

V. KESIMPULAN

Dari hasil penelitian yang telah dilakukan, maka dapat diambil kesimpulan sebagai berikut :

1. Semakin tinggi konsentrasi penambahan inokulum *Chlorella* sp., maka kandungan oksigen terlarut (DO) limbah cair pabrik kulit PT Budi Makmur Jaya Murni juga semakin tinggi.
2. Semakin tinggi konsentrasi penambahan inokulum *Chlorella* sp., maka kandungan COD dan Cr limbah cair pabrik kulit PT Budi Makmur Jaya Murni semakin rendah.
3. pH dan suhu limbah cair pabrik kulit PT Budi Makmur Jaya Murni sesuai dengan syarat tumbuh *Chlorella* sp.

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LAMPIRAN



LAMBDA-KAPPA 13:00 Wednesday, Mar 01, 2000 1

OBS	PERL	BLOK_1	BLOK_2
1	K0L0	0.012	0.008
2	K0L1	0.018	0.022
3	K0L2	0.020	0.020
4	K0L3	0.042	0.038
5	K0L4	0.056	0.064
6	K1L0	0.013	0.007
7	K1L1	0.273	0.243
8	K1L2	0.477	0.517
9	K1L3	0.817	0.820
10	K1L4	0.823	1.153
11	K2L0	0.017	0.007
12	K2L1	0.763	0.670
13	K2L2	1.127	1.157
14	K2L3	1.223	1.327
15	K2L4	1.327	1.410
16	K3L0	0.013	0.003
17	K3L1	0.897	0.810
18	K3L2	1.213	1.851
19	K3L3	1.277	1.987
20	K3L4	1.403	2.710

Analysis of Variance Procedure
Class Level Information

Class	Levels	Values
INOKULUM	4	K0 K1 K2 K3
LAMA	5	L0 L1 L2 L3 L4
BLOK	2	1 2

Number of observations in data set = 40

Analysis of Variance Procedure

Dependent Variable: DO

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
BLOK	1	0.22695423	0.22695423	3.73	0.0685
PERL	19	16.76466587	0.88235084	14.50	0.0001
INOKULUM	3	7.86523228	2.62174409	43.09	0.0001
LAMA	4	6.15737150	1.53934288	25.30	0.0001
INOKULUM*LAMA	12	2.74206210	0.22850517	3.76	0.0051
Error	19	1.15603228	0.06084380		

Corrected Total 39 18.14765238

R-Square	C.V.	Root MSE	DO Mean
0.936299	37.04379	0.246665	0.66587500

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Duncan's Multiple Range Test for variable: DO

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

Alpha= 0.05 df= 19 MSE= 0.060844

Number of Means	2	3	4	5
Critical Range	0.258	0.271	0.280	0.285

Means with the same letter are not significantly different.

Duncan Grouping	Mean	N	LAMA
A	1.118	8	L4
A			
B	0.941	8	L3
B			
B	0.798	8	L2
C	0.462	8	L1
D	0.010	8	L0

Duncan's Multiple Range Test for variable: DO

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

Alpha= 0.05 df= 19 MSE= 0.060844

Number of Means	2	3	4
Critical Range	0.231	0.242	0.250

Means with the same letter are not significantly different.

Duncan Grouping	Mean	N	INOKULUM
A	1.216	10	K3
B	0.903	10	K2
C	0.514	10	K1
D	0.030	10	K0

Duncan's Multiple Range Test for variable: DO

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

Alpha= 0.05 df= 19 MSE= 0.060844

Number of Means	2	3	4	5	6	7	8	9	10	11
Critical Range	0.516	0.541	0.559	0.569	0.578	0.584	0.589	0.593	0.596	0.598

Number of Means	12	13	14	15	16	17	18	19	20
Critical Range	0.600	0.602	0.603	0.604	0.605	0.606	0.607	0.607	0.607

Means with the same letter are not significantly different.

Duncan Grouping	Mean	N	PERL
A	2.056	2	K3L4
A			
B A	1.632	2	K3L3
B A			
B A C	1.532	2	K3L2
B C			
B D C	1.368	2	K2L4
B D C			
B E D C	1.275	2	K2L3
B E D C			
B E D C	1.142	2	K2L2
B E D C			
F E D C	0.988	2	K1L4
F E D			
F E D	0.853	2	K3L1
F E D			
F E D	0.818	2	K1L3
F E D			
F E G	0.716	2	K2L1
F G			
F G H	0.497	2	K1L2
F G H			
G H	0.258	2	K1L1
G H			
H	0.060	2	K0L4
H			
H	0.040	2	K0L3
H			
H	0.020	2	K0L2
H			
H	0.020	2	K0L1
H			
H	0.012	2	K2L0
H			
H	0.010	2	K1L0
H			
H	0.010	2	K0L0
H			
H	0.008	2	K3L0

LAMBDA-KAPPA

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OBS	PERL	BLOK_1	BLOK_2
1	K0L0	175.47	175.89
2	K0L1	175.60	175.56
3	K0L2	174.85	174.91
4	K0L3	174.76	174.68
5	K0L4	173.71	173.78
6	K1L0	170.97	180.60
7	K1L1	161.60	173.23
8	K1L2	145.97	167.57
9	K1L3	137.93	159.10
10	K1L4	130.83	144.23
11	K2L0	171.07	180.37
12	K2L1	150.27	161.67
13	K2L2	133.20	146.00
14	K2L3	129.60	123.40
15	K2L4	121.70	114.77
16	K3L0	170.97	180.57
17	K3L1	150.27	150.27
18	K3L2	130.83	133.23
19	K3L3	128.93	114.50
20	K3L4	127.90	101.27

Analysis of Variance Procedure
Class Level Information

Class	Levels	Values
INOKULUM	4	K0 K1 K2 K3
LAMA	5	L0 L1 L2 L3 L4
BLOK	2	1 2

Number of observations in data set = 40
Analysis of Variance Procedure

Dependent Variable: COD

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
BLOK	1	119.612222	119.612222	1.77	0.1989
PERL	19	18870.36453	993.17708	14.71	0.0001
INOKULUM	3	7924.680487	2641.560162	39.13	0.0001
LAMA	4	7983.210565	1995.802641	29.56	0.0001
INOKULUM*LAMA	12	2962.473475	246.872790	3.66	0.0058
Error	19	1282.65393	67.50810		
Corrected Total	39	20272.63068			

R-Square	C.V.	Root MSE	COD Mean
0.936730	5.350890	8.216331	153.550750

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= 19 MSE= 67.5081

Number of Means 2 3 4
Critical Range 7.680 8.064 8.329

Means with the same letter are not significantly different.

Duncan Grouping	Mean	N	INOKULUM
A	174.921	10	K0
B	157.203	10	K1
C	143.205	10	K2
C			
C	138.874	10	K3

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= 19 MSE= 67.5081

Number of Means 2 3 4 5
Critical Range 8.586 9.016 9.312 9.484

Means with the same letter are not significantly different.

Duncan Grouping	Mean	N	LAMA
A	175.739	8	L0
B	162.309	8	L1
C	150.820	8	L2
C			
D	142.862	8	L3
D			
D	136.024	8	L4

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= 19 MSE= 67.5081

Number of Means	2	3	4	5	6	7	8	9	10	11
Critical Range	17.17	18.03	18.62	18.97	19.24	19.45	19.61	19.74	19.84	19.92

Number of Means	12	13	14	15	16	17	18	19	20
Critical Range	19.99	20.05	20.09	20.13	20.16	20.18	20.20	20.22	20.21

Means with the same letter are not significantly different.

Duncan Grouping		Mean	N	PERL		
	A	175.785	2	K1L0		
	A					
	A	175.770	2	K3L0		
	A					
	A	175.720	2	K2L0		
	A					
	A	175.680	2	K0L0		
	A					
	A	175.580	2	K0L1		
	A					
	A	174.880	2	K0L2		
	A					
	A	174.720	2	K0L3		
	A					
	A	173.745	2	K0L4		
	A					
B	A	167.415	2	K1L1		
B	A					
B	A	C	156.770	2	K1L2	
B	A	C				
B	D	A	C	155.970	2	K2L1
B	D		C			
B	D	E	C	150.270	2	K3L1
B	D	E	C			
B	D	E	C	148.515	2	K1L3
	D	E	C			
F	D	E	C	139.600	2	K2L2
F	D	E				
F	D	E		137.530	2	K1L4
F		E				
F		E	G	132.030	2	K3L2
F			G			
F			G	126.500	2	K2L3
F			G			
F			G	121.715	2	K3L3
			G			
			G	118.235	2	K2L4
			G			
			G	114.585	2	K3L4

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OBS	PERL	BLOK_1	BLOK_2
1	K0L0	0.140	0.180
2	K0L1	0.151	0.169
3	K0L2	0.157	0.163
4	K0L3	0.155	0.165
5	K0L4	0.132	0.188
6	K1L0	0.152	0.165
7	K1L1	0.143	0.149
8	K1L2	0.127	0.137
9	K1L3	0.113	0.112
10	K1L4	0.102	0.102
11	K2L0	0.151	0.166
12	K2L1	0.124	0.124
13	K2L2	0.103	0.084
14	K2L3	0.094	0.073
15	K2L4	0.081	0.042
16	K3L0	0.153	0.155
17	K3L1	0.095	0.102
18	K3L2	0.064	0.072
19	K3L3	0.049	0.054
20	K3L4	0.046	0.013

Analysis of Variance Procedure
Class Level Information

Class	Levels	Values
INOKULUM	4	K0 K1 K2 K3
LAMA	5	L0 L1 L2 L3 L4
BLOK	2	1 2

Number of observations in data set = 40
Analysis of Variance Procedure

Dependent Variable: Cr

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
BLOK	1	0.00017223	0.00017223	0.73	0.4028
PERL	19	0.06961428	0.00366391	15.58	0.0001
INOKULUM	3	0.03522748	0.01174249	49.93	0.0001
LAMA	4	0.02355015	0.00588754	25.03	0.0001
INOKULUM*LAMA	12	0.01083665	0.00090305	3.84	0.0045
Error	19	0.00446827	0.00023517		
Corrected Total	39	0.07425477			

R-Square	C.V.	Root MSE	Cr Mean
0.939825	12.92212	0.015335	0.11867500

LAMBDA-KAPPA

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Duncan's Multiple Range Test for variable: Cr

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

Alpha= 0.05 df= 19 MSE= 0.000235

Number of Means	2	3	4
Critical Range	.0143	.0151	.0155

Means with the same letter are not significantly different.

Duncan Grouping	Mean	N	INOKULUM
A	0.16000	10	K0
B	0.13020	10	K1
C	0.10420	10	K2
D	0.08030	10	K3

Duncan's Multiple Range Test for variable: Cr

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

Alpha= 0.05 df= 19 MSE= 0.000235

Number of Means	2	3	4	5
Critical Range	.0160	.0168	.0174	.0177

Means with the same letter are not significantly different.

Duncan Grouping	Mean	N	LAMA
A	0.15775	8	L0
B	0.13212	8	L1
C	0.11337	8	L2
C			
D	0.10188	8	L3
D			
D	0.08825	8	L4

Duncan's Multiple Range Test for variable: Cr

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

Alpha= 0.05 df= 19 MSE= 0.000235

Number of Means	2	3	4	5	6	7	8	9	10	11
Critical Range	.0321	.0337	.0348	.0354	.0359	.0363	.0366	.0368	.0370	.0372

Number of Means	12	13	14	15	16	17	18	19	20
Critical Range	.0373	.0374	.0375	.0376	.0376	.0377	.0377	.0377	.0377

Means with the same letter are not significantly different.

Duncan Grouping	Mean	N	PERL			
A	0.1600	2	K0L0			
A						
A	0.1600	2	K0L1			
A						
A	0.1600	2	K0L2			
A						
A	0.1600	2	K0L3			
A						
A	0.1600	2	K0L4			
A						
A	0.1585	2	K1L0			
A						
A	0.1585	2	K2L0			
A						
A	0.1540	2	K3L0			
A						
B	0.1460	2	K1L1			
B						
B	A	C	0.1320	2	K1L2	
B	A	C				
B	D	A	C	0.1240	2	K2L1
B	D		C			
B	D	E	C	0.1125	2	K1L3
	D	E	C			
F	D	E	C	0.1020	2	K1L4
F	D	E	C			
F	D	E	C	0.0985	2	K3L1
F	D	E				
F	D	E	G	0.0935	2	K2L2
F	D	E	G			
F	H	E	G	0.0835	2	K2L3
F	H		G			
F	H		G	0.0680	2	K3L2
	H		G			
	H	I	G	0.0615	2	K2L4
	H	I				
	H	I		0.0515	2	K3L3
		I				
		I		0.0295	2	K3L4

LAMBDA-KAPPA

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OBS	PERL	BLOK_1	BLOK_2
1	K0L0	6.1	6.7
2	K0L1	6.2	6.6
3	K0L2	6.5	6.3
4	K0L3	6.4	6.4
5	K0L4	6.0	6.8
6	K1L0	6.5	6.3
7	K1L1	6.7	6.3
8	K1L2	6.6	6.3
9	K1L3	6.6	6.3
10	K1L4	6.6	6.4
11	K2L0	6.6	6.3
12	K2L1	6.6	6.4
13	K2L2	6.6	6.0
14	K2L3	6.6	6.4
15	K2L4	6.6	6.4
16	K3L0	6.7	6.3
17	K3L1	6.7	6.3
18	K3L2	6.7	6.3
19	K3L3	6.7	6.3
20	K3L4	6.7	6.3

Analysis of Variance Procedure
Class Level Information

Class	Levels	Values
INOKULUM	4	K0 K1 K2 K3
LAMA	5	L0 L1 L2 L3 L4
BLOK	2	1 2

Number of observations in data set = 40
Analysis of Variance Procedure

Dependent Variable: pH

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
BLOK	1	0.27225000	0.27225000	4.23	0.0537
PERL	19	0.12475000	0.00656579	0.10	1.0000
INOKULUM	3	0.05075000	0.01691667	0.26	0.8513
LAMA	4	0.02350000	0.00587500	0.09	0.9841
INOKULUM*LAMA	12	0.05050000	0.00420833	0.07	1.0000
Error	19	1.22275000	0.06435526		
Corrected Total	39	1.61975000			

R-Square	C.V.	Root MSE	pH Mean
0.245100	3.931552	0.253683	6.45250000

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= 19 MSE= 0.064355

Number of Means	2	3	4
Critical Range	0.237	0.249	0.257

Means with the same letter are not significantly different.

Duncan Grouping	Mean	N	INOKULUM
A	6.500	10	K3
A			
A	6.460	10	K1
A			
A	6.450	10	K2
A			
A	6.400	10	K0

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= 19 MSE= 0.064355

Number of Means	2	3	4	5
Critical Range	0.265	0.278	0.288	0.293

Means with the same letter are not significantly different.

Duncan Grouping	Mean	N	LAMA
A	6.475	8	L4
A			
A	6.475	8	L1
A			
A	6.462	8	L3
A			
A	6.437	8	L0
A			
A	6.412	8	L2

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= 19 MSE= 0.064355

Number of Means	2	3	4	5	6	7	8	9	10	11
Critical Range	0.530	0.557	0.575	0.586	0.594	0.600	0.606	0.609	0.613	0.615

Number of Means	12	13	14	15	16	17	18	19	20
Critical Range	0.617	0.619	0.620	0.621	0.622	0.623	0.624	0.624	0.624

Means with the same letter are not significantly different.

Duncan Grouping	Mean	N	PERL
A	6.500	2	K3L1
A	6.500	2	K3L2
A	6.500	2	K3L3
A	6.500	2	K3L4
A	6.500	2	K1L1
A	6.500	2	K2L3
A	6.500	2	K2L4
A	6.500	2	K3L0
A	6.500	2	K1L4
A	6.500	2	K2L1
A	6.450	2	K1L3
A	6.450	2	K2L0
A	6.450	2	K1L2
A	6.400	2	K0L4
A	6.400	2	K0L0
A	6.400	2	K1L0
A	6.400	2	K0L2
A	6.400	2	K0L1
A	6.400	2	K0L3
A	6.300	2	K2L2

LAMBDA-KAPPA

13:12 Friday, Mar 3, 2000

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OBS	PERL	BLOK_1	BLOK_2
1	K0L0	29.0	28
2	K0L1	29.0	28
3	K0L2	29.0	28
4	K0L3	29.0	28
5	K0L4	29.0	28
6	K1L0	29.0	28
7	K1L1	29.0	28
8	K1L2	29.0	28
9	K1L3	29.0	28
10	K1L4	29.0	28
11	K2L0	28.7	28
12	K2L1	28.7	28
13	K2L2	29.0	28
14	K2L3	28.7	28
15	K2L4	28.3	28
16	K3L0	28.7	28
17	K3L1	29.0	28
18	K3L2	28.7	28
19	K3L3	29.0	28
20	K3L4	29.0	28

Analysis of Variance Procedure
Class Level Information

Class	Levels	Values
INOKULUM	4	K0 K1 K2 K3
LAMA	5	L0 L1 L2 L3 L4
BLOK	2	1 2

Number of observations in data set = 40
Analysis of Variance Procedure

Dependent Variable: SUHU

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
LOK	1	7.92100000	7.92100000	431.23	0.0001
ERL	19	0.34900000	0.01836842	1.00	0.5000
NOKULUM	3	0.17100000	0.05700000	3.10	0.0511
LAMA	4	0.01900000	0.00475000	0.26	0.9008
NOKULUM*LAMA	12	0.15900000	0.01325000	0.72	0.7149
Error	19	0.34900000	0.01836842		
Corrected Total	39	8.61900000			

R-Square	C.V.	Root MSE	SUHU Mean
0.959508	0.476464	0.135530	28.4450000

Duncan's Multiple Range Test for variable: SUHU

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

Alpha= 0.05 df= 19 MSE= 0.018368

Number of Means	2	3	4
Critical Range	0.127	0.133	0.137

Means with the same letter are not significantly different.

Duncan Grouping	Mean	N	INOKULUM
A	28.5000	10	K0
A			
A	28.5000	10	K1
A			
B	28.4400	10	K3
B			
B	28.3400	10	K2

Duncan's Multiple Range Test for variable: SUHU

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

Alpha= 0.05 df= 19 MSE= 0.018368

Number of Means	2	3	4	5
Critical Range	0.142	0.149	0.154	0.156

Means with the same letter are not significantly different.

Duncan Grouping	Mean	N	LAMA
A	28.4625	8	L2
A			
A	28.4625	8	L1
A			
A	28.4625	8	L3
A			
A	28.4250	8	L0
A			
A	28.4125	8	L4

Duncan's Multiple Range Test for variable: SUHU

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

Alpha= 0.05 df= 19 MSE= 0.018368

Number of Means	2	3	4	5	6	7	8	9	10	11
Critical Range	0.283	0.297	0.307	0.313	0.317	0.321	0.324	0.326	0.327	0.329

Number of Means	12	13	14	15	16	17	18	19	20
Critical Range	0.330	0.331	0.331	0.332	0.333	0.333	0.333	0.334	0.333

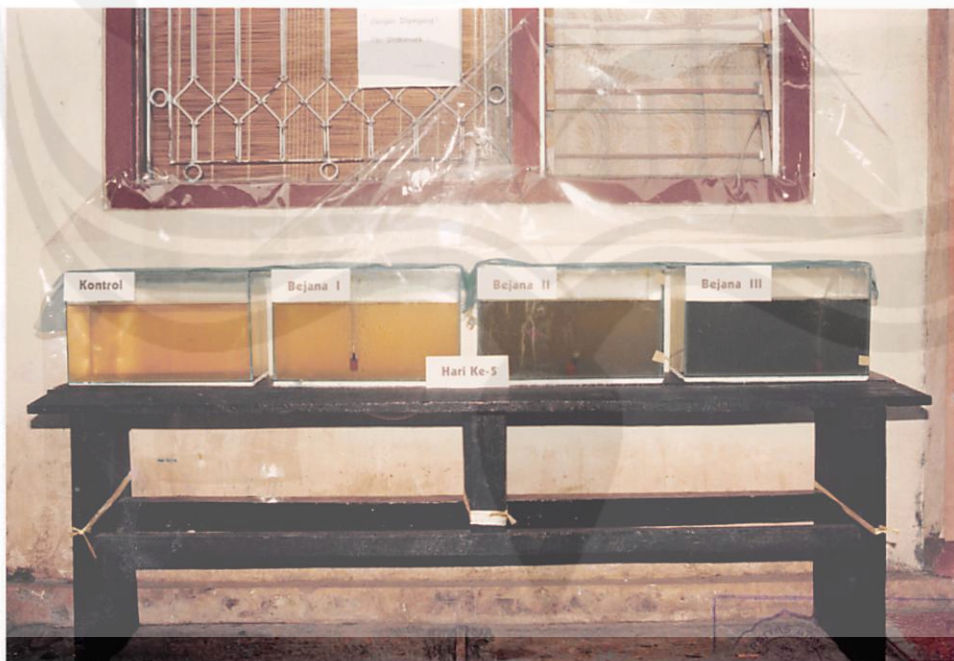
Means with the same letter are not significantly different.

Duncan Grouping	Mean	N	PERL
A	28.500	2	K0L0
A			
A	28.500	2	K0L1
A			
A	28.500	2	K0L2
A			
A	28.500	2	K0L3
A			
A	28.500	2	K0L4
A			
A	28.500	2	K1L0
A			
A	28.500	2	K1L1
A			
A	28.500	2	K1L2
A			
A	28.500	2	K1L3
A			
A	28.500	2	K1L4
A			
A	28.500	2	K3L3
A			
A	28.500	2	K3L4
A			
A	28.500	2	K2L2
A			
A	28.500	2	K3L1
A			
B	28.350	2	K2L3
B			
B	28.350	2	K3L0
B			
B	28.350	2	K2L0
B			
B	28.350	2	K3L2
B			
B	28.350	2	K2L1
B			
B	28.150	2	K2L4



Gb. 1
Hari ke - 0

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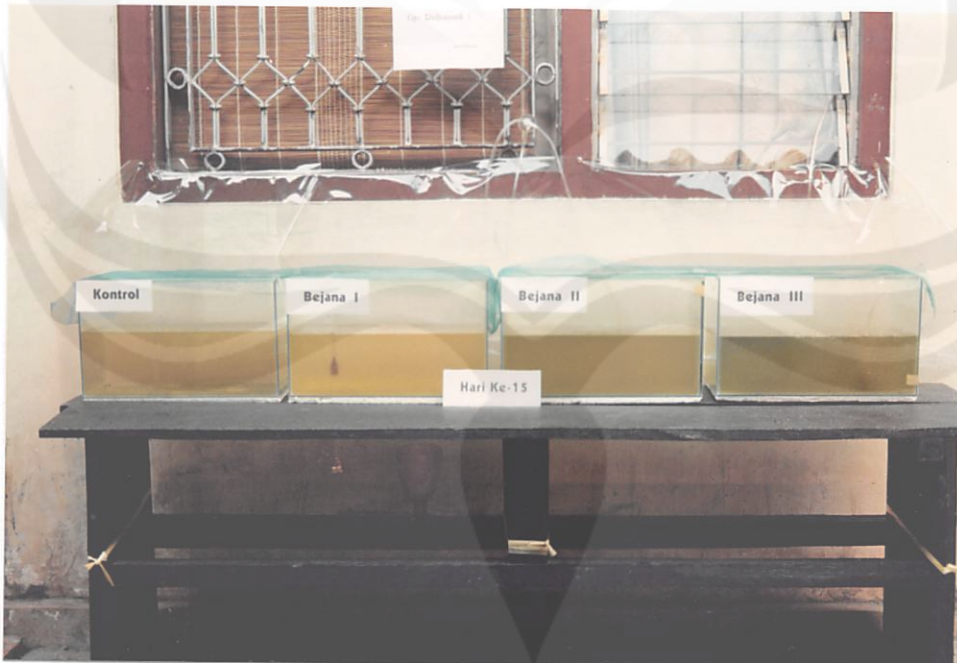


Gb. 2
Hari ke - 5

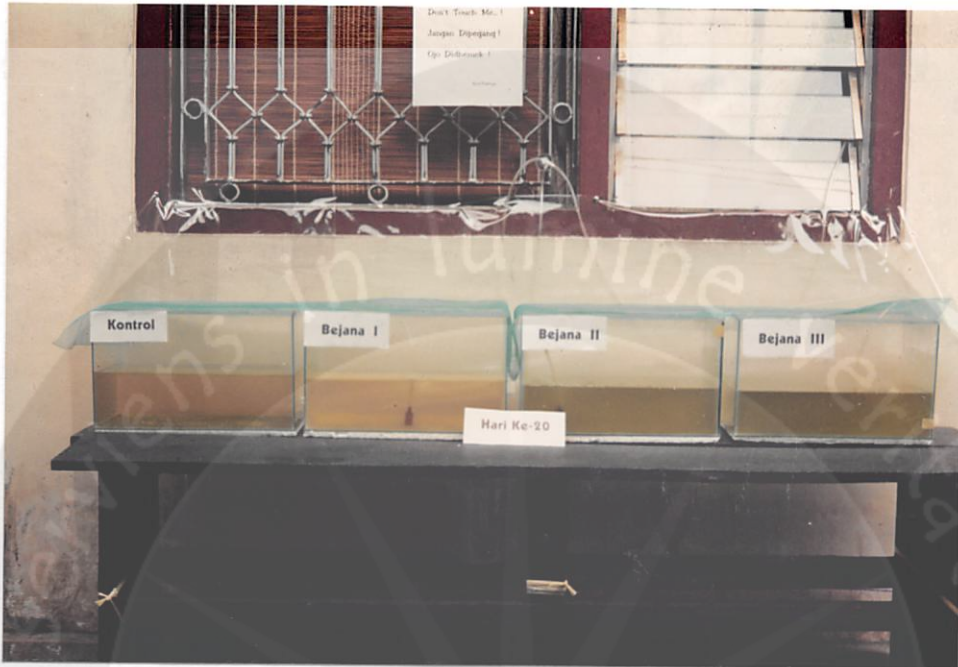
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Gb. 3
Hari ke - 10



Gb. 4
Hari ke - 15



Gb. 5
Hari ke - 20



DEPARTEMEN KESEHATAN R.I.
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SURAT KETERANGAN

Yang bertanda tangan dibawah ini menerangkan bahwa mahasiswa :

Nama : Yanida Andriana
No. Mhs : 0171/BL
NIRM : 920051052903120016

Telah melakukan penelitian di BTKL pada tanggal 23 Juli 1998 sampai
dengan 17 September 1998 dengan judul skripsi : PENGOLAHAN LIMBAH
CAIR PABRIK KULIT PT. BUDI MAKMUR JAYA MURNI
MENGUNAKAN *Chlorella* sp.

Demikian keterangan kami semoga dapat digunakan sebagai mestinya.

Penyelia Laboratorium Biologi



Drs. Hendratno
140253662

