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Lampiran 1 Hasil Data perubahan parameter selama penelitian

Data amoniak (NH_3), nitrit (NO_2). nitrat (NO_3)

No	Kode Sampel	Parameter		
		Amoniak-NH_3 (ppm)	Nitrit-NO_2 (ppm)	Nitrat-NO_3 (ppm)
Data Awal				
Awal Pemeliharaan		**0.003**	**0.083**	**1.020**
Data Akhir				
1	A1	0.050	0.231	4.449
2	A2	0.073	0.271	4.095
3	A3	0.035	0.233	4.445
4	B1	0.102	0.375	3.658
5	B2	0.106	0.659	4.375
6	B3	0.106	0.678	4.350
7	C1	0.090	0.441	4.209
8	C2	0.121	0.477	3.900
9	C3	0.130	0.611	4.400
Perubahan data				
1	A1	0.047	0.148	3.429
2	A2	0.070	0.188	3.075
3	A3	0.032	0.150	3.425
4	B1	0.099	0.292	2.638
5	B2	0.103	0.576	3.355
6	B3	0.103	0.595	3.330
7	C1	0.087	0.358	3.189
8	C2	0.118	0.394	2.880
9	C3	0.127	0.528	3.380

Data kepadatan biofilm

Kode Sampel	Pertumbuahan Biofilm (ml)		
	Data Awala	Data Akhir	Perubahan Data
A1		21	7
A2	14	42	28
A3		24	10
B1		44	32
B2	12	37	25
B3		46	34
C1		30	17
C2	13	10	-3
C3		17	4

Data pertumbuhan panjang mutlak dan sintasan

Kode Sampel	Pertumbuhan Panjang (cm)			Sintasan (%)
	Data Awal	Data Akhir	Perubahan Data	Selama Penelitian
A1	5.5	6.3	0.8	0.9
A2	5.8	5.9	0.1	1.0
A3	5.4	6.6	1.2	1.0
B1	6.3	6.7	0.4	1.0
B2	5.4	6.2	0.8	1.0
B3	6.0	6.2	0.3	1.0
C1	5.2	5.7	0.5	0.9
C2	5.7	6.7	1.1	0.7
C3	5.9	6.9	1.0	0.9

Datar pendukung kualitas air

Kode Sampel	Parameter		
	pH	DO (ppm)	Suhu (°c)
		Data Awal	
	7.18	**3.8**	**29**
		Data Akhir	
A1	5.81	4.5	29
A2	5.67	4.2	29
A3	5.68	3.5	29
B1	5.12	4.5	29
B2	5.24	4.5	29
B3	5.26	4.5	29
C1	5.41	4.2	29
C2	5.25	3.8	29
C3	5.22	3.8	29
		Perubahan Data	
A1	-1.37	0.7	0
A2	-1.51	0.4	0
A3	-1.50	-0.3	0
B1	-2.06	0.7	0
B2	-1.94	0.7	0
B3	-1.92	0.7	0
C1	-1.77	0.4	0
C2	-1.93	0.0	0
C3	-1.96	0.0	0

Lampiran 2 Deskripsi Data

Descriptives[a,b,c,d,e]

Parameter	Perlakuan			Statistic	Std. Error
Amoniak (NH3)	Bunga Pinus	Mean		.04967	.011050
		95% Confidence Interval for Mean	Lower Bound	.00212	
			Upper Bound	.09721	
		5% Trimmed Mean		.	
		Median		.04700	
		Variance		.000	
		Std. Deviation		.019140	
		Minimum		.032	
		Maximum		.070	
		Range		.038	
		Interquartile Range		.	
		Skewness		.615	1.225
		Kurtosis		.	.
	Bunga Cemara Angin	Mean		.10167	.001333
		95% Confidence Interval for Mean	Lower Bound	.09593	
			Upper Bound	.10740	
		5% Trimmed Mean		.	
		Median		.10300	
		Variance		.000	
		Std. Deviation		.002309	
		Minimum		.099	
		Maximum		.103	
		Range		.004	
		Interquartile Range		.	
		Skewness		-1.732	1.225
		Kurtosis		.	.
	Bioball	Mean		.11067	.012115
		95% Confidence Interval for Mean	Lower Bound	.05854	
			Upper Bound	.16279	
		5% Trimmed Mean		.	
		Median		.11800	
		Variance		.000	
		Std. Deviation		.020984	
		Minimum		.087	
		Maximum		.127	
		Range		.040	
		Interquartile Range		.	

		Skewness		-1.381	1.225
		Kurtosis		.	.
Nitrit (NO2)	Bunga Pinus	Mean		.16200	.013013
		95% Confidence	Lower Bound	.10601	
		Interval for Mean	Upper Bound	.21799	
		5% Trimmed Mean		.	
		Median		.15000	
		Variance		.001	
		Std. Deviation		.022539	
		Minimum		.148	
		Maximum		.188	
		Range		.040	
		Interquartile Range		.	
		Skewness		1.717	1.225
		Kurtosis		.	.
	Bunga Cemara Angin	Mean		.48767	.097987
		95% Confidence	Lower Bound	.06606	
		Interval for Mean	Upper Bound	.90927	
		5% Trimmed Mean		.	
		Median		.57600	
		Variance		.029	
		Std. Deviation		.169718	
		Minimum		.292	
		Maximum		.595	
		Range		.303	
		Interquartile Range		.	
		Skewness		-1.708	1.225
		Kurtosis		.	.
	Bioball	Mean		.42667	.051721
		95% Confidence	Lower Bound	.20413	
		Interval for Mean	Upper Bound	.64921	
		5% Trimmed Mean		.	
		Median		.39400	
		Variance		.008	
		Std. Deviation		.089584	
		Minimum		.358	
		Maximum		.528	
		Range		.170	
		Interquartile Range		.	
		Skewness		1.423	1.225
		Kurtosis		.	.
Nitrat (NO3)	Bunga Pinus	Mean		3.30967	.117339
		95% Confidence	Lower Bound	2.80480	

		Interval for Mean	Upper Bound	3.81454	
		5% Trimmed Mean		.	
		Median		3.42500	
		Variance		.041	
		Std. Deviation		.203237	
		Minimum		3.075	
		Maximum		3.429	
		Range		.354	
		Interquartile Range		.	
		Skewness		-1.731	1.225
		Kurtosis		.	.
	Bunga Cemara Angin	Mean		3.10767	.234944
		95% Confidence	Lower Bound	2.09678	
		Interval for Mean	Upper Bound	4.11855	
		5% Trimmed Mean		.	
		Median		3.33000	
		Variance		.166	
		Std. Deviation		.406935	
		Minimum		2.638	
		Maximum		3.355	
		Range		.717	
		Interquartile Range		.	
		Skewness		-1.725	1.225
		Kurtosis		.	.
	Bioball	Mean		3.14967	.145671
		95% Confidence	Lower Bound	2.52289	
		Interval for Mean	Upper Bound	3.77644	
		5% Trimmed Mean		.	
		Median		3.18900	
		Variance		.064	
		Std. Deviation		.252310	
		Minimum		2.880	
		Maximum		3.380	
		Range		.500	
		Interquartile Range		.	
		Skewness		-.684	1.225
		Kurtosis		.	.
Sintasan	Bunga Pinus	Mean		.967	.0333
		95% Confidence	Lower Bound	.823	
		Interval for Mean	Upper Bound	1.110	
		5% Trimmed Mean		.	
		Median		1.000	
		Variance		.003	

		Std. Deviation		.0577	
		Minimum		.9	
		Maximum		1.0	
		Range		.1	
		Interquartile Range		.	
		Skewness		-1.732	1.225
		Kurtosis		.	.
	Bioball	Mean		.833	.0667
		95% Confidence	Lower Bound	.546	
		Interval for Mean	Upper Bound	1.120	
		5% Trimmed Mean		.	
		Median		.900	
		Variance		.013	
		Std. Deviation		.1155	
		Minimum		.7	
		Maximum		.9	
		Range		.2	
		Interquartile Range		.	
		Skewness		-1.732	1.225
		Kurtosis		.	.
Panhjang mutlak	Bunga Pinus	Mean		.70	.321
		95% Confidence	Lower Bound	-.68	
		Interval for Mean	Upper Bound	2.08	
		5% Trimmed Mean		.	
		Median		.80	
		Variance		.310	
		Std. Deviation		.557	
		Minimum		0	
		Maximum		1	
		Range		1	
		Interquartile Range		.	
		Skewness		-.782	1.225
		Kurtosis		.	.
	Bunga Cemara Angin	Mean		.50	.153
		95% Confidence	Lower Bound	-.16	
		Interval for Mean	Upper Bound	1.16	
		5% Trimmed Mean		.	
		Median		.40	
		Variance		.070	
		Std. Deviation		.265	
		Minimum		0	
		Maximum		1	
		Range		1	

		Interquartile Range		.	
		Skewness		1.458	1.225
		Kurtosis		.	.
	Bioball	Mean		.87	.186
		95% Confidence	Lower Bound	.07	
		Interval for Mean	Upper Bound	1.67	
		5% Trimmed Mean		.	
		Median		1.00	
		Variance		.103	
		Std. Deviation		.321	
		Minimum		1	
		Maximum		1	
		Range		1	
		Interquartile Range		.	
		Skewness		-1.545	1.225
		Kurtosis		.	.
Kepadatan Biofilm	Bunga Pinus	Mean		15.00	6.557
		95% Confidence	-13.21		
		Interval for Mean	43.21		
		5% Trimmed Mean		.	
		Median		10.00	
		Variance		129.000	
		Std. Deviation		11.358	
		Minimum		7	
		Maximum		28	
		Range		21	
		Interquartile Range		.	
		Skewness		1.597	1.225
		Kurtosis		.	.
	Bunga Cemara Angin	Mean		30.33	2.728
		95% Confidence	18.59		
		Interval for Mean	42.07		
		5% Trimmed Mean		.	
		Median		32.00	
		Variance		22.333	
		Std. Deviation		4.726	
		Minimum		25	
		Maximum		34	
		Range		9	
		Interquartile Range		.	
		Skewness		-1.390	1.225
		Kurtosis		.	.
	Bioball	Mean		6.00	5.859

		95% Confidence Interval for Mean	-19.21 31.21		
		5% Trimmed Mean		.	
		Median		4.00	
		Variance		103.000	
		Std. Deviation		10.149	
		Minimum		-3	
		Maximum		17	
		Range		20	
		Interquartile Range		.	
		Skewness		.852	1.225
		Kurtosis		.	.
pH	Bunga Pinus	Mean		5.720	.0451
		95% Confidence Interval for Mean	Lower Bound	5.526	
			Upper Bound	5.914	
		5% Trimmed Mean		.	
		Median		5.680	
		Variance		.006	
		Std. Deviation		.0781	
		Minimum		5.7	
		Maximum		5.8	
		Range		.1	
		Interquartile Range		.	
		Skewness		1.700	1.225
		Kurtosis		.	.
	Bunga Cemara Angin	Mean		5.207	.0437
		95% Confidence Interval for Mean	Lower Bound	5.019	
			Upper Bound	5.395	
		5% Trimmed Mean		.	
		Median		5.240	
		Variance		.006	
		Std. Deviation		.0757	
		Minimum		5.1	
		Maximum		5.3	
		Range		.1	
		Interquartile Range		.	
		Skewness		-1.597	1.225
		Kurtosis		.	.
	Bioball	Mean		5.293	.0590
		95% Confidence Interval for Mean	Lower Bound	5.040	
			Upper Bound	5.547	
		5% Trimmed Mean		.	
		Median		5.250	

		Variance		.010	
		Std. Deviation		.1021	
		Minimum		5.2	
		Maximum		5.4	
		Range		.2	
		Interquartile Range		.	
		Skewness		1.565	1.225
		Kurtosis		.	.
DO	Bunga Pinus	Mean		4.067	.2963
		95% Confidence	Lower Bound	2.792	
		Interval for Mean	Upper Bound	5.341	
		5% Trimmed Mean		.	
		Median		4.200	
		Variance		.263	
		Std. Deviation		.5132	
		Minimum		3.5	
		Maximum		4.5	
		Range		1.0	
		Interquartile Range		.	
		Skewness		-1.090	1.225
		Kurtosis		.	.
	Bioball	Mean		3.933	.1333
		95% Confidence	Lower Bound	3.360	
		Interval for Mean	Upper Bound	4.507	
		5% Trimmed Mean		.	
		Median		3.800	
		Variance		.053	
		Std. Deviation		.2309	
		Minimum		3.8	
		Maximum		4.2	
		Range		.4	
		Interquartile Range		.	
		Skewness		1.732	1.225
		Kurtosis		.	.

a. Sintasan is constant when Perlakuan = Bunga Cemara Angin. It has been omitted.

b. DO is constant when Perlakuan = Bunga Cemara Angin. It has been omitted.

c. Suhu is constant when Perlakuan = Bunga Pinus. It has been omitted.

d. Suhu is constant when Perlakuan = Bunga Cemara Angin. It has been omitted.

e. Suhu is constant when Perlakuan = Bioball. It has been omitted.

Lampiran 3 Uji Normalitas

Tests of Normality[b,c,d,e,f]

Parameter	Perlakuan	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
		Statistic	df	Sig.	Statistic	df	Sig.
Amoniak (NH3)	Bunga Pinus	.222	3	.	.985	3	.769
	Bunga Cemara Angin	.385	3	.	.750	3	.000
	Bioball	.303	3	.	.908	3	.413
Nitrit (NO2)	Bunga Pinus	.369	3	.	.787	3	.085
	Bunga Cemara Angin	.365	3	.	.797	3	.107
	Bioball	.309	3	.	.900	3	.386
Nitrat (NO3)	Bunga Pinus	.381	3	.	.758	3	.019
	Bunga Cemara Angin	.374	3	.	.776	3	.059
	Bioball	.229	3	.	.982	3	.741
Sintasan	Bunga Pinus	.385	3	.	.750	3	.000
	Bioball	.385	3	.	.750	3	.000
Panhjang mutlak	Bunga Pinus	.238	3	.	.976	3	.702
	Bunga Cemara Angin	.314	3	.	.893	3	.363
	Bioball	.328	3	.	.871	3	.298
Kepadatan Biofilm	Bunga Pinus	.337	3	.	.855	3	.253
	Bunga Cemara Angin	.304	3	.	.907	3	.407
	Bioball	.245	3	.	.971	3	.672
pH	Bunga Pinus	.362	3	.	.803	3	.122
	Bunga Cemara Angin	.337	3	.	.855	3	.253
	Bioball	.331	3	.	.865	3	.281
DO	Bunga Pinus	.269	3	.	.949	3	.567
	Bioball	.385	3	.	.750	3	.000

a. Lilliefors Significance Correction

b. Sintasan is constant when Perlakuan = Bunga Cemara Angin. It has been omitted.

c. DO is constant when Perlakuan = Bunga Cemara Angin. It has been omitted.

d. Suhu is constant when Perlakuan = Bunga Pinus. It has been omitted.

e. Suhu is constant when Perlakuan = Bunga Cemara Angin. It has been omitted.

f. Suhu is constant when Perlakuan = Bioball. It has been omitted.

Lampiran 4 Analisis Ragam parameter penelitian

ANOVA

Parameter	Perlakuan	Sum of Squares	df	Mean Square	F	Sig.
Amoniak (NH3)	Between Groups	0.007	2	0.003	12.018	0.008
	Within Groups	0.002	6	0		
	Total	0.008	8			
Nitrit (NO2)	Between Groups	0.18	2	0.09	7.224	0.025
	Within Groups	0.075	6	0.012		
	Total	0.255	8			
Nitrat (NO3)	Between Groups	0.068	2	0.034	0.378	0.701
	Within Groups	0.541	6	0.09		
	Total	0.609	8			
Sintasan	Between Groups	0.047	2	0.023	4.2	0.072
	Within Groups	0.033	6	0.006		
	Total	0.08	8			
Panhjang mutlak	Between Groups	0.202	2	0.101	0.628	0.566
	Within Groups	0.967	6	0.161		
	Total	1.169	8			
Kepadatan Biofilm	Between Groups	908.222	2	454.111	5.356	0.046
	Within Groups	508.667	6	84.778		
	Total	1416.889	8			

Lampiran 5 Uji lanjut tukey

Multiple Comparisons

Tukey HSD

Dependent Variable	(I) Perlakuan	(J) Perlakuan	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval Lower Bound	95% Confidence Interval Upper Bound
Amoniak (NH3)	Bunga Pinus	Bunga Cemara Angin	-.052000*	.013433	.019	-.09322	-.01078
		Bioball	-.061000*	.013433	.009	-.10222	-.01978
	Bunga Cemara Angin	Bunga Pinus	.052000*	.013433	.019	.01078	.09322
		Bioball	-.009000	.013433	.789	-.05022	.03222
	Bioball	Bunga Pinus	.061000*	.013433	.009	.01978	.10222
		Bunga Cemara Angin	.009000	.013433	.789	-.03222	.05022
Nitrit (NO2)	Bunga Pinus	Bunga Cemara Angin	-.325667*	.091089	.027	-.60515	-.04618
		Bioball	-.264667	.091089	.061	-.54415	.01482
	Bunga Cemara Angin	Bunga Pinus	.325667*	.091089	.027	.04618	.60515
		Bioball	.061000	.091089	.789	-.21849	.34049
	Bioball	Bunga Pinus	.264667	.091089	.061	-.01482	.54415
		Bunga Cemara Angin	-.061000	.091089	.789	-.34049	.21849
Nitrat (NO3)	Bunga Pinus	Bunga Cemara Angin	.202000	.245204	.703	-.55035	.95435
		Bioball	.160000	.245204	.798	-.59235	.91235
	Bunga Cemara Angin	Bunga Pinus	-.202000	.245204	.703	-.95435	.55035
		Bioball	-.042000	.245204	.984	-.79435	.71035
	Bioball	Bunga Pinus	-.160000	.245204	.798	-.91235	.59235
		Bunga Cemara Angin	.042000	.245204	.984	-.71035	.79435
Sintasan	Bunga Pinus	Bunga Cemara Angin	-.0333	.0609	.851	-.220	.153
		Bioball	.1333	.0609	.151	-.053	.320
	Bunga Cemara Angin	Bunga Pinus	.0333	.0609	.851	-.153	.220
		Bioball	.1667	.0609	.075	-.020	.353
	Bioball	Bunga Pinus	-.1333	.0609	.151	-.320	.053
		Bunga Cemara Angin	-.1667	.0609	.075	-.353	.020
Panjang mutlak	Bunga Pinus	Bunga Cemara Angin	.200	.328	.820	-.81	1.21
		Bioball	-.167	.328	.870	-1.17	.84
	Bunga Cemara Angin	Bunga Pinus	-.200	.328	.820	-1.21	.81
		Bioball	-.367	.328	.538	-1.37	.64
	Bioball	Bunga Pinus	.167	.328	.870	-.84	1.17
		Bunga Cemara Angin	.367	.328	.538	-.64	1.37
Kepadatan Biofilm	Bunga Pinus	Bunga Cemara Angin	-15.333	7.518	.184	-38.40	7.73
		Bioball	9.000	7.518	.497	-14.07	32.07
	Bunga Cemara Angin	Bunga Pinus	15.333	7.518	.184	-7.73	38.40
		Bioball	24.333*	7.518	.041	1.27	47.40
	Bioball	Bunga Pinus	-9.000	7.518	.497	-32.07	14.07
		Bunga Cemara Angin	-24.333*	7.518	.041	-47.40	-1.27