Perancangan Percobaan

KORELASI DAN REGRESI LINEAR TUNGGAL

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Korelasi Regresi

- Koefisien korelasi: Hubungan kualitatif antar *variable* (respons) pengukuran
  - Koefisien korelasi (r), rentang nilai $-1 < r < 1$ (Taylor, 1990)
    - ✓ Lemah = < 0,35
    - ✓ Sedang = 0,36–0,67
    - ✓ Kuat = 0,68–1
- Koefisien determinasi: Seberapa besar secara kuantitatif hubungan tersebut
  - Koefisien determinasi (R^2)
  - Variabel sudah dibedakan antara variabel terikat (*dependent variable*, *y*) dan variabel bebas (*independent variable*, *x*)
  - Misalkan nilai R^2 = 0,97 maka variabel terikat (*dependent variable*, *y*) dipengaruhi variabel bebas (*independent variable*, *x*) sebesar: 0,97*100% = **97%**, sisanya 100% – 97% = **3%** dipengaruhi variabel lain yang tidak diukur pada penelitian tersebut.

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Teladan 1 – Korelasi (Data Mentah 1)

Analyze > Correlate > Bivariate

a gabungan - regresi tunggal.sav [DataSet...

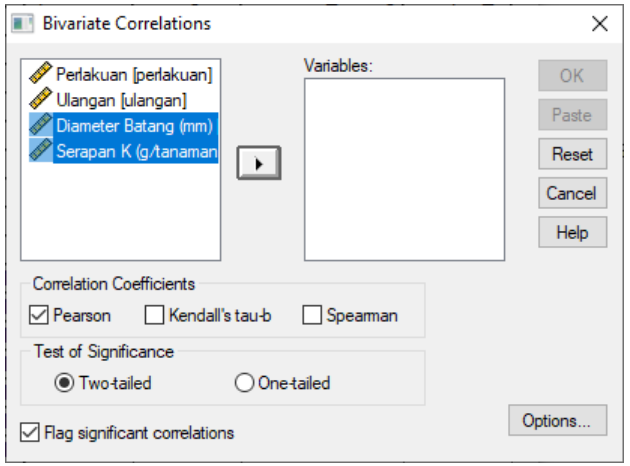
File Edit View Data Transform Analyze Graphs Utilities
Window Help

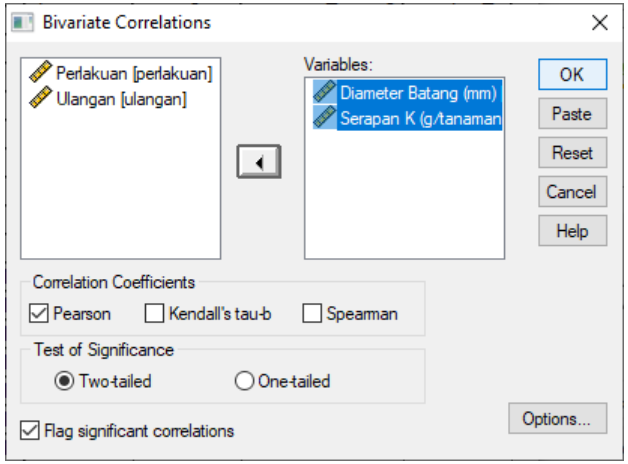
28 : perlakuan

	perlakuan	ulangan	diameter_batang	serapan_k
1	A0	ulangan1	3,65	,02
2	A0	ulangan2	5,20	,01
3	A0	ulangan3	7,25	,02
4	A1	ulangan1	9,39	,05
5	A1	ulangan2	7,52	,04
6	A1	ulangan3	9,55	,04
7	A2	ulangan1	9,16	,05
8	A2	ulangan2	11,19	,04
9	A2	ulangan3	8,24	,04
10	A3	ulangan1	5,22	,03
11	A3	ulangan2	12,14	,03
12	A3	ulangan3	7,94	,01
13	A4	ulangan1	11,88	,04
14	A4	ulangan2	15,17	,03
15	A4	ulangan3	8,50	,04
16	A5	ulangan1	5,31	,03
17	A5	ulangan2	9,49	,01
18	A5	ulangan3	8,24	,03
19	A6	ulangan1	12,46	,07
20	A6	ulangan2	8,17	,04
21	A6	ulangan3	10,55	,03
22	A7	ulangan1	13,45	,08
23	A7	ulangan2	14,51	,03
24	A7	ulangan3	8,60	,04
25	A8	ulangan1	12,18	,05
26	A8	ulangan2	11,65	,09
27	A8	ulangan3	9,44	,04

Data View | Variable View

SPSS





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Hasil Korelasi

Correlations

		Diameter Batang (mm)	Serapan K (g/tanaman)
Diameter Batang (mm)	Pearson Correlation	1	,467*
	Sig. (2-tailed)		,014
	N	27	27
Serapan K (g/tanaman)	Pearson Correlation	,467*	1
	Sig. (2-tailed)	,014	
	N	27	27

*. Correlation is significant at the 0.05 level (2-tailed).

- Korelasi: Hubungan antar respons pengukuran
  - Koefisien korelasi (*r*), rentang nilai $-1 < r < 1$ (Taylor, 1990)
    - ✓ Lemah = < 0,35
    - ✓ Sedang = 0,36–0,67
    - ✓ Kuat = 0,68–1

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Regresi Linear Tunggal

- Tujuannya untuk melihat apakah *independent variable* (*x*) mampu memprediksi *dependent variable* (*y*). Dalam hal ini terdapat 1 *independent variable* (*x*).
- Uji asumsi yang harus dipenuhi:
  - Normalitas residu; Residu terdistribusi normal
  - (Linearitas); Apakah *independent variable* linear dengan *dependent variable*?; Model regresi akan sia-sia jika linearitas tidak terpenuhi
  - Homoskedastisitas; Untuk melihat apakah varians residu dipengaruhi faktor-faktor lain

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Teladan 2 – Regresi Tunggal (Data Mentah 1)

- Data Mentah-1
- Pertanyaan Penelitian: Apakah serapan K mampu memprediksi diameter batang
- *Dependent Variable*: Diameter batang
- *Independent Variable*: Serapan K
- Analisis Statistika: Regresi linear tunggal

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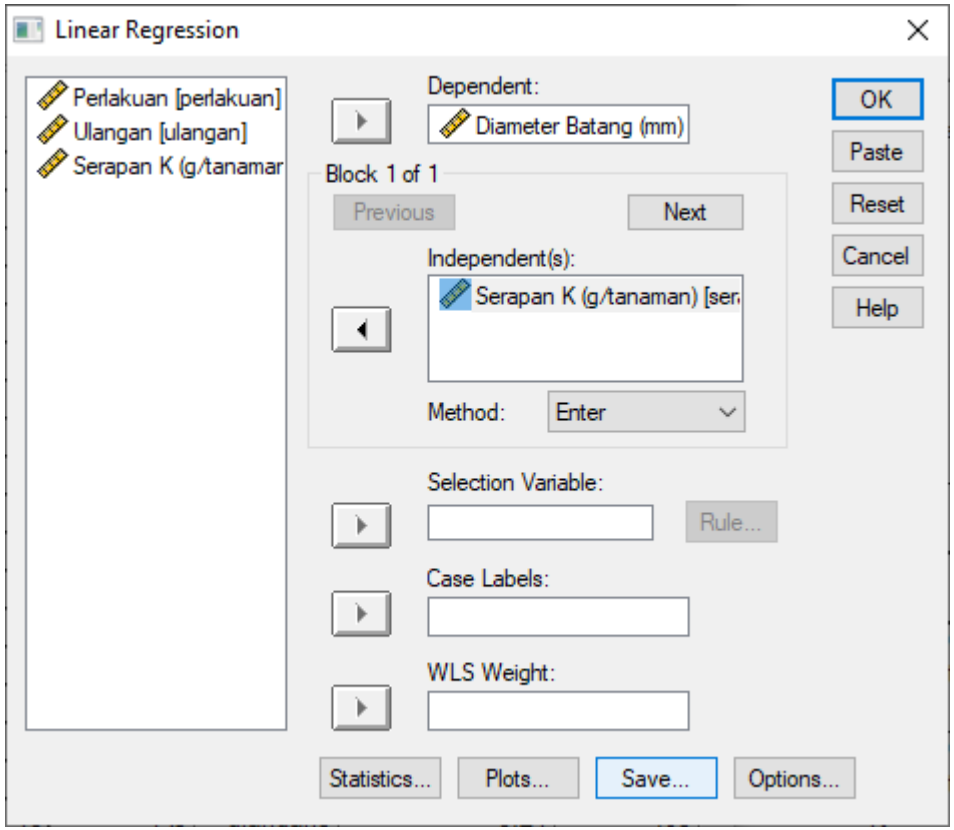
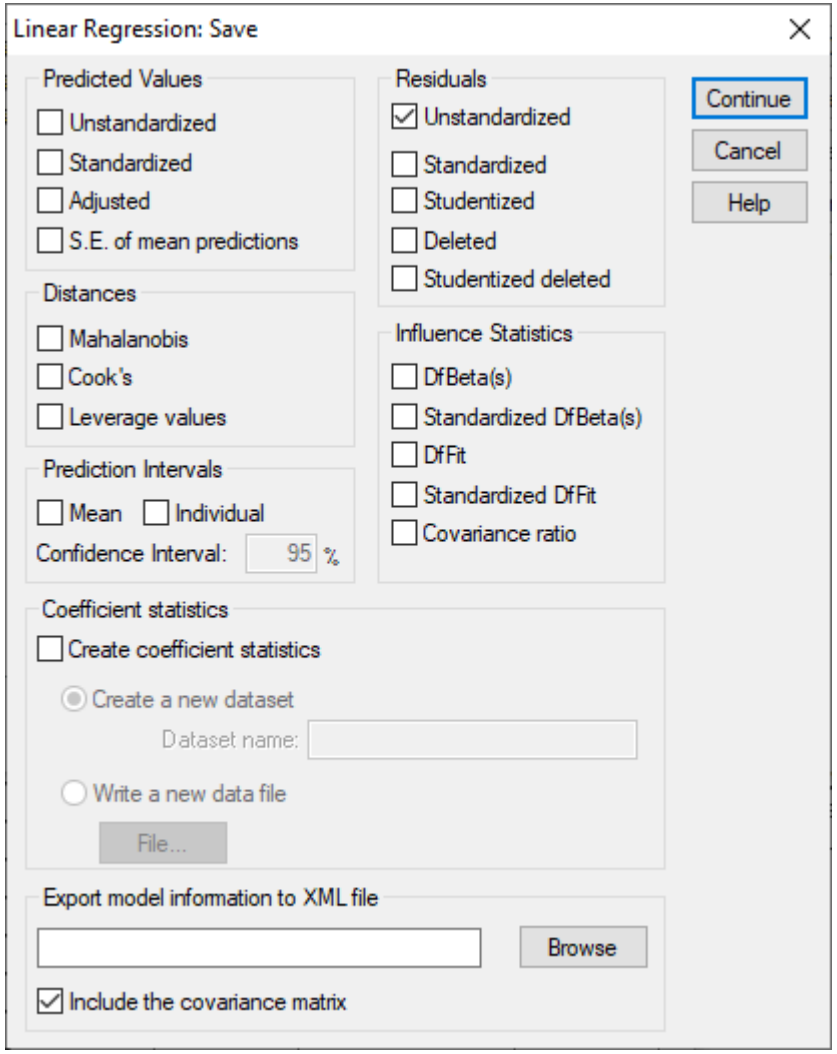
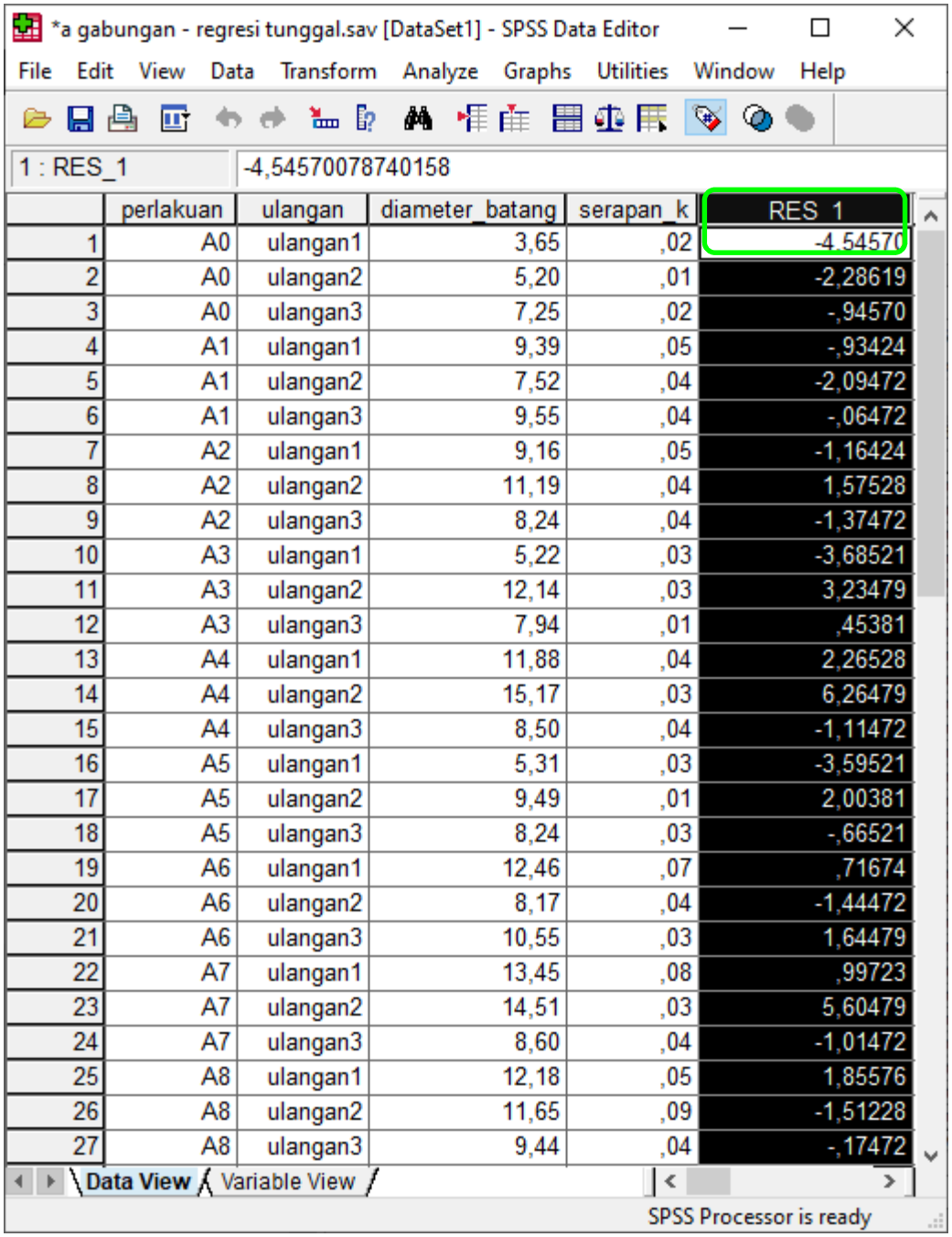
Uji Normalitas Residu

1) Analyze > Regression > Linear







	perlakuan	ulangan	diameter_batang	serapan_k	RES_1
1	A0	ulangan1	3,65	,02	-4,54570
2	A0	ulangan2	5,20	,01	-2,28619
3	A0	ulangan3	7,25	,02	-,94570
4	A1	ulangan1	9,39	,05	-,93424
5	A1	ulangan2	7,52	,04	-2,09472
6	A1	ulangan3	9,55	,04	-,06472
7	A2	ulangan1	9,16	,05	-1,16424
8	A2	ulangan2	11,19	,04	1,57528
9	A2	ulangan3	8,24	,04	-1,37472
10	A3	ulangan1	5,22	,03	-3,68521
11	A3	ulangan2	12,14	,03	3,23479
12	A3	ulangan3	7,94	,01	,45381
13	A4	ulangan1	11,88	,04	2,26528
14	A4	ulangan2	15,17	,03	6,26479
15	A4	ulangan3	8,50	,04	-1,11472
16	A5	ulangan1	5,31	,03	-3,59521
17	A5	ulangan2	9,49	,01	2,00381
18	A5	ulangan3	8,24	,03	-,66521
19	A6	ulangan1	12,46	,07	,71674
20	A6	ulangan2	8,17	,04	-1,44472
21	A6	ulangan3	10,55	,03	1,64479
22	A7	ulangan1	13,45	,08	,99723
23	A7	ulangan2	14,51	,03	5,60479
24	A7	ulangan3	8,60	,04	-1,01472
25	A8	ulangan1	12,18	,05	1,85576
26	A8	ulangan2	11,65	,09	-1,51228
27	A8	ulangan3	9,44	,04	-,17472

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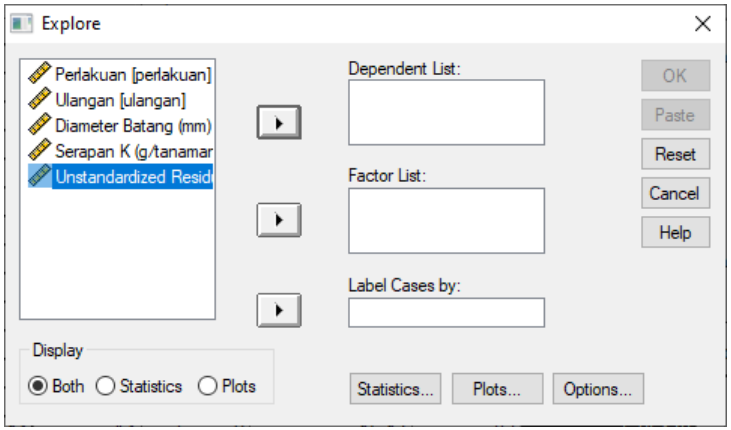
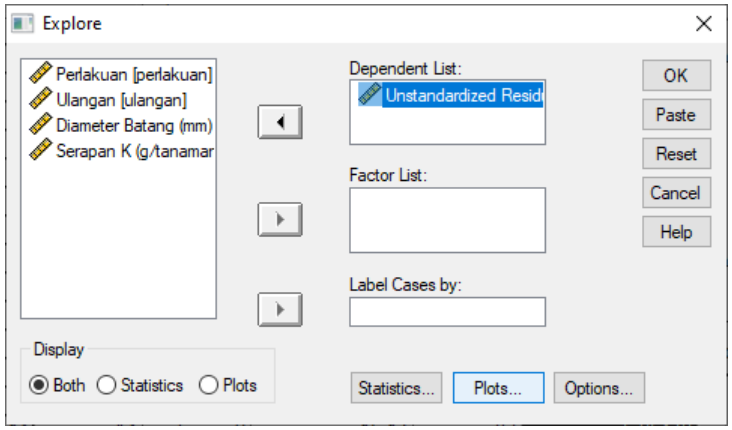
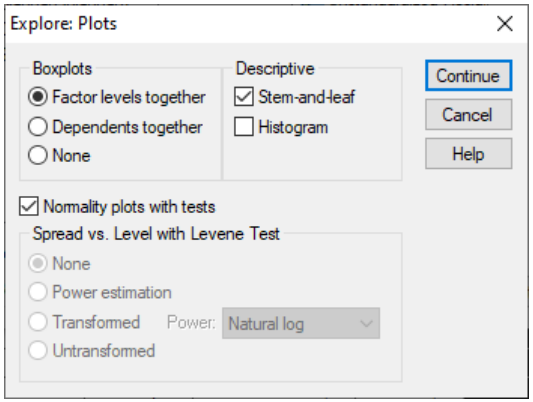
Uji Normalitas Residu

2) Analyze > Descriptive Statistics > Explore







Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Unstandardized Residual	,124	27	,200*	,956	27	,293

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

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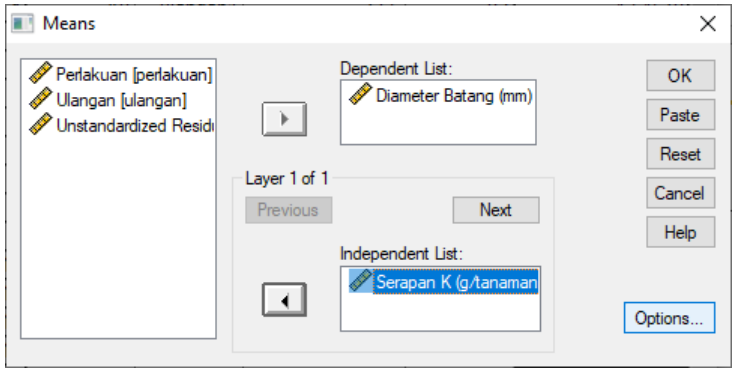
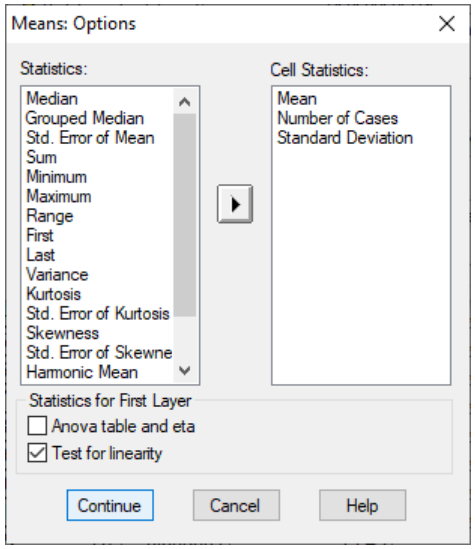
Uji Linearitas

Analyze > Compare means > Means





ANOVA Table

			Sum of Squares	df	Mean Square	F	Sig.
Diameter Batang (mm) * Serapan K (g/tanaman)	Between Groups	(Combined)	78,648	7	11,235	1,544	,212
		Linearity	47,358	1	47,358	6,509	,020
		Deviation from Linearity	31,291	6	5,215	,717	,641
	Within Groups		138,246	19	7,276		
	Total		216,895	26			

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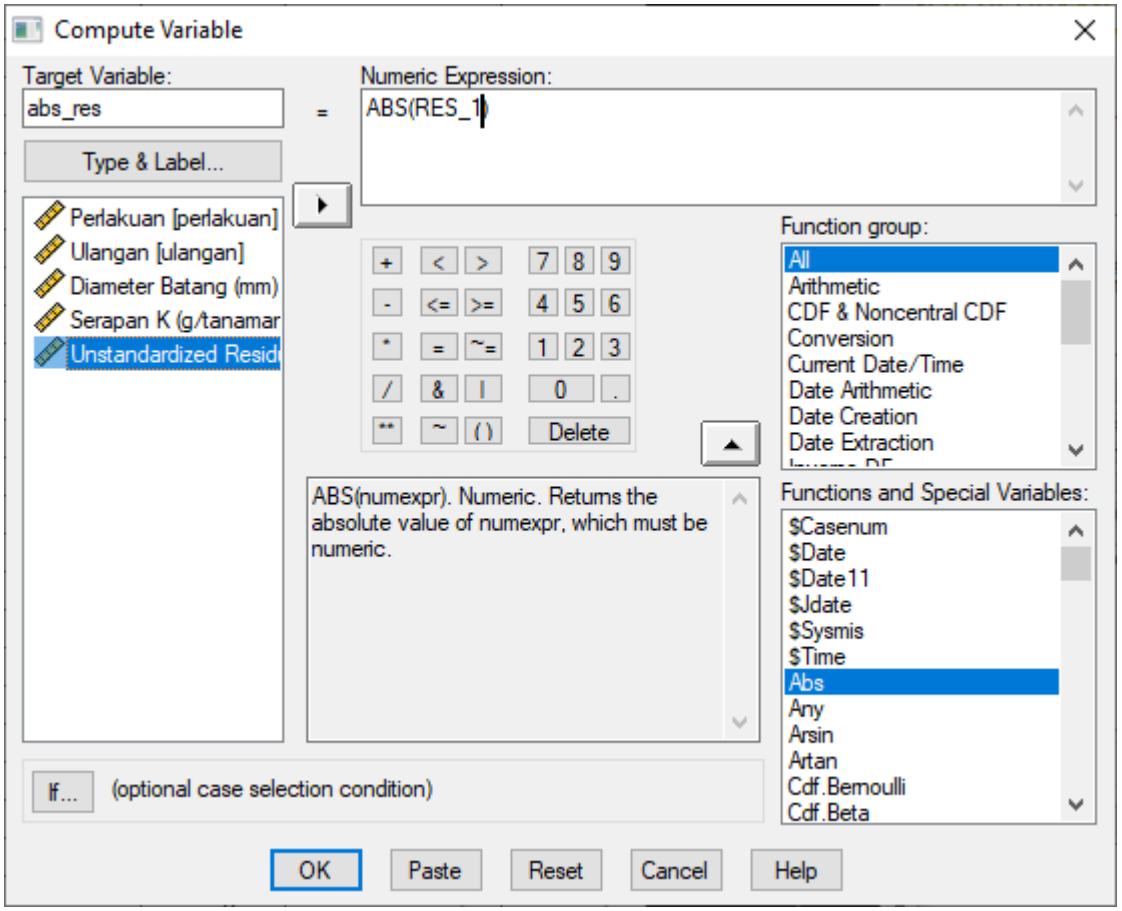
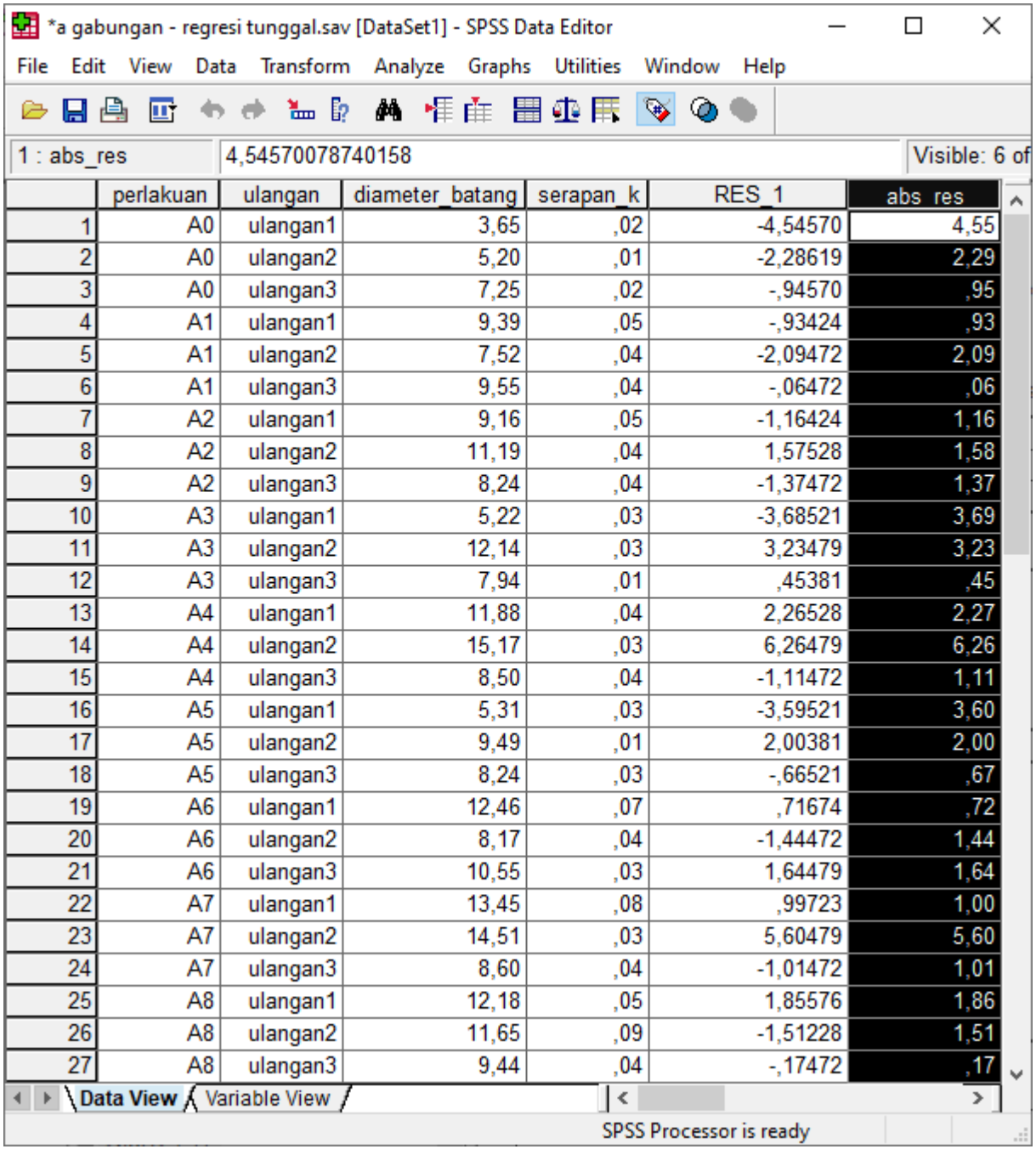
Uji Homoskedastisitas (Uji Glesjer)

1) Transform > Compute Variable





	perlakuan	ulangan	diameter_batang	serapan_k	RES_1	abs_res
1	A0	ulangan1	3,65	,02	-4,54570	4,55
2	A0	ulangan2	5,20	,01	-2,28619	2,29
3	A0	ulangan3	7,25	,02	-,94570	,95
4	A1	ulangan1	9,39	,05	-,93424	,93
5	A1	ulangan2	7,52	,04	-2,09472	2,09
6	A1	ulangan3	9,55	,04	-,06472	,06
7	A2	ulangan1	9,16	,05	-1,16424	1,16
8	A2	ulangan2	11,19	,04	1,57528	1,58
9	A2	ulangan3	8,24	,04	-1,37472	1,37
10	A3	ulangan1	5,22	,03	-3,68521	3,69
11	A3	ulangan2	12,14	,03	3,23479	3,23
12	A3	ulangan3	7,94	,01	,45381	,45
13	A4	ulangan1	11,88	,04	2,26528	2,27
14	A4	ulangan2	15,17	,03	6,26479	6,26
15	A4	ulangan3	8,50	,04	-1,11472	1,11
16	A5	ulangan1	5,31	,03	-3,59521	3,60
17	A5	ulangan2	9,49	,01	2,00381	2,00
18	A5	ulangan3	8,24	,03	-,66521	,67
19	A6	ulangan1	12,46	,07	,71674	,72
20	A6	ulangan2	8,17	,04	-1,44472	1,44
21	A6	ulangan3	10,55	,03	1,64479	1,64
22	A7	ulangan1	13,45	,08	,99723	1,00
23	A7	ulangan2	14,51	,03	5,60479	5,60
24	A7	ulangan3	8,60	,04	-1,01472	1,01
25	A8	ulangan1	12,18	,05	1,85576	1,86
26	A8	ulangan2	11,65	,09	-1,51228	1,51
27	A8	ulangan3	9,44	,04	-,17472	,17

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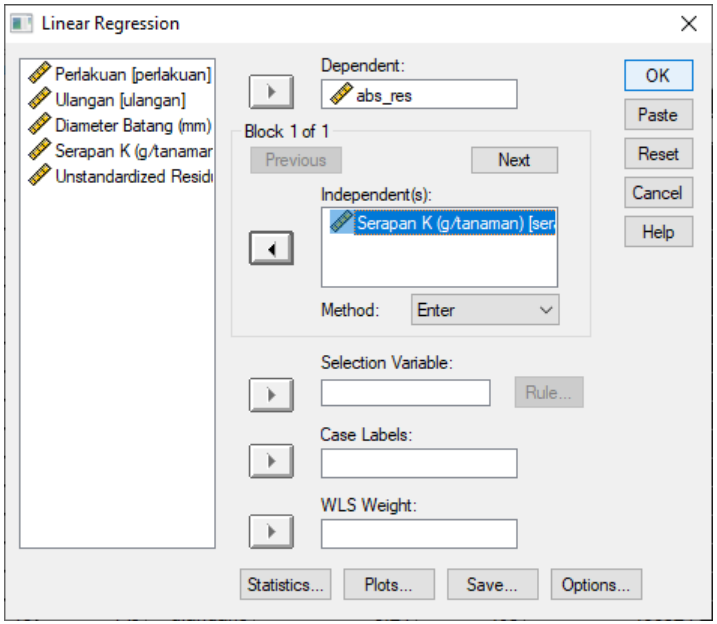
Uji Homoskedastisitas

2) Analyze > Regression > Linear

Sig. Reg. annova > 0,05 artinya tidak terjadi homoskedastisitas



ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	5,332	1	5,332	2,250	,146[a]
	Residual	59,247	25	2,370		
	Total	64,579	26			

a. Predictors: (Constant), Serapan K (g/tanaman)

b. Dependent Variable: abs_res

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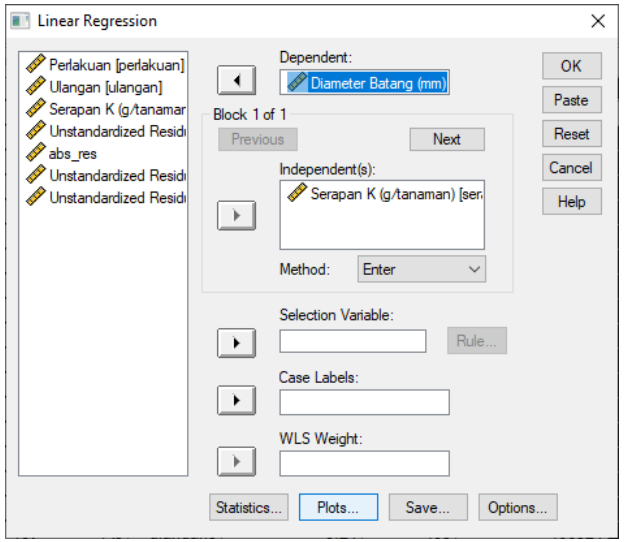
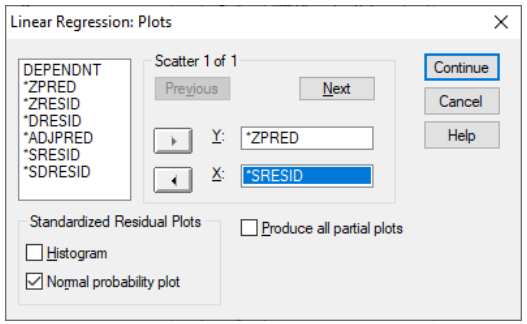
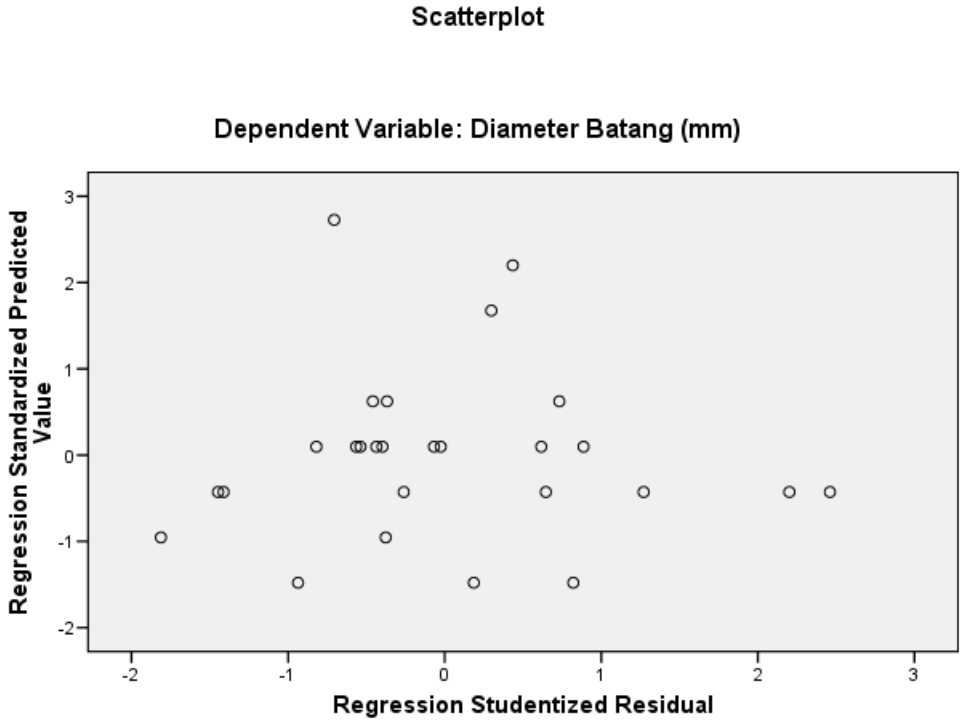
Uji Homoskedastisitas (Uji Scatterplot)

1) Dengan melihat Scatterplot (dalam kasus jika anova nyata, pindah ke metode ini) → Scatterplot tidak teratur/acak artinya tidak terjadi homoskedastisitas → Analyze > Regression > Linear







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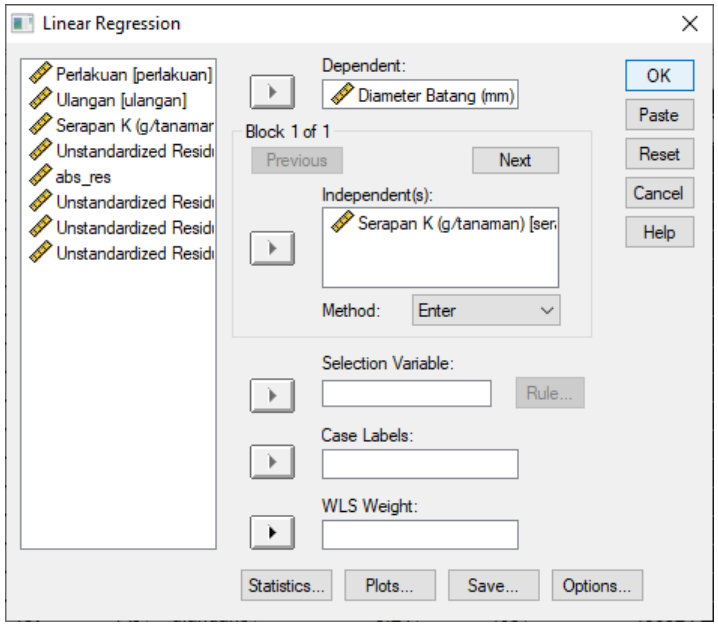
Regresi Linear Tunggal

Analyze > Regression > Linear



Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,467[a]	,218	,187	2,60413

a. Predictors: (Constant), Serapan K (g/tanaman)

b. Dependent Variable: Diameter Batang (mm)

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	47,358	1	47,358	6,983	,014[a]
	Residual	169,537	25	6,781		
	Total	216,895	26			

a. Predictors: (Constant), Serapan K (g/tanaman)

b. Dependent Variable: Diameter Batang (mm)

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	6,777	1,140		5,943	,000
	Serapan K (g/tanaman)	70,951	26,849	,467	2,643	,014

a. Dependent Variable: Diameter Batang (mm)

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Regresi Linear Tunggal

- Persamaan regresi linear:
  - *Y = B*x + C*
  - *Diameter Batang = B*Serapan K + C*
  - *Y = 70,951x + 6,777*

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	6,777	1,140		5,943	,000
	Serapan K (g/tanaman)	70,951	26,849	,467	2,643	,014

a. Dependent Variable: Diameter Batang (mm)

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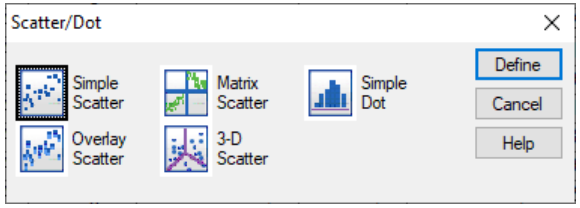
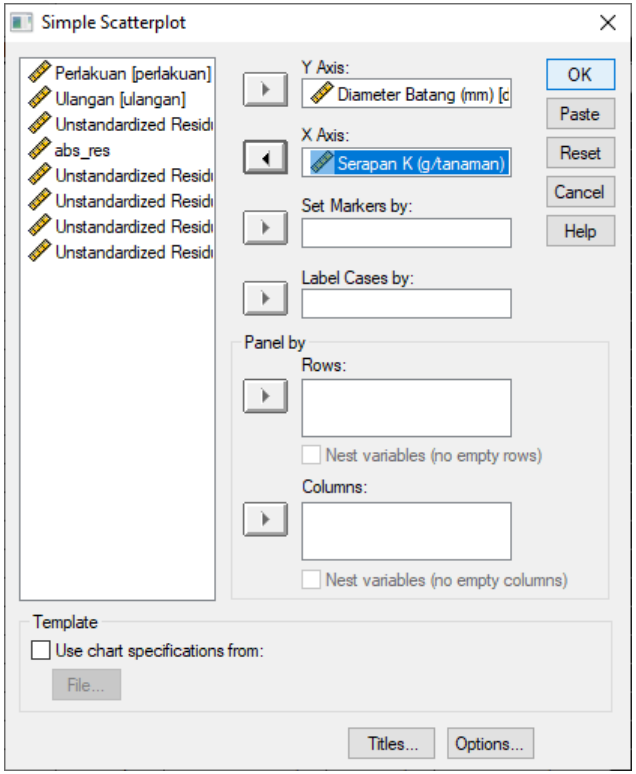
Grafik Linear

Graphs > Legacy Dialogs > Scatter/Dot





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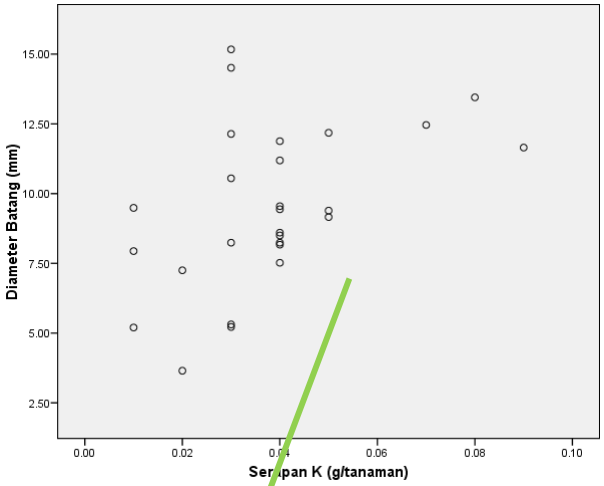
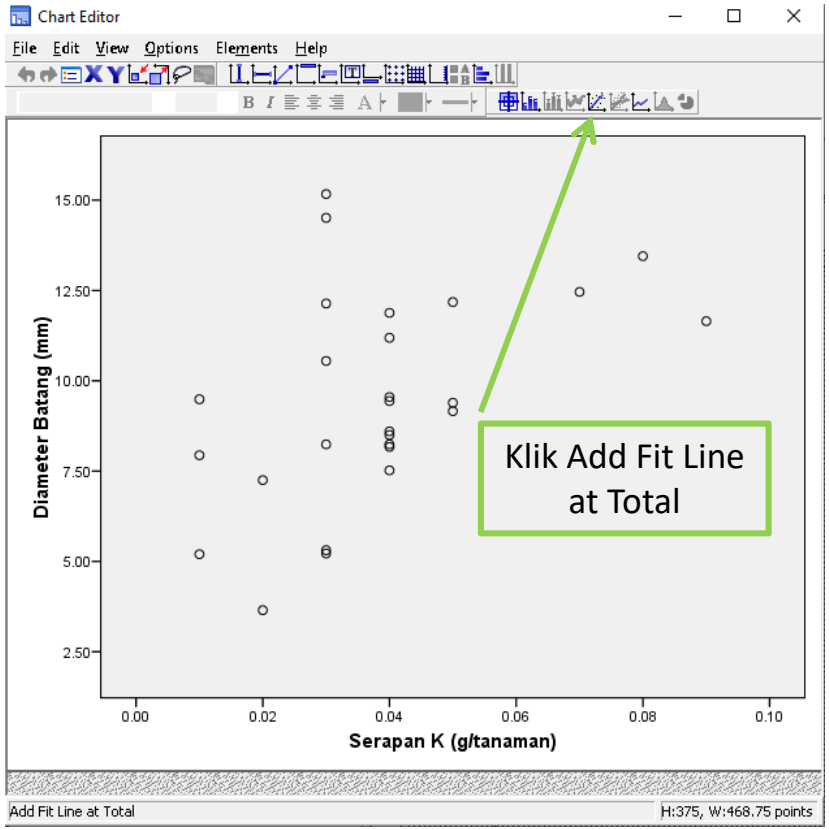
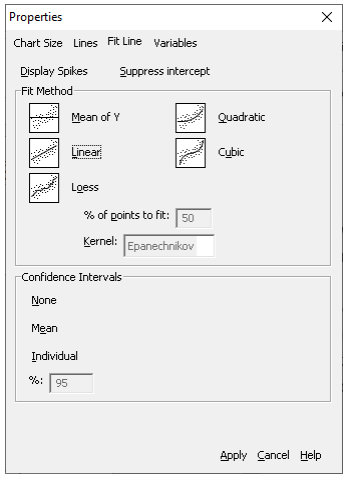
Grafik Linear



Klik 2 kali pada bidang grafik



Klik Add Fit Line at Total



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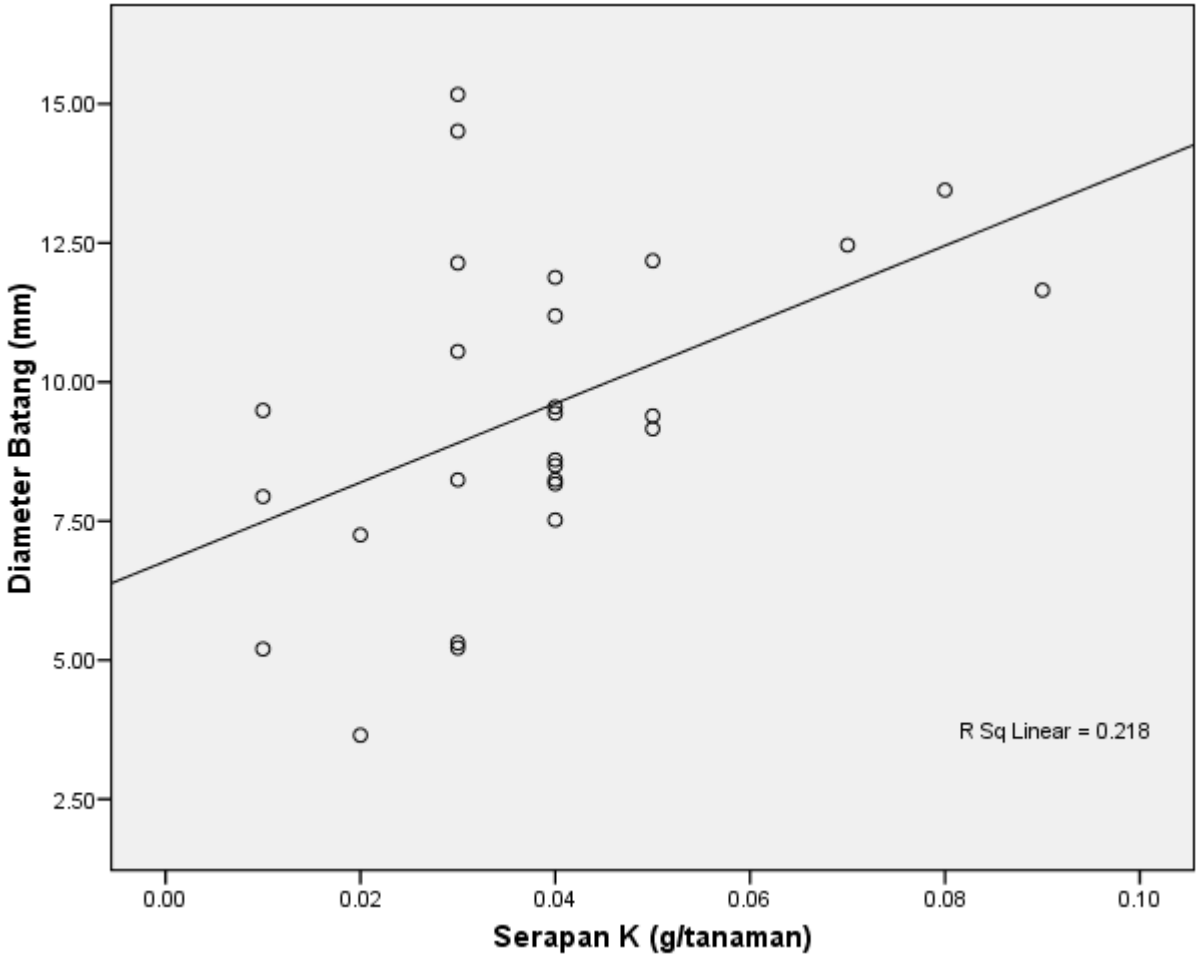
Grafik Linear



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