

**E1. Data Penyesuaikliman Bakteria Dalam Reaktor 5 L**

Tarikh	Hari	COD			NH <sub>4</sub> <sup>+</sup> -N		
		Influen (mg/L)	Efluen (mg/L)	Penyingkiran (%)	Influen (mg/L)	Efluen (mg/L)	Penyingkiran (%)
11-Jun-08	0	194	35	81.96%	3.34	0.17	94.98%
13-Jun-08	2	178	41	76.97%	3.32	0.18	94.57%
16-Jun-08	5	184	27	85.33%	3.36	0.15	95.40%
18-Jun-08	7	184.5	25	86.45%	3.31	0.17	94.94%
23-Jun-08	12	207	20	90.34%	3.34	0.18	94.59%
28-Jun-08	17	204	20	90.20%	3.41	0.26	92.45%
30-Jun-08	19	202	31	84.65%	3.34	0.03	99.23%
3-Jul-08	22	199	23	88.44%	3.39	0.03	99.24%
9-Jul-08	28	196	10	94.90%	3.36	0.19	94.25%
21-Jul-08	40	212	17	91.98%	3.30	0.17	94.92%
23-Jul-08	42	404	15	96.29%	3.26	0.27	91.70%
25-Jul-08	45	391	13	96.68%	3.30	0.32	90.23%
4-Ogos-08	55	394	4	98.98%	3.37	0.26	92.37%
6-Ogos-08	57	414	8	98.07%	3.32	0.27	91.86%
12-Ogos-08	63	292	4.5	98.46%	3.21	0.22	93.17%
16-Ogos-08	67	414	8	98.07%	3.34	0.31	90.73%
20-Ogos-08	71	395	2	99.49%	3.34	0.23	93.05%
25-Ogos-08	76	405	15	96.30%	3.30	0.23	92.97%
27-Ogos-08	78	400	65	83.75%	3.41	0.05	98.49%
29-Ogos-08	80	392	9	97.70%	3.25	0.13	96.03%
4-Sep-08	86	624	222	64.42%	3.44	0.17	95.13%
8-Sep-08	90	620	20	96.77%	3.34	0.24	92.66%
11-Sep-08	93	599	120	79.97%	3.23	0.22	93.23%
15-Sep-08	97	620	67	89.19%	3.26	0.09	97.23%
18-Sep-08	100	606	128	78.88%	3.36	0.05	98.47%
23-Sep-08	105	600	55	90.83%	3.25	0.04	98.81%
25-Sep-08	107	610	41	93.28%	3.27	0.06	98.03%
8-Oct-08	120	606	15	97.52%	3.30	0.06	98.05%
10-Oct-08	122	601	14	97.67%	3.28	0.08	97.65%
13-Oct-08	125	595	6	98.99%	3.26	0.06	98.02%

## E2. Data Pemantauan Prestasi Semasa Keadaan Optimum Secara Jangka Panjang

Fasa	Tarikh	Hari	COD			NH <sub>4</sub> <sup>+</sup> -N			NO <sub>3</sub> -N		Mn <sup>2+</sup> (mg/L)		
			Influen (mg/L)	Efluen (mg/L)	Penyingkiran (%)	Influen (mg/L)	Efluen (mg/L)	Penyingkiran (%)	Influen (mg/L)	Efluen (mg/L)	Influen (mg/L)	Efluen (mg/L)	Penyingkiran (%)
PM1	12-Apr-10	292	909	94	89.7%	11.1	2.99	73.1%	1.30	0.50	2.030	1.900	6.40%
	13-Apr-10	293	909	31	96.6%	11.1	1.22	89.0%	1.30	0.40	2.030		
	13-Apr-10	294	909	34	96.3%	11.1	1.40	87.4%	1.30	0.00	2.030	2.150	-5.91%
	14-Apr-10	295	948	28	97.0%	10.2	1.62	84.1%	1.00	0.80	2.060		
	15-Apr-10	296	948	45	95.3%	10.2	1.24	87.8%	1.00	0.50	2.060		
	15-Apr-10	297	948	35	96.3%	10.2	1.48	85.5%			2.060		
	16-Apr-10	298	948	84	91.1%	11.5	1.36	88.2%			2.110		
	17-Apr-10	299	948	30	96.8%	11.5	1.22	89.4%			2.110		
	19-Apr-10	300	925	162	82.5%	11.5	0.92	92.0%			2.110		
	20-Apr-10	301	925	327	64.6%	11.5	1.29	88.8%			2.070		
08-Mei-10	318	899	42	95.3%	10.6	0.50	95.3%						
PM1	09-Mei-10	319	899	40	95.6%	10.6	0.52	95.1%			3.270	2.150	
	10-Mei-10	320	866	112	87.1%	11.2	0.40	96.4%					
	10-Mei-10	321	866	147	83.0%	11.2	0.49	95.6%					
	11-Mei-10	322	866	209	75.9%	11.2	0.48	95.7%					
	11-Mei-10	323	866	174	79.9%	11.2	0.57	94.9%			2.030	2.170	
	12-Mei-10	324	894	297	66.8%	10.4	0.22	97.9%					
	17-Mei-10	330	905	176	80.6%	10.2	0.25	97.5%					
18-Mei-10	331	905	246	72.8%	10.2	0.30	97.1%						
PM2	14-Jun-10	332	942	130	86.2%	9.7	0.20	97.9%	2.70	3.10	1.470	2.940	
	15-Jun-10	333	942	138	85.4%	9.7	0.48	95.1%	2.70	2.40			
	16-Jun-10	334	925	189	79.6%	9.8	0.83	91.5%	2.40	3.60	0.710	2.160	
	17-Jun-10	335	925	181	80.4%	9.8	0.57	94.2%	2.40	1.70			
	18-Jun-10	336	925	65	93.0%	9.8	0.27	97.2%	2.40	1.80			
	20-Jun-10	337	925	148	84.0%	8.9	0.60	93.3%	2.50	5.10	0.000	1.500	
21-Jun-10	338	925	171	81.5%	8.9	0.34	96.2%	2.50	4.90	0.000			

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PM3	10-Jul-10	352	129	31	76.0%	10.3	0.57	94.5%	3.20	1.60	0.405	0.070	82.72%
	11-Jul-10	353	129	25	80.6%	10.3	2.28	77.9%	3.20	1.70	0.405	0.055	86.42%
	12-Jul-10	354	129	28	78.3%	10.3	1.82	82.3%	3.20	1.90	0.405	0.059	85.43%
	13-Jul-10	355	129	30	76.7%	10.3	2.45	76.2%	3.20	1.90	0.402	0.071	82.34%
	13-Jul-10	356	129	18	86.0%	10.3	2.60	74.8%	3.20	1.80	0.402	0.072	82.09%
	14-Jul-10	357	129	40	69.0%	10.3	2.76	73.2%	3.20	1.60	0.402	0.067	83.33%
	15-Jul-10	358	114	24	78.9%	10.7	2.90	72.9%	2.90	1.90	0.411	0.023	94.40%
	15-Jul-10	359	114	27	76.3%	10.7	2.98	72.1%	2.90	1.80	0.411	0.029	92.94%
PM4	04-Ogos-10	375	118	12	89.8%	10.1	0.27	97.3%	2.90	7.90	0.399	0.035	91.23%
	05-Ogos-10	376	118	15	87.3%	10.1	0.27	97.3%	2.90	7.30	0.399	0.035	91.23%
	05-Ogos-10	377	118	19	83.9%	10.1	0.25	97.5%	2.90	5.90	0.399	0.041	89.72%
	06-Ogos-10	378	118	27	77.1%	10.1	0.35	96.5%	2.90	5.40	0.399	0.031	92.23%
	07-Ogos-10	379	113	14	87.6%	10.1	0.25	97.5%	2.60	5.70	0.403	0.015	96.28%
	09-Ogos-10	380	113	17	85.0%	10.1	0.16	98.4%	2.60	5.50	0.403	0.021	94.79%
	10-Ogos-10	381	110	15	86.4%	9.9	0.21	97.9%	2.60	3.70	0.403	0.010	97.52%
PM4	16-Ogos-10	385	116	13	88.8%	10.1	0.25	97.5%	3.00	5.20	0.391	0.015	96.16%
	17-Ogos-10	386	116	10	91.4%	10.1	0.17	98.3%	3.00	4.50	0.391	0.030	92.33%
	18-Ogos-10	387	116	12	89.7%	10.1	0.15	98.5%	3.00	4.50	0.391	0.013	96.68%
	18-Ogos-10	388	116	12	89.7%	10.1	0.15	98.5%	3.00	4.50	0.391	0.014	96.42%
	19-Ogos-10	389	113	17	85.0%	10.3	0.12	98.8%	2.50	4.50	0.401	0.041	89.78%
	20-Ogos-10	390	113	13	88.5%	10.3	0.13	98.7%	2.50	2.10	0.401	0.039	90.27%
	21-Ogos-10	391	113	14	87.6%	10.3	0.15	98.5%	2.50	2.00	0.401	0.037	90.77%
	22-Ogos-10	392	118	21	82.2%	9.9	0.17	98.3%	2.40	3.70	0.397	0.048	87.91%
	23-Ogos-10	393	118	20	83.1%	9.9	0.09	99.1%	2.40	2.50	0.397	0.033	91.69%

### E3. Data Ujian Pemantauan Masa Nyata Secara Jangka Masa Panjang

Fasa	Tarikh	Hari	COD			NH <sub>4</sub> <sup>+</sup> -N			NO <sub>3</sub> -N		Mn <sup>2+</sup> (mg/L)		
			Influen (mg/L)	Efluen (mg/L)	Penyingkiran (%)	Influen (mg/L)	Efluen (mg/L)	Penyingkiran (%)	Influen (mg/L)	Efluen (mg/L)	Influen (mg/L)	Efluen (mg/L)	Penyingkiran (%)
I	08-Sept-10	403	97	11	88.66%	9.9	1.32	86.67%	3.7	7.9	0.341	0.098	71.41%
	12-Sept-10	407	103	15	85.44%	10.4	1.19	88.56%	4.1	8.2	0.381	0.091	76.06%
	16-Sept-10	411	103	14	86.41%	9.8	1.15	88.27%	4.3	8.5	0.315	0.101	67.94%
	20-Sept-10	415	100	17	83.00%	9.2	0.80	91.30%	5.1	7.0	0.379	0.068	81.95%
	26-Sept-10	421	96	10	89.58%	10.2	1.22	88.04%	3.9	7.1	0.327	0.090	72.60%
	02-Okt-10	427	95	13	86.32%	10.1	1.31	87.03%	3.6	7.9	0.401	0.108	73.07%
	06-Okt-10	431	100	14	86.00%	10.7	1.35	87.38%	2.3	8.3	0.442	0.099	77.69%
	12-Okt-10	437	96	10	89.58%	10.2	1.22	88.04%	3.9	7.1	0.327	0.099	69.72%
II	12-Nov-10	468	100	16	84.00%	9.8	1.41	85.61%	4.6	7.1	0.350	0.121	65.43%
	16-Nov-10	472	97	11	88.66%	9.9	1.31	86.77%	4.4	6.2	0.341	0.103	69.79%
	20-Nov-10	476	100	18	82.00%	9.2	1.99	78.37%	3.9	6.1	0.379	0.091	75.94%
	24-Nov-10	480	103	19	81.55%	10.7	1.20	88.79%	4.3	6.7	0.363	0.080	78.07%
	28-Nov-10	484	95	16	83.16%	10.2	0.80	92.16%	5.1	8.3	0.363	0.068	81.16%
	02-Dis-10	488	95	17	82.11%	9.9	2.89	70.81%	4.2	6.1	0.357	0.163	54.34%
	08-Dis-10	494	96	12	87.50%	9.9	3.30	66.67%	5.6	7.5	0.351	0.120	65.81%
	12-Dis-10	498	101	15	85.15%	9.7	3.30	65.98%	3.9	5.1	0.336	0.126	62.50%
	16-Dis-10	502	97	15	84.54%	9.9	3.31	66.57%	4.3	7.7	0.341	0.133	61.00%
III	31-Jan-11	548	200	19	90.50%	9.8	2.88	70.61%	2.1	2.0	0.296	0.234	20.95%
	01-Feb-11	549	189	16	91.53%	9.8	2.91	70.31%	3.9	2.3	0.294	0.274	6.80%
	02-Feb-11	550	189	20	89.42%	9.8	2.75	71.94%			0.296	0.233	21.28%
	03-Feb-11	551	189	15	92.06%	9.8	2.58	73.67%			0.301	0.254	15.61%
	04-Feb-11	552	193	15	92.23%	9.9	3.05	69.19%	4.1	2.5	0.301	0.165	45.18%
	05-Feb-11	553	193	13	93.26%	9.9	2.96	70.10%			0.301	0.117	61.13%
	06-Feb-11	554	193	15	92.23%	9.9	3.21	67.58%			0.331	0.125	62.24%
	07-Feb-11	555	201	13	93.53%	9.6	3.23	66.35%			0.331	0.107	67.67%
	08-Feb-11	556	202	12	94.06%	10.3	3.00	70.87%	4.3	1.9	0.277	0.097	64.98%
	09-Feb-11	557	202	14	93.07%	10.3	3.08	70.10%			0.277	0.081	70.76%

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VI	09-Mac-11	585	191	19	90.05%	9.1	0.48	94.73%			0.284	0.059	79.23%
	10-Mac-11	586	191	19	90.05%	9.1	0.56	93.85%	4.7	12.9	0.284	0.049	82.75%
	11-Mac-11	587	191	15	92.15%	9.1	0.57	93.74%			0.284	0.051	82.04%
	12-Mac-11	588	185	15	91.89%	9.7	0.48	95.05%			0.313	0.053	83.07%
	13-Mac-11	589	185	13	92.97%	9.7	0.44	95.46%	2.6	9.3	0.313	0.045	85.62%
	14-Mac-11	590	185	17	90.81%	9.7	0.33	96.60%			0.313	0.053	83.07%
	15-Mac-11	591	184	18	90.22%	10.1	0.27	97.33%	4.8	5.7	0.356	0.061	82.87%
	16-Mac-11	592	184	14	92.39%	10.1	0.42	95.84%			0.356	0.045	87.36%
	17-Mac-11	593	184	16	91.30%	10.1	0.39	96.14%	3.3	7.9	0.356	0.041	88.48%
V	03-Apr-11	610	179	13	92.74%	9.9	0.26	97.37%	1.4	4.6	0.292	0.029	90.07%
	04-Apr-11	611	179	17	90.50%	9.9	0.18	98.18%			0.292	0.015	94.86%
	05-Apr-11	612	181	13	92.82%	9.7	0.22	97.73%	1.3	3.4	0.266	0.021	92.11%
	06-Apr-11	613	197	12	93.91%	9.7	0.14	98.56%			0.266	0.017	93.61%
	07-Apr-11	614	185	14	92.43%	9.7	0.06	99.38%			0.266	0.018	93.23%
	08-Apr-11	615	185	16	91.35%	8.9	0.08	99.10%	1.1	3.9	0.266	0.021	92.11%
	09-Apr-11	616	185	15	91.89%	8.9	0.05	99.44%			0.273	0.025	90.84%
	10-Apr-11	617	193	19	90.16%	8.9	0.19	97.87%			0.273	0.021	92.31%
	11-Apr-11	618	193	12	93.78%	9.5	0.15	98.42%	1.3	3.3	0.273	0.019	93.04%
	12-Apr-11	619	193	13	93.26%	9.5	0.22	97.68%			0.277	0.016	94.22%
13-Apr-11	620	193	19	90.16%	9.5	0.28	97.05%			0.277	0.018	93.50%	

#### E4. Data Pertumbuhan Biojisim

Tarikh	X			X <sub>e</sub>		
	Sebelum turas (g)	Selepas turas (g)	MLSS (mg/L)	Sebelum turas (g)	selepas turas (g)	MLSS (mg/L)
11/04/2009	0.0838	0.3232	4788	0.0840	0.0846	12
15/04/2009	0.0847	0.3472	5250	0.0840	0.0856	32
19/04/2009	0.0826	0.3928	6204	0.0832	0.0858	52
23/04/2009	0.0823	0.3951	6256	0.0802	0.0807	10
27/04/2009	0.0823	0.4076	6506	0.0837	0.0840	6
01/05/2009	0.0895	0.4443	7096	0.0890	0.0894	8
05/05/2009	0.0826	0.4256	6860	0.0830	0.0897	134
12/05/2009	0.0822	0.4578	7512	0.0820	0.0863	86
14/05/2009	0.0825	0.4724	7798	0.0825	0.0846	42
19/05/2009	0.0826	0.4728	7804	0.0824	0.0836	24
23/05/2009	0.0834	0.5049	8430	0.0828	0.0848	40
28/05/2009	0.0824	0.6070	10492	0.0819	0.0835	32
11/06/2009	0.0785	0.5625	9680	0.0829	0.0833	8
15/06/2009	0.0785	0.5835	10100	0.0794	0.0827	66
19/06/2009	0.0791	0.6254	10926	0.0787	0.0815	56
23/06/2009	0.0783	0.6297	11028	0.0777	0.0904	254
29/06/2009	0.0788	0.6277	10978	0.0799	0.0831	64
02/07/2009	0.0794	0.6503	11418	0.0782	0.0797	30
07/07/2009	0.0788	0.6521	11466	0.0783	0.0827	88
12/07/2009	0.0814	0.6649	11670	0.0805	0.0849	88
29/07/2009	0.0771	0.6824	12106	0.0771	0.0823	104
01/08/2009	0.0768	0.6659	11782	0.0783	0.0812	58
04/08/2009	0.0767	0.6892	12250	0.0766	0.0781	30
07/08/2009	0.0773	0.6911	12276	0.0772	0.0779	14
28/08/2009	0.0876	0.6771	11790	0.0877	0.0880	6
03/09/2009	0.0869	0.6755	11772	0.0791	0.0811	40
17/09/2009	0.0792	0.6099	10614	0.0786	0.0793	14
01/10/2009	0.0794	0.5868	10148	0.0788	0.0800	24
13/10/2009	0.0795	0.5297	9004	0.0787	0.0790	6
26/10/2009	0.0786	0.5573	9573.8	0.0787	0.0791	8
16/11/2009	0.0797	0.5335	9076	0.0779	0.0789	20
25/11/2009	0.0795	0.5358	9126	0.0787	0.0789	4
01/12/2009	0.0795	0.5392	9194	0.0780	0.0791	22
07/01/2010	0.0819	0.5584	9530	0.0813	0.0929	232