

BAB V

KESIMPULAN dan SARAN

V.1 KESIMPULAN :

Dari hasil penelitian dapat disimpulkan :

1. Hasil yang diperoleh dari pengolahan limbah secara anaerob terhadap campuran limbah padat dan limbah cair untuk semua perbandingan telah sesuai dengan Keputusan Menteri Negara Kependudukan dan Lingkungan Hidup No. KEP-03/MENKLH/II/1991 tentang Baku Mutu Limbah Cair Golongan III (dapat dimanfaatkan untuk peternakan, perikanan, pertanian), yaitu untuk nilai BOD sebesar 100 mg/ltr dan untuk nilai COD sebesar 250 mg/ltr .
2. Hasil penurunan BOD_5 dan COD yang paling optimal dihasilkan oleh perlakuan dengan perbandingan 3 : 1. Penurunan BOD yang terjadi mulai dari hari ke 0 sampai hari ke 15 sebanyak 86,8 % , dengan nilai awal $406,67 \text{ mg/ltr}$ dan nilai akhir $53,33 \text{ mg/ltr}$. Sedangkan untuk nilai COD terjadi penurunan sebesar 43,2 % dengan nilai awal $182,393 \text{ mg/ltr}$ dan nilai akhir $103,453 \text{ mg/ltr}$. Demikian juga untuk hasil gas bio yang terbanyak dihasilkan oleh perlakuan dengan perbandingan 3 : 1.
3. Bakteri yang terdapat pada digester anaerob mempunyai sifat gram positif dengan bentuk bulat dan bakteri gram negatif dengan bentuk batang.

V.2 SARAN

1. Pengukuran MLSS dilakukan pada saat berat kertas saring yang dikeringkan dalam oven telah konstan.
2. Pengecatan bakteri sebaiknya dilakukan sebelum umur bakteri terlalu tua.
3. Pengamatan sebaiknya dilakukan tidak hanya 15 hari, tetapi dilakukan hingga nilai COD yang terukur konstan.
4. Masih diperlukan penelitian lebih lanjut tentang pemanfaatan sisa lumpur (campuran blotong dan limbah cair) yang dihasilkan dari proses pengolahan limbah secara anaerob, terutama tentang komposisi kandungan blotong yang telah diolah dan pengaruhnya untuk pemupukan tanaman serta dari gas bio yang dihasilkan dapat dimanfaatkan sebagai sumber energi (bahan bakar pengganti).



LAMPIRAN

PERHITUNGAN KANDUNGAN BAHAN ORGANIK

Untuk perbandingan Blotong : Limbah Cair :

1. 0 bagian blotong : 4 bagian limbah cair

$$\frac{4}{4} \times (15,48 \frac{\text{gr}}{100\text{ml}} \times \frac{3000 \text{ ml}}{100 \text{ ml}}) = 464,4 \frac{\text{gr}}{3 \text{ liter}}$$

2. 1 bagian blotong : 3 bagian limbah cair

$$\begin{aligned} & [\frac{1}{4} \times (53,96 \times \frac{3000}{100})] + [\frac{3}{4} \times (15,48 \times \frac{3000}{100})] \\ & = 404,7 + 348,3 = 753 \frac{\text{gr}}{3 \text{ liter}} \end{aligned}$$

3. 2 bagian blotong : 2 bagian limbah cair

$$\begin{aligned} & [\frac{2}{4} \times (53,96 \times \frac{3000}{100})] + [\frac{2}{4} \times (15,48 \times \frac{3000}{100})] \\ & = 809,4 + 232,2 = 1041,6 \frac{\text{gr}}{3 \text{ liter}} \end{aligned}$$

4. 3 bagian blotong : 1 bagian limbah cair

$$\begin{aligned} & [\frac{3}{4} \times (53,96 \times \frac{3000}{100})] + [\frac{1}{4} \times (15,48 \times \frac{3000}{100})] \\ & = 1214,1 + 116,1 = 1330,2 \frac{\text{gr}}{3 \text{ liter}} \end{aligned}$$



DEPARTEMEN KESEHATAN RI
BALAI LABORATORIUM KESEHATAN YOGYAKARTA

Ngadinegaran Mj. III/62
Yogyakarta 55143

Telp. (0274) 378187
Fax. (0274) 381582

Nomor : LA.00.02.2.263.

30 Mei 1997

Lampiran : -

Perihal : Hasil pemeriksaan Laboratorium

Lab. No. : 31 s/d 42

Kepada Yth.

Sdri. Veronika Niken. S

d/a. Jl. Nyi Ageng Nis 21B Yogyakarta

di Yogyakarta

Dengan ini kami kirimkan hasil pemeriksaan berdasarkan surat saudara tertanggal -
26 Mei 1997, perihal permintaan pemeriksaan bahan berupa : Air limbah gula

Pendapatan Pemeriksaan.

Bahan Pem. (kode)	0:4	0:4	0:4	1:3	1:3	1:3
Lab. No.	31	32	33	34	35	36
Sulfat (mg/l)	44,60	43,60	44,40	857,00	842,00	844,00
Karbonat (mg/l)	637,25	588,0	558,0	4660,5	4678,5	4645,5
Bahan Pem. (kode)	2:2	2:2	2:2	3:1	3:1	3:1
Lab. No.	37	38	39	40	41	42
Sulfat (mg/l)	171,00	173,00	170,50	1133,0	1136,0	1096,0
Karbonat (mg/l)	1420,5	1271,25	1420,5	7746,0	8677,5	8379,0

Demikian harap menjadikan periksa.



Tembusan Kepada Yth.

1. Kepala Kanwil Dep. Kes. R.I. Prop. D.I.Y.
2. Kepala Dinas Kes. Prop. D.I.Y.
3. Arsip.



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Telp. (0274) 378187
Fax (0274) 381582

Nomor : LA.00.02.2.6/6 .

26 Agustus 1997

Lampiran : -

Perihal : Hasil pemeriksaan Laboratorium

Lab. No. : 113 s/d 116

Kepada Yth.

Idri. Veronika Niken S

/a. Jl. Nyi Ageng Nis No. 218

Pilahan Permai

Di Yogyakarta

Dengan ini kami kirimkan hasil pemeriksaan berdasarkan surat saudara tanggal : -
18 Agustus 1997, perihal permintaan pemeriksaan bahan berupa : Air limbah gula.

Pendapatan Pemeriksaan :

Bahan pemeriksaan (kode)	0:4	1:3	2:2	3:1
Lab. No.	113	114	115	116
Sulfat (mg/l)	245,00	114,00	197,25	121,00
Karbonat (mg/l)	1893,14	3329,38	3503,84	1326,14

Demikian harap menjadikan periksa.

Kepala,

Nendrosuwito, MSc
NIP. 14001543.


Tembusan Kepada Yth.

1. Kepala Kanwil Dep. Kes. R.I. Prop. D.I.Y.
2. Kepala Dinas Kes. Prop. D.I.Y.
3. Arsip.

OBS	PERL	WAKTU	BOD5	COD	MLSS	VFA	GAS	PH
1	0:4	0	166.667	291.123	0.6467	384.472	0.0000	7.02000
2	0:4	5	173.333	274.460	0.9333	480.128	12.5600	7.09667
3	0:4	10	100.000	261.307	1.4467	457.069	8.3733	6.92667
4	0:4	15	96.667	257.800	1.5980	578.511	17.1653	7.06667
5	1:3	0	186.667	405.470	13.9467	463.526	0.0000	7.02000
6	1:3	5	166.667	321.287	20.1400	539.303	14.6533	7.13333
7	1:3	10	83.333	228.053	21.3333	605.003	19.6773	7.02333
8	1:3	15	36.667	213.953	21.5917	667.808	41.8667	6.92333
9	2:2	0	106.667	182.710	30.0200	451.172	0.0000	7.02000
10	2:2	5	80.000	139.273	37.5933	545.784	34.7493	6.92667
11	2:2	10	43.333	113.213	44.4800	575.445	36.4240	6.95000
12	2:2	15	26.667	103.470	49.3780	650.761	62.1333	7.03000
13	3:1	0	406.667	182.393	32.8200	461.575	0.0000	7.02000
14	3:1	5	346.667	139.303	39.5933	535.606	54.8453	7.02667
15	3:1	10	160.000	113.243	47.2733	553.202	61.9627	7.14333
16	3:1	15	53.333	103.453	55.6053	755.753	95.8747	7.10333

CORRELATION ANALYSIS

6 'VAR' Variables: BOD5 COD MLSS VFA GAS PH

Simple Statistics

Variable	N	Mean	Std·Dev	Sum	Minimum	Maximum
BOD5	16	139.58333	106.67969	2233	26.66667	406.66667
COD	16	208.15708	89.24545	3331	103.45333	405.47000
MLSS	16	26.14998	18.77739	418.39967	0.64667	55.60533
VFA	16	544.06994	95.43584	8705	384.47200	755.75333
GAS	16	28.76783	28.36659	460.28533	0	95.87467
PH	16	7.02687	0.07030	112.43000	6.92333	7.14333

Pearson Correlation Coefficients / Prob > |R| under Ho: Rho=0 / N = 16

	BOD5	COD	MLSS	VFA	GAS	PH
BOD5	1.00000	0.15926	-0.07481	-0.51446	-0.30626	0.22216
	0.0	0.5558	0.7831	0.0415	0.2486	0.4083
COD	0.15926	1.00000	-0.82647	-0.52538	-0.72762	0.06275
	0.5558	0.0	0.0001	0.0366	0.0014	0.8174
MLSS	-0.07481	-0.82647	1.00000	0.58101	0.75847	0.10105
	0.7831	0.0001	0.0	0.0183	0.0007	0.7096
VFA	-0.51446	-0.52538	0.58101	1.00000	0.82736	0.09885
	0.0415	0.0366	0.0183	0.0	0.0001	0.7157
GAS	-0.30626	-0.72762	0.75847	0.82736	1.00000	0.21139
	0.2486	0.0014	0.0007	0.0001	0.0	0.4319
PH	0.22216	0.06275	0.10105	0.09885	0.21139	1.00000
	0.4083	0.8174	0.7096	0.7157	0.4319	0.0

Model: MODEL1

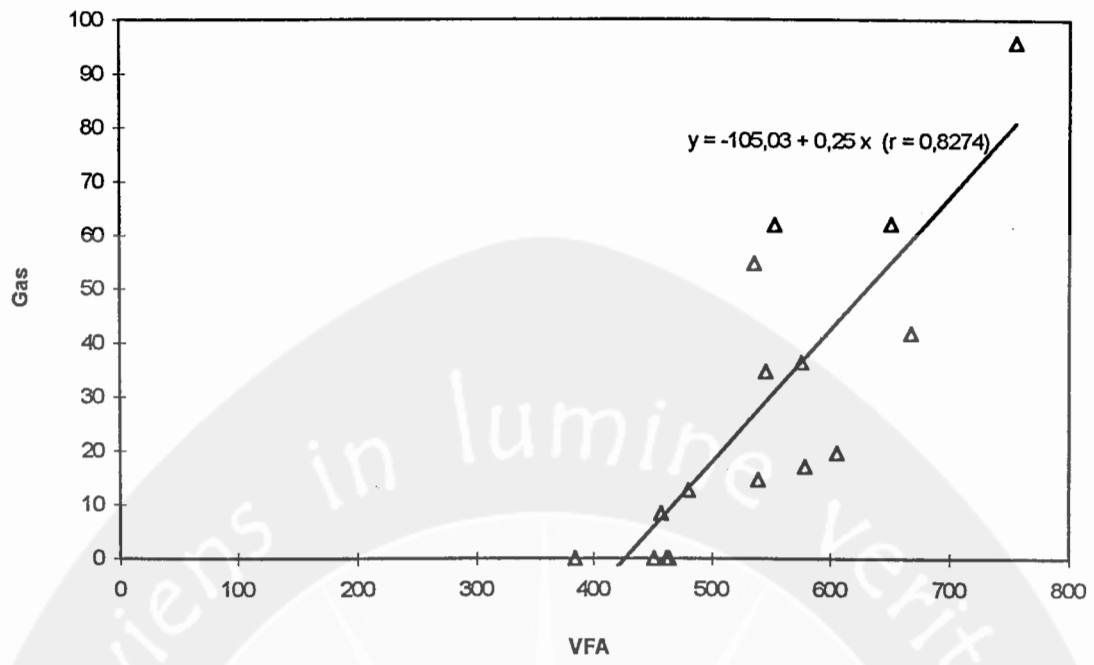
Dependent Variable: GAS

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Prob>F
Regression	1	8262.24757	8262.24757	30.378	0.0001
Error	14	3807.70047	271.97860		
C Total	15	12069.94804			
Root MSE	16.49177	R-square	0.6845		
Dep Mean	28.76783	Adj R-sq	0.6620		
C.V.	57.32713				

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	T for H0: Parameter=0	Prob > T
INTERCEP	1	-105.029273	24.62295468	-4.266	0.0008
VFA	1	0.245919	0.04461802	5.512	0.0001



Model: MODEL1

Dependent Variable: VFA

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Prob>F
Regression	1	1335.00643	1335.00643	0.138	0.7157
Error	14	135284.97444	9663.21246		
C Total	15	136619.98087			
Root MSE		98.30164	R-square	0.0098	
Dep Mean		544.06994	Adj R-sq	-0.0610	
C.V.		18.06783			

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	T for H0: Parameter=0	Prob > T
INTERCEP	1	-398.973562	2537.2962814	-0.157	0.8773
PH	1	134.205248	361.06765297	0.372	0.7157

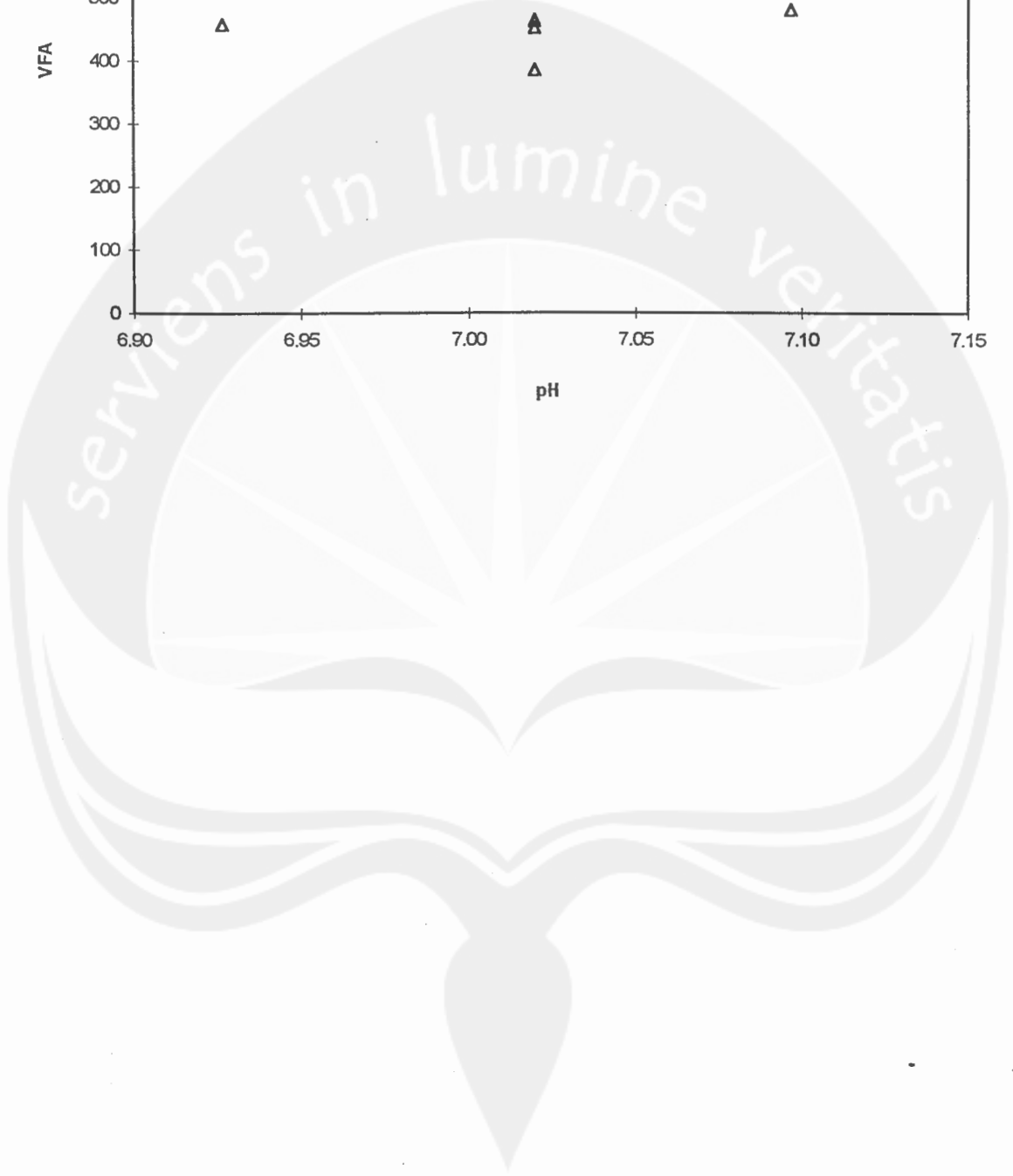
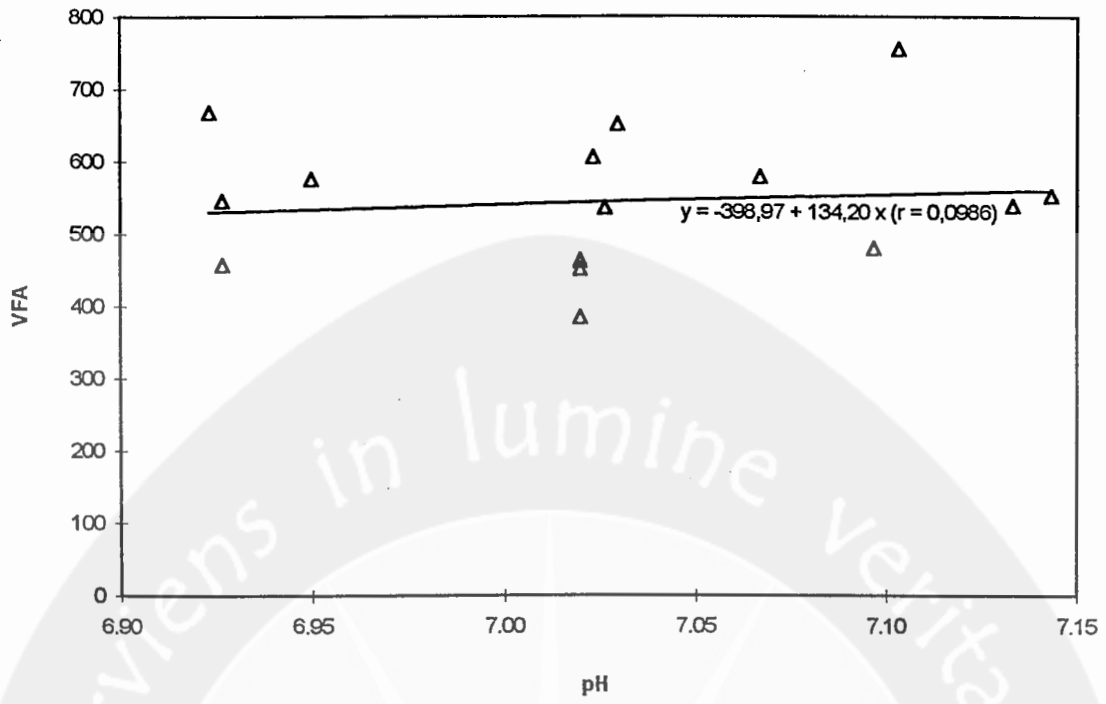
Dependent Variable: GAS

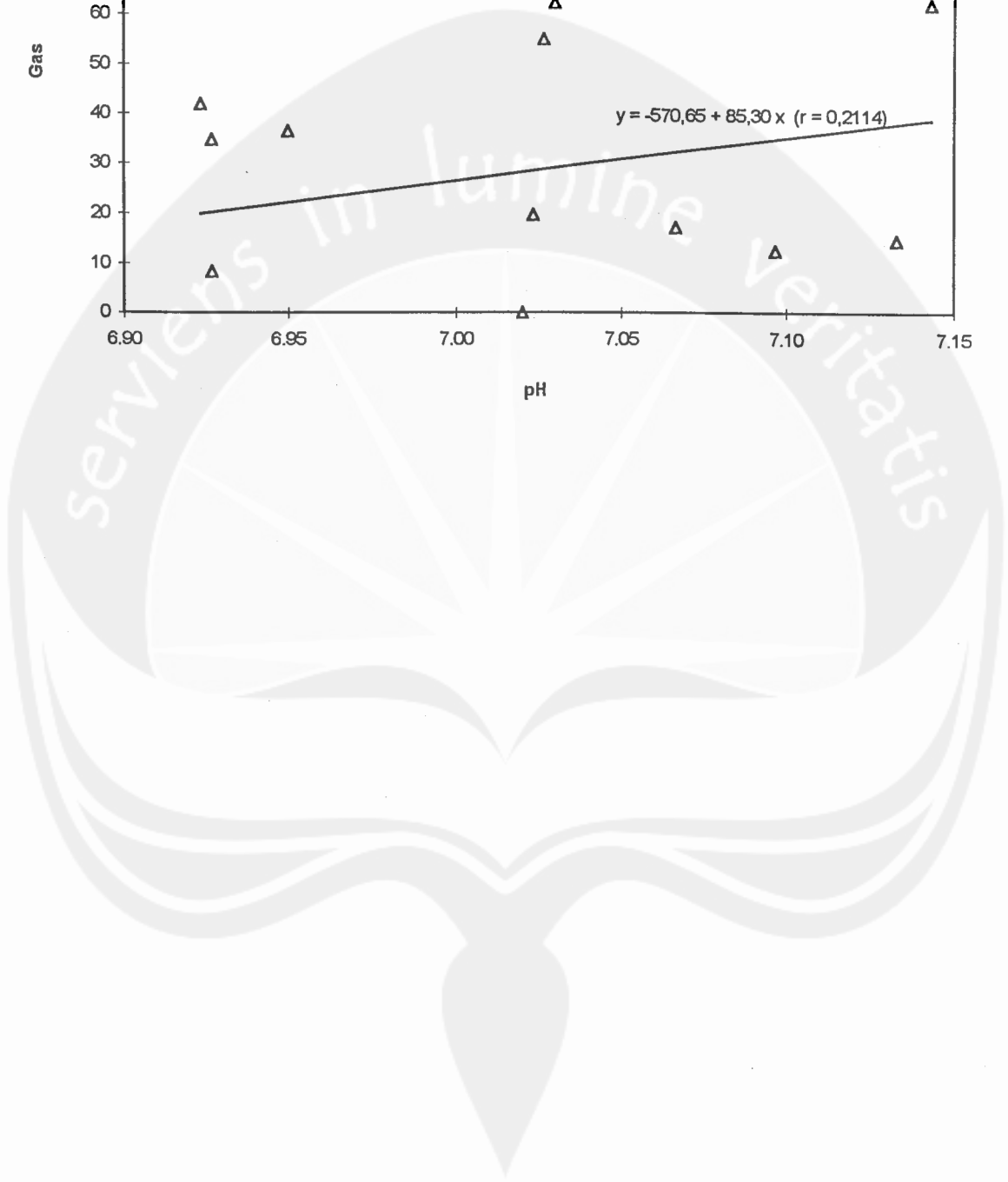
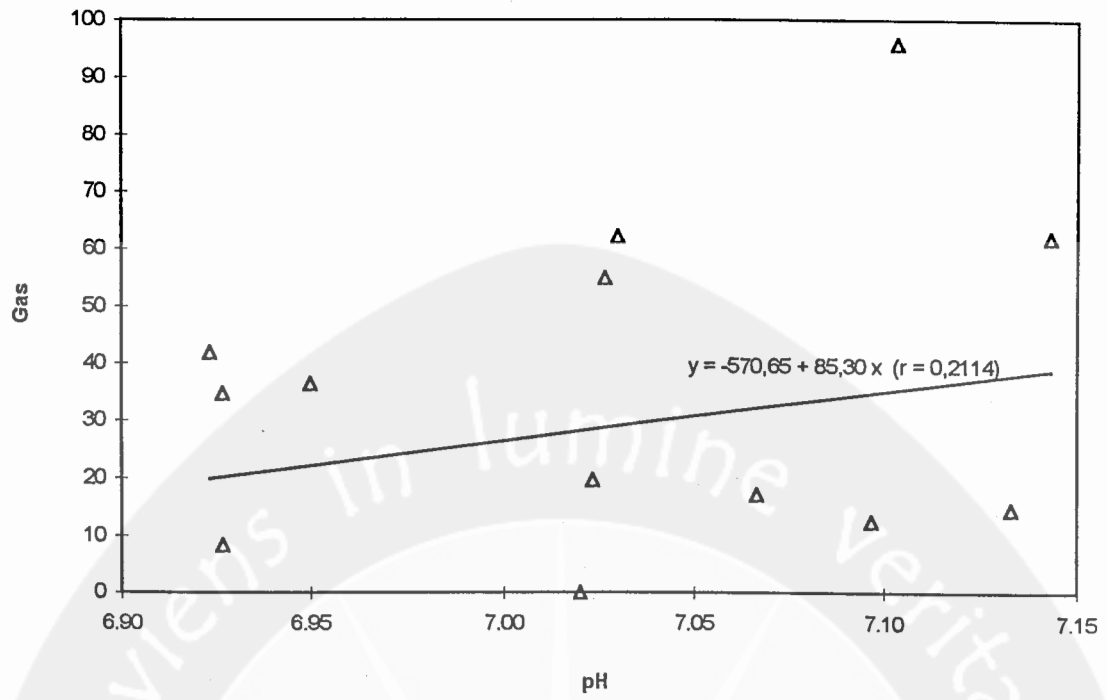
Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Prob>F
Regression	1	539.36093	539.36093	0.655	0.4319
Error	14	11530.58710	823.61336		
C Total	15	12069.94804			
Root MSE		28.69866	R-square	0.0447	
Dep Mean		28.76783	Adj R-sq	-0.0236	
C.V.		99.75956			

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	T for H0: Parameter=0	Prob > T
INTERCEP	1	-570.650181	740.75076976	-0.770	0.4539
PH	1	85.303640	105.41186847	0.809	0.4319





Model: MODEL1

Dependent Variable: VFA

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Prob>F
Regression	1	37710.86692	37710.86692	5.338	0.0366
Error	14	98909.11394	7064.93671		
C Total	15	136619.98087			
Root MSE	84.05318	R-square	0.2760		
Dep Mean	544.06994	Adj R-sq	0.2243		
C.V.	15.44897				

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	T for H0: Parameter=0	Prob > T
INTERCEP	1	661.017923	54.80732137	12.061	0.0001
COD	1	-0.561826	0.24317696	-2.310	0.0366

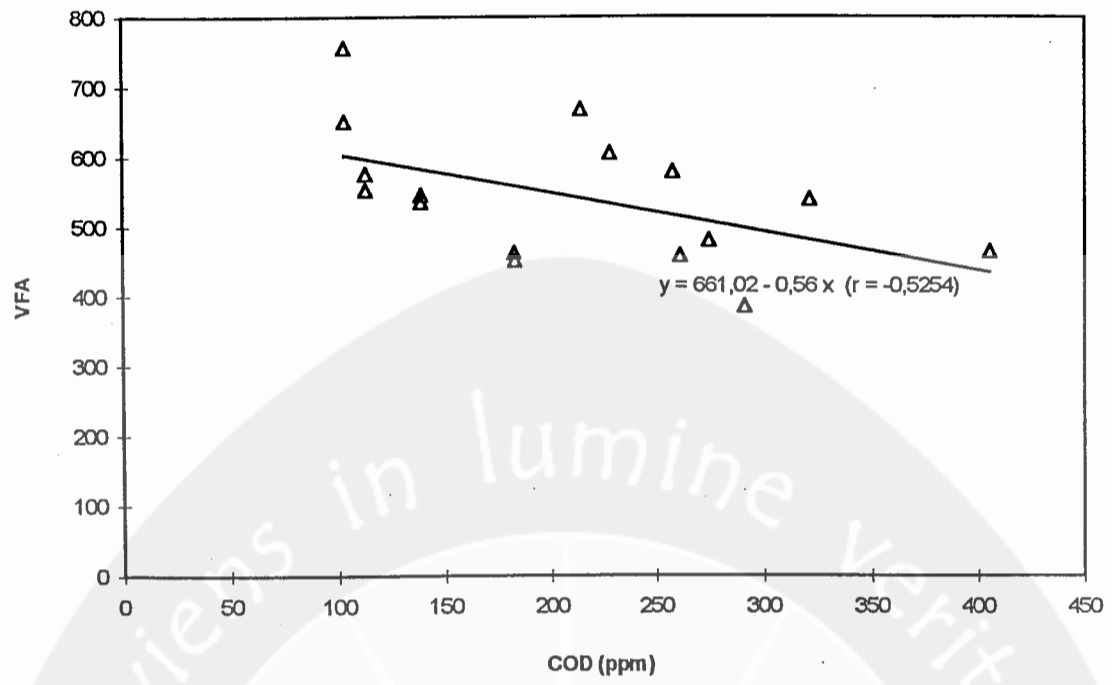
Dependent Variable: GAS

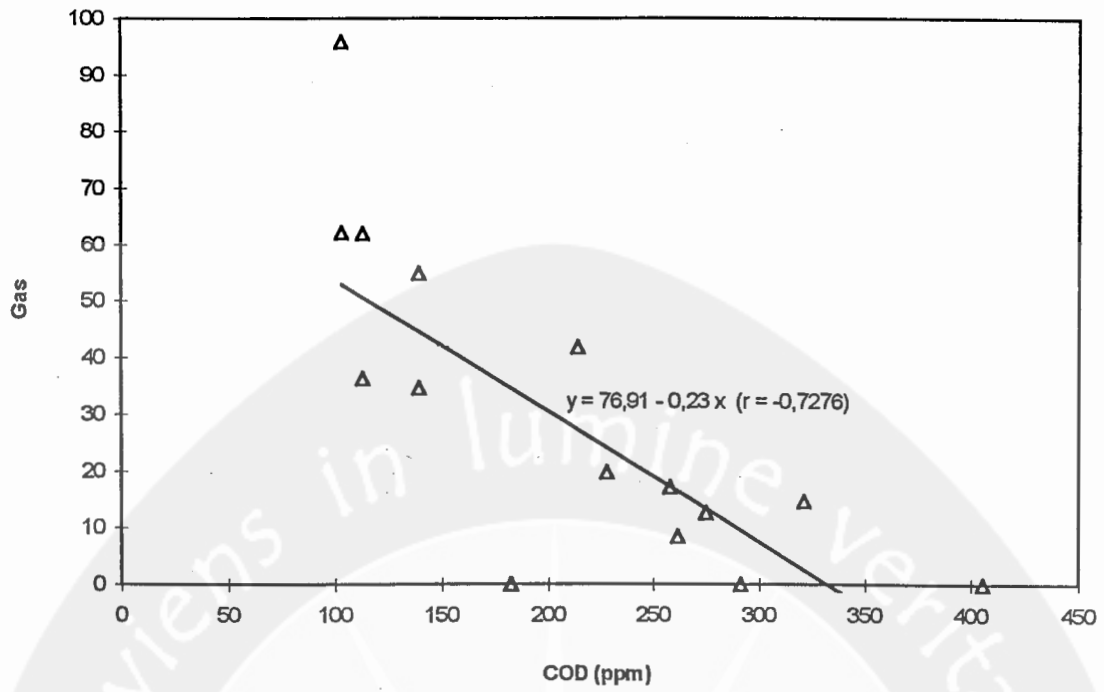
Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Prob>F
Regression	1	6390.17818	6390.17818	15.751	0.0014
Error	14	5679.76986	405.69785		
C Total	15	12069.94804			
Root MSE	20.14194	R-square	0.5294		
Dep Mean	28.76783	Adj R-sq	0.4958		
C.V.	70.01550				

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	T for H0: Parameter=0	Prob > T
INTERCEP	1	76.908929	13.13366065	5.856	0.0001
COD	1	-0.231273	0.05827330	-3.969	0.0014





Model: MODEL1

Dependent Variable: VFA

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Prob>F
Regression	1	36159.36810	36159.36810	5.039	0.0415
Error	14	100460.61276	7175.75805		
C Total	15	136619.98087			
Root MSE	84.70985	R-square	0.2647		
Dep Mean	544.06994	Adj R-sq	0.2121		
C.V.	15.56966				

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	T for H0: Parameter=0	Prob > T
INTERCEP	1	608.311578	35.60165571	17.087	0.0001
BOD5	1	-0.460239	0.20502486	-2.245	0.0415

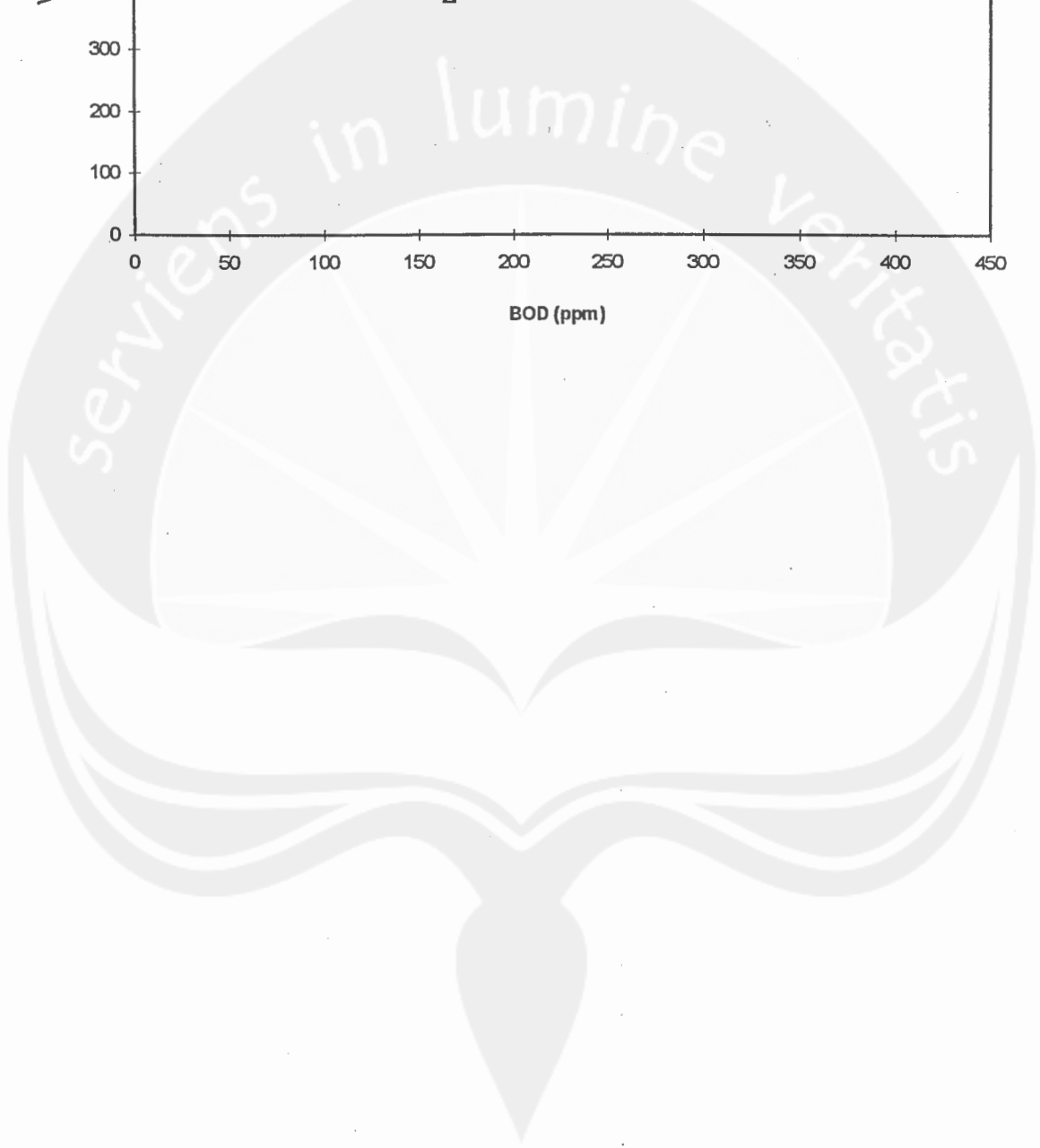
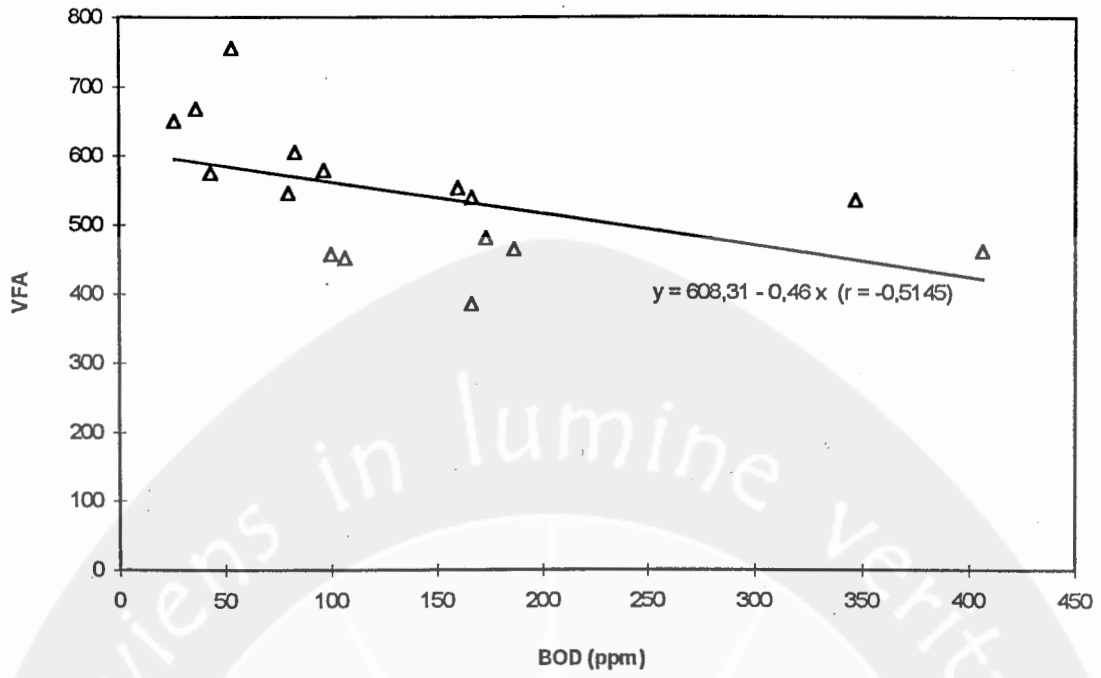
Dependent Variable: GAS

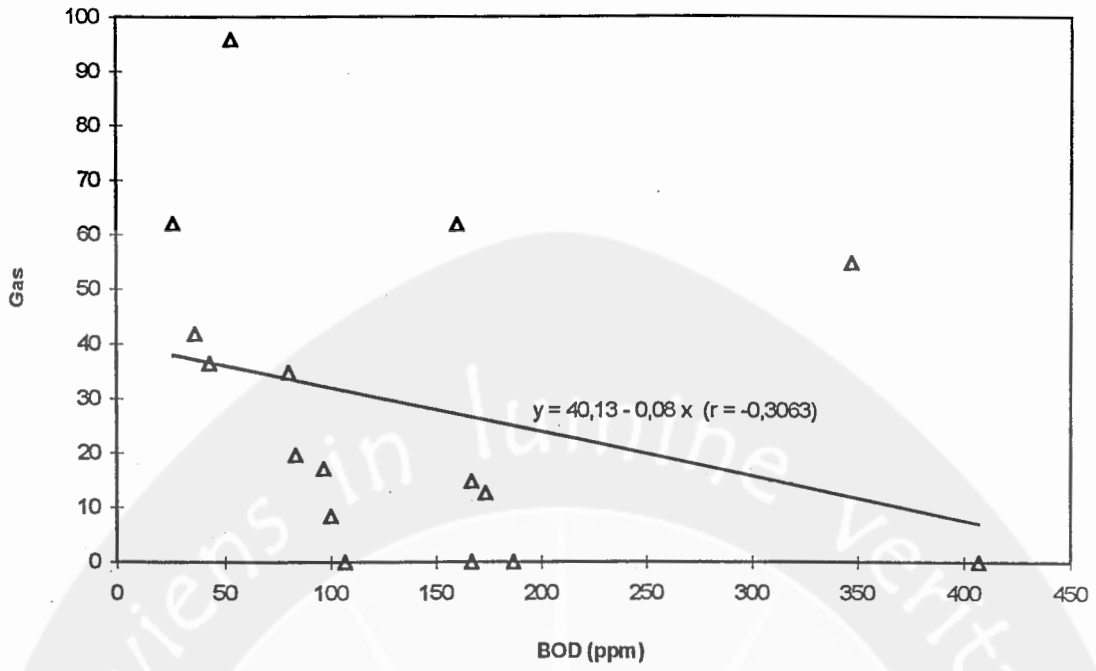
Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Prob>F
Regression	1	1132.09600	1132.09600	1.449	0.2486
Error	14	10937.85204	781.27515		
C Total	15	12069.94804			
Root MSE	27.95130	R-square	0.0938		
Dep Mean	28.76783	Adj R-sq	0.0291		
C.V.	97.16164				

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	T for H0: Parameter=0	Prob > T
INTERCEP	1	40.134885	11.74730668	3.417	0.0042
BOD5	1	-0.081436	0.06765107	-1.204	0.2486





----- WAKTU=0 -----

Duncan's Multiple Range Test for variable: BOD5

NOTE: This test controls the type I comparisonwise error rate, not the experimentwise error rate

Alpha= 0.05 df= 24 MSE= 750

Number of Means	2	3	4
Critical Range	46.104482	48.438361	50.046838

Means with the same letter are not significantly different.

Duncan Grouping	Mean	N	PERL
A	406.67	3	3:1
B	186.67	3	1:3
B	166.67	3	0:4
C	106.67	3	2:2

----- WAKTU=5 -----

Duncan's Multiple Range Test for variable: BOD5

NOTE: This test controls the type I comparisonwise error rate, not the experimentwise error rate

Alpha= 0.05 df= 24 MSE= 750

Number of Means	2	3	4
Critical Range	46.104482	48.438361	50.046838

Means with the same letter are not significantly different.

Duncan Grouping	Mean	N	PERL
A	346.67	3	3:1
B	173.33	3	0:4
B	166.67	3	1:3
C	80.00	3	2:2

----- WAKTU=10 -----

Duncan's Multiple Range Test for variable: BOD5

NOTE: This test controls the type I comparisonwise error rate, not the experimentwise error rate

Alpha= 0.05 df= 24 MSE= 750

Number of Means	2	3	4
Critical Range	46.104482	48.438361	50.046838

Means with the same letter are not significantly different.

Duncan Grouping	Mean	N	PERL
A	160.00	3	3:1
B	100.00	3	0:4
B			
C B	83.33	3	1:3
C			
C	43.33	3	2:2

----- WAKTU=15 -----

Duncan's Multiple Range Test for variable: BOD5

NOTE: This test controls the type I comparisonwise error rate, not the experimentwise error rate

Alpha= 0.05 df= 24 MSE= .750

Number of Means	2	3	4
Critical Range	46.104482	48.438361	50.046838

Means with the same letter are not significantly different.

Duncan Grouping	Mean	N	PERL
A	96.67	3	0:4
A			
B A	53.33	3	3:1
B			
B	36.67	3	1:3
B			
B	26.67	3	2:2

----- WAKTU=0 -----

Duncan's Multiple Range Test for variable: COD

NOTE: This test controls the type I comparisonwise error rate, not the experimentwise error rate

Alpha= 0.05 df= 24 MSE= 4.001426

Number of Means	2	3	4
Critical Range	3.3675956	3.5380684	3.6555559

Means with the same letter are not significantly different.

Duncan Grouping	Mean	N	PERL
A	405.470	3	1:3
B	291.123	3	0:4
C	182.710	3	2:2
C			
C	182.393	3	3:1

----- WAKTU=5 -----

Duncan's Multiple Range Test for variable: COD

NOTE: This test controls the type I comparisonwise error rate, not the experimentwise error rate

Alpha= 0.05 df= 24 MSE= 4.001426

Number of Means	2	3	4
Critical Range	3.3675956	3.5380684	3.6555559

Means with the same letter are not significantly different.

Duncan Grouping	Mean	N	PERL
A	321.287	3	1:3
B	274.460	3	0:4
C	139.303	3	3:1
C			
C	139.273	3	2:2

----- WAKTU=10 -----

Duncan's Multiple Range Test for variable: COD

NOTE: This test controls the type I comparisonwise error rate, not the experimentwise error rate

Alpha= 0.05 df= 24 MSE= 4.001426

Number of Means	2	3	4
Critical Range	3.3675956	3.5380684	3.6555559

Means with the same letter are not significantly different.

Duncan Grouping	Mean	N	PERL
A	261.307	3	0:4
B	228.053	3	1:3
C	113.243	3	3:1
C	113.213	3	2:2

----- WAKTU=15 -----

Duncan's Multiple Range Test for variable: COD

NOTE: This test controls the type I comparisonwise error rate, not the experimentwise error rate

Alpha= 0.05 df= 24 MSE= 4.001426

Number of Means	2	3	4
Critical Range	3.3675956	3.5380684	3.6555559

Means with the same letter are not significantly different.

Duncan Grouping	Mean	N	PERL
A	257.800	3	0:4
B	213.953	3	1:3
C	103.470	3	2:2
C	103.453	3	3:1

----- WAKTU=0 -----

Duncan's Multiple Range Test for variable: MLSS

NOTE: This test controls the type I comparisonwise error rate, not the experimentwise error rate

Alpha= 0.05 df= 24 MSE= 1.597798

Number of Means	2	3	4
Critical Range	2.1280087	2.2357318	2.309973

Means with the same letter are not significantly different.

Duncan Grouping	Mean	N	PERL
A	32.820	3	3:1
B	30.020	3	2:2
C	13.947	3	1:3
D	0.647	3	0:4

----- WAKTU=5 -----

Duncan's Multiple Range Test for variable: MLSS

NOTE: This test controls the type I comparisonwise error rate, not the experimentwise error rate

Alpha= 0.05 df= 24 MSE= 1.597798

Number of Means	2	3	4
Critical Range	2.1280087	2.2357318	2.309973

Means with the same letter are not significantly different.

Duncan Grouping	Mean	N	PERL
A	39.593	3	3:1
A			
A	37.593	3	2:2
B	20.140	3	1:3
C	0.933	3	0:4

----- WAKTU=10 -----

Duncan's Multiple Range Test for variable: MLSS

NOTE: This test controls the type I comparisonwise error rate, not the experimentwise error rate

Alpha= 0.05 df= 24 MSE= 1.597798

Number of Means	2	3	4
Critical Range	2.1280087	2.2357318	2.309973

Means with the same letter are not significantly different.

Duncan Grouping	Mean	N	PERL
A	47.273	3	3:1
B	44.480	3	2:2
C	21.333	3	1:3
D	1.447	3	0:4

----- WAKTU=15 -----

Duncan's Multiple Range Test for variable: MLSS

NOTE: This test controls the type I comparisonwise error rate, not the experimentwise error rate

Alpha= 0.05 df= 24 MSE= 1.597798

Number of Means	2	3	4
Critical Range	2.1280087	2.2357318	2.309973

Means with the same letter are not significantly different.

Duncan Grouping	Mean	N	PERL
A	55.605	3	3:1
B	49.378	3	2:2
C	21.592	3	1:3
D	1.598	3	0:4

----- WAKTU=0 -----

Duncan's Multiple Range Test for variable: VFA

NOTE: This test controls the type I comparisonwise error rate, not the experimentwise error rate

Alpha= 0.05 df= 24 MSE= 2502.23

Number of Means	2	3	4
Critical Range	84.212416	88.475376	91.41335

Means with the same letter are not significantly different.

Duncan Grouping	Mean	N	PERL
A	463.53	3	1:3
A			
A	461.57	3	3:1
A			
A	451.17	3	2:2
A			
A	384.47	3	0:4

----- WAKTU=5 -----

Duncan's Multiple Range Test for variable: VFA

NOTE: This test controls the type I comparisonwise error rate, not the experimentwise error rate

Alpha= 0.05 df= 24 MSE= 2502.23

Number of Means	2	3	4
Critical Range	84.212416	88.475376	91.41335

Means with the same letter are not significantly different.

Duncan Grouping	Mean	N	PERL
A	545.78	3	2:2
A			
A	539.30	3	1:3
A			
A	535.61	3	3:1
A			
A	480.13	3	0:4

----- WAKTU=10 -----

Duncan's Multiple Range Test for variable: VFA

NOTE: This test controls the type I comparisonwise error rate, not the experimentwise error rate

Alpha= 0.05 df= 24 MSE= 2502.23

Number of Means	2	3	4
Critical Range	84.212416	88.475376	91.41335

Means with the same letter are not significantly different.

Duncan Grouping	Mean	N	PERL
A	605.00	3	1:3
A			
A	575.45	3	2:2
A			
A	553.20	3	3:1
B	457.07	3	0:4

----- WAKTU=15 -----

Duncan's Multiple Range Test for variable: VFA

NOTE: This test controls the type I comparisonwise error rate, not the experimentwise error rate

Alpha= 0.05 df= 24 MSE= 2502.23

Number of Means	2	3	4
Critical Range	84.212416	88.475376	91.41335

Means with the same letter are not significantly different.

Duncan Grouping	Mean	N	PERL
A	755.75	3	3:1
A			
B	667.81	3	1:3
B			
B	650.76	3	2:2
C			
C	578.51	3	0:4

----- WAKTU=5 -----

Duncan's Multiple Range Test for variable: GAS

NOTE: This test controls the type I comparisonwise error rate, not the experimentwise error rate

Alpha= 0.05 df= 24 MSE= 45.83104

Number of Means	2	3	4
Critical Range	11.397048	11.973984	12.3716

Means with the same letter are not significantly different.

Duncan Grouping	Mean	N	PERL
A	54.845	3	3:1
B	34.749	3	2:2
C	14.653	3	1:3
C			
C	12.560	3	0:4

----- WAKTU=10 -----

Duncan's Multiple Range Test for variable: GAS

NOTE: This test controls the type I comparisonwise error rate, not the experimentwise error rate

Alpha= 0.05 df= 24 MSE= 45.83104

Number of Means	2	3	4
Critical Range	11.397048	11.973984	12.3716

Means with the same letter are not significantly different.

Duncan Grouping	Mean	N	PERL
A	61.963	3	3:1
B	36.424	3	2:2
C	19.677	3	1:3
C			
C	8.373	3	0:4

----- WAKTU=15 -----

Duncan's Multiple Range Test for variable: GAS

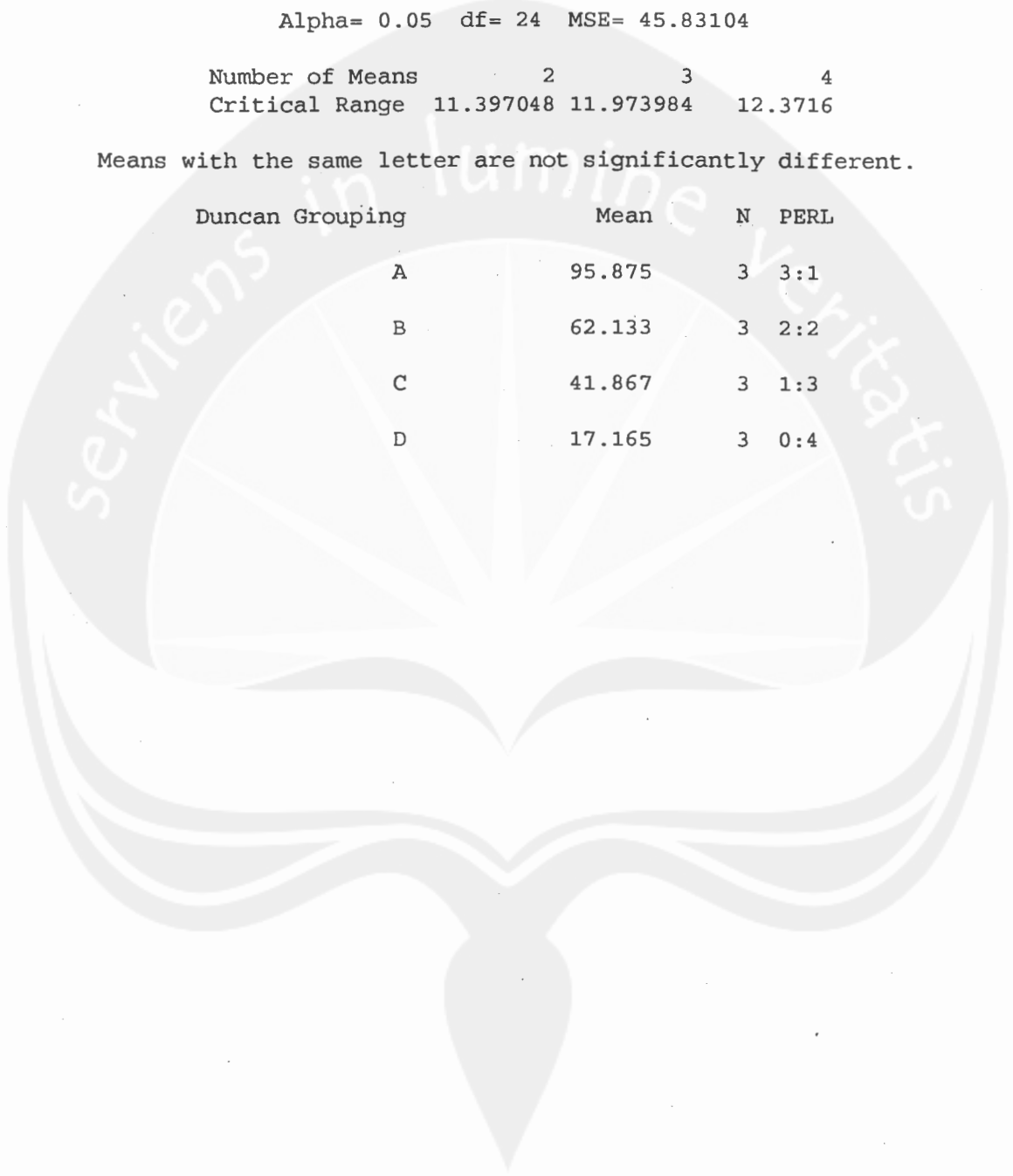
NOTE: This test controls the type I comparisonwise error rate, not the experimentwise error rate

Alpha= 0.05 df= 24 MSE= 45.83104

Number of Means	2	3	4
Critical Range	11.397048	11.973984	12.3716

Means with the same letter are not significantly different.

Duncan Grouping	Mean	N	PERL
A	95.875	3	3:1
B	62.133	3	2:2
C	41.867	3	1:3
D	17.165	3	0:4



----- WAKTU=5 -----

Duncan's Multiple Range Test for variable: PH

NOTE: This test controls the type I comparisonwise error rate, not the experimentwise error rate

Alpha= 0.05 df= 24 MSE= .0142451

Number of Means 2 3 4
 Critical Range 0.2009305 0.2111019 0.2181119

Means with the same letter are not significantly different.

Duncan Grouping	Mean	N	PERL
A	7.133	3	1:3
A			
A	7.097	3	0:4
A			
A	7.027	3	3:1
A			
A	6.927	3	2:2

----- WAKTU=10 -----

Duncan's Multiple Range Test for variable: PH

NOTE: This test controls the type I comparisonwise error rate, not the experimentwise error rate

Alpha= 0.05 df= 24 MSE= .0142451

Number of Means 2 3 4
 Critical Range 0.2009305 0.2111019 0.2181119

Means with the same letter are not significantly different.

Duncan Grouping	Mean	N	PERL
A	7.143	3	3:1
A			
A	7.023	3	1:3
A			
A	6.950	3	2:2
A			
A	6.927	3	0:4

----- WAKTU=15 -----

Duncan's Multiple Range Test for variable: PH

NOTE: This test controls the type I comparisonwise error rate, not the experimentwise error rate

Alpha= 0.05 df= 24 MSE= .0142451

Number of Means	2	3	4
Critical Range	0.2009305	0.2111019	0.2181119

Means with the same letter are not significantly different.

Duncan Grouping	Mean	N	PERL
A	7.1033	3	3:1
A			
A	7.0667	3	0:4
A			
A	7.0300	3	2:2
A			
A	6.9233	3	1:3

