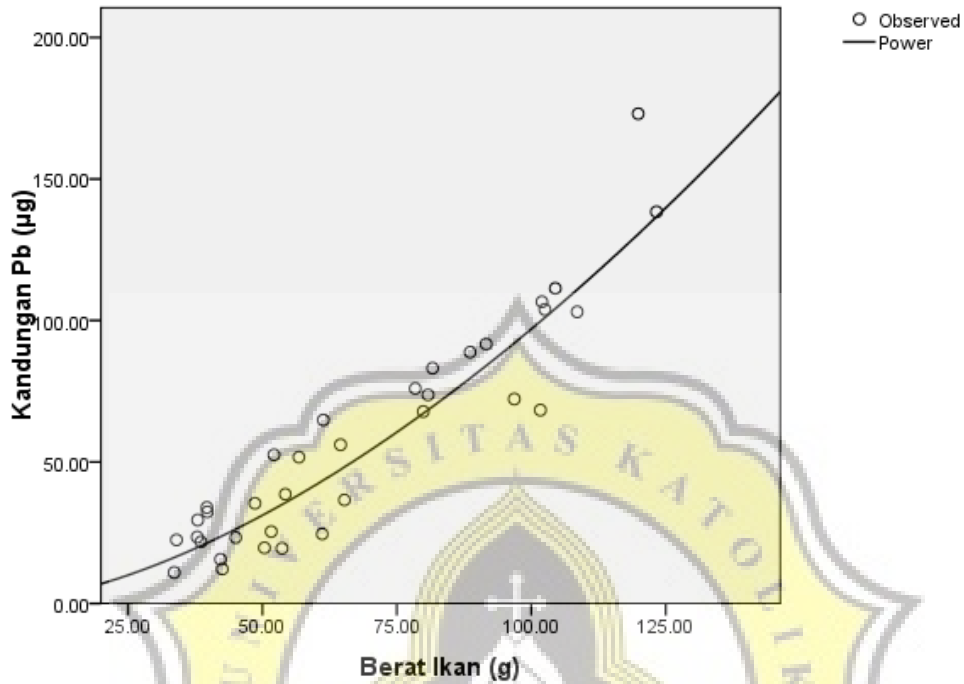
	Sum of Squares	df	Mean Square	F	Sig.
Regression	14.573	1	14.573	141.526	.000
Residual	3.398	33	.103		
Total	17.971	34			

The independent variable is berat.

**Coefficients**

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
ln(berat)	1.638	.138	.901	11.896	.000
(Constant)	.051	.029		1.747	.090

The dependent variable is ln(TPb).



~ Data SPSS berat ikan berukuran kecil dengan logam Cu

**Power**

**Model Summary**

R	R Square	Adjusted R Square	Std. Error of the Estimate
.803	.644	.633	.275

The independent variable is berat.

**ANOVA**

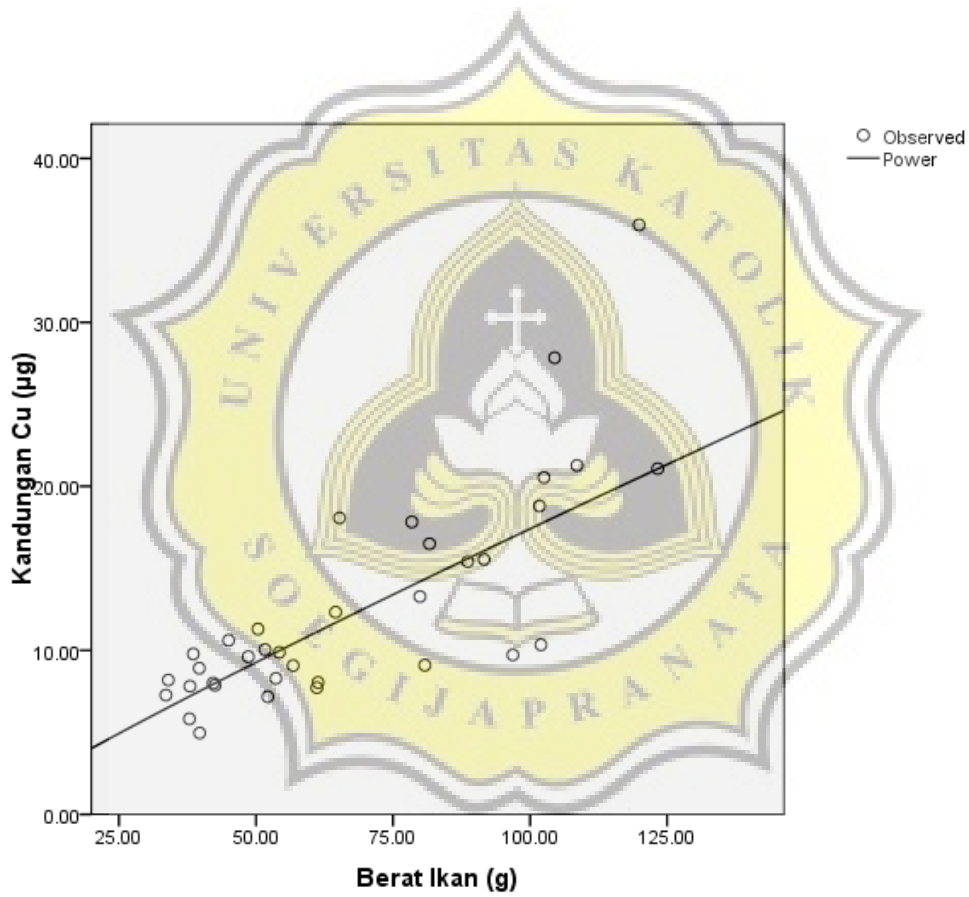
	Sum of Squares	df	Mean Square	F	Sig.
Regression	4.503	1	4.503	59.742	.000
Residual	2.488	33	.075		
Total	6.991	34			

The independent variable is berat.

### Coefficients

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
ln(berat)	.911	.118	.803	7.729	.000
(Constant)	.263	.129		2.042	.049

The dependent variable is ln(TCu).



~ Data SPSS berat ikan berukuran sedang dengan logam Pb

## Power

**Model Summary**

R	R Square	Adjusted R Square	Std. Error of the Estimate
.838	.702	.691	.143

The independent variable is berat.

**ANOVA**

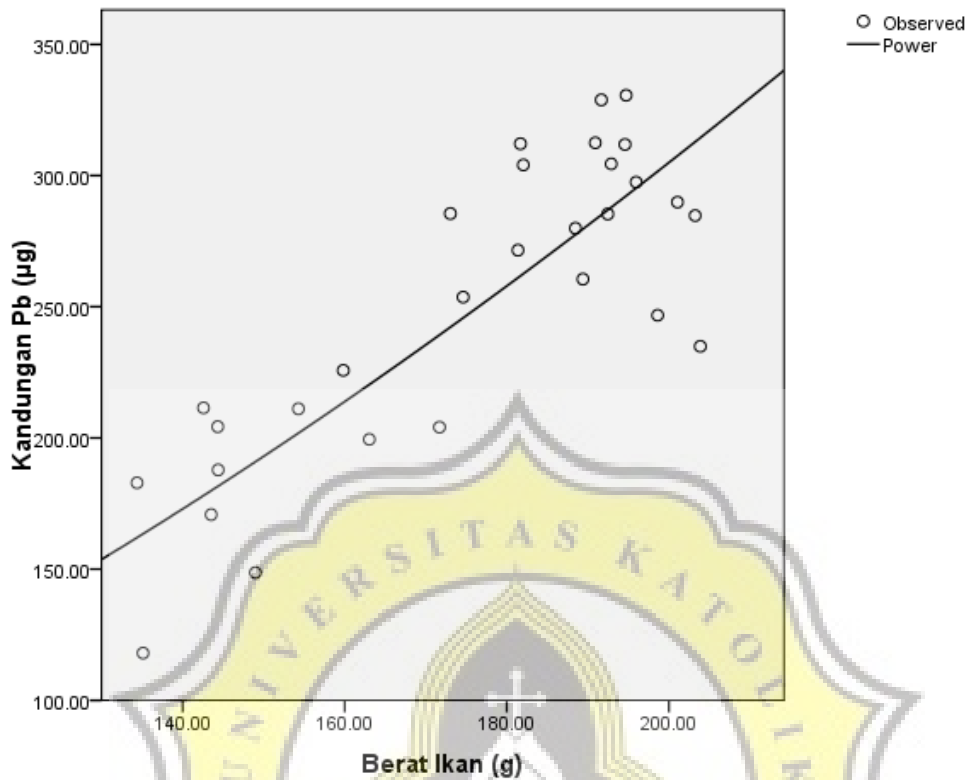
	Sum of Squares	df	Mean Square	F	Sig.
Regression	1.295	1	1.295	63.734	.000
Residual	.549	27	.020		
Total	1.844	28			

The independent variable is berat.

**Coefficients**

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
ln(berat)	1.590	.199	.838	7.983	.000
(Constant)	.067	.069		.974	.339

The dependent variable is ln(TPb).



~ Data SPSS berat ikan berukuran sedang dengan logam Cu

**Power**

**Model Summary**

R	R Square	Adjusted R Square	Std. Error of the Estimate
.515	.266	.238	.313

The independent variable is berat.

**ANOVA**

	Sum of Squares	df	Mean Square	F	Sig.
Regression	.957	1	.957	9.767	.004
Residual	2.644	27	.098		
Total	3.601	28			

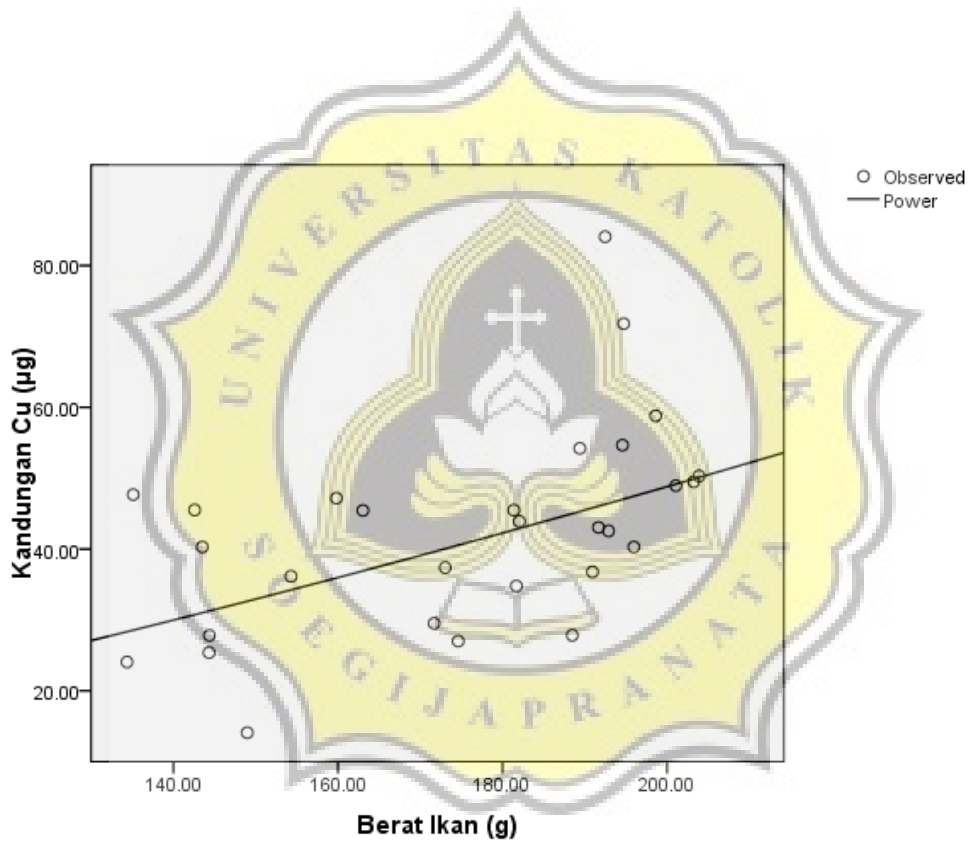
The independent variable is berat.



### Coefficients

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
ln(berat)	1.366	.437	.515	3.125	.004
(Constant)	.035	.079		.443	.661

The dependent variable is ln(TCu).



~ Data SPSS berat ikan berukuran besar dengan logam Pb

## Power

**Model Summary**

R	R Square	Adjusted R Square	Std. Error of the Estimate
.721	.519	.499	.111

The independent variable is berat.

**ANOVA**

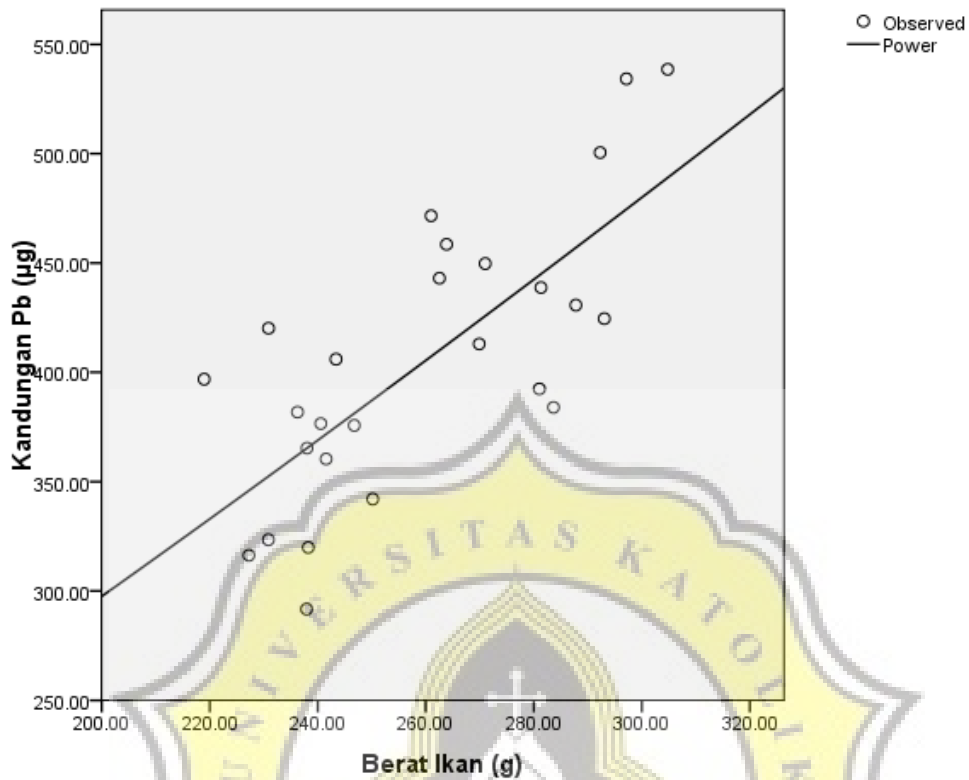
	Sum of Squares	df	Mean Square	F	Sig.
Regression	.321	1	.321	25.939	.000
Residual	.297	24	.012		
Total	.619	25			

The independent variable is berat.

**Coefficients**

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
ln(berat)	1.179	.232	.721	5.093	.000
(Constant)	.575	.739		.778	.444

The dependent variable is ln(TPb).



~ Data SPSS berat ikan berukuran besar dengan logam Cu

### Power

#### Model Summary

R	R Square	Adjusted R Square	Std. Error of the Estimate
.173	.030	-.010	.244

The independent variable is berat.

#### ANOVA

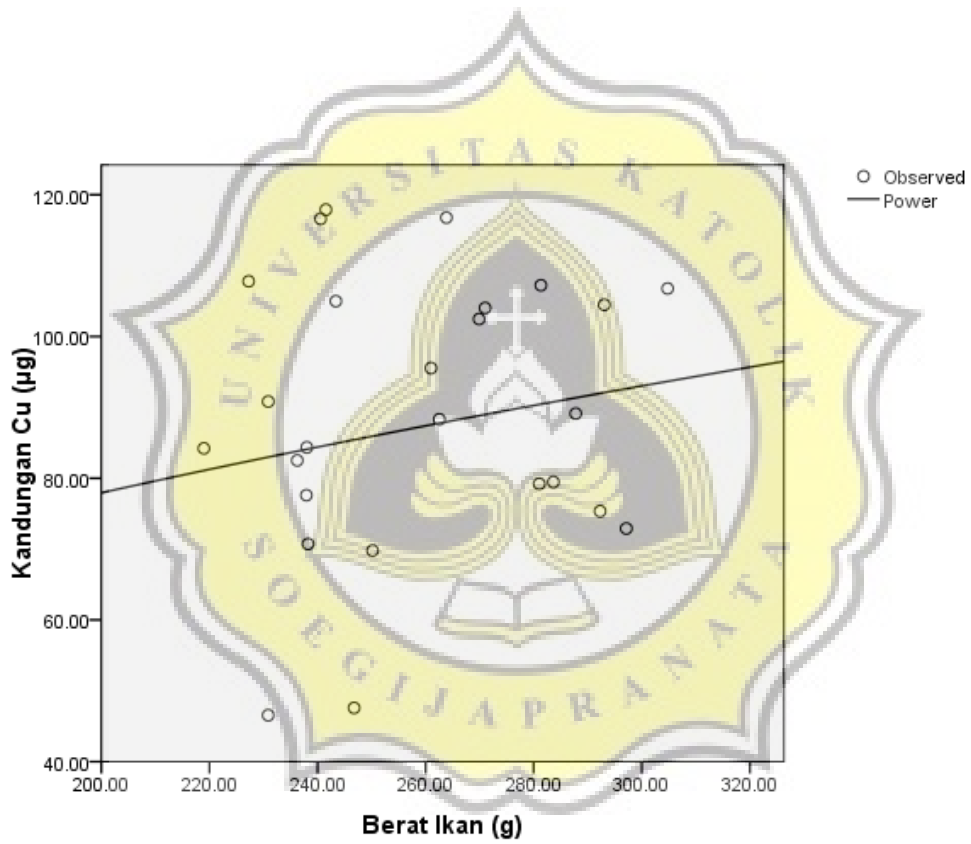
	Sum of Squares	df	Mean Square	F	Sig.
Regression	.044	1	.044	.740	.398
Residual	1.425	24	.059		
Total	1.469	25			

The independent variable is berat.

### Coefficients

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
ln(berat)	.436	.507	.173	.860	.398
(Constant)	7.730	21.756		.355	.725

The dependent variable is ln(TCu).



~ Data SPSS panjang ikan berukuran kecil dengan logam Pb

## Power

**Model Summary**

R	R Square	Adjusted R Square	Std. Error of the Estimate
.783	.612	.596	.122

The independent variable is panjang.

**ANOVA**

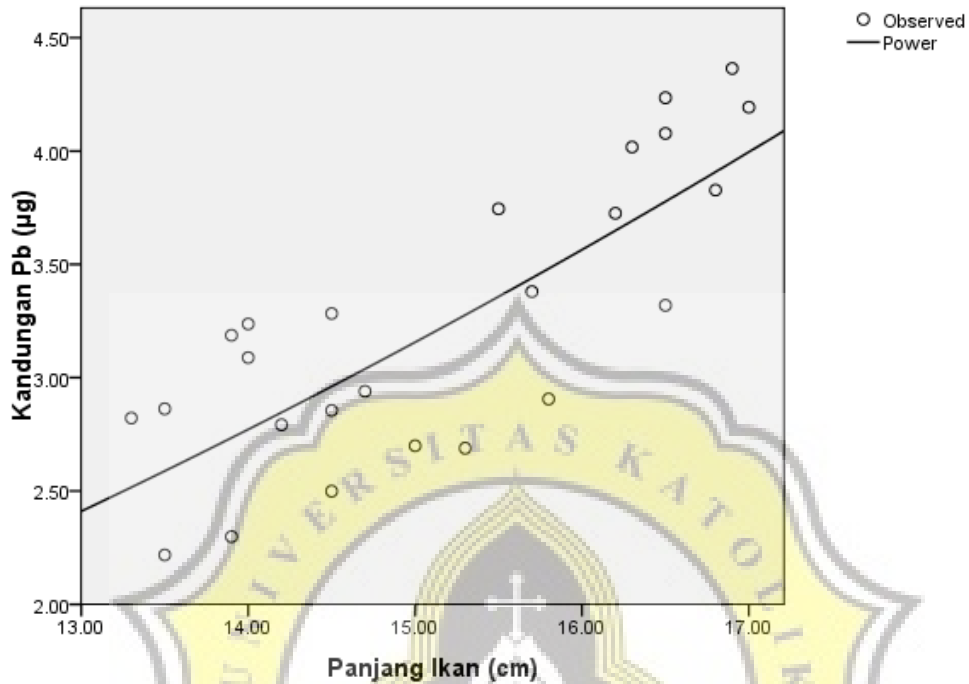
	Sum of Squares	df	Mean Square	F	Sig.
Regression	.542	1	.542	36.348	.000
Residual	.343	23	.015		
Total	.885	24			

The independent variable is panjang.

**Coefficients**

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
ln(panjang)	1.884	.312	.783	6.029	.000
(Constant)	.019	.016		1.179	.251

The dependent variable is ln(PbS).



~ Data SPSS panjang ikan berukuran kecil dengan logam Cu

**Power**

**Model Summary**

R	R Square	Adjusted R Square	Std. Error of the Estimate
.638	.407	.381	.083

The independent variable is panjang.

**ANOVA**

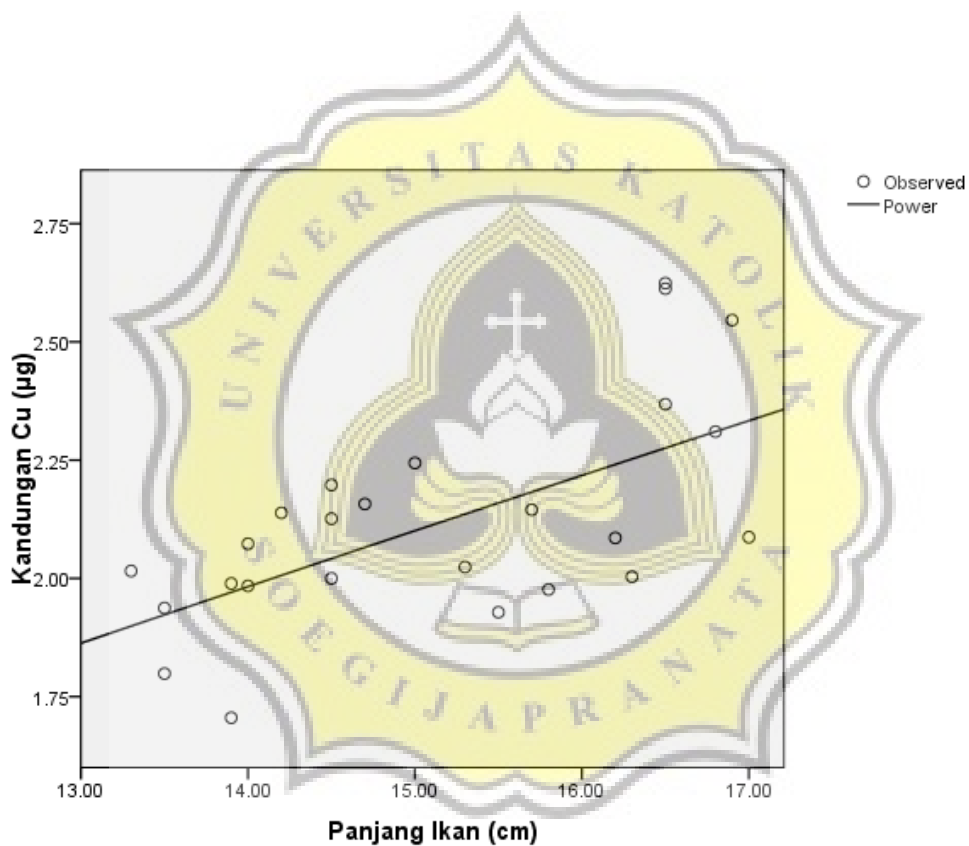
	Sum of Squares	df	Mean Square	F	Sig.
Regression	.108	1	.108	15.796	.001
Residual	.157	23	.007		
Total	.264	24			

The independent variable is panjang.

### Coefficients

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
ln(panjang)	.839	.211	.638	3.974	.001
(Constant)	.217	.124		1.744	.094

The dependent variable is ln(CuS).



~ Data SPSS panjang ikan berukuran sedang dengan logam Pb

**Power**

**Model Summary**

R	R Square	Adjusted R Square	Std. Error of the Estimate
.801	.642	.630	.094

The independent variable is panjang.

**ANOVA**

	Sum of Squares	df	Mean Square	F	Sig.
Regression	.462	1	.462	51.975	.000
Residual	.258	29	.009		
Total	.720	30			

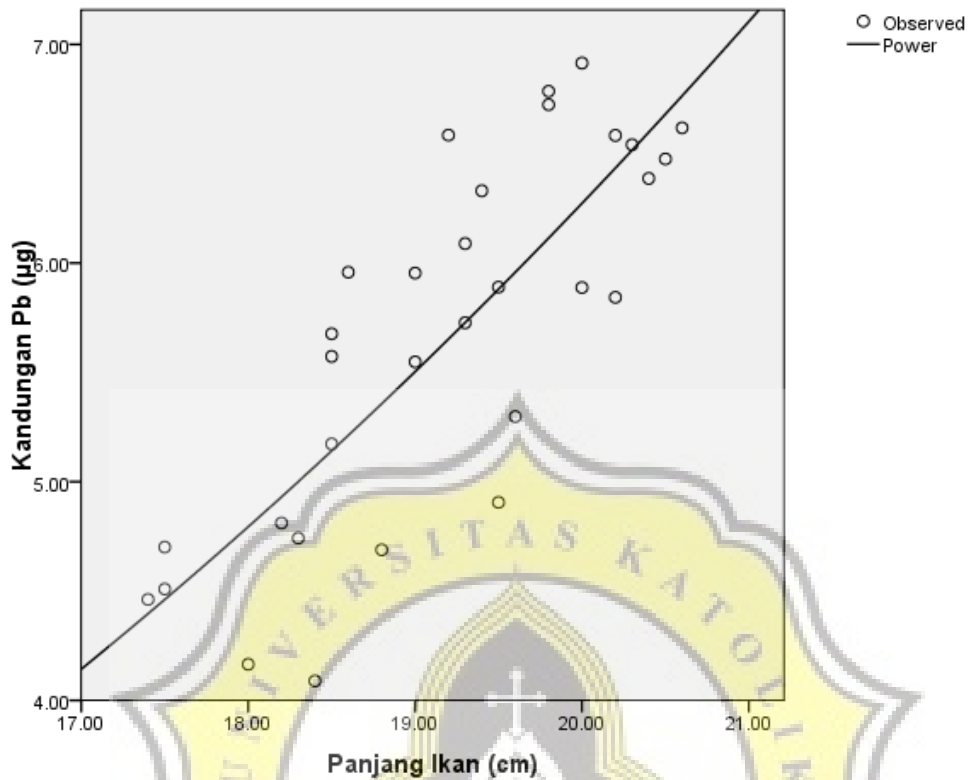
The independent variable is panjang.

**Coefficients**

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
ln(panjang)	2.553	.354	.801	7.209	.000
(Constant)	.003	.003		.957	.347

The dependent variable is ln(PbS).





~ Data SPSS panjang ikan berukuran sedang dengan logam Cu

### Power

#### Model Summary

R	R Square	Adjusted R Square	Std. Error of the Estimate
.681	.464	.446	.131

The independent variable is panjang.

#### ANOVA

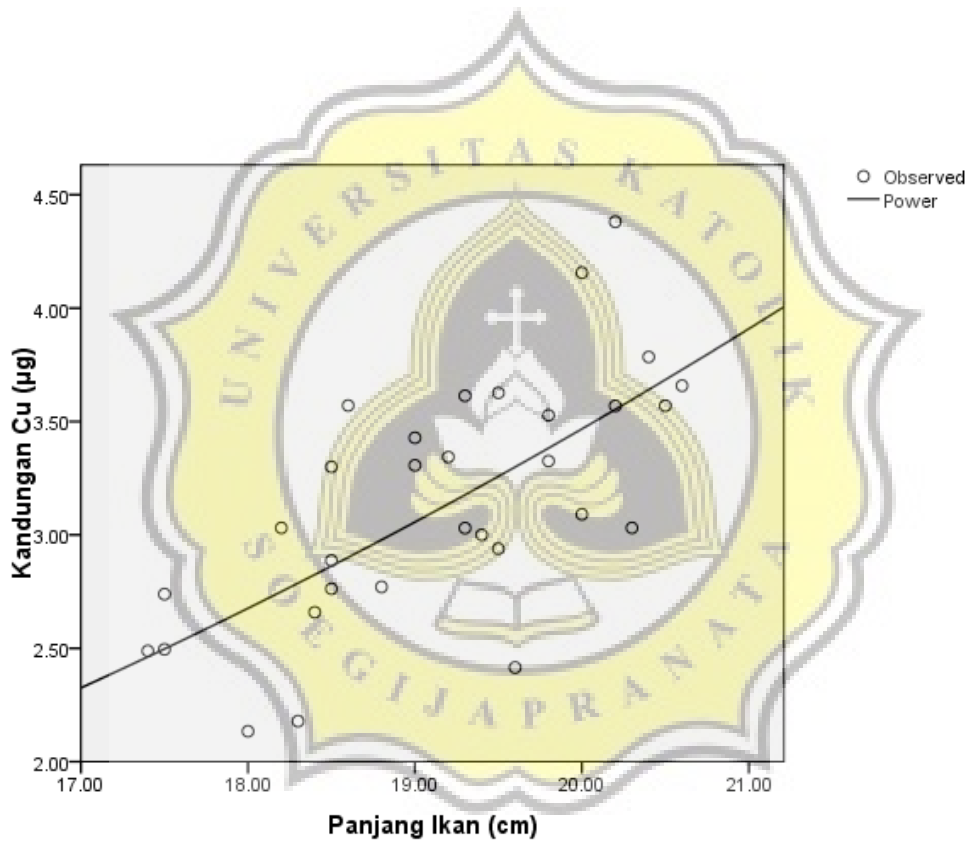
	Sum of Squares	df	Mean Square	F	Sig.
Regression	.428	1	.428	25.134	.000
Residual	.494	29	.017		
Total	.923	30			

The independent variable is panjang.

### Coefficients

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
ln(panjang)	2.458	.490	.681	5.013	.000
(Constant)	.002	.003		.691	.495

The dependent variable is ln(CuS).



~ Data SPSS panjang ikan berukuran besar dengan logam Pb

**Power**

**Model Summary**

R	R Square	Adjusted R Square	Std. Error of the Estimate
.747	.558	.544	.046

The independent variable is panjang.

**ANOVA**

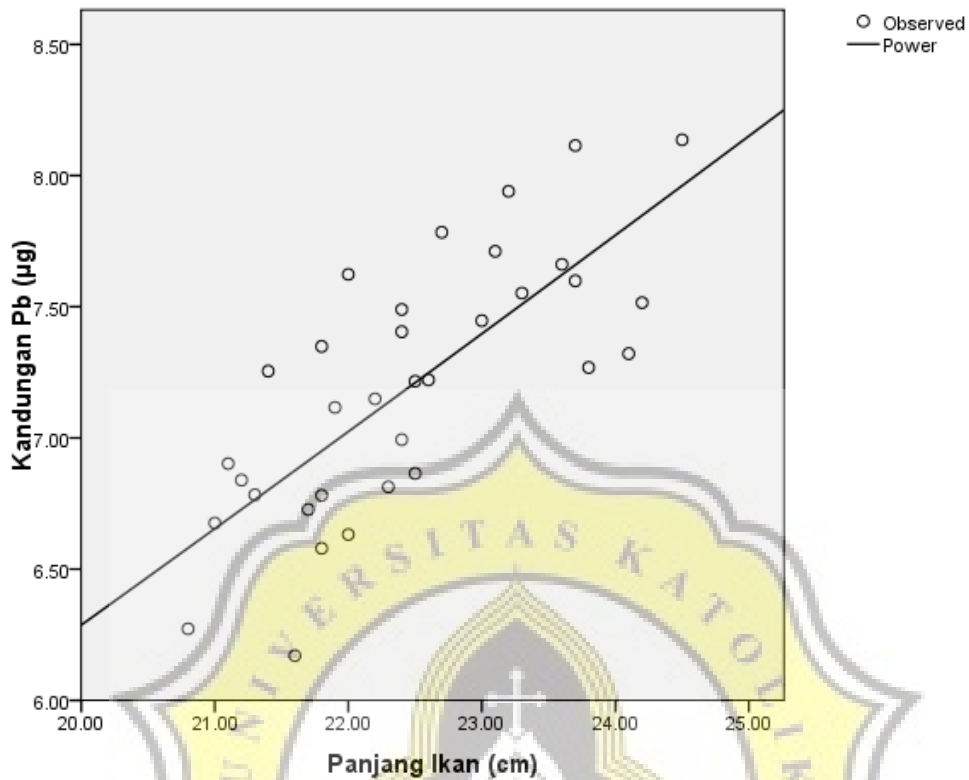
	Sum of Squares	df	Mean Square	F	Sig.
Regression	.086	1	.086	40.354	.000
Residual	.068	32	.002		
Total	.154	33			

The independent variable is panjang.

**Coefficients**

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
ln(panjang)	1.163	.183	.747	6.352	.000
(Constant)	.193	.110		1.755	.089

The dependent variable is ln(PbS).



~ Data SPSS panjang ikan berukuran besar dengan logam Cu

**Power**

**Model Summary**

R	R Square	Adjusted R Square	Std. Error of the Estimate
.573	.329	.308	.098

The independent variable is panjang.

**ANOVA**

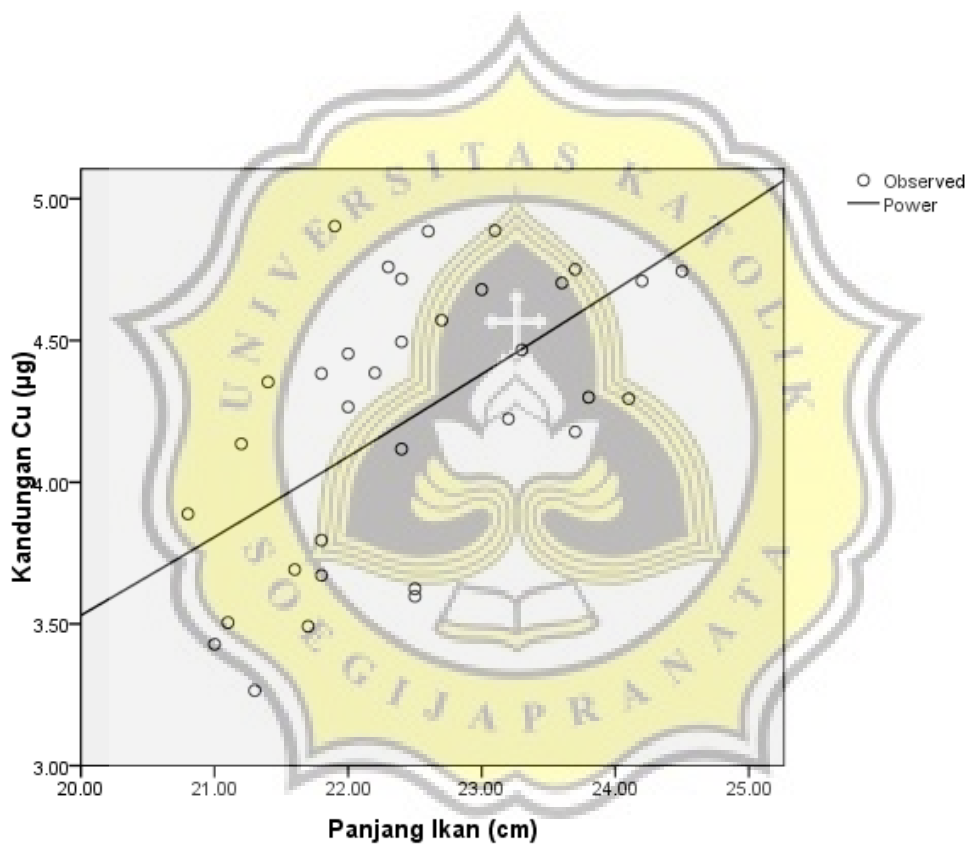
	Sum of Squares	df	Mean Square	F	Sig.
Regression	.151	1	.151	15.672	.000
Residual	.309	32	.010		
Total	.460	33			

The independent variable is panjang.

**Coefficients**

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
ln(panjang)	1.544	.390	.573	3.959	.000
(Constant)	.035	.042		.824	.416

The dependent variable is ln(CuS).



### Lampiran 3. Perhitungan MRL Logam

~ MRL logam Pb

*Maximum Tolerable Weekly Intake* (MTWI) = 25 µg/kg berat badan.

$$\begin{aligned} \text{Asumsi berat badan} = 65 \text{ kg} \rightarrow \text{MTWI} &= 25 \text{ µg/kg} \times 65 \text{ kg} \\ &= 1625 \text{ µg} = 1,625 \text{ mg} \end{aligned}$$

$$\text{Index}_{\text{log am}} = \left( \frac{\text{total}_{\text{konsumsi}}_{\text{ikan}}}{\text{total}_{\text{konsumsi}}} \right) \times 100\% \times \text{MTWI}$$

$$\begin{aligned} \text{Index}_{\text{log am}} &= \left( \frac{49,84 \text{ g / hari}}{838,54 \text{ g / hari}} \right) \times 100\% \times 1,625 \text{ mg} \\ &= 0,0965 \text{ mg} \end{aligned}$$

Maksimum konsumsi ikan per minggu = 49,84 g/hari x 7 hari = 348,88 g = 0,348 kg

$$\text{MRL} = \frac{\text{index}_{\text{log am}}_{\text{maksimum}}_{\text{pada}}_{\text{ikan}}}{\text{maksimum}_{\text{konsumsi}}_{\text{ikan}}_{\text{per}}_{\text{min}}_{\text{inggu}}}$$

$$\text{MRL} = \frac{0,0965 \text{ mg}}{0,348 \text{ kg}} = 0,28 \text{ mg/kg} = 0,28 \text{ µg/g}$$

~ MRL logam Cu

*Upper Limit of Safe Range* (ULSR) logam Cu = 12 mg/hari.

$$\begin{aligned} \text{Maximum Tolerable Weekly Intake} \text{ (MTWI)} &= 12 \text{ mg/hari} \times 7 \text{ hari} \\ &= 84 \text{ mg} \end{aligned}$$

$$\text{Index}_{\text{log am}} = \left( \frac{\text{total}_{\text{konsumsi}}_{\text{ikan}}}{\text{total}_{\text{konsumsi}}} \right) \times 100\% \times \text{MTWI}$$

$$\begin{aligned} \text{Index}_{\text{log am}} &= \left( \frac{49,84 \text{ g / hari}}{838,54 \text{ g / hari}} \right) \times 100\% \times 84 \text{ mg} \\ &= 4,99 \text{ mg} \end{aligned}$$

Maksimum konsumsi ikan per minggu = 49,84 g / hari x 7 hari = 348,88 g = 0,348 kg

$$MRL = \frac{\text{index\_logam\_maksimum\_pada\_ikan}}{\text{maksimum\_konsumsi\_ikan\_per\_min\ ggu}}$$

$$MRL = \frac{4,99\text{mg}}{0,348\text{kg}} = 14,34 \text{ mg/kg} = 14,34 \text{ }\mu\text{g/g}$$

