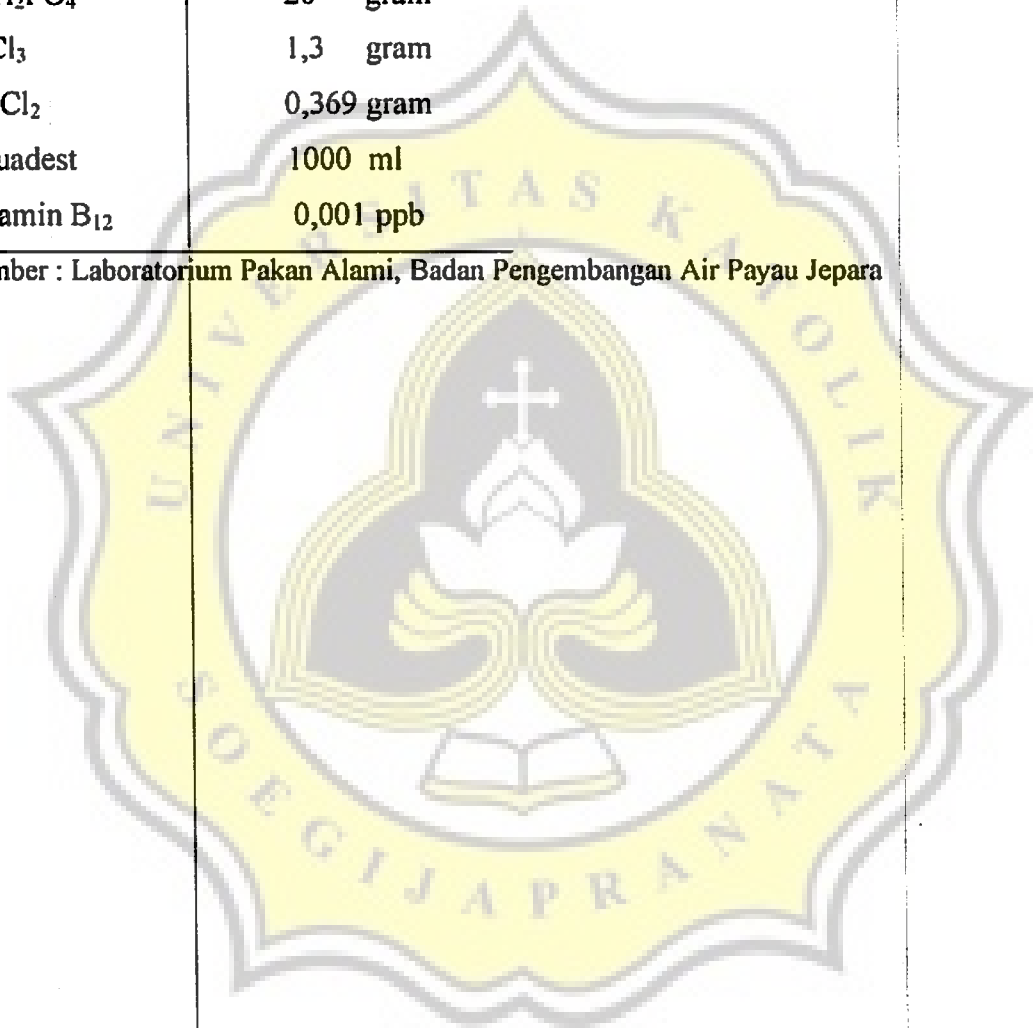


LAMPIRAN 1. Komposisi Media Walne

Nama bahan kimia	Ukuran
NH_4NO_3	7 mmol/l
EDTA	45 gram
K_2HPO_4	33,6 gram
NaH_2PO_4	20 gram
FeCl_3	1,3 gram
MnCl_2	0,369 gram
Aquadest	1000 ml
Vitamin B ₁₂	0,001 ppb

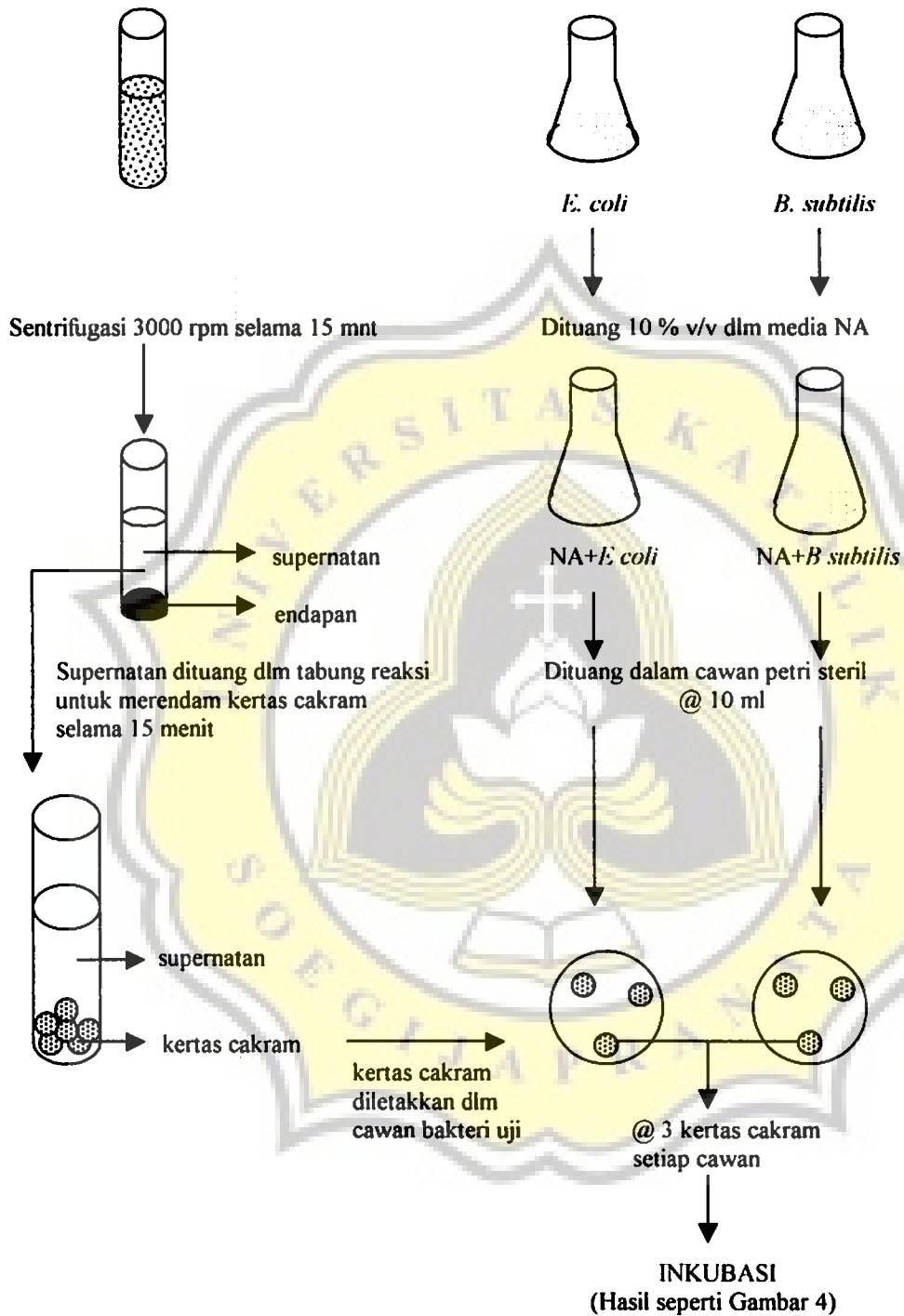
Sumber : Laboratorium Pakan Alami, Badan Pengembangan Air Payau Jepara



LAMPIRAN 2. Metoda Pengujian Aktivitas Antimikrobia

@ 7 ml *Chlorella* dlm Media ARK

Biakan bakteri dalam Media NB saat fase eksponensial (λ 580 & 25 % transmittan)



LAMPIRAN 3. Perhitungan Laju Pertumbuhan Spesifik Sel (μ) dan Waktu Penggandaan Sel (dt)

❖ Y ARK 0 % = fase stasioner 0 – 12 hari

$$Y \text{ ARK } 0 \% = -3 \text{ E} - 05 x^3 - 0,0023 x^2 + 0,0978 x + 5,1497$$

$$Y_{12} = -0,00003 (12)^3 - 0,0023 (12)^2 + 0,0978 (12) + 5,1497 = 5,9403$$

$$= \text{antilog } 5,9403 = 871565,44$$

$$Y_0 = -0,00003 (0)^3 - 0,0023 (0)^2 + 0,0978 (0) + 5,1497 = 5,1497$$

$$= \text{antilog } 5,1497 = 141156,21$$

$$\mu \text{ } 0 \% = \frac{\ln Y_{12} - \ln Y_0}{t_{12} - t_0} = \frac{\ln 871565,44 - \ln 141156,21}{12} = 0,156 \text{ sel/ hari}$$

$$dt = \frac{\ln 2}{\mu} = \frac{0,693}{0,156} = 4,56 \text{ hari}$$

❖ Y ARK 25 % = fase stasioner 0 – 9 hari

$$Y \text{ ARK } 25 \% = -0,0021 x^3 + 0,0415 x^2 - 0,1478 x + 5,3963$$

$$Y_9 = -0,0021 (9)^3 + 0,0415 (9)^2 - 0,1478 (9) + 5,3963 = 5,8967$$

$$= \text{antilog } 5,8967 = 788315,38$$

$$Y_0 = -0,0021 (0)^3 + 0,0415 (0)^2 - 0,1478 (0) + 5,3963 = 5,3963$$

$$= \text{antilog } 5,3963 = 249057,72$$

$$\mu \text{ } 25 \% = \frac{\ln Y_9 - \ln Y_0}{t_9 - t_0} = \frac{\ln 788315,38 - \ln 249057,72}{9} = 0,128 \text{ sel/ hari}$$

$$dt = \frac{\ln 2}{\mu} = \frac{0,693}{0,128} = 5,41 \text{ hari}$$

❖ Y ARK 50 % = fase stasioner 0 – 10 hari

$$Y \text{ ARK } 50 \% = -0,0014 x^3 + 0,0247 x^2 - 0,0385 x + 5,230$$

$$Y_{10} = -0,0014 (10)^3 + 0,0247 (10)^2 - 0,0385 (10) + 5,230 = 5,9150$$

$$= \text{antilog } 5,9150 = 822242,65$$

$$Y_0 = -0,0014 (0)^3 + 0,0247 (0)^2 - 0,0385 (0) + 5,230 = 5,230$$

$$= \text{antilog } 5,230 = 169824,37$$

$$\mu \text{ } 50 \% = \frac{\ln Y_{10} - \ln Y_0}{t_{10} - t_0} = \frac{\ln 822242,65 - \ln 169824,37}{10} = 0,158 \text{ sel/ hari}$$

$$dt = \frac{\ln 2}{\mu} = \frac{0,693}{0,158} = 4,39 \text{ hari}$$

❖ Y ARK 75 % = fase stasioner 0 – 9 hari

$$Y_{\text{ARK 75 \%}} = 0,0001 x^4 - 0,0049 x^3 + 0,0584 x^2 - 0,1054 x + 5,3266$$

$$Y_9 = 0,0001 (9)^4 - 0,0049 (9)^3 + 0,0584 (9)^2 - 0,1054 (9) + 5,3266 = 6,1924 \\ = \text{antilog } 6,1924 = 1557399,40$$

$$Y_0 = 0,0001 (0)^4 - 0,0049 (0)^3 + 0,0584 (0)^2 - 0,1054 (0) + 5,3266 = 5,3266 \\ = \text{antilog } 5,3266 = 212128,97$$

$$\mu_{75 \%} = \frac{\ln Y_9 - \ln Y_0}{t_9 - t_0} = \frac{\ln 1557399 - \ln 212128,97}{9} = 0,222 \text{ sel/ hari}$$

$$dt = \frac{\ln 2}{\mu} = \frac{0,693}{0,222} = 3,13 \text{ hari}$$

❖ Y ARK 100 % = fase stasioner 0 – 8 hari

$$Y_{\text{ARK 100 \%}} = -0,0001 x^4 + 0,0015 x^3 - 0,0019 x^2 + 0,0484 x + 5,2266$$

$$Y_8 = -0,0001 (8)^4 + 0,0015 (8)^3 - 0,0019 (8)^2 + 0,0484 (8) + 5,2266 = 5,8506 \\ = \text{antilog } 5,8506 = 708924,52$$

$$Y_0 = -0,0001 (0)^4 + 0,0015 (0)^3 - 0,0019 (0)^2 + 0,0484 (0) + 5,2266 = 5,2266 \\ = \text{antilog } 5,2266 = 168500,04$$

$$\mu_{100 \%} = \frac{\ln Y_8 - \ln Y_0}{t_8 - t_0} = \frac{\ln 708924,52 - \ln 168500,04}{8} = 0,180 \text{ sel/ hari}$$

$$dt = \frac{\ln 2}{\mu} = \frac{0,693}{0,180} = 3,86 \text{ hari}$$

❖ Y Walne = fase stasioner 0 – 11 hari

$$Y_{\text{Walne}} = 0,0005 x^3 - 0,0131 x^2 + 0,1508 x + 5,1361$$

$$Y_{11} = 0,0005 (11)^3 - 0,0131 (11)^2 + 0,1508 (11) + 5,1361 = 5,8753 \\ = \text{antilog } 5,8753 = 750412,40$$

$$Y_0 = 0,0005 (0)^3 - 0,0131 (0)^2 + 0,1508 (0) + 5,1361 = 5,1361 \\ = \text{antilog } 5,1361 = 136804,38$$

$$\mu_{\text{Walne}} = \frac{\ln Y_{11} - \ln Y_0}{t_{11} - t_0} = \frac{\ln 750412,40 - \ln 136804,38}{11} = 0,155 \text{ sel/ hari}$$

$$dt = \frac{\ln 2}{\mu} = \frac{0,693}{0,155} = 4,47 \text{ hari}$$

LAMPIRAN 4. Diameter Zona Jernih (Aktivitas Antimikrobia) *Chlorella vulgaris* Bey (cm)

Hari	Jam	ARK 0%		ARK 25 %		ARK 50 %		ARK 75 %		ARK 100 %		Walne	
		<i>E. coli</i>	<i>B. subtils</i>	<i>E. coli</i>	<i>B. subtils</i>	<i>E. coli</i>	<i>B. subtils</i>	<i>E. coli</i>	<i>B. subtils</i>	<i>E. coli</i>	<i>B. subtils</i>	<i>E. coli</i>	<i>B. subtils</i>
1	6	0	0	0.55	0.57	0.53	0.62	0.52	0.53	0.48	0.70	0	0
	12	0	0	0.65	0.67	0.63	0.72	0.60	0.63	0.55	0.88	0	0
	18	0	0	0.83	0.85	0.78	0.75	0.73	0.83	0.70	0.97	0	0
	24	0	0	0.98	1.00	0.78	0.93	0.93	0.97	0.88	1.03	0	0
2	6	0.50	0.55	0.62	0.53	0.77	0.62	0.63	0.53	0.65	0.87	0	0
	12	0.55	0.55	0.73	0.57	0.87	0.73	0.75	0.60	0.87	1.00	0	0
	18	0.58	0.57	0.90	0.67	0.98	0.92	0.87	0.80	0.98	1.08	0.57	0.55
	24	0.68	0.60	1.02	0.92	1.07	1.03	0.98	0.93	1.03	1.15	0.65	0.68
3	6	0.67	0	0.90	0.55	0.95	0.97	0.82	0.62	0.80	0.85	0.55	0.61
	12	0.70	0.52	0.97	0.65	1.00	1.07	0.9	0.72	1.03	0.88	0.62	0.59
	18	0.77	0.57	1.03	0.85	1.05	1.13	1.00	0.75	1.03	1.05	0.70	0.48
	24	0.83	0.62	1.42	1.08	1.08	1.25	1.05	0.95	1.08	1.22	0.82	0.62
4	6	0.53	0	1.47	0.93	0.93	1.05	0.78	0.72	1.00	0.83	0.53	0.60
	12	0.57	0	1.48	0.97	1.02	1.10	0.83	0.80	1.03	0.87	0.55	0.62
	18	0.75	0.60	1.50	1.03	1.05	1.18	0.92	0.82	1.07	1.23	0.60	0.62
	24	0.88	0.70	1.55	1.10	1.12	1.32	0.98	0.88	1.17	0.97	0.90	0.67
5	6	0.80	0.73	1.35	0.73	0.95	0.98	0.63	0.72	1.00	0.88	0.77	0.53
	12	0.82	0.85	1.42	0.85	0.97	1.05	0.73	0.83	1.07	0.97	0.85	0.55
	18	0.83	0.87	1.55	1.05	1.03	1.23	0.80	0.83	1.12	1.10	0.90	0.60
	24	0.90	0.88	1.63	1.17	1.05	1.38	0.95	0.88	1.25	1.30	0.97	0.63
6	6	0.82	0.50	1.53	0.93	0.98	1.25	0.90	0.73	1.25	1.00	0.93	0.56
	12	0.80	0.62	1.58	0.97	1.02	1.30	0.95	0.78	1.27	1.08	1.00	0.63
	18	0.87	0.80	1.60	0.98	1.07	1.38	0.98	0.83	1.33	1.10	1.05	0.66
	24	0.95	0.92	1.65	1.20	1.12	1.45	1.02	0.87	1.40	1.30	1.00	0.75
7	6	0.57	0.98	1.13	1.22	1.30	1.17	0.78	1.28	1.23	1.22	1.10	1.30
	12	0.60	1.07	1.47	1.50	1.43	1.55	0.87	1.35	1.32	1.37	1.22	1.20
	18	0.82	0.97	1.47	1.60	1.67	1.43	1.07	1.60	1.43	1.47	1.33	1.25
	24	0.97	0.87	1.67	1.65	1.73	1.52	1.15	1.62	1.53	1.53	1.37	1.30
8	6	1.05	0.53	1.68	1.15	1.72	1.72	1.65	1.88	1.32	1.68	0	1.13
	12	1.07	0.55	1.75	1.27	1.78	1.90	1.90	2.17	1.60	1.93	1.23	1.12
	18	1.10	0.63	1.80	1.62	1.83	1.92	1.97	2.10	1.58	2.05	1.25	1.13
	24	1.10	0.70	1.85	1.65	1.87	1.97	2.00	2.03	1.63	2.05	1.27	1.12
9	6	0.97	0.45	1.68	1.82	1.73	1.63	1.38	1.48	1.03	0.97	0	1.00
	12	1.12	0.46	1.87	1.98	1.97	1.77	1.53	1.73	0.95	0.60	0	1.00
	18	1.30	0.52	1.85	1.80	2.00	1.65	1.50	1.60	0	0	0	0.77
	24	1.27	0.65	1.73	1.62	2.02	1.47	1.48	1.43	0	0	0	0.42
10	6	1.12	0	0	0	1.35	1.05	1.80	1.67	ND	ND	0.57	0
	12	1.13	0.78	0.52	0.38	1.42	1.13	1.72	1.55	ND	ND	0.55	0
	18	1.07	0.90	0.53	0.45	1.47	1.27	1.58	1.45	ND	ND	0.47	0.58
	24	1.08	0	0.63	0.55	1.45	1.47	1.43	1.37	ND	ND	0	0.60
11	6	0.98	0	ND	ND	1.08	1.32	1.55	1.17	ND	ND	0	0
	12	0.90	0.60	ND	ND	1.15	1.28	1.50	1.17	ND	ND	0	0.55
	18	0.87	0	ND	ND	1.40	1.32	1.42	1.07	ND	ND	0	0.48
	24	0.87	0	ND	ND	1.43	1.37	1.40	0.95	ND	ND	0	0.53

Ket : ND = Not Detected



LAMPIRAN 5. Diameter Daerah Pertumbuhan (cm)

Hari	Jam	ARK 0%		ARK 25%		ARK 50 %		ARK 75 %		ARK 100 %		Walne	
		<i>E. coli</i>	<i>B. subtilis</i>	<i>E. coli</i>	<i>B. subtilis</i>	<i>E. coli</i>	<i>B. subtilis</i>	<i>E. coli</i>	<i>B. subtilis</i>	<i>E. coli</i>	<i>B. subtilis</i>	<i>E. coli</i>	<i>B. subtilis</i>
1	6	0.53	0.87	1.05	1.31	0.74	1.70	1.05	1.20	1.02	1.00	0	0.67
	12	0.68	0.97	1.12	1.4	0.85	1.88	1.13	1.27	1.32	0.99	0	0.75
	18	0.97	1.10	1.07	1.43	0.89	2.13	1.14	1.24	1.42	1.13	0.57	1.00
	24	0.25	1.22	0.55	1.75	0.84	1.85	1.07	1.35	1.29	1.27	0.80	1.30
2	6	0.65	0.78	1.08	0.95	1.38	0.93	1.97	1.04	1.78	1.35	0.98	0.95
	12	0.78	0.97	1.45	1.25	1.81	1.44	2.22	1.40	1.83	1.55	1.25	1.13
	18	0.99	0.67	1.46	1.3	2.44	1.41	2.41	2.12	1.97	1.70	1.08	1.32
	24	1.12	1.02	1.56	1.18	2.68	1.44	2.37	2.14	2.32	1.95	1.10	1.44
3	6	1.20	0.82	1.17	1.68	1.10	2.53	1.60	0.91	1.00	1.48	1.00	1.73
	12	1.23	1.50	2.01	2.28	1.25	1.25	1.92	1.51	1.10	1.42	1.6	1.93
	18	1.58	1.83	2.40	2.68	1.43	1.37	2.55	1.65	1.34	1.37	1.87	2.09
	24	1.60	2.05	2.13	2.24	1.55	1.35	2.72	1.45	1.54	1.28	2.01	1.91
4	6	1.26	0.88	0.81	1.54	1.12	1.12	1.39	0.91	1.68	1.74	0.80	0.73
	12	1.33	1.23	0.99	1.98	1.38	1.43	1.80	1.35	2.27	2.03	1.00	1.03
	18	1.21	1.35	1.20	2.05	1.45	1.55	2.01	1.48	2.41	2.09	1.07	1.36
	24	1.37	1.45	1.28	2.15	1.17	1.63	2.12	1.59	2.45	2.24	1.07	1.53
5	6	1.07	1.85	1.23	2.07	1.43	1.44	1.47	1.65	1.30	2.14	0.55	1.05
	12	1.13	1.88	1.58	2.3	1.79	1.67	2.05	2.05	1.68	2.56	0.73	1.30
	18	1.33	2.00	2.18	2.18	2.02	1.64	2.25	2.47	1.75	2.57	1.08	1.75
	24	1.40	2.13	1.89	2.15	2.22	1.92	2.25	2.65	1.70	2.53	1.78	1.98
6	6	0.68	1.40	1.07	1.85	1.57	2.00	1.33	1.60	1.17	1.88	0.84	1.16
	12	1.33	1.52	1.24	1.94	1.83	2.18	1.76	1.97	1.36	2.08	0.86	1.42
	18	2.03	1.80	1.30	2.07	1.79	2.18	1.98	2.00	1.47	2.33	1.45	1.91
	24	2.00	1.00	1.62	2.08	1.80	2.22	1.85	2.15	1.60	2.45	1.63	1.93
7	6	0.32	0.68	0.87	0.78	0.78	0.95	1.15	0.80	0.74	0.83	0.82	0.60
	12	0.40	0.62	0.75	0.63	0.79	0.72	1.35	1.10	1.26	1.15	1.30	1.12
	18	0.75	1.23	0.76	0.62	0.58	0.94	1.23	0.95	1.32	1.11	1.32	1.17
	24	0.70	1.30	0.75	0.6	0.64	0.91	1.22	1.06	1.24	1.20	1.28	1.32
8	6	0.16	1.77	0.72	1.15	0.88	1.10	0.53	0.97	1.10	1.25	1.63	0.82
	12	0.36	1.80	0.78	1.33	1.04	0.90	0.52	0.81	1.07	1.12	0.55	0.91
	18	0.80	2.00	0.87	1.23	1.07	1.03	0.70	1.00	1.17	1.07	0.83	1.57
	24	1.31	2.10	0.87	1.17	1.08	1.36	0.77	1.19	1.12	1.17	1.65	2.20
9	6	0	0	1.14	0.95	1.02	0.77	0.89	1.12	1.92	0.23	0.97	0
	12	0	0	1.10	0.94	0.95	0.83	1.07	1.10	1.32	1.63	1.08	0
	18	0	0	1.17	0.83	0.98	0.95	1.13	1.25	2.32	2.20	1.13	0
	24	0	0	1.04	1.38	1.18	1.06	1.22	1.49	2.33	2.28	1.13	0.90
10	6	0	0	1.58	1.88	0.78	1.00	0.43	0.53	ND	ND	0.90	1.07
	12	0.60	0	1.10	1.74	0.73	1.05	0.60	0.73	ND	ND	0.98	1.67
	18	0.63	0.52	1.25	1.82	0.75	1.08	0.79	1.07	ND	ND	1.11	2.67
	24	0.80	0.63	2.02	1.92	1.05	1.05	1.05	1.40	ND	ND	1.70	3.03
11	6	0.67	0	ND	ND	1.10	1.00	0.53	0.63	ND	ND	1.40	1.05
	12	0.45	0	ND	ND	1.08	1.09	0.67	0.80	ND	ND	1.48	0.63
	18	0.59	0	ND	ND	1.03	1.11	0.88	1.00	ND	ND	1.62	0.82
	24	0.64	0	ND	ND	1.10	1.13	0.93	1.17	ND	ND	1.07	0.80

LAMPIRAN 6. Hasil Pengamatan pH dan Suhu Media ARK dan Media Walne tempat tumbuh *Chlorella vulgaris* Bey.

Parameter	Hari													
	0	1	2	3	4	5	6	7	8	9	10	11	12	
Suhu (⁰ C)	27-29	28-30	28-30	28-29	27-28	27-29	28-29	27-28	27-28	27-28	27-29	27-29	28-29	28-29
Media ARK 0 %	pH 6	6	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
	Juml sel (10 ⁴)	18	23	24	28	36	50	58	62	63	68	78	81	97
Media ARK 25 %	pH 6.5	6.5	6.5	6.5	7.5	8	8.5	8.5	9	9	9	9	9	9
	Juml sel (10 ⁴)	18	20	18	22	27	35	43	61	89	112	89	83	83
Media ARK 50 %	pH 6.5	6	6	6	7	7	8	9	9	9	9	9	9	9
	Juml sel (10 ⁴)	18	18	19	24	38	42	56	83	93	113	80	79	72
Media ARK 75 %	pH 6.5	6	6.5	6	6	6	6	7	8	8	9	9	9	9
	Juml sel (10 ⁴)	18	21	27	37	53	64	95	114	193	232	114	107	99
Media ARK 100 %	pH 6.5	6	6	6	6	6	7	8	8	8	9	9	9	9
	Juml sel (10 ⁴)	18	21	28	29	31	43	47	61	100	92	64	63	50
Media Walne	pH 6	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
	Juml sel (10 ⁴)	18	22	38	38	42	45	46	49	61	68	69	81	70