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LAMPIRAN

Lampiran 1. Lembar Pengesahan Skripsi

KEMENTERIAN PENDIDIKAN, KEBUDAYAAN, RISET DAN TEKNOLOGI
UNIVERSITAS HASANUDDIN
FAKULTAS TEKNIK
DEPARTEMEN TEKNIK LINGKUNGAN
Poros Malino KM.6.Bontomarannu (92172) Gowa Sulawesi Selatan
Telp (0411) 586262 Fax (0411) 586015

LEMBAR PENGESAHAN SKRIPSI

PENGOLAHAN LIMBAH RUMAH PEMOTONGAN HEWAN (RPH) DENGAN METODE ELEKTRO-FLOTASI

Disusun dan diajukan oleh

Bagas Fairuz Daffa
D131191063

Telah memenuhi syarat untuk melaksanakan Seminar Hasil
Pada tanggal 28 November 2023

Menyetujui,

Pembimbing Utama,

Dr. Roslinda Ibrahim, S.P., M.T.
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DTL – Unhas: 27593/TD.06/2023

Lampiran 2. Laporan Hasil Pengujian

LABORATORIUM KUALITAS AIR
DEPARTEMEN TEKNIK LINGKUNGAN
FAKULTAS TEKNIK UNIVERSITAS HASANUDDIN
Lantai 3 Gedung Sipil Fakultas Teknik Universitas Hasanuddin
Jln. Poros Malino KM.6, Bonto Marannu (92172) Gowa, Sulawesi Selatan
WATER QUALITY LABORATORY

LAPORAN HASIL PENGUJIAN

Berdasarkan pengujian sampel air yang dilakukan di Laboratorium Kualitas Air Departemen Teknik Lingkungan Fakultas Teknik Universitas Hasanuddin oleh:

Nama	: Bagas Fairuz Daffa
NIM	: D131 19 1063
Lokasi	: RPH Tamangapa, Kecamatan Tamangapa, Kota Makassar dan Departemen Teknik Lingkungan Fakultas Teknik Universitas Hasanuddin.
Hari, Tanggal Sampel	: Sabtu, 9 September 2023 – Senin, 31 Oktober 2023
Hari, Tanggal Analisis	: Minggu, 10 September – Selasa, 1 November 2023
Parameter	: *Power Of Hydrogen* (Ph), *Chemical Oxygen Demand* (COD), *Biological Oxygen Demand* (BOD), *Total Suspended Solid (TSS)*, Minyak Lemak, dan Amonia.
Baku Mutu	: Air Limbah RPH, Lampiran XLV Peraturan Menteri Lingkungan Hidup Nomor 5 Tahun 2014

Maka dilampirkan hasil pengujian terhadap sampel air sebagai berikut:

A. Parameter *power of hydrogen* (pH)

Variasi	Konsentrasi			Baku mutu	Keterangan
	A	B	Rata-Rata		
V1T1	6,96	7,1	7,03	6,0-8,0	M
V1T2	7,12	7,16	7,14		M
V1T3	7,21	7,29	7,25		M
V2T1	7,12	7,16	7,14		M
V2T2	7,3	7,44	7,37		M
V2T3	7,6	7,74	7,67		M
V3T1	7,32	7,8	7,56		M
V3T2	7,72	8,06	7,89		M
V3T3	8,04	8,32	8,18		M

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B. Parameter *Chemical Oxygen Demand* (COD)

Variasi	Konsentrasi COD			Baku mutu (g/L)	Keterangan
	A (5 ml)	B (10 ml)	Rata-Rata		
P	2380,00	2340,00	2360,00	200	TM
V1T1	468,00	234,00	351,00		TM
V1T2	376,00	218,00	297,00		TM
V1T3	320,00	202,00	261,00		TM
V2T1	420,00	226,00	323,00		TM
V2T2	372,00	162,00	267,00		TM
V2T3	324,00	53,00	188,50		M
V3T1	380,00	194,00	287,00		TM
V3T2	348,00	142,00	245,00		TM
V3T3	148,00	126,00	137,00		M

C. Parameter *Biological Oxygen Demand* (BOD)

Variasi	V.Winkler (ml)	Konsentrasi $BOD_{0\ (fp\ 500)}$		
		A	B	Rata-Rata
P	135,00	6,35	4,37	5,36
V1T5	155,00	5,56	5,96	5,76
V1T10	160,00	12,32	4,37	8,35
V1T15	150,00	4,37	5,56	4,97
V2T5	147,00	6,56	6,56	6,56
V2T10	150,00	13,31	7,55	10,43
V2T15	150,00	8,54	7,35	7,95
V3T5	145,00	12,71	5,76	9,24
V3T10	153,00	5,96	7,55	6,76
V3T15	155,00	8,54	11,33	9,94

Variasi	Konsentrasi $BOD_{5\ (fp\ 500)}$			Hasil (mg/L)	Baku mutu (mg/L)	Ket.
	A	B	Rata-Rata			
P	3,98	0,80	2,39	1487,50	100	TM
V1T5	3,97	5,96	4,97	397,42		TM
V1T10	9,92	6,15	8,04	156,15		TM
V1T15	5,96	3,58	4,77	99,33		M
V2T5	5,96	5,96	5,96	297,55		TM
V2T10	11,92	8,34	10,13	149,00		TM
V2T15	7,35	8,34	7,85	50,57		M
V3T5	11,31	6,55	8,93	152,55		TM
V3T10	6,75	6,36	6,55	100,38		TM
V3T15	6,95	12,72	9,84	49,68		M

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D. Parameter *Total Suspended Solid* (TSS)

Variasi	Konsentrasi TSS A (30 ml)		
	W0 (gr)	W1 (gr)	Hasil (mg/L)
P	0,0926	0,1010	280
V1T1	0,0885	0,0901	53,3
V1T2	0,0877	0,0890	43,3
V1T3	0,0898	0,0909	36,7
V2T1	0,0903	0,0914	36,7
V2T2	0,0912	0,0920	26,7
V2T3	0,0918	0,0920	6,7
V3T1	0,0908	0,0920	40,00
V3T2	0,0913	0,0920	23,33
V3T3	0,0907	0,0910	10,00

Variasi	Konsentrasi TSS B (30 ml)			Rata-Rata (mg/L)	Baku Mutu (mg/L)	Ket.
	W0 (gr)	W1 (gr)	Hasil (mg/L)			
V1T1	0,0891	0,0910	63,3	58,33	25	M
V1T2	0,0894	0,0905	36,7	40,00		M
V1T3	0,0884	0,0894	33,3	35,00		M
V2T1	0,0902	0,0916	46,7	41,67		M
V2T2	0,0902	0,0908	20,0	23,33		M
V2T3	0,0910	0,0915	16,7	11,67		M
V3T1	0,0912	0,0923	36,67	38,33		M
V3T2	0,0909	0,0914	16,67	20,00		M
V3T3	0,0916	0,0918	6,67	8,33		M

E. Parameter Minyak Lemak

Variasi	A		
	W0 (gr)	W1 (gr)	Hasil (mg/L)
P	113,797	113,935	1383
V1T1	113,627	113,684	568,000
V1T2	113,627	113,675	481,000
V1T3	113,687	113,719	322,000
V2T1	147,963	148,001	383,000
V2T2	147,968	147,990	223,000
V2T3	113,633	113,648	147,000
V3T1	113,670	113,691	207,000
V3T2	147,963	147,988	254,000
V3T3	113,635	113,645	100,000

LABORATORIUM KUALITAS AIR
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Variasi	B			Rata-Rata (mg/L)	Baku Mutu (mg/L)	Ket.
	W0 (gr)	W1 (gr)	Hasil (mg/L)			
P	113,890	114,002	1120	1251,50	15	
V1T1	113,643	113,700	571,000	569,500		TM
V1T2	113,544	113,590	467,000	474,000		TM
V1T3	113,673	113,700	271,000	296,500		TM
V2T1	113,647	113,682	350,000	366,500		TM
V2T2	147,699	147,722	231,000	227,000		TM
V2T3	113,640	113,649	88,000	117,500		TM
V3T1	113,661	113,680	192,000	199,500		TM
V3T2	113,640	113,649	90,000	172,000		TM
V3T3	113,645	113,656	106,000	103,000		TM

F. Amonia

Variasi	Konsentrasi Amonia (mg/L)			Baku Mutu (mg/L)	Ket.
	A (50 ml)	B (50 ml)	Rata-Rata		
P	68,930	69,183	69,057	25	TM
V1T1	63,345	62,507	62,926		TM
V2T1	61,782	59,596	60,689		TM
V3T1	50,900	45,952	48,426		TM
V1T2	50,230	55,566	52,898		TM
V2T2	36,400	36,79	36,595		TM
V3T2	10,500	10,462	10,481		M
V1T3	33,001	34,273	33,637		TM
V2T3	30,518	32,716	31,617		TM
V3T3	12,230	10,174	11,202		M

Gowa, 1 November 2023

Mengetahui,
Laboran Laboratorium Kualitas Air
Departemen Teknik Lingkungan

Syarifuddin, S.T.
NIP 19600730 198903 003

Praktikan Laboratorium Kualitas Air
Departemen Teknik Lingkungan

Bagas Fairuz Daffa
NIM D131 19 1063

Lampiran 2. Baku Mutu Air Limbah RPH.

LAMPIRAN XLV
PERATURAN MENTERI LINGKUNGAN HIDUP
REPUBLIK INDONESIA
NOMOR 5 TAHUN 2014
TENTANG
BAKU MUTU AIR LIMBAH

BAKU MUTU AIR LIMBAH BAGI USAHA DAN/ATAU KEGIATAN
RUMAH PEMOTONGAN HEWAN

Parameter	Satuan	Kadar Paling Tinggi
BOD	mg/L	100
COD	mg/L	200
TSS	mg/L	100
Minyak dan Lemak	mg/L	15
NH_3-N	mg/L	25
pH	-	6 – 9
Volume air limbah paling tinggi untuk sapi, kerbau dan kuda: 1.5 m3/ekor/hari Volume air limbah paling tinggi untuk kambing dan domba: 0.15 m3/ekor/hari Volume air limbah paling tinggi untuk babi: 0.65 m3/ekor/hari		

MENTERI LINGKUNGAN HIDUP
REPUBLIK INDONESIA,

BALTHASAR KAMBUAYA

Lampiran 3. Metode Pengujian Sampel

A. Parameter Power of Hydrogen (pH)

SNI 6989.11:2019 (2004) Air dan air limbah – Bagian 11 : Cara uji derajat keasaman (pH) dengan menggunakan pH meter

1. Prinsip Pengujian

   Metode pengukuran pH berdasarkan pengukuran aktivitas ion hidrogen secara potensiometri/elektrometri dengan menggunakan pH meter.

2. Alat
   - pH meter;
   - Gelas piala 250 mL; dan
   - Kertas tisu;
3. Bahan
   - Larutan contoh uji;
   - Air bebas mineral (aquades); dan
   - Larutan penyangga (*buffer*).
4. Prosedur Pengujian
   a. Kalibrasi pH meter
      1) Bilas elektroda dengan aquades terlebih dahulu dan
      2) Lakukan kalibrasi alat pH meter dengan larutan penyangga sesuai instruksi kerja alat.
   b. Pengukuran Contoh Uji
      1) Keringkan elektroda dengan kertas tisu;
      2) Bilas elektroda dengan aquades;
      3) Bilas elektroda dengan contoh uji;
      4) Celupkan elektroda ke dalam contoh uji sampai pH meter menunjukkan pembacaan yang tetap selama 1 menit; dan
      5) Catat hasil pembacaan pada tampilan dari pH meter

B. Parameter Biological Oxygen Demand (BOD)

SNI 6989.72:2009 Air dan air limbah – Bagian 72: Cara uji Kebutuhan Oksigen Biokimia (Biochemical Oxygen Demand/BOD)

1. Prinsip Pengujian

   Sejumlah contoh uji ditambahkan ke dalam larutan pengencer jenuh oksigen yang telah ditambah larutan nutrisi dan bibit mikroba, kemudian diinkubasi dalam ruang gelap pada suhu 20 ºC ± 1 ºC selama 5 hari. Nilai BOD dihitung berdasarkan selisih konsentrasi oksigen terlarut 0 hari dan 5 hari. Bahan kontrol standar uji BOD ini, digunakan larutan glukosa-asam glutamat.

2. Alat
   - Botol Winkler gelap dan terang;
   - Lemari inkubasi;
   - Statif;
   - Klem;
   - Buret;
   - Pipet volumetrik 1 mL;
   - Pipet tetes;
   - Labu ukur 100 mL;
   - Gelas ukur 50 mL; dan
   - Erlenmeyer;

3. Bahan
   - Larutan contoh uji;
   - Air bebas mineral (aquades);
   - Sodium thiosulfate, $Na_2S_2O_3$;
   - Mangan sulfat, $MnSO_4$;
   - Larutan Alkali iodida azida, NaOH-KI;
   - Indikator Amilum; dan
   - Asam sulfat, H_2SO_4 pekat;

4. Prosedur Pengujian
   a. Siapkan 2 botol Wrinkler, tandai masing-masing botol dengan notasi A_0 untuk botol Wrinkler terang dan notasi A_5 untuk botol Wrinkler gelap;
   b. Encerkan larutan uji jika diperlukan.

c. Aerasikan larutan uji selama 15 menit menggunakan aerator pada gelas piala 1000 mL;
d. Lalu, masukkan larutan contoh uji ke dalam botol Wrinkler sampai meluap, kemudian tutup botol secara hari-hati untuk menghindari terbentuknya gelembung udara;
e. Lakukan pengocokan beberapa kali hingga homogen, kemudian tambahkan aquades sekitar mulut botol Wrinkler;
f. Simpan botol A_5 dalam lemari inkubator;
g. Lakukan pengukuran DO terhadap botol A_0 dengan metode titrasi sesuai SNI 06-6989.14-2004, lalu catat sebagai DO_0; dan
h. Setelah lima hari, lakukan pengukuran DO terhadap botol A_5 dengan metode titrasi, lalu catat sebagai DO_5.

5. Perhitungan

Nilai BOD

$$\text{BOD (ppm)} = (\text{DO}_0 - \text{DO}_5) \times fp$$

Keterangan:

DO_0 = Dissolved Oxygen pada hari ke 0 (mg/L)

DO_5 = Dissolved Oxygen pada hari ke 5 (mg/L)

fp= faktor pengenceran

C. Parameter Chemical Oxygen Demand (COD)

SNI 6989.15:2019 (2004) Air dan air limbah – Bagian 15 : Cara uji kebutuhan oksigen kimiawi (chemical oxygen demand/COD) dengan refluks terbuka secara titrimetri

1. Prinsip Pengujian

   Zat organik dioksidasi dengan campuran mendidih asam sulfat dan kalium dikromat yang diketahui normalitasnya dalam suatu refluk selama 2 jam. Kelebihan kalium dikromat yang tidak tereduksi, dititrasi dengan larutan ferro ammonium sulfat (FAS).

2. Alat
   - Pendingin Liebig 30 cm;
   - Hot plate;
   - Statif dan Klem;
   - Buret 25 mL;
   - Pipet volumetrik 5 mL; 10 mL; dan 15 mL;
   - Pipet tetes;
   - Erlenmeyer 250 mL; dan
   - Timbangan analitik.

3. Bahan
   - Larutan contoh uji;
   - Air bebas mineral (aquades)
   - Larutan Kalium dikromat, $K_2Cr_2O_7$ 0,25 N;
   - Larutan Asam sulfat – perak sulfat;
   - Larutan indikator Ferroin;
   - Larutan Ferro Ammonium Sulfat, FAS 0,1 N;
   - Serbuk Merkuri sulfat, $HgSO_4$; dan
   - Batu didih.

4. Prosedur Pengujian
   a. Pipet 10 mL contoh uji, masukkan ke dalam erlenmeyer 250 mL;
   b. Tambahkan 0,2 g serbuk $HgSO_4$ dan beberapa batu didih;
   c. Tambahkan 5 mL larutan kalium dikromat, $K_2Cr_2O_7$ 0,25 N;

d. Tambahkan 15 mL pereaksi asam sulfat – perak sulfat perlahan-lahan sambil didinginkan dalam air pendingin;
e. Hubungkan dengan pendingin Liebig dan didihkan di atas hot plate selama 60 menit;
f. Dinginkan dan cuci bagian dalam dari pendingin dengan air suling hingga volume contoh uji menjadi lebih kurang 70 mL;
g. Dinginkan sampai temperatur kamar, tambahkan indikator ferroin 2 sampai dengan 3 tetes, titrasi dengan larutan FAS 0,1 N sampai warna merah kecokelatan, catat volume larutan FAS; dan
h. Lakukan langkah a sampai dengan g terhadap aquades sebagai blanko. Catat volume larutan FAS.

5. Perhitungan

$$COD(mg/L) = \frac{(A - B) \times 8000 \times N}{V}$$

Keterangan

A = volume larutan FAS untuk blanko (mL)

B = volume larutan FAS untuk larutan uji (mL)

N = normalitas FAS (N)

V = volume larutan contoh uji (mL)

D. Parameter Total Suspended Solid (TSS)

SNI 6989.3:2019 Air dan air limbah – Bagian 3 : Cara uji padatan tersuspensi total (*Total Suspended Solids*, TSS) secara gravimetri

1. Prinsip Pengujian

   Contoh uji yang telah homogen disaring dengan media penyaring yang telah ditimbang. Residu yang tertahan pada media penyaring dikeringkan pada kisaran suhu 103 ºC - 105 ºC hingga mencapai berat tetap. Kenaikan berat saringan mewakili Padatan Tersuspensi Total (TSS).

2. Alat
   - Desikator;
   - Oven;
   - Timbangan analitik;
   - Pipet volumetrik 10 ml;
   - Cawan;
   - Alat penyaring;
   - Sistem vakum; dan
   - Pinset.

3. Bahan
   - Larutan contoh uji;
   - Kertas saring glass microfiber; dan
   - Air bebas mineral (aquades).

4. Prosedur Pengujian
   a. Persiapan kertas saring
      1) Letakkan kertas saring pada peralatan penyaring;
      2) Pasang sistem vakum, hidupkan pompa vakum kemudian bilas kertas saring dengan aquades 20 mL.
      3) Lanjutkan pengisapan hingga tiris, matikan pompa vakum;
      4) Pindahkan kertas saring ke dalam cawan menggunakan pinset.
      5) Keringkan cawan yang berisi kertas saring dalam oven selama 45 menit;
      6) Dinginkan cawan dan kertas saring dalam desikator; dan

7) Timbang cawan bersama kertas saring sehingga diperoleh berat tetap (W_0).

b. Pengujian total padatan tersuspesi

1) Letakkan kertas saring pada perlatan penyaring;
2) Aduk contoh uji hingga diperoleh contoh uji yang homogen;
3) Ambil contoh uji 10 mL dan masukkan ke dalam peralatan penyaring. Nyalakan sistem vakum;
4) Pindahkan kertas saring secara hati-hati dari peralatan penyaring menggunakan pinset ke cawan.
5) Keringkan cawan yang berisi kertas saring dalam oven selama 45 menit;
6) Dinginkan cawan dan kertas saring dalam desikator; dan
7) Timbang cawan berisi kertas saring sehingga diperoleh berat tetap (W_1).

5. Perhitungan

$$TSS(mg/L) = \frac{(W_1 - W_0) \times 1000}{V}$$

Keterangan:

W = berat hasil penimbangan (mg)

V = volume larutan contoh uji (mL)

E. Parameter Minyak dan Lemak

SNI 6989.10-2011 Air dan air limbah – Bagian 10 : Cara uji minyak dan lemak secara gravimetri

1. Prinsip Pengujian

   Minyak nabati dan minyak mineral dalam contoh uji air yang diasamkan pH lebih kecil dari 2 diekstraksi dengan n-heksana dalam corong pisah dan untuk menghilangkan air yang masih tersisa digunakan natrium sulfat anhidrat. Ekstrak minyak nabati dan minyak mineral dipisahkan dari pelarut organik secara destilasi. Residu yang tertinggal pada labu destilasi ditimbang sebagai minyak dan lemak.

2. Alat
   - Gelas erlenmeyer;
   - Gelas piala 50 mL dan 250 mL;
   - Gelas ukur 50 mL;
   - Pipet tetes;
   - Oven;
   - Penangas air;
   - Neraca teknis;
   - Corong pisah;
   - Kertas saring;
   - Desikator; dan
   - Alat destilasi.

3. Bahan
   - Larutan contoh uji;
   - Asam sulfat, H_2SO_4 1:1;
   - N-heksana 85%; dan
   - Natrium sulfat, Na_2SO_4.

4. Prosedur Pengujian
   a. Timbang berat Erlenmeyer sebagai berat (W_0);
   b. Ambil 100 mL contoh uji ke dalam gelas piala;
   c. Atur pH dengan menambahkan H_2SO_4 1:1 sebanyak 1 mL;

d. Pindahkan contoh uji ke corong pisah;
e. Bilas gelas piala dengan 30 mL n-heksana dan tambahkan hasil ke dalam corong pisah;
f. Kocok corong pisah dengan kuat selama 2 menit sehingga lapisan air dan n-heksana memisah;
g. Pisahkan fasa air ke dalam gelas piala,
h. Masukkan fasa n-heksana ke dalam Erlenmeyer dengan melewatkan pada kertas saring yang berisi Na_2SO_4;
i. Masukan kembali fasa air ke dalam corong pisah untuk diekstraksi kembali;
j. Lakukan ekstraksi sekali lagi dengan 30 mL n-heksana;
k. Gabungkan ekstrak dalam Erlenmeyer dan lakukan destilasi dengan penangas air pada suhu 70 °C;
l. Saat terlihat kondensasi pelarut berhenti, hentikan destilasi. Dinginkan dan keringkan labu destilasi dalam oven dengan suhu 70 °C ± 2 °C selama 30 - 45 menit;
m. Masukkan ke dalam desikator hingga dingin dan timbang Erlenmeyer sehingga didapatkan berat (W_1);

5. Perhitungan

Kadar minyak dan lemak

$$\text{Kadar minyak dan lemak } (mg/L) = \frac{(W_1 - W_0) \times 1000}{V}$$

Keterangan

V = volume contoh uji (mL)

W = berat pengukuran (mg)

F. Parameter Amonia (NH_3)

SNI 6989.30:2005 Air dan air limbah – Bagian 30 : Cara uji amonia (NH_3^-) dengan spektrofotometer secara fenat

1. Prinsip Pengujian

   Cara uji ini digunakan untuk mementuan kadar amonia dengan spektrofotometer secara fenat dalam contoh air dan air limbah pada kisaran kadar 0,1 mg/L sampai dengan 0,6 mg/L NH_3-N pada panjang gelombang 640 nm.

2. Alat
   - Spektrofotometer;
   - Labu ukur 100 mL;
   - Pipet volumetrik 25 mL;
   - Gelas ukur 50 mL;
   - Labu Erlenmeyer 250 mL;
   - Stopwatch; dan
   - Timbangan analitik.

3. Bahan
   - Larutan contoh uji;
   - Air bebas mineral (aquades);
   - Larutan induk amonia;
   - Larutan kerja dengan 3 kadar berbeda;
   - Larutan fenol;
   - Larutan nitroprusid; dan
   - Larutan pengoksidasi.

4. Prosedur Pengujian
   a. Pembuatan larutan pengoksidasi yang terdiri dari:
      1) 100 mL larutan alkalin sitrat; dan
      2) 25 mL larutan natrium hipoklorit.
   b. Pembuatan Kurva Kalibrasi
      1) Optimalkan alat spektrofotometer sesuai dengan petunjuk alat untuk pengujian kadar fosfat;

2) Ambil 25 mL larutan kerja masukkan masing-masing ke dalam erlenmeyer;
3) Tambahkan 1 mL larutan fenol dan homogenkan;
4) Tambahkan 1 mL Natrium Nitroprusid dan homogenkan;
5) Tambahkan 2,5 mL larutan campuran dan dihomogenkan;
6) Tutup mulut erlenmeyer dengan *plastic wrap* dan tunggu selama 1 jam;
7) Masukkan ke dalam kuvet pada alat spektrofotometer, ukur dan catat serapannya pada panjang gelombang 640 nm;
8) Buat kurva kalibrasi menggunakan data pada tahap e dan tentukan persamaan garis lurusnya;
9) Jika koefisien korelasi regresi linier (r) lebih kecil dari 0,995, periksa kondisi alat dan ulangi langkah pembuatan kurva kalibrasi hingga diperoleh nilai koefisien r ≥ 0,995.

c. Pengujian Kadar Amonia

1) Pipet 25 mL contoh uji secara duplo dan masukkan masing-masing ke dalam erlenmeyer;
2) Tambahkan 1 mL larutan fenol dan homogenkan;
3) Tambahkan 1 mL Natrium Nitroprusid dan homogenkan;
4) Tambahkan 2,5 mL larutan campuran dan dihomogenkan;
5) Tutup mulut erlenmeyer dengan *plastic wrap* dan tunggu selama 1 jam;
6) Masukkan ke dalam kuvet pada alat spektrofotometer, ukur dan catat serapannya pada panjang gelombang 640 nm; dan
7) Tentukan kadar fosfat dari kurva kalibrasi sehingga didapatkan kadar fosfat (C).

5. Perhitungan

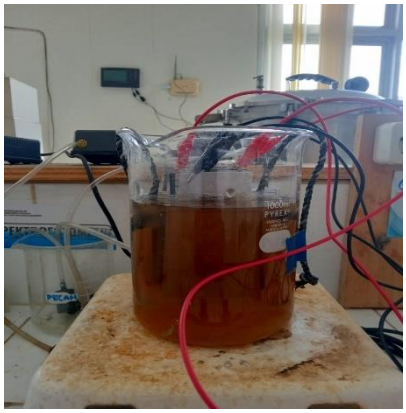
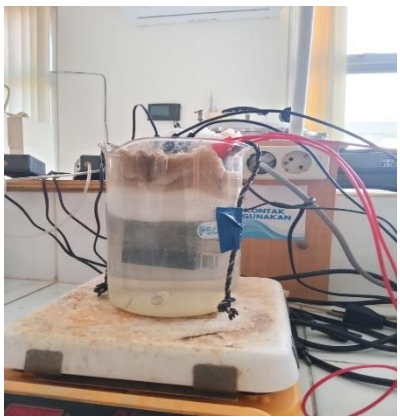
$$Kadar\ Amonia\ (mg\ NH_3^-/L) = C \times fp$$

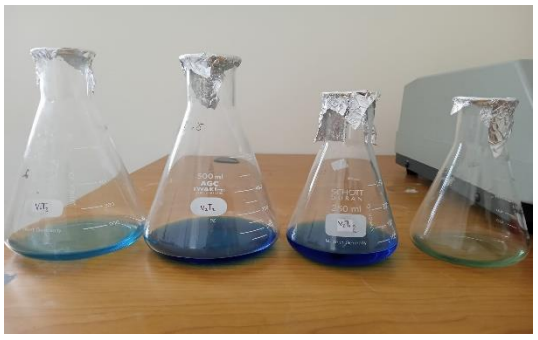
Keterangan

C = kadar amonia yang didapatkan dari kurva kalibrasi (mg/L)

fp= faktor pengenceran

Lampiran 4. Dokumentasi

<table>
<tr><td>  </td><td>  </td></tr>
<tr><td colspan="2">Perencanaan dan Pembuatan Reaktor</td></tr>
<tr><td>  </td><td>  </td></tr>
<tr><td colspan="2">Pengambilan Sampel Air Limbah RPH</td></tr>
<tr><td>  </td><td>  </td></tr>
<tr><td colspan="2">Proses Elektroflotasi</td></tr>
</table>



Pengujian Sampel Air Limbah

Hasil Pengolahan Air Limbah RPH tiap Variasi

Lampiran 5. Hasil Analisis Statistik

A. Analisis Regresi Linear Berganda Tegangan Listrik dan Jumlah Pelat

```
REGRESSION
 /MISSING LISTWISE
 /STATISTICS COEFF OUTS R ANOVA
 /CRITERIA=PIN(.05) POUT(.10)
 /NOORIGIN
 /DEPENDENT Y1
 /METHOD=ENTER X1 X2.
```

Regression

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	Pelat, Tegangan[b]	.	Enter

a. Dependent Variable: pH

b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,970[a]	,940	,920	,10921

a. Predictors: (Constant), Pelat, Tegangan

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1,127	2	,563	47,236	,000[b]
	Residual	,072	6	,012		
	Total	1,198	8			

a. Dependent Variable: pH

b. Predictors: (Constant), Pelat, Tegangan

Coefficients[a]

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		

1	(Constant)	5,540	,203		27,332	,000
	Tegangan	,046	,009	,511	5,121	,002
	Pelat	,184	,022	,824	8,261	,000

a. Dependent Variable: pH

```
REGRESSION
 /MISSING LISTWISE
 /STATISTICS COEFF OUTS R ANOVA
 /CRITERIA=PIN(.05) POUT(.10)
 /NOORIGIN
 /DEPENDENT Y2
 /METHOD=ENTER X1 X2.
```

Regression

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	Pelat, Tegangan[b]	.	Enter

a. Dependent Variable: COD

b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,973[a]	,947	,929	17,60189

a. Predictors: (Constant), Pelat, Tegangan

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	32975,042	2	16487,521	53,215	,000[b]
	Residual	1858,958	6	309,826		
	Total	34834,000	8			

a. Dependent Variable: COD

c. Predictors: (Constant), Pelat, Tegangan

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	546,667	32,668		16,734	,000
	Tegangan	-12,483	1,437	-,819	-8,686	,000
	Pelat	-20,000	3,593	-,525	-5,566	,001

a. Dependent Variable: COD

```
REGRESSION
 /MISSING LISTWISE
 /STATISTICS COEFF OUTS R ANOVA
 /CRITERIA=PIN(.05) POUT(.10)
 /NOORIGIN
 /DEPENDENT Y3
 /METHOD=ENTER X1 X2.
```

Regression

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	Pelat, Tegangan[b]	.	Enter

a. Dependent Variable: BOD

b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,920[a]	,846	,795	52,31495

a. Predictors: (Constant), Pelat, Tegangan

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	90421,555	2	45210,777	16,519	,004[b]
	Residual	16421,126	6	2736,854		
	Total	106842,680	8			

a. Dependent Variable: BOD

b. Predictors: (Constant), Pelat, Tegangan

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	610,910	97,092		6,292	,001
	Tegangan	-21,598	4,271	-,809	-5,056	,002
	Pelat	-29,191	10,679	-,438	-2,734	,034

a. Dependent Variable: BOD

```
REGRESSION
 /MISSING LISTWISE
 /STATISTICS COEFF OUTS R ANOVA
 /CRITERIA=PIN(.05) POUT(.10)
 /NOORIGIN
 /DEPENDENT Y4
 /METHOD=ENTER X1 X2.
```

Regression

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	Pelat, Tegangan[b]	.	Enter

a. Dependent Variable: TSS

b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,956[a]	,913	,884	5,47989

a. Predictors: (Constant), Pelat, Tegangan

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1898,130	2	949,065	31,605	,001[b]
	Residual	180,175	6	30,029		
	Total	2078,305	8			

a. Dependent Variable: TSS

b. Predictors: (Constant), Pelat, Tegangan

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	102,963	10,170		10,124	,000
	Tegangan	-2,778	,447	-,746	-6,208	,001
	Pelat	-5,556	1,119	-,597	-4,967	,003

a. Dependent Variable: TSS

```
REGRESSION
  /MISSING LISTWISE
  /STATISTICS COEFF OUTS R ANOVA
  /CRITERIA=PIN(.05) POUT(.10)
  /NOORIGIN
  /DEPENDENT Y5
  /METHOD=ENTER X1 X2.
```

Regression

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	Pelat, Tegangan[b]	.	Enter

a. Dependent Variable: Minyak Lemak

b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,952[a]	,907	,876	56,68697

a. Predictors: (Constant), Pelat, Tegangan

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	188605,417	2	94302,708	29,347	,001[b]
	Residual	19280,472	6	3213,412		
	Total	207885,889	8			

a. Dependent Variable: Minyak Lemak

b. Predictors: (Constant), Pelat, Tegangan

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1063,778	105,207		10,111	,000
	Tegangan	-20,617	4,628	-,554	-4,454	,004
	Pelat	-72,125	11,571	-,775	-6,233	,001

a. Dependent Variable: Minyak Lemak

```
REGRESSION
 /MISSING LISTWISE
 /STATISTICS COEFF OUTS R ANOVA
 /CRITERIA=PIN(.05) POUT(.10)
 /NOORIGIN
 /DEPENDENT Y6
 /METHOD=ENTER X1 X2.
```

Regression

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	Pelat, Tegangan[b]	.	Enter

a. Dependent Variable: Amonia

b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,930[a]	,865	,820	8,20581

a. Predictors: (Constant), Pelat, Tegangan

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	2595,264	2	1297,632	19,271	,002[b]
	Residual	404,012	6	67,335		
	Total	2999,276	8			

a. Dependent Variable: Amonia

b. Predictors: (Constant), Pelat, Tegangan

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	123,722	15,229		8,124	,000
	Tegangan	-3,210	,670	-,718	-4,791	,003
	Pelat	-6,613	1,675	-,592	-3,948	,008

a. Dependent Variable: Amonia

B. Analisis Regresi Non-Linear dengan Metode *Curve Fitting* Hubungan Pembentukan Gas H_2 dan O_2.

Curve Fit

```
* Curve Estimation.
TSET NEWVAR=NONE.
CURVEFIT
  /VARIABLES=Y1 Y2 Y3 Y4 Y5 Y6 WITH X1
  /CONSTANT
  /MODEL=LINEAR POWER EXPONENTIAL
  /PRINT ANOVA
  /PLOT FIT.
```

Curve Fit

Case Processing Summary

	N
Total Cases	9
Excluded Cases[a]	0
Forecasted Cases	0
Newly Created Cases	0

a. Cases with a missing value in any variable are excluded from the analysis.

Variable Processing Summary

		Variables			
		Dependent			
		pH	COD	BOD	TSS
Number of Positive Values		9	9	9	9
Number of Zeros		0	0	0	0
Number of Negative Values		0	0	0	0
Number of Missing Values	User-Missing	0	0	0	0
	System-Missing	0	0	0	0

Variable Processing Summary

	Variables		
	Dependent		
	Minyak Lemak	Amonia	Mol H2

Number of Positive Values		9	9	9
Number of Zeros		0	0	0
Number of Negative Values		0	0	0
Number of Missing Values	User-Missing	0	0	0
	System-Missing	0	0	0

pH

Linear

Model Summary

R	R Square	Adjusted R Square	Std. Error of the Estimate
,886	,785	,754	,192

The independent variable is Mol H2.

ANOVA

	Sum of Squares	df	Mean Square	F	Sig.
Regression	,940	1	,940	25,496	,001
Residual	,258	7	,037		
Total	1,198	8			

The independent variable is Mol H2.

Coefficients

	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta	t	Sig.
Mol H2	18,006	3,566	,886	5,049	,001
(Constant)	6,886	,132		52,077	,000

Power

Model Summary

R	R Square	Adjusted R Square	Std. Error of the Estimate
,812	,659	,610	,032

The independent variable is Mol H2.

ANOVA

	Sum of Squares	df	Mean Square	F	Sig.
Regression	,014	1	,014	13,518	,008
Residual	,007	7	,001		
Total	,021	8			

The independent variable is Mol H2.

Coefficients

	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta	t	Sig.
ln(Mol H2)	,059	,016	,812	3,677	,008
(Constant)	9,243	,547		16,893	,000

The dependent variable is ln(pH).

Exponential

Model Summary

R	R Square	Adjusted R Square	Std. Error of the Estimate
,885	,783	,752	,025

The independent variable is Mol H2.

ANOVA

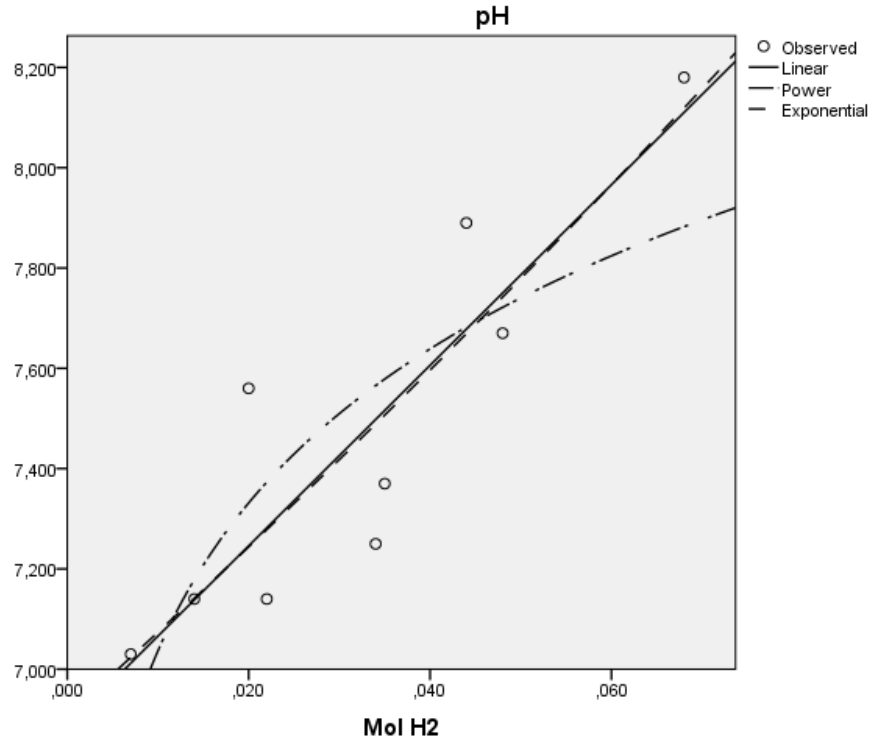
	Sum of Squares	df	Mean Square	F	Sig.
Regression	,016	1	,016	25,282	,002
Residual	,005	7	,001		
Total	,021	8			

The independent variable is Mol H2.

Coefficients

	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta	t	Sig.
Mol H2	2,376	,473	,885	5,028	,002
(Constant)	6,908	,121		57,068	,000

The dependent variable is ln(pH).



COD

Linear

Model Summary

R	R Square	Adjusted R Square	Std. Error of the Estimate
,979	,958	,952	14,407

The independent variable is Mol H2.

ANOVA

	Sum of Squares	df	Mean Square	F	Sig.
Regression	33381,056	1	33381,056	160,823	,000
Residual	1452,944	7	207,563		
Total	34834,000	8			

The independent variable is Mol H2.

Coefficients

	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta	t	Sig.
Mol H2	-3392,614	267,522	-,979	-12,682	,000
(Constant)	371,905	9,920		37,492	,000

Power

Model Summary

R	R Square	Adjusted R Square	Std. Error of the Estimate
,861	,741	,705	,158

The independent variable is Mol H2.

ANOVA

	Sum of Squares	df	Mean Square	F	Sig.
Regression	,501	1	,501	20,073	,003
Residual	,175	7	,025		
Total	,676	8			

The independent variable is Mol H2.

Coefficients

	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta	t	Sig.
ln(Mol H2)	-,357	,080	-,861	-4,480	,003
(Constant)	69,551	20,384		3,412	,011

The dependent variable is ln(COD).

Exponential

Model Summary

R	R Square	Adjusted R Square	Std. Error of the Estimate
,963	,928	,917	,084

The independent variable is Mol H2.

ANOVA

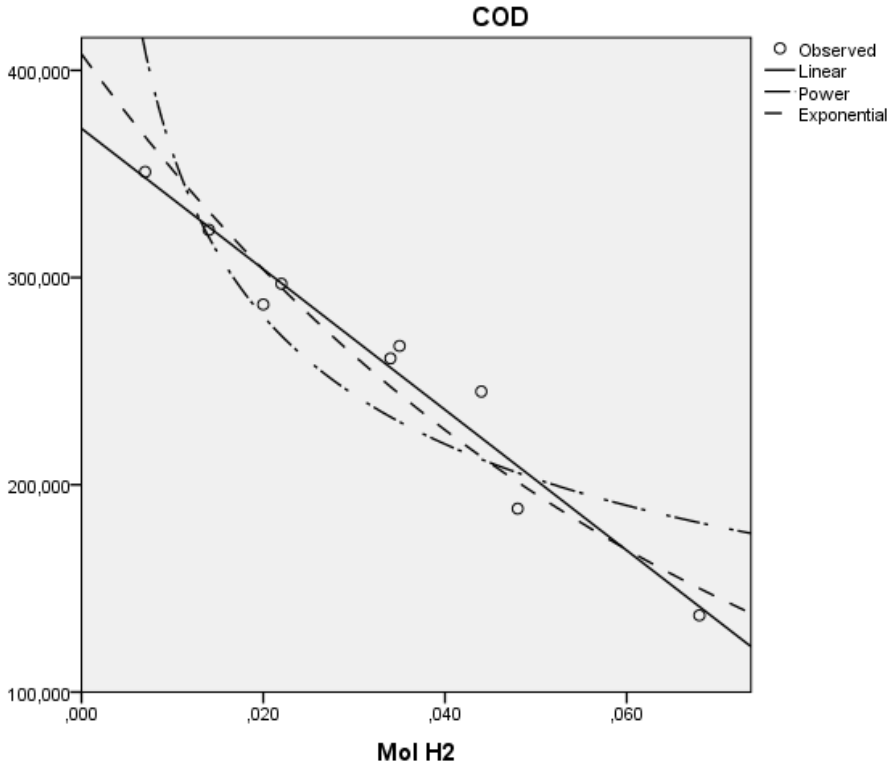
	Sum of Squares	df	Mean Square	F	Sig.
Regression	,627	1	,627	89,687	,000
Residual	,049	7	,007		
Total	,676	8			

The independent variable is Mol H2.

Coefficients

	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta	t	Sig.
Mol H2	-14,707	1,553	-,963	-9,470	,000
(Constant)	407,851	23,485		17,367	,000

The dependent variable is ln(COD).



BOD

Linear

Model Summary

R	R Square	Adjusted R Square	Std. Error of the Estimate
,845	,715	,674	65,992

The independent variable is Mol H2.

ANOVA

	Sum of Squares	df	Mean Square	F	Sig.
Regression	76356,762	1	76356,762	17,533	,004
Residual	30484,857	7	4354,980		
Total	106841,619	8			

The independent variable is Mol H2.

Coefficients

	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta	t	Sig.
Mol H2	-5131,072	1225,399	-,845	-4,187	,004
(Constant)	327,878	45,437		7,216	,000

Power

Model Summary

R	R Square	Adjusted R Square	Std. Error of the Estimate
,943	,889	,873	,251

The independent variable is Mol H2.

ANOVA

	Sum of Squares	df	Mean Square	F	Sig.
Regression	3,527	1	3,527	55,996	,000
Residual	,441	7	,063		
Total	3,968	8			

The independent variable is Mol H2.

Coefficients

	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta	t	Sig.
ln(Mol H2)	-,948	,127	-,943	-7,483	,000
(Constant)	4,223	1,966		2,149	,069

The dependent variable is ln(BOD).

Exponential

Model Summary

R	R Square	Adjusted R Square	Std. Error of the Estimate
,928	,861	,841	,280

The independent variable is Mol H2.

ANOVA

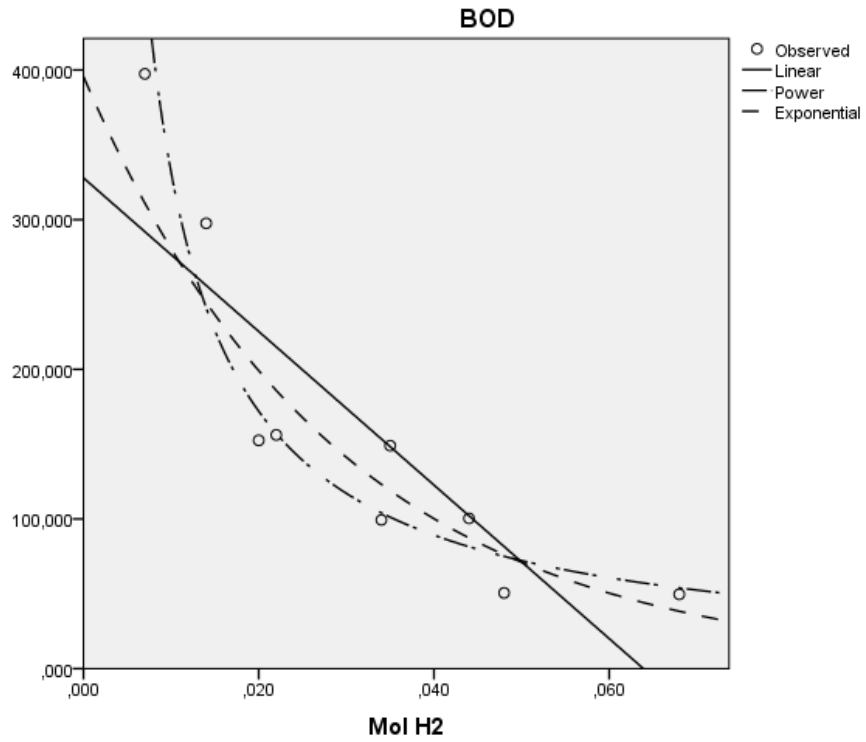
	Sum of Squares	df	Mean Square	F	Sig.
Regression	3,418	1	3,418	43,457	,000
Residual	,550	7	,079		
Total	3,968	8			

The independent variable is Mol H2.

Coefficients

	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta	t	Sig.
Mol H2	-34,328	5,207	-,928	-6,592	,000
(Constant)	395,570	76,379		5,179	,001

The dependent variable is ln(BOD).



TSS

Linear

Model Summary

R	R Square	Adjusted R Square	Std. Error of the Estimate
,947	,897	,882	5,543

The independent variable is Mol H2.

ANOVA

	Sum of Squares	df	Mean Square	F	Sig.
Regression	1863,274	1	1863,274	60,633	,000
Residual	215,112	7	30,730		
Total	2078,386	8			

The independent variable is Mol H2.

Coefficients

	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta	t	Sig.
Mol H2	-801,535	102,936	-,947	-7,787	,000
(Constant)	56,746	3,817		14,867	,000

Power

Model Summary

R	R Square	Adjusted R Square	Std. Error of the Estimate
,888	,788	,758	,317

The independent variable is Mol H2.

ANOVA

	Sum of Squares	df	Mean Square	F	Sig.
Regression	2,614	1	2,614	26,050	,001
Residual	,702	7	,100		
Total	3,317	8			

The independent variable is Mol H2.

Coefficients

	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta	t	Sig.
ln(Mol H2)	-,816	,160	-,888	-5,104	,001
(Constant)	1,375	,808		1,702	,132

The dependent variable is ln(TSS).

Exponential

Model Summary

R	R Square	Adjusted R Square	Std. Error of the Estimate
,962	,926	,915	,188

The independent variable is Mol H2.

ANOVA

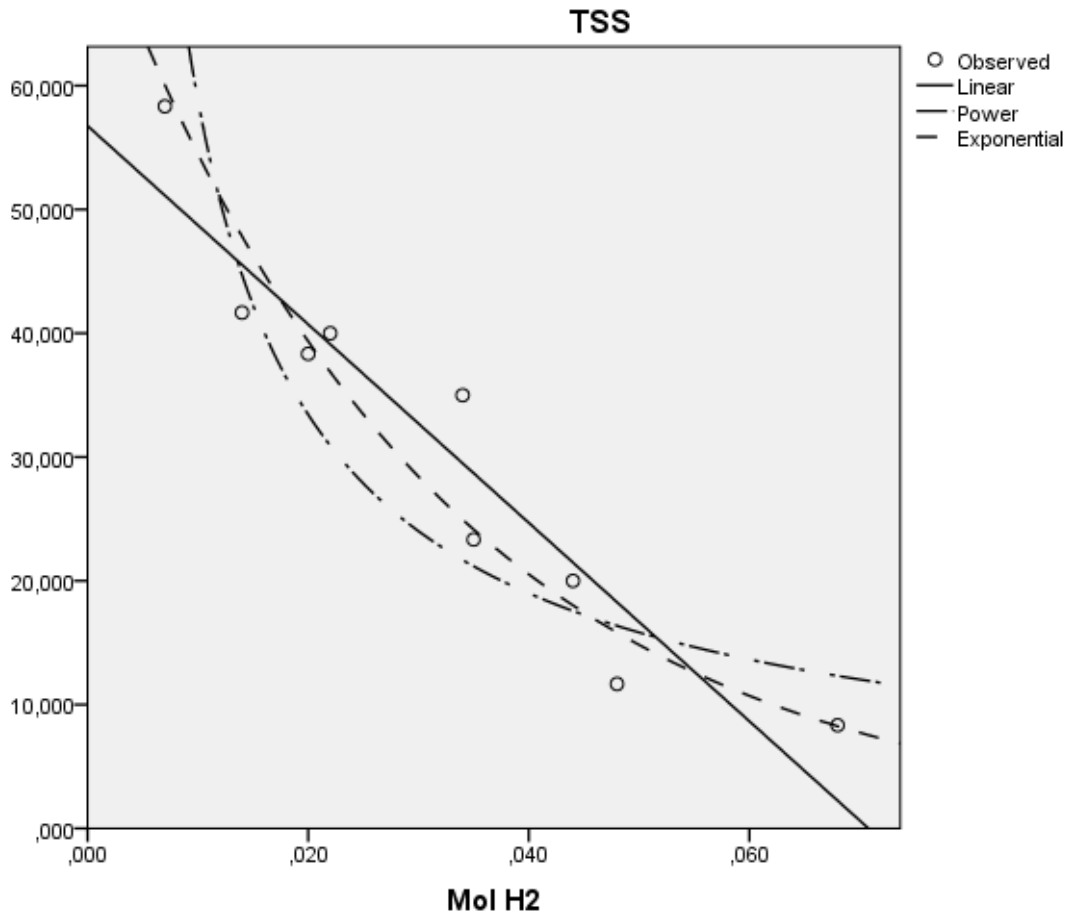
	Sum of Squares	df	Mean Square	F	Sig.
Regression	3,070	1	3,070	87,113	,000
Residual	,247	7	,035		
Total	3,317	8			

The independent variable is Mol H2.

Coefficients

	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta	t	Sig.
Mol H2	-32,535	3,486	-,962	-9,333	,000
(Constant)	75,433	9,750		7,737	,000

The dependent variable is ln(TSS).



Minyak Lemak

Linear

Model Summary

R	R Square	Adjusted R Square	Std. Error of the Estimate
,821	,674	,628	98,330

The independent variable is Mol H2.

ANOVA

	Sum of Squares	df	Mean Square	F	Sig.
Regression	140204,768	1	140204,768	14,501	,007
Residual	67681,121	7	9668,732		
Total	207885,889	8			

The independent variable is Mol H2.

Coefficients

	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta	t	Sig.
Mol H2	-6952,896	1825,867	-,821	-3,808	,007
(Constant)	506,194	67,702		7,477	,000

Power

Model Summary

R	R Square	Adjusted R Square	Std. Error of the Estimate
,858	,736	,698	,325

The independent variable is Mol H2.

ANOVA

	Sum of Squares	df	Mean Square	F	Sig.
Regression	2,066	1	2,066	19,503	,003
Residual	,741	7	,106		
Total	2,807	8			

The independent variable is Mol H2.

Coefficients

	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta	t	Sig.
ln(Mol H2)	-,725	,164	-,858	-4,416	,003
(Constant)	17,527	10,578		1,657	,142

The dependent variable is ln(Minyak Lemak).

Exponential

Model Summary

R	R Square	Adjusted R Square	Std. Error of the Estimate
,881	,775	,743	,300

The independent variable is Mol H2.

ANOVA

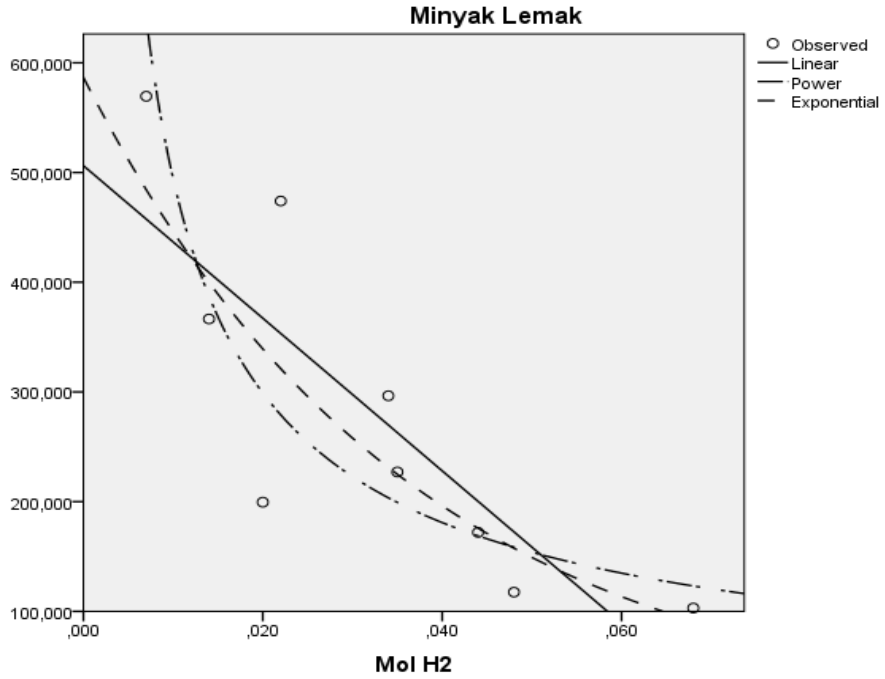
	Sum of Squares	df	Mean Square	F	Sig.
Regression	2,177	1	2,177	24,155	,002
Residual	,631	7	,090		
Total	2,807	8			

The independent variable is Mol H2.

Coefficients

	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta	t	Sig.
Mol H2	-27,396	5,574	-,881	-4,915	,002
(Constant)	586,723	121,267		4,838	,002

The dependent variable is ln(Minyak Lemak).



Amonia

Linear

Model Summary

R	R Square	Adjusted R Square	Std. Error of the Estimate
,928	,860	,841	7,732

The independent variable is Mol H2.

ANOVA

	Sum of Squares	df	Mean Square	F	Sig.
Regression	2580,792	1	2580,792	43,169	,000
Residual	418,484	7	59,783		
Total	2999,276	8			

The independent variable is Mol H2.

Coefficients

	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta	t	Sig.
Mol H2	-943,324	143,574	-,928	-6,570	,000
(Constant)	69,325	5,324		13,022	,000

Power

Model Summary

R	R Square	Adjusted R Square	Std. Error of the Estimate
,809	,654	,605	,425

The independent variable is Mol H2.

ANOVA

	Sum of Squares	df	Mean Square	F	Sig.
Regression	2,389	1	2,389	13,233	,008
Residual	1,264	7	,181		
Total	3,653	8			

The independent variable is Mol H2.

Coefficients

	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta	T	Sig.
ln(Mol H2)	-,780	,214	-,809	-3,638	,008
(Constant)	1,959	1,544		1,269	,245

The dependent variable is ln(Amonia).

Exponential

Model Summary

R	R Square	Adjusted R Square	Std. Error of the Estimate
,884	,782	,750	,338

The independent variable is Mol H2.

ANOVA

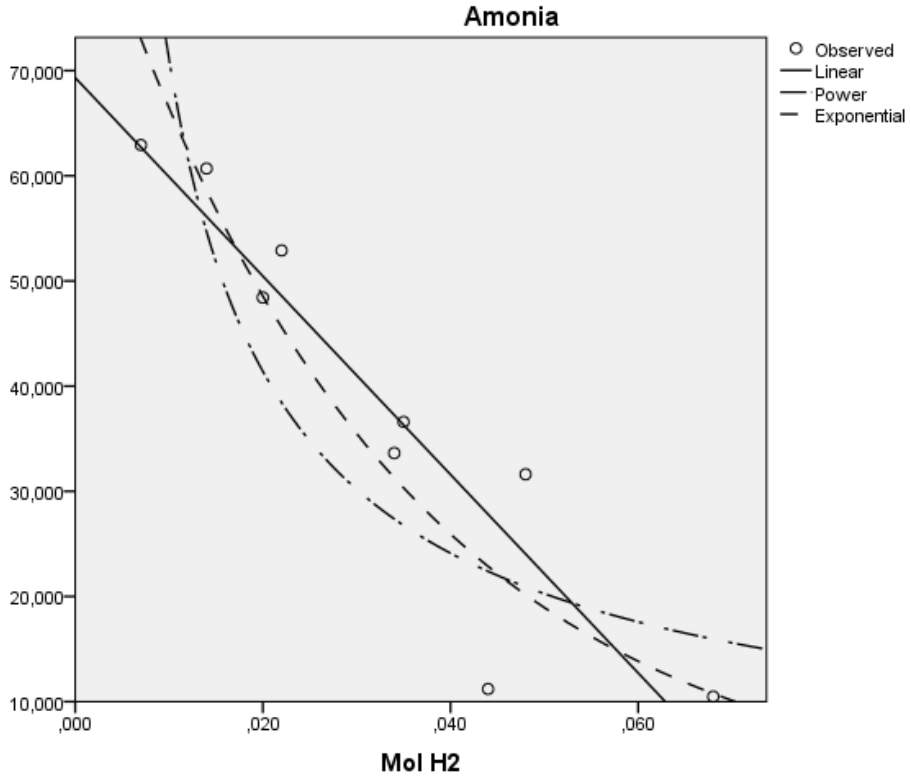
	Sum of Squares	df	Mean Square	F	Sig.
Regression	2,855	1	2,855	25,051	,002
Residual	,798	7	,114		
Total	3,653	8			

The independent variable is Mol H2.

Coefficients

	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta	t	Sig.
Mol H2	-31,376	6,269	-,884	-5,005	,002
(Constant)	90,951	21,142		4,302	,004

The dependent variable is ln(Amonia).



```
* Curve Estimation.
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CURVEFIT
  /VARIABLES=Y1 Y2 Y3 Y4 Y5 Y6 WITH X1
  /CONSTANT
  /MODEL=LINEAR POWER EXPONENTIAL
  /PRINT ANOVA
  /PLOT FIT.
```

Curve Fit

Variable Processing Summary

		Variables			
		Dependent			
		pH	COD	BOD	TSS
Number of Positive Values		9	9	9	9
Number of Zeros		0	0	0	0
Number of Negative Values		0	0	0	0
Number of Missing Values	User-Missing	0	0	0	0
	System-Missing	0	0	0	0

Variable Processing Summary

		Variables		
		Dependent		
		Minyak Lemak	Amonia	Mol O2
Number of Positive Values		9	9	9
Number of Zeros		0	0	0
Number of Negative Values		0	0	0
Number of Missing Values	User-Missing	0	0	0
	System-Missing	0	0	0

pH

Linear

Model Summary

R	R Square	Adjusted R Square	Std. Error of the Estimate
,883	,780	,749	,194

The independent variable is Mol O2.

ANOVA

	Sum of Squares	df	Mean Square	F	Sig.
Regression	,935	1	,935	24,868	,002
Residual	,263	7	,038		
Total	1,198	8			

The independent variable is Mol O2.

Coefficients

	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta	t	Sig.
Mol O2	36,190	7,257	,883	4,987	,002
(Constant)	6,879	,135		50,949	,000

Power

Model Summary

R	R Square	Adjusted R Square	Std. Error of the Estimate
,818	,669	,621	,031

The independent variable is Mol O2.

ANOVA

	Sum of Squares	df	Mean Square	F	Sig.
Regression	,014	1	,014	14,127	,007
Residual	,007	7	,001		
Total	,021	8			

The independent variable is Mol O2.

Coefficients

	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta	t	Sig.
ln(Mol O2)	,062	,017	,818	3,759	,007
(Constant)	9,749	,701		13,905	,000

The dependent variable is ln(pH).

Exponential

Model Summary

R	R Square	Adjusted R Square	Std. Error of the Estimate
,882	,779	,747	,026

The independent variable is Mol O2.

ANOVA

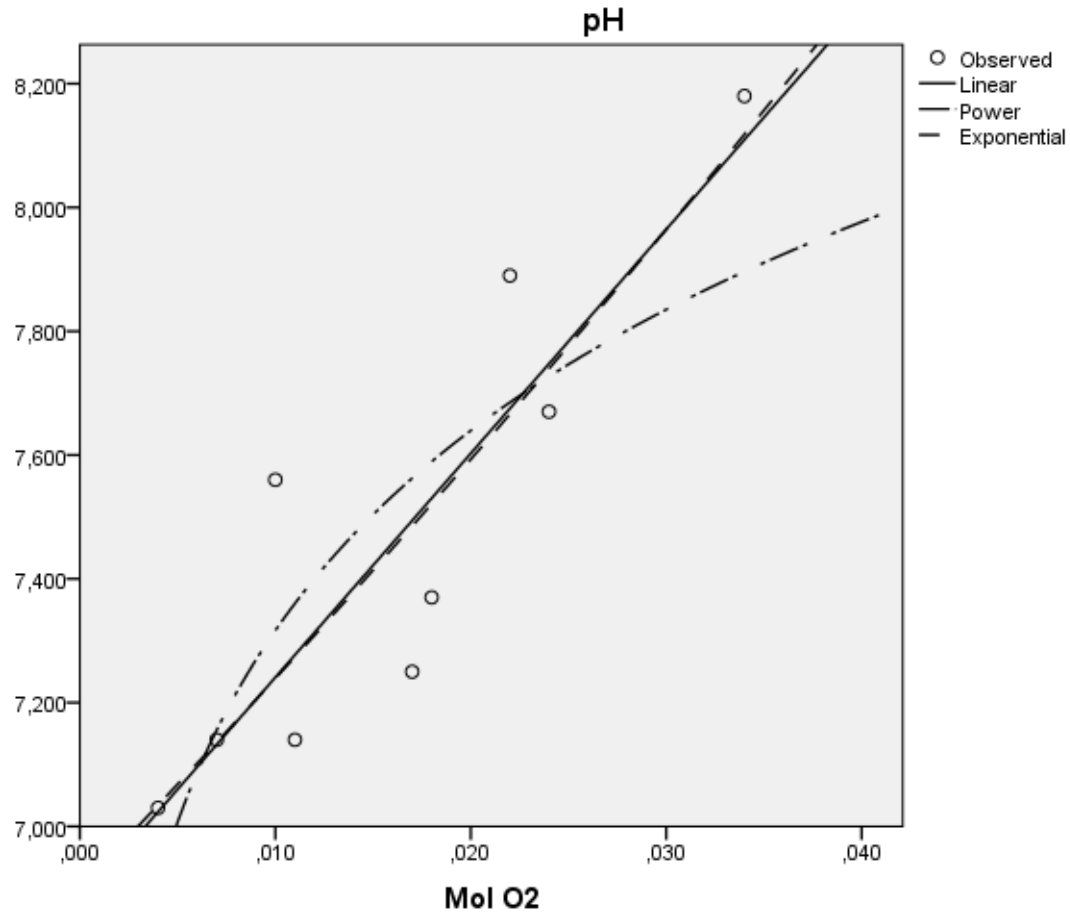
	Sum of Squares	df	Mean Square	F	Sig.
Regression	,016	1	,016	24,644	,002
Residual	,005	7	,001		
Total	,021	8			

The independent variable is Mol O2.

Coefficients

	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta	t	Sig.
Mol O2	4,776	,962	,882	4,964	,002
(Constant)	6,901	,124		55,875	,000

The dependent variable is ln(pH).



COD

Linear

Model Summary

R	R Square	Adjusted R Square	Std. Error of the Estimate
,977	,955	,948	15,038

The independent variable is Mol O2.

ANOVA

	Sum of Squares	df	Mean Square	F	Sig.
Regression	33251,059	1	33251,059	147,041	,000
Residual	1582,941	7	226,134		
Total	34834,000	8			

The independent variable is Mol O2.

Coefficients

	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta	t	Sig.
Mol O2	-6824,230	562,774	-,977	-12,126	,000
(Constant)	373,296	10,470		35,654	,000

Power

Model Summary

R	R Square	Adjusted R Square	Std. Error of the Estimate
,871	,758	,723	,153

The independent variable is Mol O2.

ANOVA

	Sum of Squares	df	Mean Square	F	Sig.
Regression	,513	1	,513	21,918	,002
Residual	,164	7	,023		
Total	,676	8			

The independent variable is Mol O2.

Coefficients

	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta	t	Sig.
ln(Mol O2)	-,377	,081	-,871	-4,682	,002
(Constant)	50,131	17,525		2,861	,024

The dependent variable is ln(COD).

Exponential

Model Summary

R	R Square	Adjusted R Square	Std. Error of the Estimate
,962	,925	,915	,085

The independent variable is Mol O2.

ANOVA

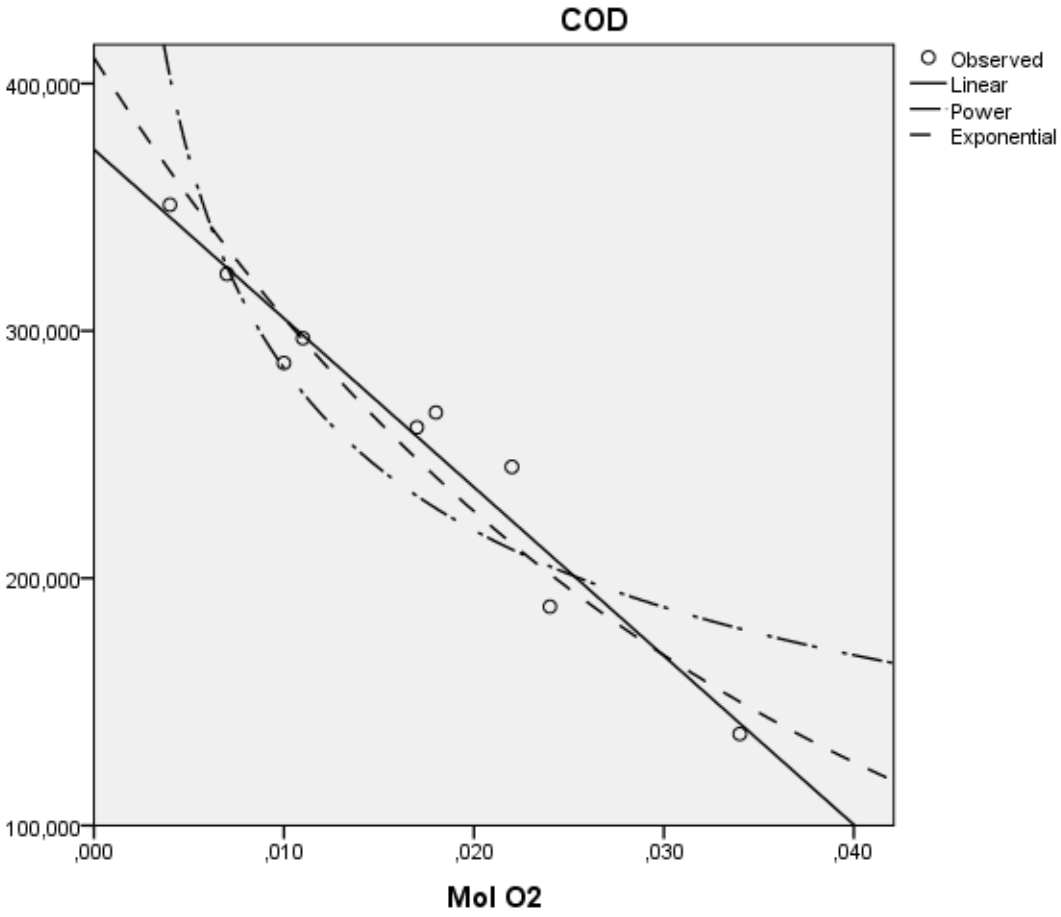
	Sum of Squares	df	Mean Square	F	Sig.
Regression	,626	1	,626	86,622	,000
Residual	,051	7	,007		
Total	,676	8			

The independent variable is Mol O2.

Coefficients

	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta	t	Sig.
Mol O2	-29,602	3,181	-,962	-9,307	,000
(Constant)	410,451	24,287		16,900	,000

The dependent variable is ln(COD).



BOD

Linear

Model Summary

R	R Square	Adjusted R Square	Std. Error of the Estimate
,839	,704	,662	67,205

The independent variable is Mol O2.

ANOVA

	Sum of Squares	df	Mean Square	F	Sig.
Regression	75226,307	1	75226,307	16,656	,005
Residual	31615,312	7	4516,473		
Total	106841,619	8			

The independent variable is Mol O2.

Coefficients

	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta	t	Sig.
Mol O2	-10264,452	2515,073	-,839	-4,081	,005
(Constant)	329,056	46,791		7,033	,000

Power

Model Summary

R	R Square	Adjusted R Square	Std. Error of the Estimate
,944	,892	,876	,248

The independent variable is Mol O2.

ANOVA

	Sum of Squares	df	Mean Square	F	Sig.
Regression	3,539	1	3,539	57,753	,000
Residual	,429	7	,061		
Total	3,968	8			

The independent variable is Mol O2.

Coefficients

	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta	t	Sig.
ln(Mol O2)	-,992	,130	-,944	-7,600	,000
(Constant)	1,844	1,044		1,767	,121

The dependent variable is ln(BOD).

Exponential

Model Summary

R	R Square	Adjusted R Square	Std. Error of the Estimate
,923	,853	,832	,289

The independent variable is Mol O2.

ANOVA

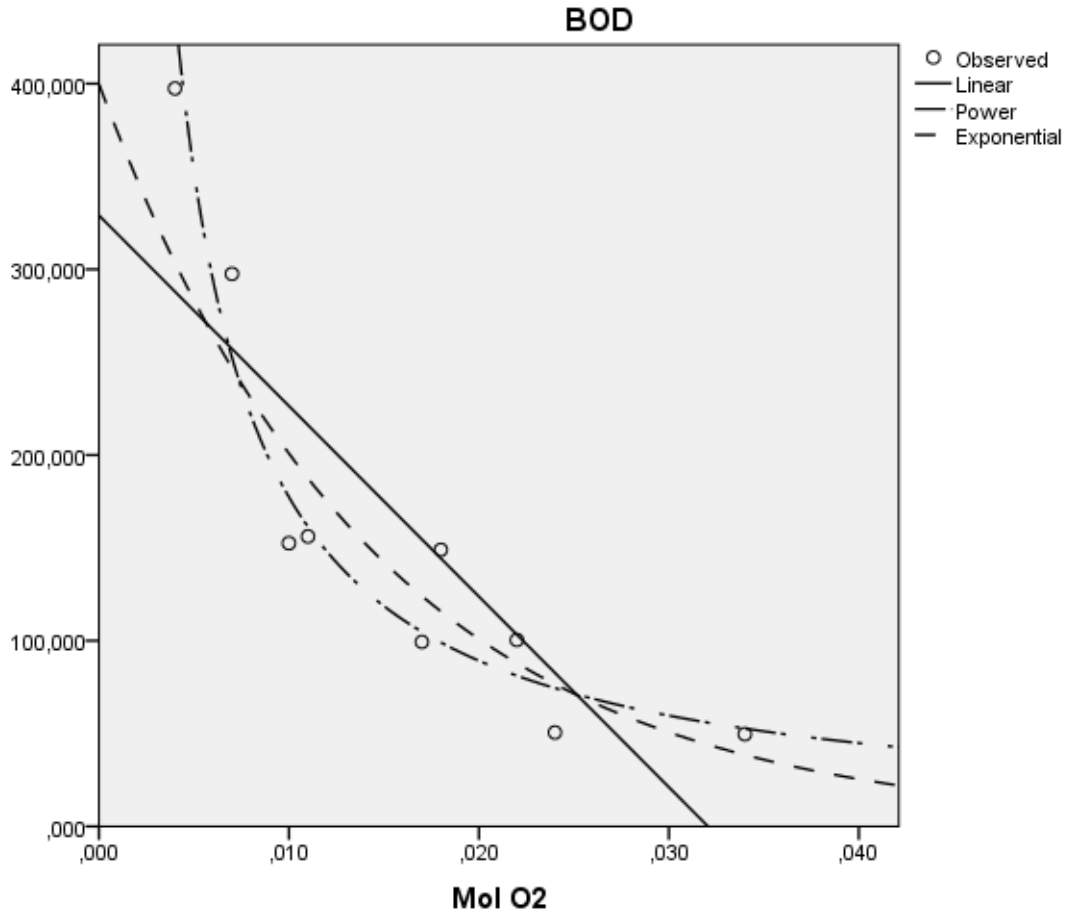
	Sum of Squares	df	Mean Square	F	Sig.
Regression	3,384	1	3,384	40,516	,000
Residual	,585	7	,084		
Total	3,968	8			

The independent variable is Mol O2.

Coefficients

	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta	t	Sig.
Mol O2	-68,839	10,815	-,923	-6,365	,000
(Constant)	399,797	80,440		4,970	,002

The dependent variable is ln(BOD).



TSS

Linear

Model Summary

R	R Square	Adjusted R Square	Std. Error of the Estimate
,946	,895	,880	5,593

The independent variable is Mol O2.

ANOVA

	Sum of Squares	df	Mean Square	F	Sig.
Regression	1859,409	1	1859,409	59,439	,000
Residual	218,977	7	31,282		
Total	2078,386	8			

The independent variable is Mol O2.

Coefficients

	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta	t	Sig.
Mol O2	-1613,758	209,316	-,946	-7,710	,000
(Constant)	57,099	3,894		14,663	,000

Power

Model Summary

R	R Square	Adjusted R Square	Std. Error of the Estimate
,898	,806	,778	,303

The independent variable is Mol O2.

ANOVA

	Sum of Squares	df	Mean Square	F	Sig.
Regression	2,672	1	2,672	29,019	,001
Residual	,645	7	,092		
Total	3,317	8			

The independent variable is Mol O2.

Coefficients

	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta	t	Sig.
ln(Mol O2)	-,862	,160	-,898	-5,387	,001
(Constant)	,651	,452		1,442	,193

The dependent variable is ln(TSS).

Exponential

Model Summary

R	R Square	Adjusted R Square	Std. Error of the Estimate
,963	,926	,916	,187

The independent variable is Mol O2.

ANOVA

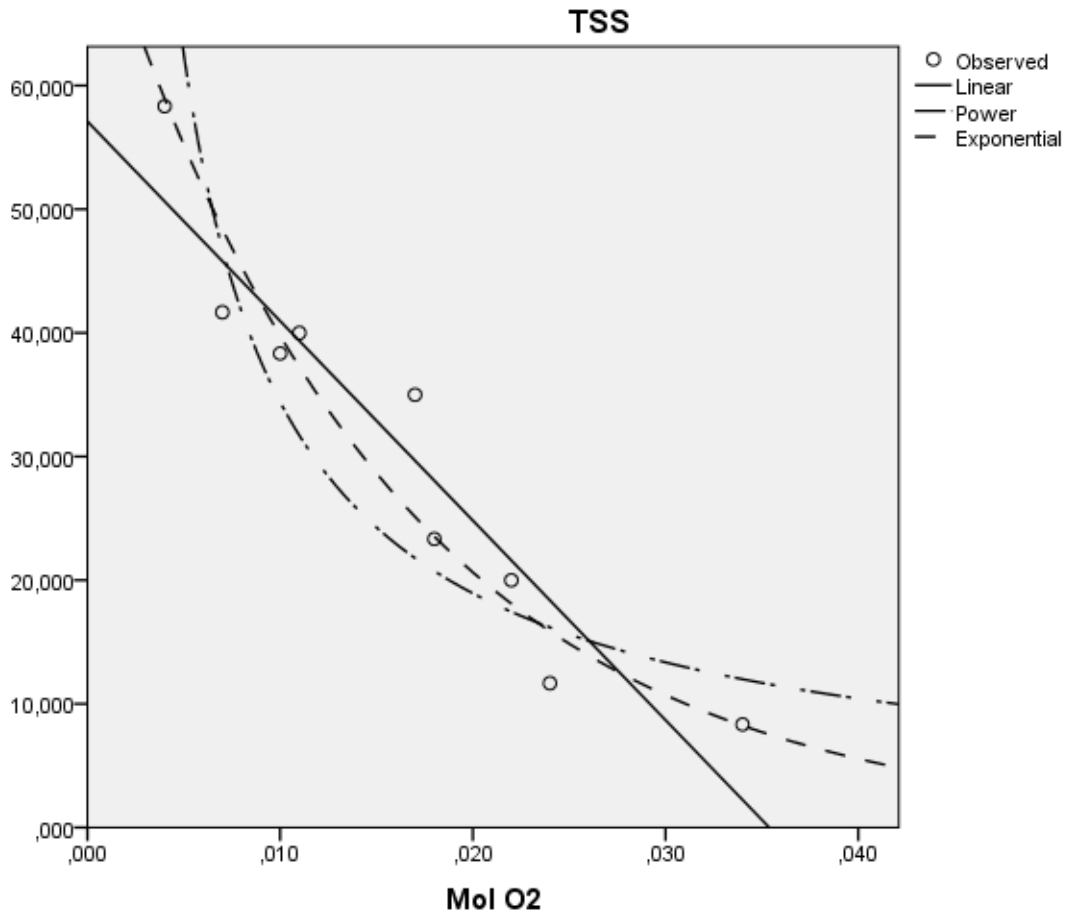
	Sum of Squares	df	Mean Square	F	Sig.
Regression	3,073	1	3,073	88,162	,000
Residual	,244	7	,035		
Total	3,317	8			

The independent variable is Mol O2.

Coefficients

	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta	t	Sig.
Mol O2	-65,601	6,987	-,963	-9,389	,000
(Constant)	76,642	9,962		7,693	,000

The dependent variable is ln(TSS).



Minyak Lemak

Linear

Model Summary

R	R Square	Adjusted R Square	Std. Error of the Estimate
,818	,669	,622	99,149

The independent variable is Mol O2.

ANOVA

	Sum of Squares	df	Mean Square	F	Sig.
Regression	139072,694	1	139072,694	14,147	,007
Residual	68813,195	7	9830,456		
Total	207885,889	8			

The independent variable is Mol O2.

Coefficients

	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta	t	Sig.
Mol O2	-13956,349	3710,545	-,818	-3,761	,007
(Constant)	508,565	69,031		7,367	,000

Power

Model Summary

R	R Square	Adjusted R Square	Std. Error of the Estimate
,861	,741	,704	,322

The independent variable is Mol O2.

ANOVA

	Sum of Squares	df	Mean Square	F	Sig.
Regression	2,079	1	2,079	19,994	,003
Residual	,728	7	,104		
Total	2,807	8			

The independent variable is Mol O2.

Coefficients

	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta	t	Sig.
ln(Mol O2)	-,760	,170	-,861	-4,471	,003
(Constant)	9,249	6,818		1,356	,217

The dependent variable is ln(Minyak Lemak).

Exponential

Model Summary

R	R Square	Adjusted R Square	Std. Error of the Estimate
,878	,772	,739	,303

The independent variable is Mol O2.

ANOVA

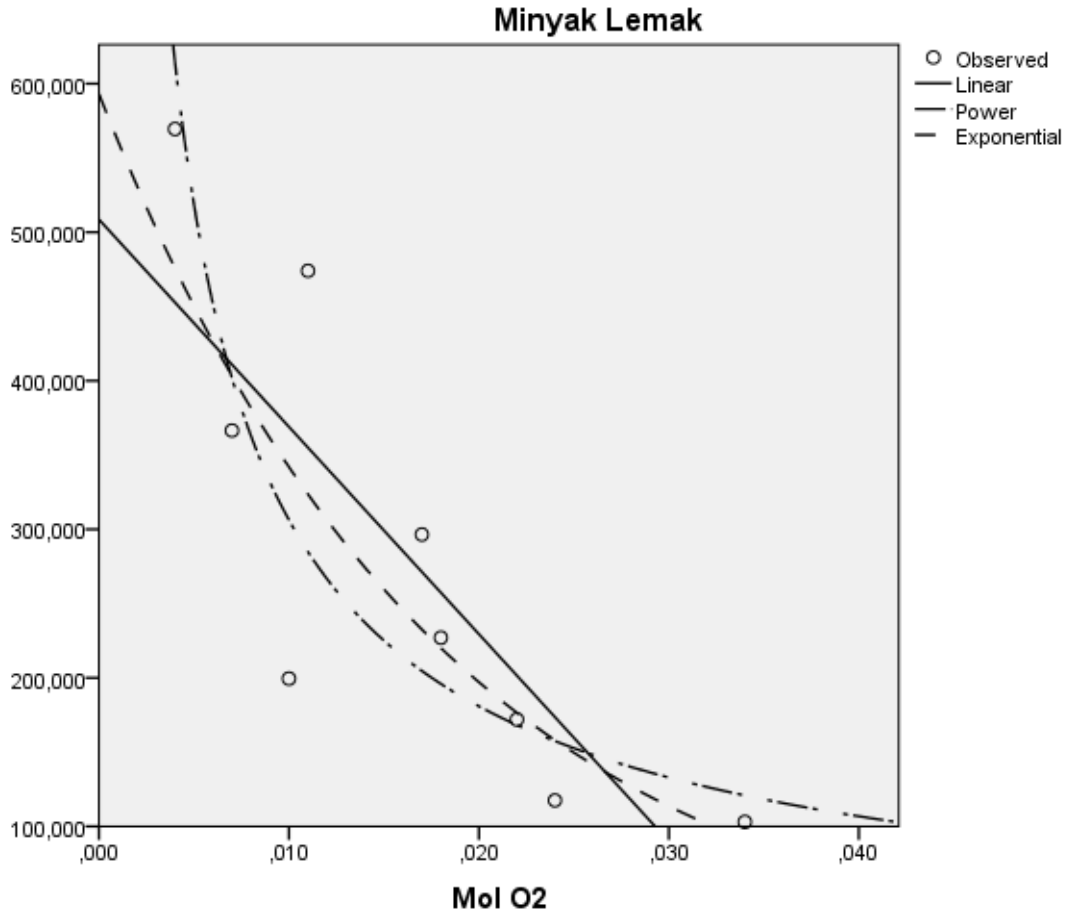
	Sum of Squares	df	Mean Square	F	Sig.
Regression	2,166	1	2,166	23,646	,002
Residual	,641	7	,092		
Total	2,807	8			

The independent variable is Mol O2.

Coefficients

	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta	t	Sig.
Mol O2	-55,081	11,327	-,878	-4,863	,002
(Constant)	593,102	124,986		4,745	,002

The dependent variable is ln(Minyak Lemak).



Amonia

Linear

Model Summary

R	R Square	Adjusted R Square	Std. Error of the Estimate
,927	,860	,840	7,752

The independent variable is Mol O2.

ANOVA

	Sum of Squares	df	Mean Square	F	Sig.
Regression	2578,616	1	2578,616	42,909	,000
Residual	420,661	7	60,094		
Total	2999,276	8			

The independent variable is Mol O2.

Coefficients

	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta	t	Sig.
Mol O2	-1900,396	290,113	-,927	-6,551	,000
(Constant)	69,759	5,397		12,925	,000

Power

Model Summary

R	R Square	Adjusted R Square	Std. Error of the Estimate
,820	,673	,626	,413

The independent variable is Mol O2.

ANOVA

	Sum of Squares	df	Mean Square	F	Sig.
Regression	2,457	1	2,457	14,379	,007
Residual	1,196	7	,171		
Total	3,653	8			

The independent variable is Mol O2.

Coefficients

	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta	t	Sig.
ln(Mol O2)	-,826	,218	-,820	-3,792	,007
(Constant)	,949	,897		1,058	,325

The dependent variable is ln(Amonia).

Exponential

Model Summary

R	R Square	Adjusted R Square	Std. Error of the Estimate
,883	,781	,749	,338

The independent variable is Mol O2.

ANOVA

	Sum of Squares	df	Mean Square	F	Sig.
Regression	2,851	1	2,851	24,897	,002
Residual	,802	7	,115		
Total	3,653	8			

The independent variable is Mol O2.

Coefficients

	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta	t	Sig.
Mol O2	-63,194	12,665	-,883	-4,990	,002
(Constant)	92,251	21,736		4,244	,004

The dependent variable is ln(Amonia).