LAMPIRAN-LAMPIRAN

Lampiran 1. Surat permohonan penelitian

KEMENTERIAN PENDIDIKAN TINGGI, SAINS DAN TEKNOLOGI
UNIVERSITAS PENDIDIKAN GANESHA
FAKULTAS MATEMATIKA DAN ILMU PENGETAHUAN ALAM
JURUSAN BIOLOGI DAN PERIKANAN KELAUTAN
Alamat : Jl. Udayana No. 11 Singaraja –Bali, Telp (0362) 25335, Kode Pos 81116

Nomor : 254/UN48.9.3/TU/2025 Singaraja, 26 Mei 2025
Lampiran : -
Perihal : Surat Permintaan Benih Ikan dan Pemimjaman tempat

Kepada
Yth. Kepala Dinas Ketahanan Pangan dan Perikanan
Kabupaten Buleleng
Di
Tempat

Dengan hormat, dalam rangka pelaksanaan penelitian mahasiswa Prodi D4 Bioteknologi Perikanan Jurusan Biologi dan Perikanan Kelautan FMIPA Universitas Pendidikan Ganesha, maka kami mohon bantuan untuk sekiranya mahasiswa kami dapat melaksanakan penelitian. Adapun data lengkap mahasiswa sebagai berikut :

Nama : Gusti Ayu Intan Pratiwi
NIM : 2353027003
Judul Penelitian : Optimasi Pertumbuhan Benih Ikan Nila (*Oreochromis Niloticus*) Melalui Aplikasi Probiotik *Lactobacillus* sp Dalam Pakan
Data Yang Diambil : Kualitas Air, Pertumbuhan Panjang damn Bobot Benih Ikan Nila

Demikian surat ini disampaikan, atas perkenan dan kerjasamanya diucapkan terima kasih.

Ketua Jurusan Biologi dan Perikanan Kelautan,

Dr. Gede Ari Yudasmara, S.Si., M.Si
NIP. 197904142002121002

Tembusan:
1. Arsip

Lampiran 2. Data Panjang Benih Ikan Nila

- Hari/ Tgl : Rabu, 11 Juni 2025
- Sampling : Panjang Awal

SAMPLING PANJANG AWAL (cm)						
Data Ikan	**Kontrol**			**Perlakuan**		
	U1	**U2**	**U3**	**U1**	**U2**	**U3**
1	10	10.2	10	10	10	10
2	10.2	10	10	10	10.2	10
3	10	10	10	10	10	10
4	10	10	10	10.2	10	10
5	10	10	10	10	10	10.2
6	10	10	10	10	10	10.2
7	10.2	10	10	10	10	10
8	10	10.2	10	10.2	10.2	10
9	10	10	10	10	10	10
10	10.2	10.2	10	10	10	10.2
11	10	10	10.2	10	10.2	10
12	10	10	10.2	10	10	10
13	10	10	10	10.2	10	10
14	10	10	10	10	10	10
15	10	10	10	10	10	10
Rata-rata	**10**	**10**	**10**	**10**	**10**	**10**
Rerata		**10**			**10**	

- Hari/Tgl : Rabu, 18 Juni 2025
- Sampling : Panjang Minggu ke – I

SAMPLING PANJANG MINGGU KE I						
Data Ikan	**Kontol**			**Perlakuan**		
	U1	**U2**	**U3**	**U1**	**U2**	**U3**
1	10.5	10.2	10.5	11.4	11.6	11.5
2	11	10.8	11.4	11.5	11.1	10.9
3	10.2	11	10.5	11.1	10.5	11
4	11.5	11	11	11.5	11	11.2
5	10.5	10.2	11.2	10.8	11	11.2
6	11	11.5	10.5	10.5	11.5	11
7	10.5	10.2	10.2	11.8	11.8	10.5
8	10.5	10.5	10.2	11	11.2	11
9	10.5	10.5	10.4	11.3	10.5	11
10	10.5	10.8	10.2	10.5	10.5	11
11	10.8	10.9	11	11.2	11	11.2
12	10.3	10.8	11	10.7	10.7	10.5
13	10.8	10.2	10.2	10.6	11	11.5
14	10.5	10.9	11	11	11.5	10.5
15	10.5	10.5	10.5	10.5	11	11
Rata-rata	**10.6**	**10.7**	**10.7**	**11.03**	**11.06**	**11**
Rerata		**10.7**			**11**	

- Hari/Tgl : Rabu, 25 Juni 2025
- Sampling : Panjang Minggu ke – II

SAMPLING PANJANG MINGGU KE II						
Data Ikan	**Kontol**			**Perlakuan**		
	U1	**U2**	**U3**	**U1**	**U2**	**U3**
1	10.8	10.5	10.6	11.6	11.7	12.1
2	11	10.5	10.7	11.8	11.5	11.8
3	10.6	10.5	11	11.9	11.8	11.8
4	11	10.9	11.2	11.5	11.5	12
5	10.5	10.7	11.2	11.2	12	11.3
6	11.1	11	11	12.3	11.5	11.6
7	11	11	10.6	11.3	11.3	12
8	10.2	11.5	11.2	12	11	11.6
9	10.5	10.4	11	12.1	12.5	11.5
10	10.6	11.4	10.8	12	12.3	11.5
11	10.9	10.8	10.9	11.2	11.8	11.5
12	11.3	10.6	10.5	11.5	12	11.5
13	10.6	11	10.5	11.5	11.6	11.3
14	11.5	11.4	11.5	11.8	11.2	11
15	11.1	11.5	11.3	11.3	11.7	11.5
Rata-rata	**10.8**	**10.9**	**10.9**	**11.7**	**11.7**	**11.6**
Rerata	**10.9**			**11.7**		

- Hari/Tgl : Rabu, 2 Juli 2025
- Sampling : Panjang Minggu ke – III

SAMPLING PANJANG MINGGU KE III						
Data Ikan	**Kontol**			**Perlakuan**		
	U1	**U2**	**U3**	**U1**	**U2**	**U3**
1	11	11	10.6	12	12.5	12.8
2	11.5	11.5	11.5	12	13.5	12.5
3	11.5	12	12	12.2	12.5	12
4	11.2	11.8	11.4	13	12.5	12
5	11.2	10.9	11	12.7	13.2	12.5
6	10.8	11	12	11.5	12.5	12.1
7	11	11.1	11	12.5	12.6	12.4
8	12	11.5	11.1	13.1	12.4	12.1
9	11.5	11	12.5	12.1	12	12.3
10	11	11.5	11	12	12.4	12
11	11.5	11	11.5	12.6	12	12.3
12	11.2	11	12.1	13	12	11.9
13	11	11.5	11.2	12	12.2	12
14	10.9	12	11.2	12	12.2	12
15	11	11.5	11.5	12.4	12.5	12
Rata-rata	**11.2**	**11.4**	**11.4**	**12.3**	**12.5**	**12.2**
Rerata	**11.3**			**12.3**		

- Hari/Tgl : Rabu, 9 Juli 2025
- Sampling : Panjang Akhir

SAMPLING PANJANG AKHIR						
Data Ikan	**Kontol**			**Perlakuan**		
	U1	**U2**	**U3**	**U1**	**U2**	**U3**
1	12	11.9	11.8	13.3	13.2	13
2	11.7	11.8	12.5	13.5	13	13.2
3	12.5	11.9	12	13.4	12.5	13.5
4	12	11.7	12.5	12.9	13.5	12.5
5	12	11.5	12.6	13.2	13	13.4
6	13	11.8	12	13.2	13	13.5
7	11.5	12	12.5	12.8	13.5	13
8	11.7	12	12.7	13	14	12.5
9	11.7	14	11.5	12.5	13.5	13
10	12	12.5	12	13	13	12.5
11	12.5	13	11.8	12.7	13	13.5
12	11.7	12.4	11.8	12.7	13.3	12.8
13	11.5	12	12	12.6	13.5	12.9
14	12	11.5	12	13	13	12.7
15	11.5	11.9	12.2	13.2	12.5	12.9
Rata-rata	**12.0**	**12.1**	**12.1**	**13**	**13.2**	**13**
Rerata	**12.07**			**13.1**		

Lampiran 3. Data Panjang Mutlak Benih Ikan Nila

Data Ikan	Panjang Mutlak Kontrol			Panjang Mutlak Perlakuan		
	Panjang Awal	Panjang Akhir	Lt-Lo	Panjang Awal	Panjang Akhir	Lt-Lo
1	10.1	11.9	1.8	10	13.2	3.17
2	10.1	12	1.9	10.1	13.2	3.17
3	10	12.1	2.1	10	13.1	3.13
4	10	12.1	2.1	10.1	13	2.90
5	10	12	2.0	10.1	13.2	3.13
6	10	12.3	2.3	10.1	13.2	3.17
7	10.1	12	1.9	10	13.1	3.10
8	10.1	12.1	2.1	10	13.2	3.03
9	10	12.4	2.4	10	13	3.00
10	10.1	12.2	2.0	10	12.8	2.77
11	10.1	12.4	2.4	10	13.1	3.00
12	10.1	12.0	1.9	10	12.9	2.93
13	10	11.8	1.8	10.1	13	2.93
14	10	11.8	1.8	10	12.9	2.90
15	10	11.9	1.9	10	12.9	2.87
Rerata	**10**	**12.07**	**2.03 cm**	**10**	**13.1**	**3.01 cm**

Lampiran 4. Uji Statistik Panjang Mutlak Benih Ikan Nila

- **Uji Normalitas (*Shapiro-Wilk*)**

Tests of Normality

		Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	KELOMPOK	Statistic	df	Sig.	Statistic	df	Sig.
PANJANG MUTLAK	Kontrol	.172	15	.200*	.889	15	.064
	Perlakuan	.153	15	.200*	.923	15	.214

- **Uji Homogenitas (*Levene*)**

Test of Homogeneity of Variance

		Levene Statistic	df1	df2	Sig.
PANJANG MUTLAK	Based on Mean	1.536	1	28	.225
	Based on Median	1.510	1	28	.229
	Based on Median and with adjusted df	1.510	1	22.542	.232
	Based on trimmed mean	1.498	1	28	.231

- **Uji T (*independent sample t-test*)**

Group Statistics

	KELOMPOK	N	Mean	Std. Deviation	Std. Error Mean
PANJANG MUTLAK	Kontrol	15	2.03	.190	.049
	Perlakuan	15	3.01	.128	.033

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means
		F	Sig.	T
PANJANG MUTLAK	Equal variances assumed	1.536	.225	-16.587
	Equal variances not assumed			-16.587

Independent Samples Test

		t-test for Equality of Means		
		df	Sig. (2-tailed)	Mean Difference
PANJANG MUTLAK	Equal variances assumed	28	.000	-.981
	Equal variances not assumed	24.502	.000	-.981

Independent Samples Test

		t-test for Equality of Means		
		Std. Error Difference	95% Confidence Interval of the Difference	
			Lower	Upper
PANJANG MUTLAK	Equal variances assumed	.059	-1.102	-.860
	Equal variances not assumed	.059	-1.103	-.859

Lampiran 5. Data Berat Benih Ikan Nila

- Hari/Tgl : Rabu, 11 Juni 2025
- Sampling : Berat Awal

SAMPLING BERAT AWAL (gram)						
Data Ikan	**Kontrol**			**Perlakuan**		
	U1	**U2**	**U3**	**U1**	**U2**	**U3**
1	16	19	17	18	18	17
2	17	17	17	17	19	16
3	17	17	16	17	17	17
4	19	17	17	18	17	17
5	17	17	17	17	18	18
6	17	17	17	17	16	18
7	18	18	17	17	17	16
8	18	19	16	19	18	17
9	17	16	17	16	17	17
10	18	18	16	17	17	19
11	17	16	18	17	18	16
12	17	17	19	16	17	16
13	17	17	17	18	17	17
14	17	18	17	17	17	17
15	17	17	17	17	16	17
Rata-rata	**17.3**	**17.3**	**17**	**17.2**	**17.3**	**17**
Rerata	**17.2 gram**			**17.2 gram**		

- Hari/Tgl : Rabu, 18 Juni 2025
- Sampling : Berat Minggu ke – I

SAMPLING BERAT MINGGU KE – I						
Data Ikan	**Kontrol**			**Perlakuan**		
	U1	**U2**	**U3**	**U1**	**U2**	**U3**
1	22	18	19	22	23	23
2	18	20	21	24	22	22
3	17	19	21	19	19	20
4	19	19	19	19	20	22
5	18	18	20	25	21	21
6	21	22	21	19	24	22
7	18	17	18	25	25	19
8	19	19	17	21	21	22
9	19	20	22	22	19	20
10	18	19	19	21	19	22
11	19	20	18	23	22	21
12	21	22	21	20	20	19
13	22	21	18	21	22	24
14	20	18	22	21	25	19
15	19	22	19	19	20	22
Rata-rata	**19.3**	**19.6**	**19.7**	**21.4**	**21.5**	**21.2**
Rerata	**19.5 gram**			**21.4 gram**		

- Hari/Tgl : Rabu, 25 Juni 2025
- Sampling : Berat Minggu ke – II

SAMPLING BERAT MINGGU KE – II						
Data Ikan	**Kontrol**			**Perlakuan**		
	U1	**U2**	**U3**	**U1**	**U2**	**U3**
1	19	20	19	26	24	31
2	22	20	20	26	23	29
3	18	23	19	27	27	28
4	21	23	20	23	25	28
5	20	23	20	24	27	22
6	22	21	23	31	23	26
7	23	19	24	23	24	27
8	18	22	25	29	22	27
9	20	21	18	28	33	21
10	20	21	25	30	33	27
11	20	20	23	24	25	24
12	24	19	18	25	30	24
13	20	19	21	25	27	25
14	24	23	24	28	23	21
15	23	23	24	23	26	23
Rata-rata	**20.9**	**21.1**	**21.5**	**26.1**	**26.1**	**25.5**
Rerata	**21.2 gram**			**26 gram**		

- Hari/Tgl : Rabu, 2 Juli 2025
- Sampling : Berat Minggu ke – III

SAMPLING BERAT MINGGU KE – III						
Data Ikan	**Kontrol**			**Perlakuan**		
	U1	**U2**	**U3**	**U1**	**U2**	**U3**
1	23	22	24	28	34	37
2	24	25	26	30	40	40
3	25	27	25	30	35	39
4	27	26	25	34	36	34
5	26	24	25	34	39	35
6	22	23	23	27	35	30
7	25	29	24	35	35	32
8	25	25	29	39	33	29
9	24	28	27	32	30	33
10	23	26	26	32	31	30
11	25	23	23	30	32	29
12	26	23	27	29	31	29
13	24	24	22	33	36	29
14	25	27	30	32	29	28
15	29	26	25	35	31	28
Rata-rata	**24.9**	**25.2**	**25.4**	**32.0**	**33.8**	**32.1**
Rerata	**25.2 gram**			**32.6 gram**		

- Hari/Tgl : Rabu, 9 Juli 2025
- Sampling : Berat Akhir

SAMPLING BERAT AKHIR						
Data Ikan	**Kontrol**			**Perlakuan**		
	U1	**U2**	**U3**	**U1**	**U2**	**U3**
1	26	29	28	34	37	33
2	27	28	26	36	38	37
3	26	27	29	39	40	38
4	33	28	27	36	36	35
5	32	29	31	36	39	38
6	35	27	29	38	39	40
7	33	31	32	37	39	38
8	29	30	30	34	38	39
9	30	32	29	36	35	38
10	30	29	30	39	34	37
11	30	29	32	35	41	32
12	27	30	32	36	34	39
13	30	29	28	37	47	34
14	26	30	36	38	37	36
15	27	28	27	40	36	45
Rata-rata	**29.4**	**29.1**	**29.7**	**36.7**	**38**	**37.3**
Rerata	**29.4 gram**			**37.3 gram**		

Lampiran 6. Data Berat mutlakBenih Ikan Nila

Data Ikan	Berat mutlak Kontrol			Berat mutlak Perlakuan		
	Berat Awal	Berat Akhir	Wt-Wo	Berat Awal	Berat Akhir	Wt-Wo
1	17.3	27.7	10.3	17.7	34.7	17
2	17	27	10	17.3	37	19.7
3	16.7	27.3	10.7	17	39	22
4	17.7	29.3	11.7	17.3	35.7	18.3
5	17	30.7	13.7	17.7	37.7	20
6	17	30.3	13.3	17	39	22
7	17.7	32	14.3	16.7	38	21.3
8	17.7	29.7	12	18	37	19
9	16.7	30.3	13.7	16.7	36.3	19.7
10	17.3	29.7	12.3	17.7	36.7	19
11	17	30.3	13.3	17	36	19
12	17.7	29.7	12	16.3	36.3	20
13	17	29	12	17.3	39.3	22
14	17.3	30.7	13.3	17	37	20
15	17	27.3	10.3	16.7	40.3	23.7
Rata-rata	**17.2 g**	**29.4 g**	**12.2 g**	**17.2 g**	**37.3 g**	**20.2 g**

Lampiran 7. Uji Statistik Berat Mutlak Benih Ikan Nila

- **Uji Normalitas (*Shapiro-Wilk*)**

Tests of Normality

	KELOMPOK	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
		Statistic	Df	Sig.	Statistic	Df	Sig.
BERAT MUTLAK	Kontrol	.186	15	.171	.925	15	.230
	Perlakuan	.208	15	.080	.957	15	.636

- **Uji Homogenitas (*Levene*)**

Test of Homogeneity of Variance

		Levene Statistic	df1	df2	Sig.
BERAT MUTLAK	Based on Mean	.400	1	28	.532
	Based on Median	.204	1	28	.655
	Based on Median and with adjusted df	.204	1	25.155	.655
	Based on trimmed mean	.371	1	28	.547

- **Uji T (*Independent sample t-test*)**

Group Statistics

	KELOMPOK	N	Mean	Std. Deviation	Std. Error Mean
BERAT MUTLAK	Kontrol	15	12.19	1.395	.360
	Perlakuan	15	20.18	1.731	.447

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means	
		F	Sig.	T	Df
BERAT MUTLAK	Equal variances assumed	.400	.532	-13.914	28
	Equal variances not assumed			-13.914	26.785

Independent Samples Test

		t-test for Equality of Means		
		Sig. (2-tailed)	Mean Difference	Std. Error Difference
BERAT MUTLAK	Equal variances assumed	.000	-7.987	.574
	Equal variances not assumed	.000	-7.987	.574

Independent Samples Test

		t-test for Equality of Means	
		95% Confidence Interval of the Difference	
		Lower	Upper
BERAT MUTLAK	Equal variances assumed	-9.162	-6.811
	Equal variances not assumed	-9.165	-6.808

Lampiran 8. Data Laju Pertumbuhan Spesifik Benih Ikan Nila

LAJU PERTUMBUHAN SPESIFIK BENIH IKAN NILA						
Data Ikan	**Kontrol**			**Perlakuan**		
	Berat Awal	**Berat Akhir**	**SGR (%)**	**Berat Awal**	**Berat Akhir**	**SGR (%)**
1	17.3	27.7	1.7	17.7	34.7	2.4
2	17	27	1.7	17.3	37	2.7
3	16.7	27.3	1.8	17	39	3.0
4	17.7	29.3	1.8	17.3	35.7	2.6
5	17	30.7	2.1	17.7	37.7	2.7
6	17	30.3	2.1	17	39	3.0
7	17.7	32	2.1	16.7	38	2.9
8	17.7	29.7	1.9	18	37	2.6
9	16.7	30.3	2.1	16.7	36.3	2.8
10	17.3	29.7	1.9	17.7	36.7	2.6
11	17	30.3	2.1	17	36	2.7
12	17.7	29.7	1.9	16.3	36.3	2.9
13	17	29	1.9	17.3	39.3	2.9
14	17.3	30.7	2.0	17	37	2.8
15	17	27.3	1.7	16.7	40.3	3.2
Rata-Rata	**Kontrol**		1.9%	**Perlakuan**		2.8%

Lampiran 9. Uji Statistik Laju Pertumbuhan Spesifik Benih Ikan Nila

- **Uji Normalitas (*Shapiro – Wilk*)**

Tests of Normality

		Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	KELOMPOK	Statistic	Df	Sig.	Statistic	df	Sig.
LAJU PERTUMBUHAN SPESIFIK (%)	Kontrol	.170	15	.200*	.918	15	.183
	Perlakuan	.113	15	.200*	.979	15	.961

- **Uji Homogenitas (*Levene*)**

Test of Homogeneity of Variance

		Levene Statistic	df1	df2	Sig.
LAJU PERTUMBUHAN SPESIFIK (%)	Based on Mean	.107	1	28	.746
	Based on Median	.108	1	28	.745
	Based on Median and with adjusted df	.108	1	26.009	.745
	Based on trimmed mean	.106	1	28	.747

- **Uji T (*Independent sample t-test*)**

Group Statistics

	KELOMPOK	N	Mean	Std. Deviation	Std. Error Mean
LAJU PERTUMBUHAN SPESIFIK (%)	Kontrol	15	1.91	.171	.044
	Perlakuan	15	2.78	.196	.051

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means		
		F	Sig.	t	df	Sig. (2-tailed)
LAJU PERTUMBUHAN SPESIFIK (%)	Equal variances assumed	.107	.746	-12.874	28	.000
	Equal variances not assumed			-12.874	27.497	.000

Independent Samples Test

		t-test for Equality of Means			
		Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
				Lower	Upper
LAJU PERTUMBUHAN SPESIFIK (%)	Equal variances assumed	-.864	.067	-1.002	-.727
	Equal variances not assumed	-.864	.067	-1.002	-.727

Lampiran 10. Data Mortalitas Benih Ikan Nila

Tgl	DOC	Kontrol (Pakan tanpa Probiotik)			Perlakuan (Pakan + Probiotik)		
		U1	U2	U3	U1	U2	U3
11/06/2025	0	0	0	0	0	0	0
12/06/2025	1	0	0	0	0	0	0
13/06/2025	2	0	0	0	0	0	0
14/06/2025	3	0	0	0	0	0	0
15/06/2025	4	0	0	0	0	0	0
16/06/2025	5	0	0	0	0	0	0
17/06/2025	6	0	0	0	0	0	0
18/06/2025	7	0	0	0	0	0	0
19/06/2025	8	0	0	0	0	0	0
20/06/2025	9	0	0	0	0	0	0
21/06/2025	10	0	0	0	0	0	0
22/06/2025	11	0	0	0	0	0	0
23/06/2025	12	0	0	0	0	0	0
24/06/2025	13	0	0	0	0	0	0
25/06/2025	14	0	0	0	0	0	0
26/06/2025	15	0	0	0	0	0	0
27/06/2025	16	0	0	0	0	0	0
28/06/2025	17	0	1	0	0	0	0
29/06/2025	18	0	0	0	0	0	0
30/06/2025	19	1	0	1	0	0	0
01/07/2025	20	0	0	0	0	0	0
02/07/2025	21	0	0	0	0	0	0
03/07/2025	22	0	0	0	0	0	0
04/07/2025	23	0	0	0	0	0	0
05/07/2025	24	0	0	0	0	0	0
06/07/2025	25	0	0	0	0	0	0
07/07/2025	26	0	0	0	0	0	0
08/07/2025	27	0	0	0	0	0	0
09/07/2025	28	0	0	0	0	0	0
Jumlah ikan tebar		**90**			**90**		
Total Mortalitas		**3**			**0**		
Jumlah ikan panen		**87**			**90**		
Survival Rate		**96.7%**			**100%**		

Lampiran 11. Uji Statistik Kelulushidupan (*survival rate*) Benih Ikan Nila

- **Uji Normalitas (*Shapiro-Wilk*)**

Tests of Normality

		Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	KELOMPOK	Statistic	Df	Sig.	Statistic	df	Sig.
SURVIVAL RATE (%)	Kontrol	.357	28	.000	.674	28	.000
	Perlakuan	.	28	.	.	28	.

Sig 0.000<0,05 (Data tidak terdistribusi secara normal)

- **Uji Homogenitas (*Levene)***

Test of Homogeneity of Variance

		Levene Statistic	df1	df2	Sig.
SURVIVAL RATE (%)	Based on Mean	183.419	1	54	.000
	Based on Median	17.591	1	54	.000
	Based on Median and with adjusted df	17.591	1	27.000	.000
	Based on trimmed mean	157.835	1	54	.000

Sig 0.000<0,05 (Data tidak homogen)

- **Uji Mann-Whitney**

Test Statistics[a]

	SURVIVAL RATE (%)
Mann-Whitney U	224.000
Wilcoxon W	630.000
Z	-3.852
Asymp. Sig. (2-tailed)	.000

P-value sig. (2-tailed) 0.000<0.05 (terdapat perbedaan yang signifikan)

Lampiran 12. Data Pemberian Pakan Harian Benih Ikan Nila

- **Data Pemberian Pakan Harian Kontrol (Pakan tanpa probiotik)**

Tgl	DOC	Mortalitas Benih Ikan Perhari	Jumlah Benih (ekor)	Berat Rata-rata Benih	Biomassa	FR	Jumlah Pakan Harian (gram)
11/06/2025	0	0	90	17.2	1548	0	0
12/06/2025	1	0	90	17.2	1548	5%	77
13/06/2025	2	0	90	17.2	1548	5%	77
14/06/2025	3	0	90	17.2	1548	5%	77
15/06/2025	4	0	90	17.2	1548	5%	77
16/06/2025	5	0	90	17.2	1548	5%	77
17/06/2025	6	0	90	17.2	1548	5%	77
18/06/2025	7	0	90	19.5	1755	5%	88
19/06/2025	8	0	90	19.5	1755	5%	88
20/06/2025	9	0	90	19.5	1755	5%	88
21/06/2025	10	0	90	19.5	1755	5%	88
22/06/2025	11	0	90	19.5	1755	5%	88
23/06/2025	12	0	90	19.5	1755	5%	88
24/06/2025	13	0	90	19.5	1755	5%	88
25/06/2025	14	0	90	21.2	1908	5%	95
26/06/2025	15	0	90	21.2	1908	5%	95
27/06/2025	16	0	90	21.2	1908	5%	95
28/06/2025	17	1	89	21.2	1887	5%	94
29/06/2025	18	0	89	21.2	1887	5%	94
30/06/2025	19	2	87	21.2	1844	5%	92
01/07/2025	20	0	87	21.2	1844	5%	92
02/07/2025	21	0	87	25.2	2192	5%	105
03/07/2025	22	0	87	25.2	2192	5%	105
04/07/2025	23	0	87	25.2	2192	5%	105
05/07/2025	24	0	87	25.2	2192	5%	105
06/07/2025	25	0	87	25.2	2192	5%	105
07/07/2025	26	0	87	25.2	2192	5%	105
08/07/2025	27	0	87	25.2	2192	5%	105
09/07/2025	28	0	87	29.4	2558	5%	SAMPLING AKHIR
Total Pakan							**2475**
Total Biomassa (Wt-W0)							**2558**
FCR							**1**

- **Data Pemberian Pakan Harian Perlakuan (Pakan + Probiotik)**

Tgl	DOC	Mortalitas Benih Ikan Perhari	Jumlah Benih (ekor)	Berat Rata-rata Benih (gram)	Biomassa	FR	Jumlah Pakan Harian (gram)
11/06/2025	0	0	90	17.2	1548	0	0
12/06/2025	1	0	90	17.2	1548	5%	77
13/06/2025	2	0	90	17.2	1548	5%	77
14/06/2025	3	0	90	17.2	1548	5%	77
15/06/2025	4	0	90	17.2	1548	5%	77
16/06/2025	5	0	90	17.2	1548	5%	77
17/06/2025	6	0	90	17.2	1548	5%	77
18/06/2025	7	0	90	21.4	1926	5%	83
19/06/2025	8	0	90	21.4	1926	5%	83
20/06/2025	9	0	90	21.4	1926	5%	83
21/06/2025	10	0	90	21.4	1926	5%	83
22/06/2025	11	0	90	21.4	1926	5%	83
23/06/2025	12	0	90	21.4	1926	5%	83
24/06/2025	13	0	90	21.4	1926	5%	83
25/06/2025	14	0	90	26	2340	5%	91
26/06/2025	15	0	90	26	2340	5%	91
27/06/2025	16	0	90	26	2340	5%	91
28/06/2025	17	0	90	26	2340	5%	91
29/06/2025	18	0	90	26	2340	5%	91
30/06/2025	19	0	90	26	2340	5%	91
01/07/2025	20	0	90	26	2340	5%	91
02/07/2025	21	0	90	32.6	2934	5%	97
03/07/2025	22	0	90	32.6	2934	5%	97
04/07/2025	23	0	90	32.6	2934	5%	97
05/07/2025	24	0	90	32.6	2934	5%	97
06/07/2025	25	0	90	32.6	2934	5%	97
07/07/2025	26	0	90	32.6	2934	5%	97
08/07/2025	27	0	90	32.6	2934	5%	97
09/07/2025	28	0	90	37.3	3357	5%	SAMPLING AKHIR
Total Pakan							**2361**
Total Biomassa (Wt-W0)							**3357**
FCR							**0.7**

Lampiran 13. Data Kualitas Air Benih Ikan Nila

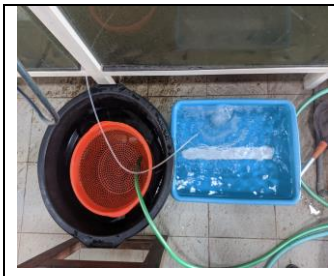
- Data Kualitas air kelompok Kontrol

Tgl	DOC	Waktu	KONTROL								
			DO (mg/L)			pH			Suhu (^{0}C)		
			U1	U2	U3	U1	U2	U3	U1	U2	U3
11/06/2025	0	Pagi	8.5	8.5	8.5	8	8	8	24	24	24
12/06/2025	1	Pagi	7.4	7.5	7.5	7.8	7.7	7.8	27	26.9	27
		Siang	7	7.3	7.2	7.7	7.6	7.7	27.5	27.6	27.8
13/06/2025	2	Pagi	6.9	7.2	7.2	7.6	7.6	7.7	27	27.1	27.3
		Siang	6.5	6.9	6.9	7.3	7.2	7.4	28	28	28
14/06/2025	3	Pagi	6	6.5	6.2	7	7.1	6.9	27.2	27	27.1
		Siang	7.3	7	7.9	8.1	8.1	8	28	28.3	28.1
15/06/2025	4	Pagi	7.1	6.9	7.6	7.9	7.9	7.9	27.6	27.3	27.1
		Siang	7.2	7.3	7.6	8	8.1	8.2	28	28.1	28
16/06/2025	5	Pagi	6.9	6.9	7.6	7.9	7.8	7.9	27.6	27.3	27.1
		Siang	7.5	7.7	7.6	8.2	8	8.2	28.1	28	28.2
17/06/2025	6	Pagi	6.9	7.2	7.2	7.6	7.6	7.7	27	27.1	27.3
		Siang	6.5	6.9	6.9	7.3	7.2	7.4	28	28.1	28.1
18/06/2025	7	Pagi	6	6.3	6.1	7.6	7.6	7.7	27	27.1	27.3
		Siang	7.9	7.8	7.8	8.1	7.9	7.8	28	28	28
19/06/2025	8	Pagi	7.6	7.5	7	8	7.7	7.6	27	26.9	27
		Siang	7.9	7.8	8	8.1	7.9	7.8	28	28	28
20/06/2025	9	Pagi	7.4	7.5	7.5	7	7.1	7.2	27.6	27.3	27.1
		Siang	7	7.3	7.2	7.8	7.6	7.7	28	27.6	27.8
21/06/2025	10	Pagi	6.9	6.9	7.6	7	6.9	7	27.6	27.3	27.1
		Siang	7.5	7.7	7.6	7.5	7.4	7.6	28	27.9	28
22/06/2025	11	Pagi	6.5	7	7	6.9	7	7.3	27.2	27.3	27.1
		Siang	7.7	7.5	7.8	7.4	7.9	7.9	28	28	28
23/06/2025	12	Pagi	6.7	6.8	6.8	7	7	7	27.8	27.7	27.2
		Siang	6.4	6.3	6.3	7.2	7.1	7.3	28.5	28.3	28.2
24/06/2025	13	Pagi	7	6	6	6.8	6.7	7.2	27	27.6	27
		Siang	6.5	6.6	6.7	7.8	7.6	7.6	28	28	28
25/06/2025	14	Pagi	6.5	7	7	6.9	7	7.3	27.2	27.3	27.1
		Siang	7.8	7.7	7.9	8.1	7.9	7.8	28.5	28.3	28.2
26/06/2025	15	Pagi	6	6.3	6.7	7	7.1	7.4	27	27.6	27
		Siang	6.3	6.5	7	7.2	7	7.3	28	28.5	28.3
27/06/2025	16	Pagi	6	6	6	6.8	6.7	7.2	27	27.6	27
		Siang	6.5	6.9	6.8	7.4	7	7.3	28	28.1	28
28/06/2025	17	Pagi	5.9	6	6.1	7.2	6.8	6.8	27.8	27.7	27.2
		Siang	7.4	7.2	7.4	7.5	7.4	7.8	28.5	28.3	28.2
29/06/2025	18	Pagi	6.5	7	7	6.9	7	7.3	27	27.3	27
		Siang	7.7	7.5	7.8	7.4	7.9	7.9	28.2	28	28.1
30/06/2025	19	Pagi	6.4	6.7	6.5	7.2	7.6	7.6	27.1	27	27
		Siang	7	7.3	7	7.4	7.6	7.9	28.1	28.3	28
01/07/2025	20	Pagi	6.3	6.5	6.7	7.2	7	7.3	27	27.2	27.1
		Siang	7.2	7.3	7.2	7.5	7.4	7.8	28.2	28	28.1
02/07/2025	21	Pagi	6	6.2	6.7	6.8	6.7	7.2	27	27.6	27
		Siang	7.9	7.8	7.8	7.9	7.9	7.8	28	27.9	28
03/07/2025	22	Pagi	6	7	7.2	7.2	7.4	7.5	27.1	27.4	27
		Siang	7.2	7.5	7.4	7.9	7.7	7.9	28.1	28	27.9
04/07/2025	23	Pagi	6	5.7	6.2	7.1	7.4	7.4	27.1	27	27.3
		Siang	6.8	6.9	6.8	7.3	7.6	7.7	28	28	27.9
05/07/2025	24	Pagi	5.9	6	6	6.9	6.8	7	27.3	27.6	27.4
		Siang	6.9	6.9	7.4	7.9	7.6	7.8	28	28.1	28
06/07/2025	25	Pagi	6.5	6.7	6.9	7.2	7.1	7.3	27	26.9	27
		Siang	7	7.3	7.2	7.8	7.6	7.7	28	27.9	28
07/07/2025	26	Pagi	6.5	7	7	6.9	7	7.3	27.2	27.3	27.1
		Siang	7.7	7.5	7.8	7.4	7.9	7.9	28	28	28
08/07/2025	27	Pagi	5.9	7.3	6.3	7.5	7	7.5	27.3	27	27.4
		Siang	7.1	6.9	7	8.1	7.9	7.9	28	28.2	28.1
09/07/2025	28	Pagi	6	6.3	6.2	7.1	7.4	7.7	27.1	27.3	27,2
Nilai Terendah			**6**			**6.7**			**27**		
Rata-rata			**6.9**			**7.5**			**28**		

- Data Kualitas Air Kelompok Perlakuan

Tgl	DOC	Waktu	PERLAKUAN								
			DO (mg/L)			pH			Suhu (^{0}C)		
			U1	U2	U3	U1	U2	U3	U1	U2	U3
11/06/2025	0	Pagi	8.5	8.5	8.5	8	8	8	24	24	24
12/06/2025	1	Pagi	7.5	7.8	7.6	7.7	7.8	7.8	27	27	27
		Siang	7.2	7.6	7.3	7.5	7.6	7.7	27.5	27.6	27.8
13/06/2025	2	Pagi	7.3	7.2	7.2	7.6	7.6	7.7	27	27.1	27.3
		Siang	7.2	7	7.1	7.3	7	7.1	28	28	28
14/06/2025	3	Pagi	7	6.9	6.9	7.1	7.1	7	27.2	27	27.1
		Siang	7.9	7.9	7.8	8	8.2	8.1	28	28	28
15/06/2025	4	Pagi	7.5	7	7.6	7.9	7.9	7.9	27.6	27.3	27.1
		Siang	7.8	7.3	7.7	8.4	8.2	8.3	28	28.1	28
16/06/2025	5	Pagi	7.6	7	7.5	7.5	7.5	7.4	27.6	27.3	27.1
		Siang	7.5	7.7	7.8	7.9	8.1	8.2	28.1	28	28.2
17/06/2025	6	Pagi	7.2	7	7.1	7.3	7	7.1	27	27.3	27.1
		Siang	7.8	7.8	7.7	7.8	7.8	8	28.1	28	28.2
18/06/2025	7	Pagi	6.5	6.4	6.5	6.9	7.5	7.8	27	27.1	27.3
		Siang	7.8	7.8	7.8	8.1	8	8.2	28	28	28
19/06/2025	8	Pagi	7.5	7.3	7.6	8	7.8	8	27	26.9	27
		Siang	7.6	7.6	7.7	7.9	7.8	7.9	28	28	28
20/06/2025	9	Pagi	7.6	7.5	7	7.5	7.7	7.6	27.6	27.3	27.1
		Siang	7.9	7.8	7.6	8.1	7.9	7.8	28	27.6	27.8
21/06/2025	10	Pagi	7	7	7.2	6.9	6.9	7	27.6	27.3	27.1
		Siang	7.5	7.7	7.6	7.4	7.4	7.4	28	27.9	28
22/06/2025	11	Pagi	6.9	7	7	7.1	7.1	7	27.2	27.3	27.1
		Siang	7.6	7.5	7.6	7.9	8.2	7.9	28	28	28
23/06/2025	12	Pagi	7.4	7.4	7.4	7.9	7.7	7.6	27.8	27.7	27.2
		Siang	7.2	7.2	71	7.8	7.6	7.6	28.5	28.3	28.2
24/06/2025	13	Pagi	7.4	6.5	7	7.2	7	7.2	27	27.6	27
		Siang	7.6	7.5	7.6	8	8.3	8	28	28	28
25/06/2025	14	Pagi	7.2	7	7.1	7.3	7	7.1	27.2	27.3	27.1
		Siang	7.5	7.7	7.6	8.2	8.2	8.3	28.5	28.3	28.2
26/06/2025	15	Pagi	7	7	7.2	7	7.5	7	27	27.6	27
		Siang	7.5	7.7	7.5	7.4	7.4	7.4	28	28.5	28.3
27/06/2025	16	Pagi	6.9	7	7	7.1	7.1	7	27	27.6	27
		Siang	7.6	7.5	7.8	8.1	8.2	7.9	28	28.1	28
28/06/2025	17	Pagi	7.2	6.9	6.8	7.2	6.9	7	27.8	27.7	27.2
		Siang	7.5	7.2	7.3	8	7.9	7.9	28.5	28.3	28.2
29/06/2025	18	Pagi	7.2	6.8	7	7.6	7	7	27	27.3	27
		Siang	7.5	7.2	7.3	7.9	7.3	7.5	28.2	28	28.1
30/06/2025	19	Pagi	6.4	6.2	6	7	6.9	6.7	27.1	27	27
		Siang	7.2	7.3	7.4	7.5	7.8	8	28.1	28.3	28
01/07/2025	20	Pagi	6.1	6	6.3	7	7.5	7.6	27	27.2	27.1
		Siang	7.2	7.1	7.4	7.5	7.8	7.9	28.2	28	28.1
02/07/2025	21	Pagi	6	6.2	6	7.5	7.3	7.4	27	27.6	27
		Siang	7.5	7.3	7.5	8.3	8.2	8.3	28	27.9	28
03/07/2025	22	Pagi	6.7	6.8	6.9	7.3	7.2	7	27.1	27.4	27
		Siang	7.5	7.7	7.6	7.4	7.4	7.4	28.1	28	27.9
04/07/2025	23	Pagi	6.7	6.4	6.5	7.3	6.9	7.2	27.1	27	27.3
		Siang	7.6	7.2	7.3	7.8	7.8	7.9	28	28	27.9
05/07/2025	24	Pagi	6.2	6	5.9	6.9	7.1	7	27.3	27.6	27.4
		Siang	7.6	7.5	7.7	8.2	8.2	8.3	28	28	28
06/07/2025	25	Pagi	7.4	7.4	7.4	7.9	7.7	7.6	27	26.9	27
		Siang	7.2	7.2	71	7.8	7.6	7.6	28	27.9	28
07/07/2025	26	Pagi	6.9	7	7	7.1	7.1	7	27.2	27.3	27.1
		Siang	7.6	7.4	7.5	8.1	8.2	7.9	28	28	28
08/07/2025	27	Pagi	7	6.8	6.7	7.9	7.8	7	27.3	27	27.4
		Siang	7.5	7.2	7.3	8.1	7.9	7.7	28	28.2	28.1
09/07/2025	28	Pagi	6	6.2	6.6	7.7	7.9	7.4	27.1	27.3	27,2
Nilai Terendah			**6**			**6.7**			**27**		
Rata-rata			**7.99**			**7.6**			**28**		

Lampiran 14. Dokumentasi Alat dan Bahan

		
Ember untuk sampling	Alat ukur benih	Timbangan digital
		
DO meter	pH Meter	*Haeter* (pemanas air)
		
Filter akuarium	Akuarium	Pipit tetes
		
Sprayer 60 ml	Selang sipon	*cup*/ toples fermentasi
		
Probiotik *Lactobacillus*	Pakan PF 1000	Benih ikan nila

RIWAYAT HIDUP

Gusti Ayu Intan Pratiwi lahir di Singaraja pada tanggal 16 November 1999 dari ayah Gusti Ngurah Alit dan ibu I Gusti Ayu Alit Rencani. Penulis merupakan putri ketiga dari tiga bersaudara. Penulis beralamat di Banjar Dinas Delod Rurung, Desa Banjarasem, Kecamatan Seririt, Kabupaten Buleleng, Bali.

Penulis menyelesaikan pendidikan dasar di SDN. 3 Banjarasem dan lulus di tahun 2012. Penulis melanjutkan pendidikan ke sekolah menengah pertama di SMP N 2 Seririt dan lulus di tahun 2015. Tahun 2018 penulis lulus dari SMA Negeri 1 Seririt dan melanjutkan pendidikan Diploma III program studi Budi Daya Ikan di Politeknik Kelautan dan Perikanan Jembrana. Selanjutnya, mulai tahun 2023 penulis menlanjutkan pendidikan alih jenjang di Universitas Pendidikan Ganesha dengan pilihan jurusan Biologi dan perikanan kelautan, program studi Diploma Empat Bioteknologi Perikanan dan tahun 2025 penulisan telah menyelesaikan penulisan tugas akhir dengan judul "Optimasi Pertumbuhan Benih Ikan Nila (*Oreochromis niloticus*) Melalui Aplikasi Probiotik *Lactobacillus* spp. Dalam Pakan Komersil".