LAMPIRAN

Lampiran 1

Surat Keterangan Laik Etik

KEMENTERIAN KESEHATAN REPUBLIK INDONESIA
BADAN PENGEMBANGAN DAN PEMBERDAYAAN
SUMBER DAYA MANUSIA KESEHATAN
POLITEKNIK KESEHATAN TANJUNGKARANG
Jl. Soekarno - Hatta No. 6 Bandar Lampung
Telp : 0721 - 783 852 Faxsimile : 0721 - 773 918
Website : http://poltekkes-tjk.ac.id E-mail : direktorat@poltekkes-tjk.ac.id

KETERANGAN LAYAK ETIK
DESCRIPTION OF ETHICAL EXEMPTION
"ETHICAL EXEMPTION"

No.296/KEPK-TJK/III/2024

Protokol penelitian versi 1 yang diusulkan oleh :
The research protocol proposed by

Peneliti utama : Vivi Indriyani
Principal In Investigator

Nama Institusi : Poltekkes Kemenkes Tanjungkarang
Name of the Institution

Dengan judul:
Title

"Efektivitas Metode Multi Soil Layering (MSL) dalam Menurunkan BOD, COD, dan TSS pada Limbah Cair Tahu Tahun 2024"

"The Effectivity of Multi Soil Layering Method Reducing BOD, COD and TSS Level of Liquid Tofu Waste"

Dinyatakan layak etik sesuai 7 (tujuh) Standar WHO 2011, yaitu 1) Nilai Sosial, 2) Nilai Ilmiah, 3) Pemerataan Beban dan Manfaat, 4) Risiko, 5) Bujukan/Eksploitasi, 6) Kerahasiaan dan Privacy, dan 7) Persetujuan Setelah Penjelasan, yang merujuk pada Pedoman CIOMS 2016. Hal ini seperti yang ditunjukkan oleh terpenuhinya indikator setiap standar.

Declared to be ethically appropriate in accordance to 7 (seven) WHO 2011 Standards, 1) Social Values, 2) Scientific Values, 3) Equitable Assessment and Benefits, 4) Risks, 5) Persuasion/Exploitation, 6) Confidentiality and Privacy, and 7) Informed Concent, referring to the 2016 CIOMS Guidelines. This is as indicated by the fulfillment of the indicators of each standard.

Pernyataan Laik Etik ini berlaku selama kurun waktu tanggal 08 Maret 2024 sampai dengan tanggal 08 Maret 2025.

This declaration of ethics applies during the period March 08, 2024 until March 08, 2025.

March 08, 2024
Professor and Chairperson,

Dr. Aprina, S.Kp., M.Kes

Lampiran 2

Surat Izin Penelitian

Kementerian Kesehatan
Poltekkes Tanjungkarang
Jalan Soekarno Hatta No.6 Bandar Lampung
Lampung 35145
(0721) 783852
https://poltekkes-tjk.ac.id

Nomor : PP.03.04/F.XLIII/2569/2024 4 April 2024
Lampiran : 1 eks
Hal : Izin Penelitian

Yth, Pimpinan Pabrik Tahu Alwa Barokah
Di- Tempat

Sehubungan dengan penyusunan Skripsi bagi mahasiswa Tingkat IV Program Studi Sanitasi Lingkungan Program Sarjana Terapan Jurusan Kesehatan Lingkungan Poltekkes Kemenkes Tanjungkarang Tahun Akademik 2023/2024, maka kami mengharapkan dapat diberikan izin kepada mahasiswa kami untuk dapat melakukan penelitian di Institusi yang Bpk/Ibu pimpin. Adapun mahasiswa yang melakukan penelitian adalah sebagai berikut :

No	NAMA	JUDUL PENELITIAN	TEMPAT PENELITIAN
1.	Vivi Indriyani NIM: 2313351044	Efektivitas Metode Multi Soil Layering (MSL) dalam Menurunkan BOD, COD, dan TSS pada Limbah Cair Tahu Tahun 2024	Pabrik Tahu Alwa Barokah

Atas perhatian dan kerjasamanya diucapkan terima kasih.

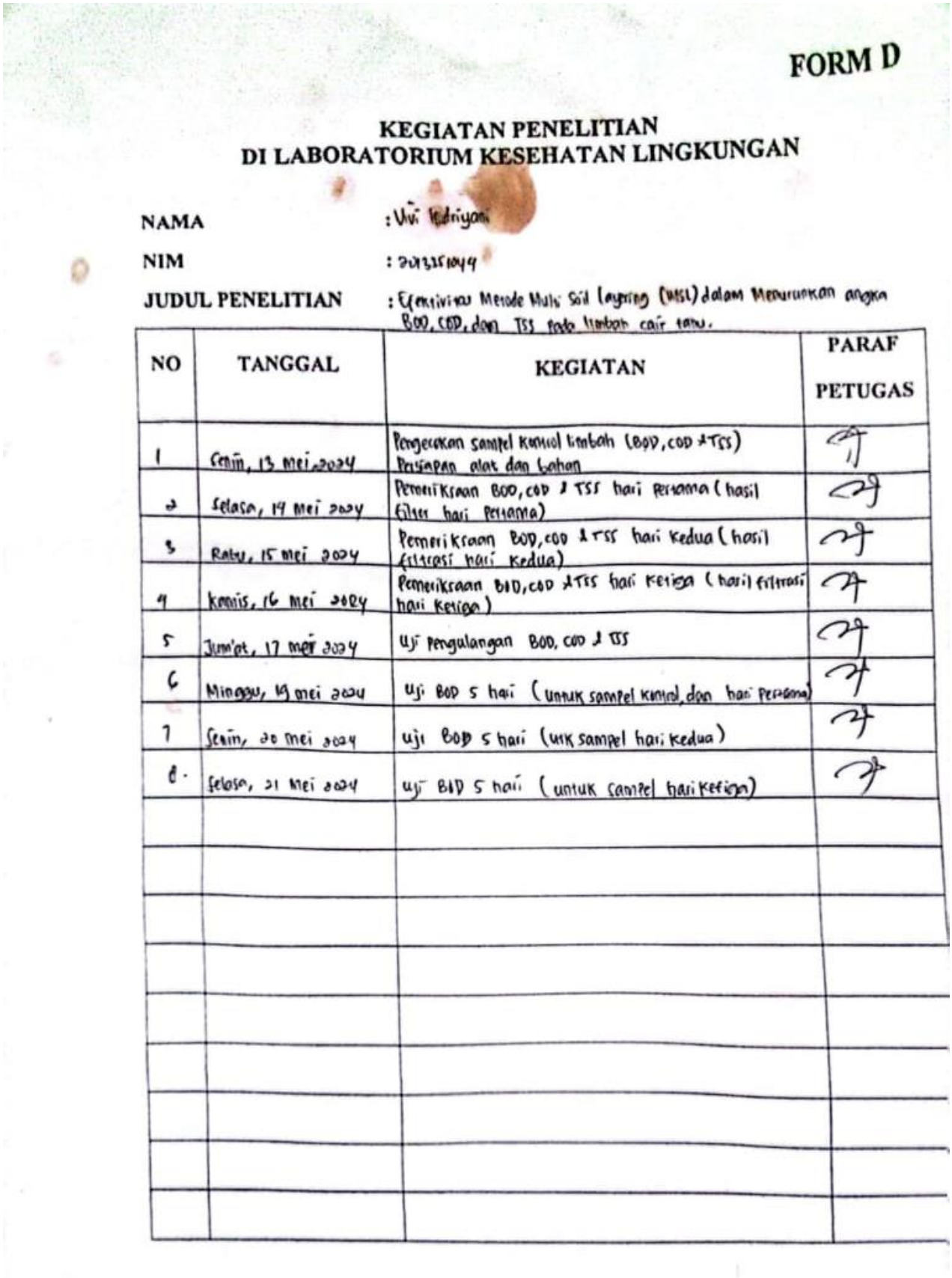
Direktur Politeknik Kesehatan Kementerian Kesehatan TanjungKarang,

Dewi Purwaningsih, S.SiT., M.Kes

Tembusan:
Ka. Jurusan Kesehatan Lingkungan

Lampiran 3

Kegiatan Penelitian di Laboratorium Kesehatan Lingkungan



FORM D

KEGIATAN PENELITIAN
DI LABORATORIUM KESEHATAN LINGKUNGAN

NAMA : Uvi Hidriyani

NIM : 2032510044

JUDUL PENELITIAN : Efektivitas Metode Multi Soil Layering (MSL) dalam Menurunkan angka BOD, COD, dan TSS pada limbah cair tahu.

NO	TANGGAL	KEGIATAN	PARAF PETUGAS
1	Senin, 13 Mei 2024	Pengecekan sampel kontrol limbah (BOD, COD & TSS) Persiapan alat dan bahan	
2	Selasa, 14 Mei 2024	Pemeriksaan BOD, COD & TSS hari pertama (hasil filter hari pertama)	
3	Rabu, 15 Mei 2024	Pemeriksaan BOD, COD & TSS hari kedua (hasil filtrasi hari kedua)	
4	Kamis, 16 Mei 2024	Pemeriksaan BOD, COD & TSS hari ketiga (hasil filtrasi hari ketiga)	
5	Jum'at, 17 Mei 2024	Uji pengulangan BOD, COD & TSS	
6	Minggu, 19 Mei 2024	uji BOD 5 hari (untuk sampel kontrol, dan hari pertama)	
7	Senin, 20 Mei 2024	uji BOD 5 hari (utk sampel hari kedua)	
8	Selasa, 21 Mei 2024	uji BOD 5 hari (untuk sampel hari ketiga)	

Lampiran 4

Hasil Output Multivariat ANOVA

General Linear Model

Notes

Output Created		04-JUN-2024 14:34:33
Comments		
Input	Data	E:\KULIAH\CATATAN & TUGAS\SKRIPSI DAN PENELITIANKU\UJI MSL.sav
	Active Dataset	DataSet1
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	27
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics are based on all cases with valid data for all variables in the model.

Syntax		GLM persenBOD persenCOD persenTSS BY ZEOLIT WAKTU /METHOD=SSTYPE(3) /INTERCEPT=INCLUDE /POSTHOC=ZEOLIT WAKTU(TUKEY LSD) /PLOT=PROFILE(ZEOLIT*WAKTU) TYPE=LINE ERRORBAR=NO MEANREFERENCE=NO YAXIS=AUTO /EMMEANS=TABLES(ZEOLIT) /EMMEANS=TABLES(WAKTU) /EMMEANS=TABLES(ZEOLIT*WAKTU) /PRINT=DESCRIPTIVE HOMOGENEITY /CRITERIA=ALPHA(.05) /DESIGN= ZEOLIT WAKTU ZEOLIT*WAKTU.
Resources	Processor Time	00:00:03,03
	Elapsed Time	00:00:01,78

Warnings

Box's Test of Equality of Covariance Matrices is not computed because there are fewer than two nonsingular cell covariance matrices.

Between-Subjects Factors

		N
KETEBALAN ZEOLIT	20,00	9
	40,00	9
	60,00	9
WAKTU (DALAM HARI)	1,00	9
	2,00	9
	3,00	9

Descriptive Statistics

	KETEBALAN ZEOLIT	WAKTU (DALAM HARI)	Mean	Std. Deviation	N
persenBOD	20,00	1,00	68,1265	26,20883	3
		2,00	52,8850	16,13535	3
		3,00	83,7583	7,85747	3
		Total	68,2566	20,75994	9
	40,00	1,00	75,1736	8,89913	3
		2,00	76,0915	11,41242	3
		3,00	76,8650	13,59281	3
		Total	76,0434	9,95431	9
	60,00	1,00	67,2314	10,73423	3
		2,00	73,8489	8,82787	3
		3,00	82,5307	3,82524	3
		Total	74,5370	9,80313	9
	Total	1,00	70,1771	15,31415	9
		2,00	67,6085	15,49238	9
		3,00	81,0513	8,68475	9
		Total	72,9456	14,29949	27
persenCOD	20,00	1,00	86,6667	13,19658	3
		2,00	90,8333	3,81881	3
		3,00	94,0741	4,62592	3
		Total	90,5247	7,92936	9
	40,00	1,00	88,5714	4,94872	3
		2,00	97,3477	1,26606	3
		3,00	93,3333	3,84900	3
		Total	93,0841	4,97026	9
	60,00	1,00	91,4286	2,85714	3

		2,00	90,0000	4,33013	3
		3,00	91,8519	2,56600	3
		Total	91,0935	3,01340	9
	Total	1,00	88,8889	7,48392	9
		2,00	92,7270	4,56880	9
		3,00	93,0864	3,41465	9
		Total	91,5674	5,56701	27
persenTSS	20,00	1,00	86,6667	5,77350	3
		2,00	91,1111	3,84900	3
		3,00	80,0000	5,77350	3
		Total	85,9259	6,62021	9
	40,00	1,00	72,2222	9,62250	3
		2,00	81,4815	6,41500	3
		3,00	84,0000	9,23760	3
		Total	79,2346	9,14432	9
	60,00	1,00	61,1111	9,62250	3
		2,00	74,0741	6,41500	3
		3,00	82,7778	9,17928	3
		Total	72,6543	11,98565	9
	Total	1,00	73,3333	13,33333	9
		2,00	82,2222	8,88889	9
		3,00	82,2593	7,34048	9
		Total	79,2716	10,67247	27

Multivariate Tests[a]

Effect		Value	F	Hypothesis df	Error df
Intercept	Pillai's Trace	,999	6463,713[b]	3,000	16,000
	Wilks' Lambda	,001	6463,713[b]	3,000	16,000
	Hotelling's Trace	1211,946	6463,713[b]	3,000	16,000
	Roy's Largest Root	1211,946	6463,713[b]	3,000	16,000
ZEOLIT	Pillai's Trace	,785	3,661	6,000	34,000
	Wilks' Lambda	,253	5,268[b]	6,000	32,000
	Hotelling's Trace	2,801	7,002	6,000	30,000
	Roy's Largest Root	2,746	15,561[c]	3,000	17,000
WAKTU	Pillai's Trace	,926	4,888	6,000	34,000

	Wilks' Lambda	,233	5,704[b]	6,000	32,000
	Hotelling's Trace	2,599	6,498	6,000	30,000
	Roy's Largest Root	2,302	13,046[c]	3,000	17,000
ZEOLIT * WAKTU	Pillai's Trace	1,341	3,635	12,000	54,000
	Wilks' Lambda	,116	4,474	12,000	42,624
	Hotelling's Trace	3,900	4,767	12,000	44,000
	Roy's Largest Root	2,534	11,402[c]	4,000	18,000

Levene's Test of Equality of Error Variances[a]

		Levene Statistic	df1	df2	Sig.
persenBOD	Based on Mean	2,001	8	18	,106
	Based on Median	,540	8	18	,811
	Based on Median and with adjusted df	,540	8	9,170	,801
	Based on trimmed mean	1,852	8	18	,132
persenCOD	Based on Mean	5,311	8	18	,002
	Based on Median	,394	8	18	,909
	Based on Median and with adjusted df	,394	8	4,281	,880
	Based on trimmed mean	4,345	8	18	,005
persenTSS	Based on Mean	,914	8	18	,527
	Based on Median	,105	8	18	,999
	Based on Median and with adjusted df	,105	8	13,795	,998
	Based on trimmed mean	,772	8	18	,632

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.[a]

a. Design: Intercept + ZEOLIT + WAKTU + ZEOLIT * WAKTU

Tests of Between-Subjects Effects

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	persenBOD	2094,394[a]	8	261,799	1,463	,238
	persenCOD	236,706[b]	8	29,588	,936	,512
	persenTSS	1924,313[c]	8	240,539	4,175	,006
Intercept	persenBOD	143668,803	1	143668,803	802,628	,000
	persenCOD	226384,069	1	226384,069	7160,595	,000
	persenTSS	169667,658	1	169667,658	2944,689	,000
ZEOLIT	persenBOD	307,041	2	153,521	,858	,441
	persenCOD	32,511	2	16,256	,514	,607
	persenTSS	792,628	2	396,314	6,878	,006
WAKTU	persenBOD	916,665	2	458,333	2,561	,105
	persenCOD	97,439	2	48,719	1,541	,241
	persenTSS	476,058	2	238,029	4,131	,033
ZEOLIT * WAKTU	persenBOD	870,687	4	217,672	1,216	,339
	persenCOD	106,757	4	26,689	,844	,515
	persenTSS	655,627	4	163,907	2,845	,055
Error	persenBOD	3221,964	18	178,998		
	persenCOD	569,075	18	31,615		
	persenTSS	1037,128	18	57,618		
Total	persenBOD	148985,160	27			
	persenCOD	227189,850	27			
	persenTSS	172629,099	27			
Corrected Total	persenBOD	5316,358	26			
	persenCOD	805,781	26			
	persenTSS	2961,440	26			

a. R Squared = ,394 (Adjusted R Squared = ,125)

b. R Squared = ,294 (Adjusted R Squared = -,020)

c. R Squared = ,650 (Adjusted R Squared = ,494)

Estimated Marginal Means

1. KETEBALAN ZEOLIT

Dependent Variable	KETEBALAN ZEOLIT	Mean	Std. Error	95% Confidence Interval	
				Lower Bound	Upper Bound
persenBOD	20,00	68,257	4,460	58,887	77,626
	40,00	76,043	4,460	66,674	85,413
	60,00	74,537	4,460	65,168	83,906
persenCOD	20,00	90,525	1,874	86,587	94,462
	40,00	93,084	1,874	89,146	97,022
	60,00	91,093	1,874	87,156	95,031
persenTSS	20,00	85,926	2,530	80,610	91,242
	40,00	79,235	2,530	73,919	84,550
	60,00	72,654	2,530	67,339	77,970

2. WAKTU (DALAM HARI)

Dependent Variable	WAKTU (DALAM HARI)	Mean	Std. Error	95% Confidence Interval	
				Lower Bound	Upper Bound
persenBOD	1,00	70,177	4,460	60,808	79,547
	2,00	67,608	4,460	58,239	76,978
	3,00	81,051	4,460	71,682	90,421
persenCOD	1,00	88,889	1,874	84,951	92,827
	2,00	92,727	1,874	88,789	96,665
	3,00	93,086	1,874	89,149	97,024
persenTSS	1,00	73,333	2,530	68,018	78,649
	2,00	82,222	2,530	76,906	87,538
	3,00	82,259	2,530	76,943	87,575

3. KETEBALAN ZEOLIT * WAKTU (DALAM HARI)

Dependent Variable	KETEBALAN ZEOLIT	WAKTU (DALAM HARI)	Mean	Std. Error
persenBOD	20,00	1,00	68,126	7,724
		2,00	52,885	7,724
		3,00	83,758	7,724
	40,00	1,00	75,174	7,724
		2,00	76,092	7,724
		3,00	76,865	7,724
	60,00	1,00	67,231	7,724

		2,00	73,849	7,724
		3,00	82,531	7,724
persenCOD	20,00	1,00	86,667	3,246
		2,00	90,833	3,246
		3,00	94,074	3,246
	40,00	1,00	88,571	3,246
		2,00	97,348	3,246
		3,00	93,333	3,246
	60,00	1,00	91,429	3,246
		2,00	90,000	3,246
		3,00	91,852	3,246
persenTSS	20,00	1,00	86,667	4,382
		2,00	91,111	4,382
		3,00	80,000	4,382
	40,00	1,00	72,222	4,382
		2,00	81,481	4,382
		3,00	84,000	4,382
	60,00	1,00	61,111	4,382
		2,00	74,074	4,382
		3,00	82,778	4,382

Post Hoc Tests

TEBALAN ZEOLIT

Multiple Comparisons

Dependent Variable		(I) KETEBALAN ZEOLIT	(J) KETEBALAN ZEOLIT	Mean Difference (I-J)	Std. Error	Sig.
persenBOD	Tukey HSD	20,00	40,00	-7,7868	6,30693	,449
			60,00	-6,2804	6,30693	,589
		40,00	20,00	7,7868	6,30693	,449
			60,00	1,5064	6,30693	,969
		60,00	20,00	6,2804	6,30693	,589
			40,00	-1,5064	6,30693	,969

	LSD	20,00	40,00	-7,7868	6,30693	,233
			60,00	-6,2804	6,30693	,333
		40,00	20,00	7,7868	6,30693	,233
			60,00	1,5064	6,30693	,814
		60,00	20,00	6,2804	6,30693	,333
			40,00	-1,5064	6,30693	,814
persenCOD	Tukey HSD	20,00	40,00	-2,5594	2,65059	,607
			60,00	-,5688	2,65059	,975
		40,00	20,00	2,5594	2,65059	,607
			60,00	1,9907	2,65059	,737
		60,00	20,00	,5688	2,65059	,975
			40,00	-1,9907	2,65059	,737
	LSD	20,00	40,00	-2,5594	2,65059	,347
			60,00	-,5688	2,65059	,833
		40,00	20,00	2,5594	2,65059	,347
			60,00	1,9907	2,65059	,462
		60,00	20,00	,5688	2,65059	,833
			40,00	-1,9907	2,65059	,462
persenTSS	Tukey HSD	20,00	40,00	6,6914	3,57827	,176
			60,00	13,2716*	3,57827	,004

	40,00	20,00	-6,6914	3,57827	,176
		60,00	6,5802	3,57827	,186
	60,00	20,00	-13,2716*	3,57827	,004
		40,00	-6,5802	3,57827	,186
LSD	20,00	40,00	6,6914	3,57827	,078
		60,00	13,2716*	3,57827	,002
	40,00	20,00	-6,6914	3,57827	,078
		60,00	6,5802	3,57827	,082
	60,00	20,00	-13,2716*	3,57827	,002
		40,00	-6,5802	3,57827	,082

Homogeneous Subsets

persenBOD

	KETEBALAN ZEOLIT	N	Subset 1
Tukey HSD[a,b]	20,00	9	68,2566
	60,00	9	74,5370
	40,00	9	76,0434
	Sig.		,449

Means for groups in homogeneous subsets are displayed.
Based on observed means.
The error term is Mean Square(Error) = 178,998.
a. Uses Harmonic Mean Sample Size = 9,000.
b. Alpha = ,05.

persenCOD

	KETEBALAN ZEOLIT	N	Subset 1
Tukey HSD[a,b]	20,00	9	90,5247
	60,00	9	91,0935
	40,00	9	93,0841
	Sig.		,607

Means for groups in homogeneous subsets are displayed.
Based on observed means.
The error term is Mean Square(Error) = 31,615.
a. Uses Harmonic Mean Sample Size = 9,000.
b. Alpha = ,05.

persenTSS

	KETEBALAN ZEOLIT	N	Subset 1	Subset 2
Tukey HSD[a,b]	60,00	9	72,6543	
	40,00	9	79,2346	79,2346
	20,00	9		85,9259
	Sig.		,186	,176

Means for groups in homogeneous subsets are displayed.
Based on observed means.
The error term is Mean Square(Error) = 57,618.
a. Uses Harmonic Mean Sample Size = 9,000.
b. Alpha = ,05.

WAKTU (DALAM HARI)

Multiple Comparisons

Dependent Variable		(I) WAKTU (DALAM HARI)	(J) WAKTU (DALAM HARI)	Mean Difference (I-J)	Std. Error	Sig.
persenBOD	Tukey HSD	1,00	2,00	2,5687	6,30693	,913
			3,00	-10,8742	6,30693	,224
		2,00	1,00	-2,5687	6,30693	,913
			3,00	-13,4428	6,30693	,111
		3,00	1,00	10,8742	6,30693	,224
			2,00	13,4428	6,30693	,111
	LSD	1,00	2,00	2,5687	6,30693	,689

			3,00	-10,8742	6,30693	,102
		2,00	1,00	-2,5687	6,30693	,689
			3,00	-13,4428*	6,30693	,047
		3,00	1,00	10,8742	6,30693	,102
			2,00	13,4428*	6,30693	,047
persenCOD	Tukey HSD	1,00	2,00	-3,8381	2,65059	,339
			3,00	-4,1975	2,65059	,278
		2,00	1,00	3,8381	2,65059	,339
			3,00	-,3594	2,65059	,990
		3,00	1,00	4,1975	2,65059	,278
			2,00	,3594	2,65059	,990
	LSD	1,00	2,00	-3,8381	2,65059	,165
			3,00	-4,1975	2,65059	,131
		2,00	1,00	3,8381	2,65059	,165
			3,00	-,3594	2,65059	,894
		3,00	1,00	4,1975	2,65059	,131
			2,00	,3594	2,65059	,894
persenTSS	Tukey HSD	1,00	2,00	-8,8889	3,57827	,057
			3,00	-8,9259	3,57827	,056
		2,00	1,00	8,8889	3,57827	,057

		3,00	-,0370	3,57827	1,000
	3,00	1,00	8,9259	3,57827	,056
		2,00	,0370	3,57827	1,000
LSD	1,00	2,00	-8,8889*	3,57827	,023
		3,00	-8,9259*	3,57827	,023
	2,00	1,00	8,8889*	3,57827	,023
		3,00	-,0370	3,57827	,992
	3,00	1,00	8,9259*	3,57827	,023
		2,00	,0370	3,57827	,992

Homogeneous Subsets

persenBOD

	WAKTU (DALAM HARI)	N	Subset 1
Tukey HSD[a,b]	2,00	9	67,6085
	1,00	9	70,1771
	3,00	9	81,0513
	Sig.		,111

Means for groups in homogeneous subsets are displayed.
Based on observed means.
The error term is Mean Square(Error) = 178,998.
a. Uses Harmonic Mean Sample Size = 9,000.
b. Alpha = ,05.

persenCOD

	WAKTU (DALAM HARI)	N	Subset 1
Tukey HSD[a,b]	1,00	9	88,8889
	2,00	9	92,7270
	3,00	9	93,0864
	Sig.		,278

Means for groups in homogeneous subsets are displayed.
Based on observed means.
The error term is Mean Square(Error) = 31,615.
a. Uses Harmonic Mean Sample Size = 9,000.
b. Alpha = ,05.

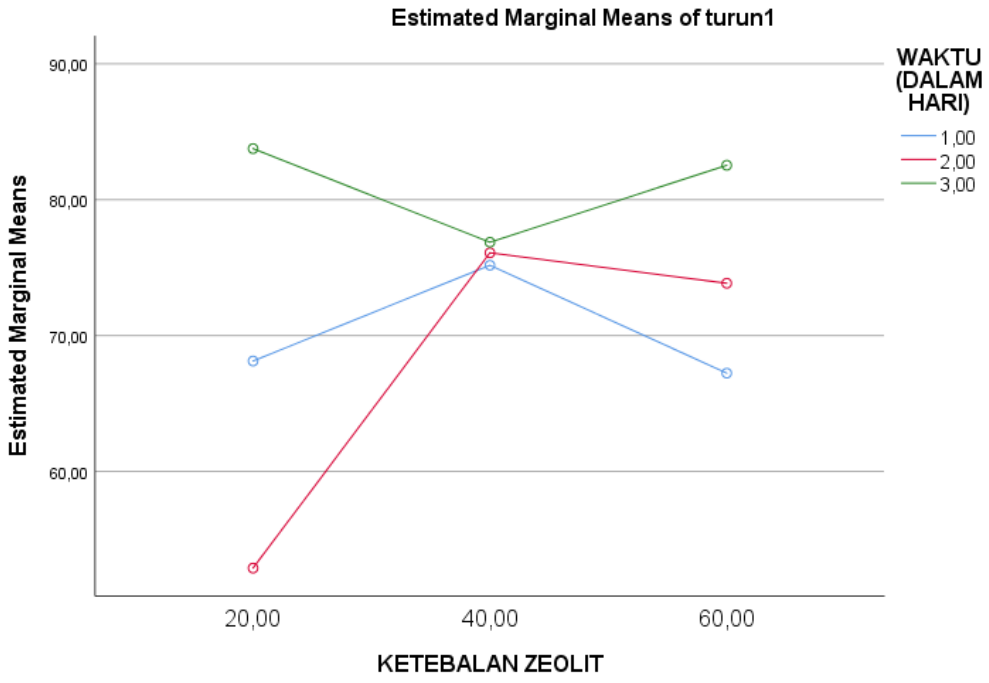
persenTSS

	WAKTU (DALAM HARI)	N	Subset 1
Tukey HSD[a,b]	1,00	9	73,3333
	2,00	9	82,2222
	3,00	9	82,2593
	Sig.		,056

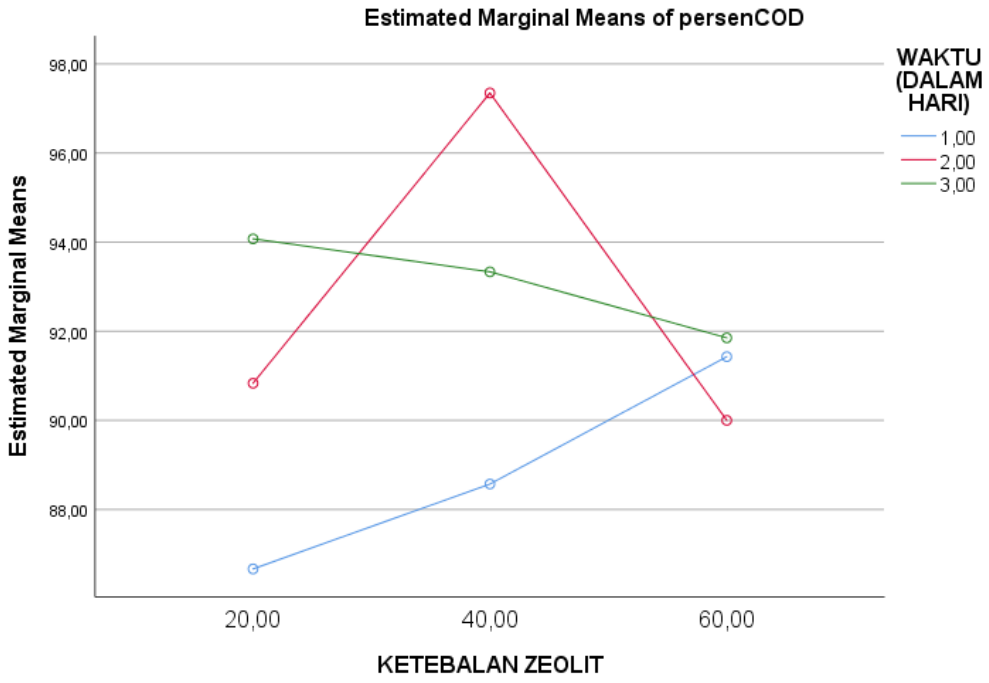
Means for groups in homogeneous subsets are displayed.
Based on observed means.
The error term is Mean Square(Error) = 57,618.
a. Uses Harmonic Mean Sample Size = 9,000.
b. Alpha = ,05.

Profile Plots

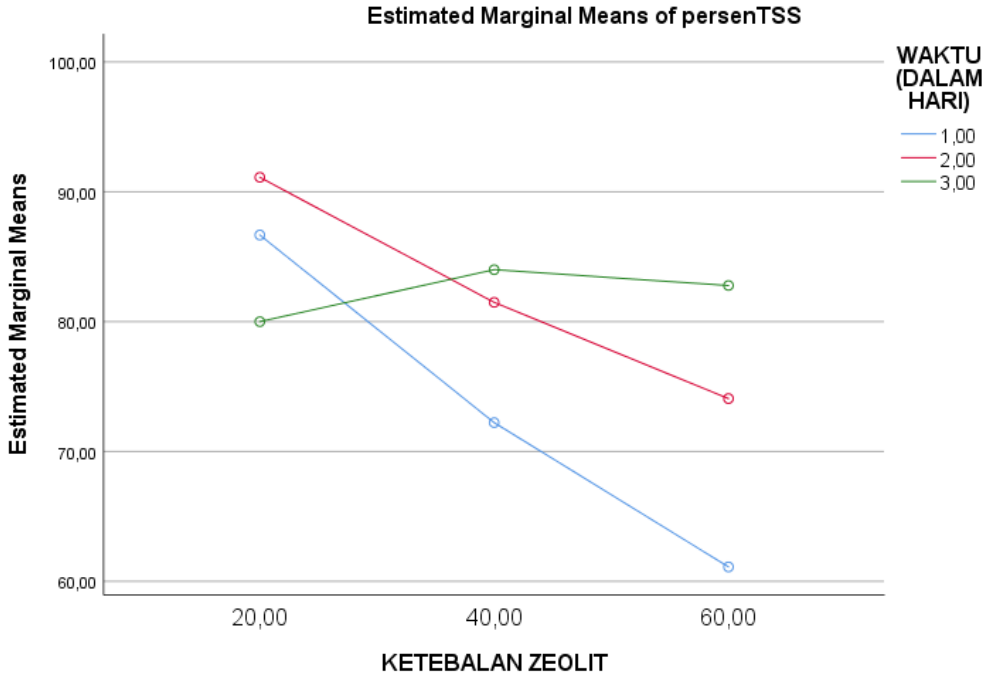
persenBOD



persenCOD

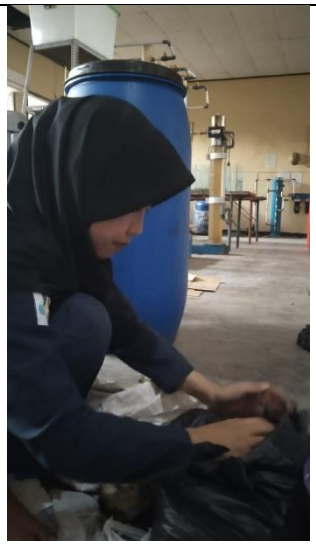

Estimated Marginal Means of persenCOD
Estimated Marginal Means
98,00
96,00
94,00
92,00
90,00
88,00
20,00
40,00
60,00
KETEBALAN ZEOLIT
WAKTU (DALAM HARI)
1,00
2,00
3,00

persenTSS


Estimated Marginal Means of persenTSS
Estimated Marginal Means
100,00
90,00
80,00
70,00
60,00
20,00
40,00
60,00
KETEBALAN ZEOLIT
WAKTU (DALAM HARI)
1,00
2,00
3,00

Lampiran 5

Dokumentasi Penelitian

	
Proses pembuatan larutan untuk uji parameter BOD dan COD	Proses pengujian parameter COD
	
Proses penyusunan komponen *Multi Soil Layering*	Proses perakitan reaktor

	
DO5 yang ditaruh di incubator khusus BOD	Proses penimbangan kertas TSS setelah dioven
	
Proses pengambilan sampel limbah	Proses pembuatan larutan BOD dan COD

Lampiran 6

Tabel Hasil Perhitungan Uji BOD, COD dan TSS

1. Tabel Hasil Uji BOD (Pengenceran 50x) di Laboratorium

Perlakuan	Volume Peniter (Vp) Ketika Titrasi				Hasil Akhir perhitungan BOD (mg/L)
	Vp Sampel DO0 (ml)	Vp Sampel DO5 (ml)	Vp Blanko DO0 (ml)	Vp Blanko DO5 (ml)	
Kontrol	11,4	4,5	10,8	8,5	156,5
	12,6	3,5	12,5	7,5	142
	11,5	6	10	9,7	176,5
Waktu 24 jam, ketebalan zeolit 20 cm	11,3	8,5	11	11	94,5
	12,2	9,7	10	10,6	81,56
	11	9,7	10,5	10,5	44
Waktu 24 jam, ketebalan zeolit 40 cm	11	9	10	9,5	50,84
	11,4	10	10,3	10,2	44,6
	11	9	10,2	10,2	67,5
Waktu 24 jam, ketebalan zeolit 60 cm	11,8	8,4	11,7	10,5	75,31
	12,4	10	11	10,4	62,5
	12	10,2	11,2	10,5	37,5
Waktu 48 jam, ketebalan zeolit 20 cm	11,5	10	11	10,7	41,2
	12,4	8,4	11	9,3	78,65
	13	11,3	12,5	11,5	25
Waktu 48 jam, ketebalan zeolit 40 cm	11,4	8,7	11,2	9,7	42,01
	13	11,1	11,9	11,3	41,95
	11,7	10,3	11,2	10,8	34
Waktu 48 jam, ketebalan zeolit 60 cm	11,2	10	11,2	11	60,5
	11,5	10,1	11,3	11,2	44,5
	11,4	10	11	10,5	31
Waktu 72 jam, ketebalan zeolit 20 cm	11	10,2	11	10,6	13,77
	11,3	10,5	10,1	10	40,5
	11,6	10,5	11,3	10,7	17
Waktu 72 jam, ketebalan zeolit 40 cm	11	10,3	11	11	23,5
	11,5	8,7	11,5	9,1	15,3
	12,3	11,5	11,7	11,5	21
Waktu 72 jam,	12,3	10,9	11,3	11	37,7

ketebalan zeolit 60 cm	11,1	9,5	10,4	9,7	31,47
	11,7	10,5	11,5	11	24

2. Tabel Hasil Uji COD di Laboratorium

Perlakuan	Volume Peniter (Vp) Ketika Titrasi				Hasil Akhir perhitungan COD (mg/L)
	Titrasi blanko (a) (ml)	Titrasi Sampel (b) (ml)	Volume Sampel (ml)	Normalitas Peniter (N)	
Kontrol	11	7,5	2,5	0,1	1120
	12	8	2,5	0,1	1280
	12	7,5	2,5	0,1	1440
Waktu 24 jam, ketebalan zeolit 20 cm	10	9	2,5	0,1	320
	10	9,5	2,5	0,1	160
	10	9,5	2,5	0,1	160
Waktu 24 jam, ketebalan zeolit 40 cm	9,5	9	2,5	0,1	160
	9,5	9	2,5	0,1	160
	9,5	9	2,5	0,1	160
Waktu 24 jam, ketebalan zeolit 60 cm	9,5	9,1	2,5	0,1	128
	9,5	9	2,5	0,1	160
	10,5	10	2,5	0,1	160
Waktu 48 jam, ketebalan zeolit 20 cm	9,2	9	2,5	0,1	64
	9,4	9	2,5	0,1	128
	9,2	9	2,5	0,1	64
Waktu 48 jam, ketebalan zeolit 40 cm	9,5	9	2,5	0,1	160
	9,3	9	2,5	0,1	96
	10	9,7	2,5	0,1	96
Waktu 48 jam, ketebalan zeolit 60 cm	10,3	10	2,5	0,1	96
	9,5	9	2,5	0,1	160
	10	9,7	2,5	0,1	96
Waktu 72 jam, ketebalan zeolit 20 cm	9,2	9	2,5	0,1	64
	9,3	9,1	2,5	0,1	64
	9,3	9,2	2,5	0,1	32
Waktu 72 jam, ketebalan zeolit 40 cm	10	9,5	2,5	0,1	160
	9,2	9,1	2,5	0,1	32
	9,3	9,1	2,5	0,1	64
Waktu 72 jam, ketebalan zeolit 60 cm	9,4	9,2	2,5	0,1	64
	9,2	9	2,5	0,1	64
	10,3	10	2,5	0,1	96

3. Tabel Hasil Uji TSS di Laboratorium

Perlakuan	Volume Peniter (Vp) Ketika Titrasi			Hasil Akhir perhitungan TSS (mg/L)
	Berat Awal (mg)	Berat akhir (mg)	Volume sampel (ml)	
Kontrol	850	910	100	600
	850	940	100	900
	850	910	100	600
Waktu 24 jam, ketebalan zeolit 20 cm	880	890	100	100
	880	890	100	100
	840	856	100	160
Waktu 24 jam, ketebalan zeolit 40 cm	860	880	100	200
	860	880	100	200
	840	866	100	260
Waktu 24 jam, ketebalan zeolit 60 cm	840	870	100	300
	840	860	100	300
	840	856	100	160
Waktu 48 jam, ketebalan zeolit 20 cm	840	850	100	100
	840	850	100	100
	840	850	100	100
Waktu 48 jam, ketebalan zeolit 40 cm	840	860	100	200
	840	860	100	200
	860	880	100	200
Waktu 48 jam, ketebalan zeolit 60 cm	840	860	100	200
	840	860	100	200
	840	850	100	100
Waktu 72 jam, ketebalan zeolit 20 cm	840	844	100	40
	840	844	100	40
	880	890	100	100
Waktu 72 jam, ketebalan zeolit 40 cm	840	850	100	100
	840	850	100	100
	840	845	100	50
Waktu 72 jam, ketebalan zeolit 60 cm	840	860	100	200
	840	860	100	200
	840	845	100	50

Lampiran 7

Rancangan Reaktor *Multi Soil Layering* (MSL)