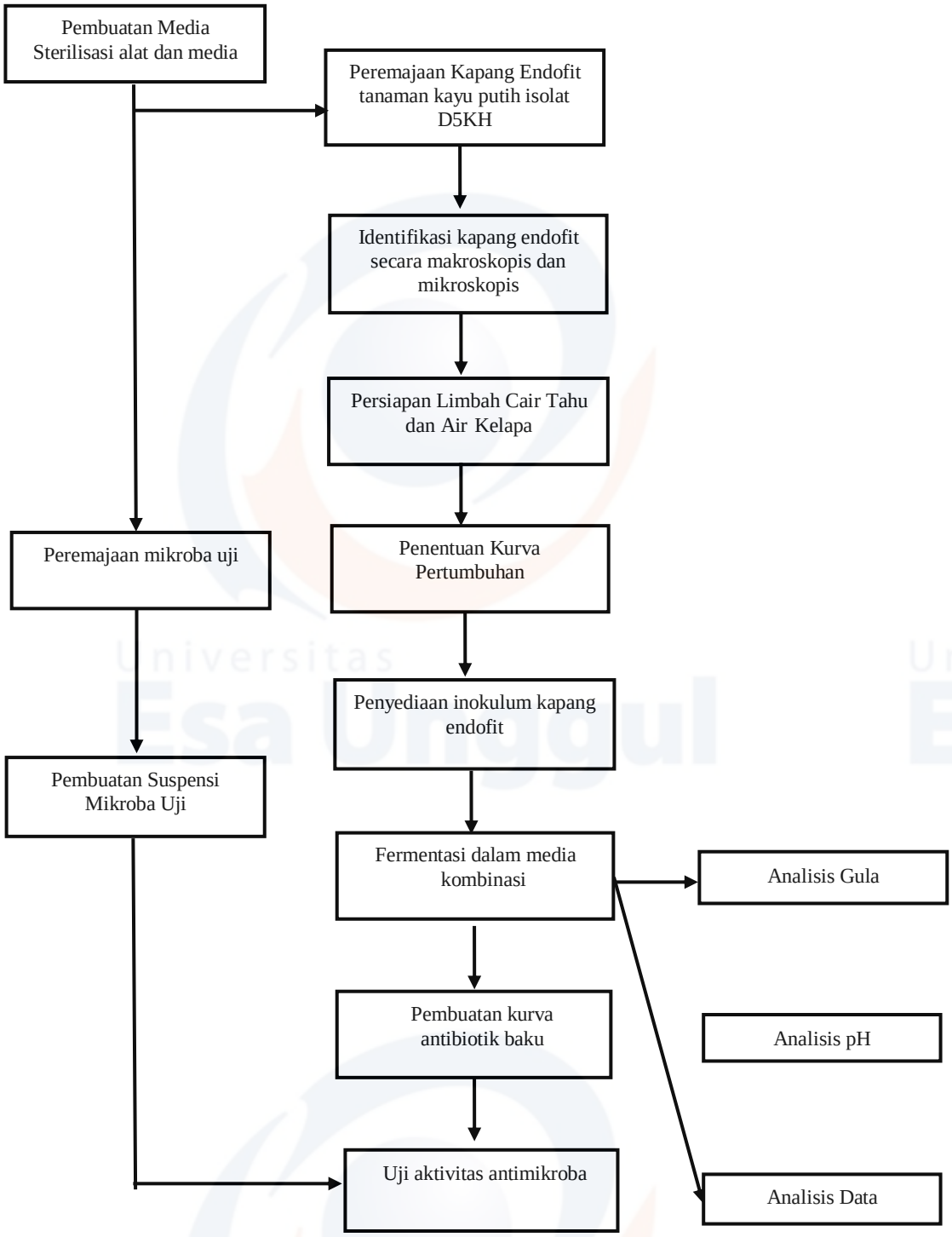
LAMPIRAN

Lampiran 1. Skema Alur Penelitian

Diagram Alir



Lampiran 2. Data bobot Miselia Kurva Pertumbuhan Kapang Endofit Tanaman Kayu Putih (Melaleuca leucadendron Linn)

Tabel 1. Data bobot miselia kapang endofit tanaman kayu putih (*Melaleuca leucadendron* Linn) dalam media PDB

Jam	Bobot Misellia Kapang
0	0
6	0,013
12	0,018
24	0,024
30	0,025
36	0,026
48	0,029
54	0,032
60	0,036
72	0,038
78	0,039
84	0,039
96	0,037
102	0,028
108	0,027

Tabel 1.2 Data Bobot Miselia Kapang Endofit Tanaman Kayu Putih (*Melaleuca leucadendron* Linn) Dalam Media Kombinasi

Jam	Konsentrasi Limbah Kombinasi		
	A (0% Limbah)	B (25% Limbah)	C (50% Limbah)
0	0	0	0
12	0,014	0,011	0,006
18	0,016	0,016	0,011
24	0,023	0,024	0,022
36	0,025	0,026	0,031
42	0,026	0,029	0,036
48	0,029	0,033	0,047
60	0,045	0,049	0,058
66	0,051	0,060	0,063
72	0,055	0,062	0,065
84	0,054	0,059	0,063
90	0,049	0,049	0,059
96	0,045	0,046	0,055
108	0,042	0,044	0,051

Lampiran 3. Data Pengujian Kadar Gula

1. Pengujian Larutan Standar Glukosa

Tabel 2.1 Absorbansi Larutan Standar Glukosa

Konsentrasi Gula (ppm)	Absorbansi
10	0,0639
20	0,1669
30	0,3087
40	0,4084
50	0,5812
60	0,6212

2. Pengujian Kadar Gula Media Fermentasi

Pengujian kadar gula media fermentasi setiap 4 jam didapatkan hasil pada Tabel 3.2

Tabel 2.2 Data Absorbansi dan Kadar Gula Pada Media Fermentasi

Jam	Absorbansi			Kadar gula (mg/mL)		
	A (0% Limbah)	B (25% Limbah)	C (50% Limbah)	A (0% Limbah)	B (25% Limbah)	C (50% Limbah)
0	0,589	0,6033	0,6197	2726,7	2787,3	2856,8
12	0,5732	0,5998	0,6085	2659,7	2772,5	2809,3
18	0,553	0,5762	0,5452	2574,2	2672,5	2541,1
24	0,5014	0,5724	0,5301	2355,5	2656,4	2477,1
36	0,424	0,5333	0,5197	2027,5	2490,7	2433,1
42	0,3973	0,4983	0,4414	1914,4	2342,4	2101,3
48	0,3432	0,3976	0,4197	1685,2	1915,7	2009,3
60	0,2824	0,3791	0,3262	1427,5	1837,3	1613,1
66	0,257	0,3621	0,2543	1319,9	1765,3	1308,5
72	0,1543	0,3432	0,2463	884,7	1685,2	1274,6
84	0,1521	0,3255	0,2161	875,4	1610,2	1146,6
90	0,142	0,2947	0,2133	832,6	1479,7	1134,7
96	0,1372	0,2646	0,1931	812,3	1352,1	1049,2
108	0,1322	0,2135	0,1723	791,1	1135,6	961,0

*Nilai absorbansi ini hasil pengukuran langsung (dari 50x pengenceran)

Lampiran 4. Data pengujian pH Media Fermentasi

Tabel 3.1 Hasil Pengujian pH pada Media Fermentasi

Jam	pH		
	A (0% Limbah)	B (25% Limbah)	C (50% Limbah)
0	6	6	6
12	6	6	6
18	6	6	6
24	6	6	6
36	6	6	6
42	6	6	6
48	6	6	5
60	5	5	5
66	5	5	5
72	5	5	4
84	4	4	4
90	4	4	4
96	3	3	4
108	2	3	3

Lampiran 5. Data Pengujian Antimikroba

1. Pengujian Antibiotik Baku

Antibiotik Ciprofloxacin terhadap *Staphylococcus aureus*

Tabel 4.1 antibiotik ciprofloxacin terhadap bakteri *Staphylococcus aureus*

Konsentrasi Antibiotik (µg/mL)	Zona Hambat (mm)
2,5	1,8
5	4,5
10	10
15	12,3
20	15,2

Antibiotik Ciprofloxacin terhadap *Escherichia coli*

Tabel 4.2 antibiotik ciprofloxacin terhadap bakteri *Escherichia coli*

Konsentrasi Antibiotik (µg/mL)	Zona Hambat (mm)
1,25	2
2,5	4,2
5	9,1
6,25	10
10	14,3

Antibiotik Ketokonazol terhadap *Candida albicans*

Tabel 4.3 Antibiotik ketokonazol terhadap Jamur *Candida albicans*

Konsentrasi Antibiotik (µg/mL)	Zona Hambat (mm)
200	10
225	12
250	14
275	15
300	16,1

Lampiran 6. Grafik Pengukuran Zona Hambat Kapang Endofit terhadap Mikroba Uji

Jam	Supernatan terhadap *Staphylococcus aureus*					
	Zona Hambat			Konsentrasi Antibiotik		
	A (0% Limbah)	B (25% limbah)	C (50% Limbah)	A (0% Limbah)	B (25% Limbah)	C (50% Limbah)
0	0	0	0	0,0	0,00	0,00
12	0,9	1	1,2	0,14	0,28	0,54
18	1,2	1,4	1,5	0,54	0,80	0,94
24	1,6	1,7	1,9	1,07	1,20	1,46
36	1,9	2	2,2	1,46	1,59	1,86
42	2,1	2,3	2,4	1,73	1,99	2,12
48	2,5	2,6	2,8	2,25	2,38	2,65
60	2,7	2,9	3	2,52	2,78	2,91
66	3,1	3,2	3,4	3,04	3,17	3,44
72	3,3	3,5	3,7	3,31	3,57	3,83
84	3	3,3	3,2	2,91	3,31	3,17
90	2,7	2,5	2,6	2,52	2,25	2,38
96	2	2,2	2,5	1,59	1,86	2,25
108	1,8	1,9	2,3	1,33	1,46	1,99

Jam	*Escherichia coli*					
	Zona Hambat			Konsentrasi Antibiotik		
	A (0% Limbah)	B (25% limbah)	C (50% Limbah)	A (0% Limbah)	B (25% Limbah)	C (50% Limbah)
0	0	0	0	0	0	0
12	0,9	1	1,3	0,01	0,09	0,30
18	1	1,3	1,4	0,09	0,30	0,37
24	1,5	1,8	2	0,44	0,65	0,80
36	2	2,3	2,5	0,80	1,01	1,15
42	2,1	2,5	2,8	0,87	1,15	1,36
48	2,4	2,7	2,9	1,08	1,29	1,43
60	2,8	3	3,2	1,36	1,51	1,65
66	3	3,4	3,6	1,51	1,79	1,93
72	3,5	3,7	3,9	1,86	2,00	2,14
84	3,3	3,5	3,6	1,72	1,86	1,93
90	3	3,2	3,3	1,51	1,65	1,72
96	2,7	3	2,5	1,29	1,51	1,15
108	2,3	2,5	1,5	1,01	1,15	0,44

Jam	*Candida albicans*					
	Zona Hambat			Konsentrasi Antibiotik		
	A (0% Limbah)	B (25% limbah)	C (50% Limbah)	A (0% Limbah)	B (25% Limbah)	C (50% Limbah)
0	0	0	0	29,28	29,28	29,28
12	0,7	0,8	0,9	40,79	42,43	44,08
18	1,2	1,4	1,4	49,01	52,30	52,30
24	1,6	1,7	1,7	55,59	57,24	57,24
36	1,8	1,9	2,1	58,88	60,53	63,82
42	2	2,1	2,5	62,17	63,82	70,39
48	2,3	2,3	2,8	67,11	67,11	75,33
60	2,8	2,6	3,3	75,33	72,04	83,55
66	3	2,9	3	78,62	76,97	78,62
72	2,7	2,7	2,7	73,68	73,68	73,68
84	2,4	2,4	2,5	68,75	68,75	70,39
90	2	2,1	2,1	62,17	63,82	63,82
96	1,9	1,9	1,8	60,53	60,53	58,88
108	1,7	1,5	1,5	57,24	53,95	53,95

Lampiran 7. Perhitungan Uji Gula

1. Pembuatan Konsentrasi Glukosa Standar 10, 20, 30, 40, 50, 60, 70, 80, 90 mg/L

b) Pembuatan Larutan Induk Glukosa 200 mg/L
Larutan induk glukosa = $\frac{m}{v}$
= $\frac{20mg\ glukosa}{0{,}1\ L}$
=200 mg/L

c) Konsentrasi 10 mg/L
M1 x V1 = M2 x V2
200 mg/L x V1 = 10 mg/L x 25mL
V1 = 1,25 mL

d) Konsentrasi 20 mg/L
M1 x V1 = M2 x V2
200 mg/L x V1 = 20 mg/L x 25mL
V1 = 2,5 mL

e) Konsentrasi 30 mg/L
M1 x V1 = M2 x V2
200 mg/L x V1 = 30 mg/L x 25mL
V1 = 3,75 mL

f) Konsentrasi 40 mg/L
M1 x V1 = M2 x V2
200 mg/L x V1 = 40 mg/L x 25mL
V1 = 5 mL

g) Konsentrasi 50 mg/L
M1 x V1 = M2 x V2
200 mg/L x V1 = 50 mg/L x 25mL
V1 = 6,25 mL

h) Konsentrasi 60 mg/L
M1 x V1 = M2 x V2
200 mg/L x V1 = 60 mg/L x 25mL
V1 = 7,5 mL

i) Konsentrasi 70 mg/L
M1 x V1 = M2 x V2
200 mg/L x V1 = 70 mg/L x 25mL
V1 = 8,75 mL

j) Konsentrasi 80 mg/L
M1 x V1 = M2 x V2
200 mg/L x V1 = 80 mg/L x 25mL
V1 = 10 mL
Konsentrasi 90 mg/L
M1 x V1 = M2 x V2
200 mg/L x V1 = 90 mg/L x 25mL
V1 = 11,25 mL

2. Pembuatan Larutan Fenol 5%
Konsentrasi (%)= m/v x 100%
= (5g)/(100 mL) x 100%
= 5%

Lampiran 8. Perhitungan Pengenceran Antibiotik

1). Ciprofloxacin
Larutan Induk konsentrasi 50 (µg/mL)
50 (µg/mL) = 0,05 mg -> 1mL
= 0,5 mg -> 10 mL

Pengenceran antibiotik

- Konsentrasi 1,25 µg/mL
  M1 x V1 = M2 x V2
  50 µg x V1 = 1,25 µg x 2mL
  V1 = 0,05 mL
  V1 = 50 µL

- Konsentrasi 2,5 µg/mL
  M1 x V1 = M2 x V2
  50 µg x V1 = 2,5 µg x 2mL
  V1 = 0,1 mL
  V1 = 100 µL

- Konsentrasi 5 µg/mL
  M1 x V1 = M2 x V2
  50 µg x V1 = 5 µg x 2mL
  V1 = 0,2 mL
  V1 = 200 µL

- Konsentrasi 6,25 µg/mL
  M1 x V1 = M2 x V2
  50 µg x V1 = 6,25 µg x 2mL
  V1 = 0,25 mL
  V1 = 250 µL

- Konsentrasi 10 µg/mL
  M1 x V1 = M2 x V2
  50 µg x V1 = 10 µg x 2mL
  V1 = 0,4 mL
  V1 = 400 µL

- Konsentrasi 15 µg/mL
  M1 x V1 = M2 x V2
  50 µg x V1 = 15 µg x 2mL
  V1 = 0,6 mL
  V1 = 600 µL

- Konsentrasi 20 µg/mL
  M1 x V1 = M2 x V2
  50 µg x V1 = 20 µg x 2mL
  V1 = 0,8 mL
  V1 = 800 µL

2). Ketokonazole
Larutan induk 50µg/mL
50µg/mL : 0,05 mg -> 1mL
: 0,5 -> 10 mL

Pengenceran antibiotik

- Konsentrasi 200 µg/mL
  M1 . V1 = M2 . V2
  500 µg x V1 = 200 µg x 2mL
  V1 = 0,8 mL
  V1 = 800 µL

- Konsentrasi 225 µg/mL
  M1 . V1 = M2 . V2
  500 µg x V1 = 225 µg x 2mL
  V1 = 0,9 mL
  V1 = 900 µL

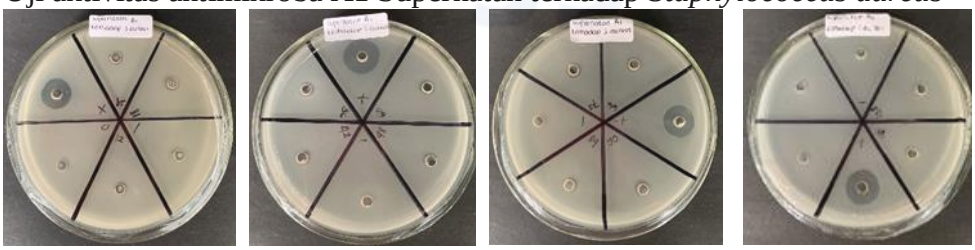
- Konsentrasi 250 µg/mL
  M1 . V1 = M2 . V2
  500 µg x V1 = 250 µg x 2mL
  V1 = 1 mL
  V1 = 1000 µL

- Konsentrasi 275 µg/mL
  M1 . V1 = M2 . V2
  500 µg x V1 = 275 µg x 2mL
  V1 = 1,1 mL
  V1 = 11000 µL

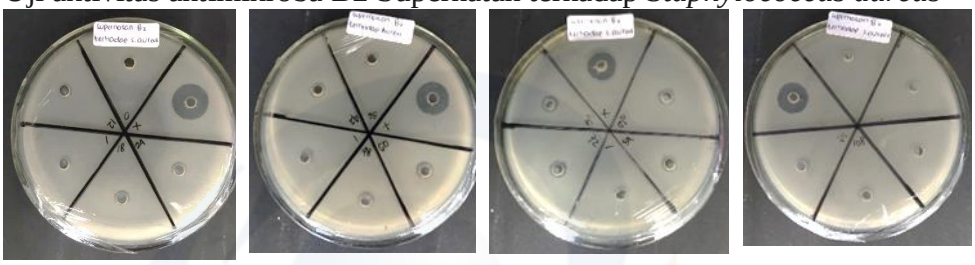
- Konsentrasi 250 µg/mL
  M1 . V1 = M2 . V2
  500 µg x V1 = 300 µg x 2mL
  V1 = 1,2 mL
  V1 = 1200 µL

Lampiran 9. Uji aktivitas Antimikroba Supernatan Hasil Fermentasi

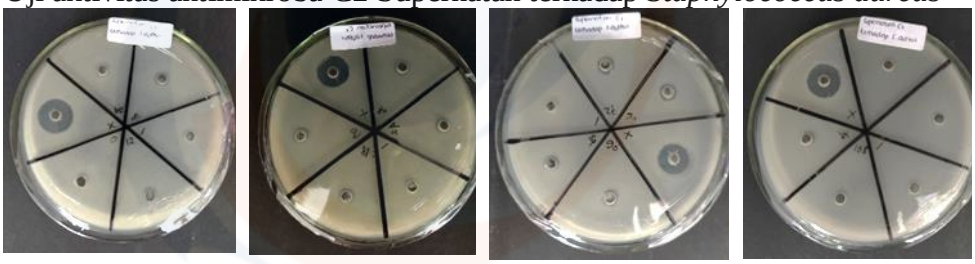
Uji aktivitas antimikroba A1 Supernatan terhadap *Staphylococcus aureus*



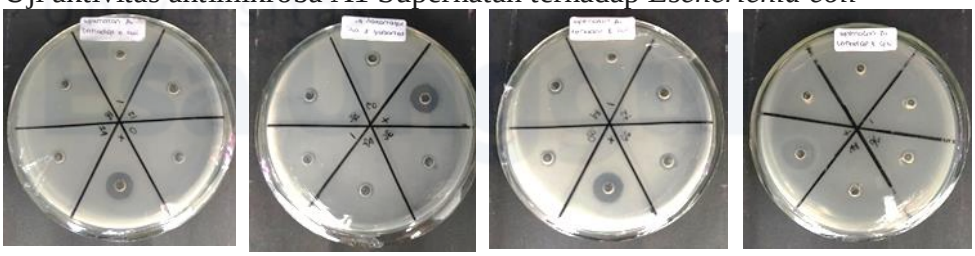
Uji aktivitas antimikroba B2 Supernatan terhadap *Staphylococcus aureus*



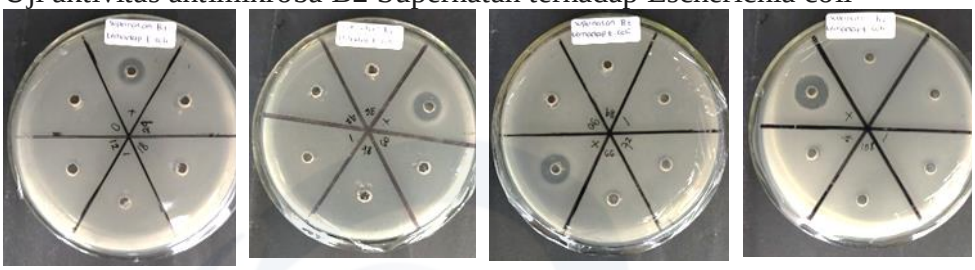
Uji aktivitas antimikroba C2 Supernatan terhadap *Staphylococcus aureus*



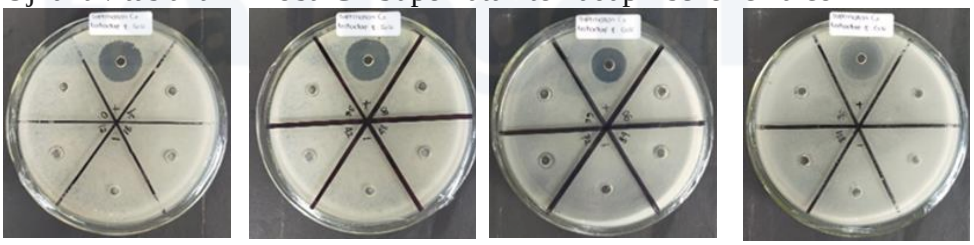
Uji aktivitas antimikroba A1 Supernatan terhadap *Escherichia coli*



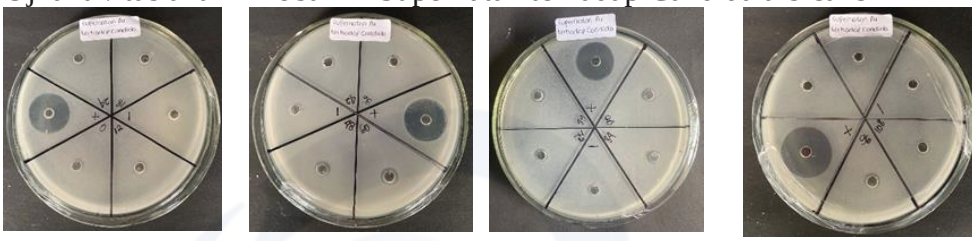
Uji aktivitas antimikroba B2 Supernatan terhadap Escherichia coli



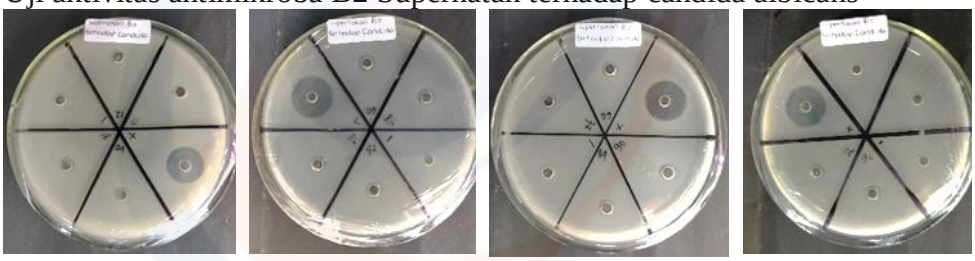
Uji aktivitas antimikroba C2 Supernatan terhadap Escherichia coli



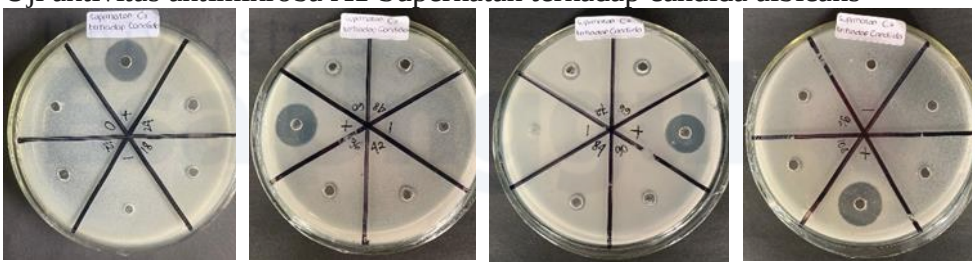
Uji aktivitas antimikroba A1 Supernatan terhadap Candida albicans



Uji aktivitas antimikroba B2 Supernatan terhadap candida albicans



Uji aktivitas antimikroba A1 Supernatan terhadap candida albicans



Lampiran 10. Kesetaraan Supernatan Terhadap Antimikroba

Jam	*Staphylococcus aureus*		
	Konsentrasi antibiotik		
	A(0% Limbah)	B (25% Limbah)	C (50% Limbah)
0	0,00	0,00	0,00
12	0,67	0,54	0,28
18	0,94	0,80	0,94
24	1,20	1,33	1,20
36	1,46	1,59	1,86
42	1,59	1,99	2,12
48	2,25	2,38	2,25
60	2,78	2,78	2,52
66	3,31	3,17	2,91
72	3,57	3,57	3,17
84	3,17	2,91	2,78
90	2,12	2,25	2,52
96	1,59	1,86	2,25
108	1,33	1,46	1,99

Jam	*Escherichia coli*		
	Konsentrasi antibiotik		
	A(0% Limbah)	B (25% Limbah)	C (50% Limbah)
0	0,00	0,00	0,00
12	0,01	0,09	1,30
18	0,09	0,30	1,70
24	0,30	0,65	2,20
36	0,44	0,80	3,00
42	0,87	1,36	3,40
48	0,94	1,65	3,50
60	1,22	2,00	3,90
66	1,36	2,22	4,20
72	2,14	2,43	4,40
84	1,86	2,14	3,20
90	1,51	2,00	2,80
96	1,29	1,65	2,60
108	1,01	1,43	2,10

Jam	*Candida albicans*		
	Konsentrasi antibiotik		
	A(0% Limbah)	B (25% Limbah)	C (50% Limbah)
0	0,00	0,00	0,00
12	49,01	50,66	44,08
18	50,66	53,95	52,30
24	53,95	57,24	57,24
36	57,24	60,53	58,88
42	62,17	62,17	70,39
48	70,39	67,11	75,33
60	75,33	70,39	83,55
66	78,62	76,97	78,62
72	73,68	73,68	76,97
84	70,39	68,75	70,39
90	62,17	63,82	63,82
96	57,24	60,53	58,88
108	52,30	53,95	53,95

Lampiran 11. Hasil Analisis Uji Statistik

1) Uji Statistik Supernatan terhadap Bakteri *Staphylococus aureus*

- **Uji Normalitas**

Tests of Normality

		Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Konsentrasi Limbah	Statistic	df	Sig.	Statistic	df	Sig.
Zona Hambat Bakteri	0%	,114	14	,200*	,961	14	,733
	25%	,123	14	,200*	,968	14	,851
	50%	,204	14	,119	,900	14	,112

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

- **Uji Homogenitas**

Test of Homogeneity of Variances

		Levene Statistic	df1	df2	Sig.
Zona Hambat Bakteri	Based on Mean	,025	2	39	,975
	Based on Median	,019	2	39	,981
	Based on Median and with adjusted df	,019	2	38,520	,981
	Based on trimmed mean	,015	2	39	,985

Descriptives

Zona Hambat Bakteri

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
0%	14	2,129	,9611	,2569	1,574	2,684	,0	3,5
25%	14	2,193	,9368	,2504	1,652	2,734	,0	3,7
50%	14	2,157	,9296	,2484	1,620	2,694	,0	3,2
Total	42	2,160	,9197	,1419	1,873	2,446	,0	3,7

- Uji Anova

ANOVA

Zona Hambat Bakteri

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	,029	2	,015	,016	,984
Within Groups	34,652	39	,889		
Total	34,681	41			

2) Uji Statistik Supernatan Terhadap Bakteri *Escherichia coli*

- Uji Normalitas

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
Konsentrasi Limbah	Statistic	df	Sig.	Statistic	df	Sig.
0%	,127	14	,200*	,979	14	,965
25%	,165	14	,200*	,924	14	,249
50%	,127	14	,200*	,953	14	,606

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

- Uji Homogenitas

Test of Homogeneity of Variances

		Levene Statistic	df1	df2	Sig.
Zona Hambat Bakteri	Based on Mean	,208	2	39	,813
	Based on Median	,142	2	39	,868
	Based on Median and with adjusted df	,142	2	37,206	,868
	Based on trimmed mean	,170	2	39	,844

Descriptives

Zona Hambat Bakteri

	N	Mean	Std. Deviation	Std. Error
0%	14	2,143	1,0924	,2920
25%	14	2,729	1,2791	,3418
50%	14	2,757	1,2389	,3311
Total	42	2,543	1,2108	,1868

- Uji Anova

ANOVA

Zona Hambat Bakteri

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	3,366	2	1,683	1,157	,325
Within Groups	56,737	39	1,455		
Total	60,103	41			

3). Uji Statistik Supernatan Terhadap Jamur *Candida albicans*

- **Uji Normalitas**

Tests of Normality

	Konsentrasi Limbah	Kolmogorov-Smirnov[a] Statistic	df	Sig.	Shapiro-Wilk Statistic	df	Sig.
Zona Hambat Bakteri	0%	,154	14	,200*	,948	14	,527
	25%	,157	14	,200*	,924	14	,252
	50%	,133	14	,200*	,959	14	,706

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

Descriptives

Zona Hambat Bakteri

	N	Mean	Std. Deviation	Std. Error
0%	14	1,871	,8100	,2165
25%	14	1,871	,7898	,2111
50%	14	2,021	,8894	,2377
Total	42	1,921	,8135	,1255

- **Uji Homogenitas**

Test of Homogeneity of Variances

		Levene Statistic	df1	df2	Sig.
Zona Hambat Bakteri	Based on Mean	,189	2	39	,828
	Based on Median	,161	2	39	,852
	Based on Median and with adjusted df	,161	2	38,989	,852
	Based on trimmed mean	,185	2	39	,832

- **Uji Anova**

ANOVA

Zona Hambat Bakteri

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	,210	2	,105	,152	,859
Within Groups	26,921	39	,690		
Total	27,131	41			

Lampiran 12. Uji Statistik Kadar Gula

- **Uji Normalitas**

Tests of Normality

	Konsentrasi Limbah	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
		Statistic	df	Sig.	Statistic	df	Sig.
Kadar Gula	0%	,201	14	,132	,880	14	,058
	25%	,155	14	,200*	,915	14	,186
	50%	,204	14	,119	,889	14	,079

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

- Uji Homogenitas

Test of Homogeneity of Variances

		Levene Statistic	df1	df2	Sig.
Kadar Gula	Based on Mean	1,082	2	39	,349
	Based on Median	1,119	2	39	,337
	Based on Median and with adjusted df	1,119	2	37,502	,337
	Based on trimmed mean	1,067	2	39	,354

Descriptives

Kadar Gula

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
0%	14	1634,764	743,8368	198,7987	1205,286	2064,243	791,1	2726,7
25%	14	2035,921	569,5513	152,2190	1707,072	2364,771	1135,6	2787,3
50%	14	1836,836	698,8639	186,7792	1433,324	2240,348	961,0	2856,8
Total	42	1835,840	678,6952	104,7249	1624,344	2047,337	791,1	2856,8

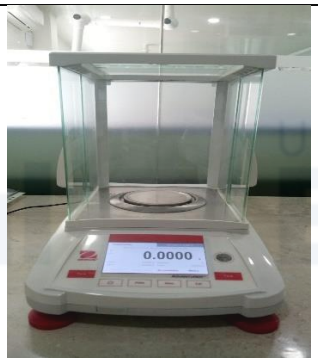
- Uji ANOVA

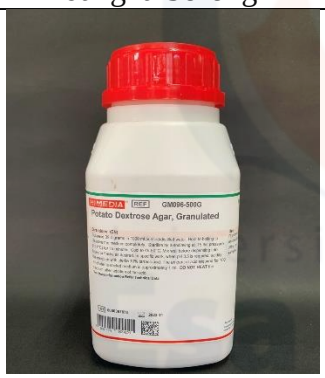
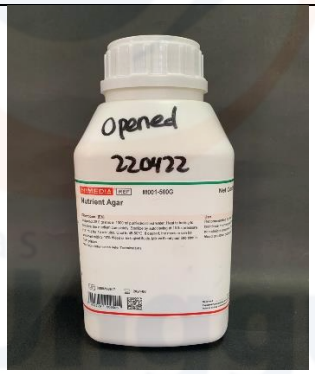
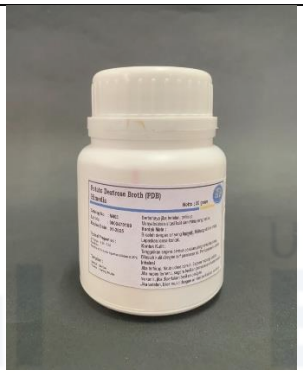
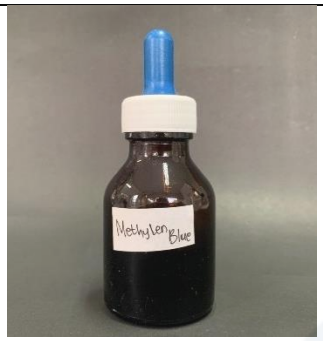
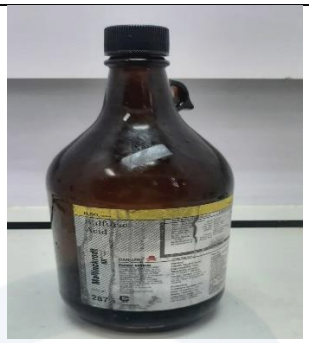
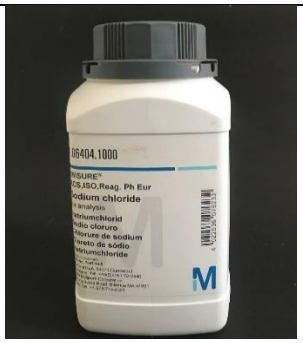
ANOVA

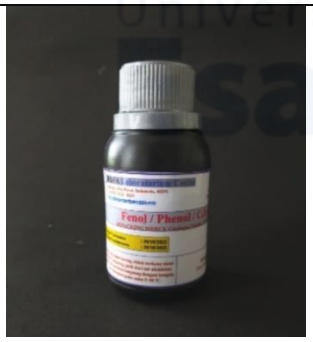
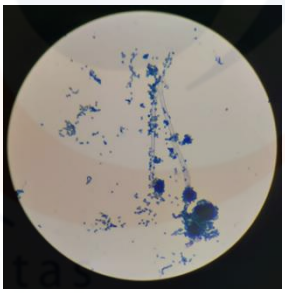
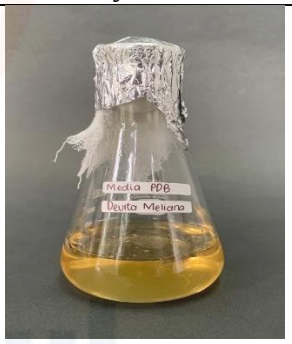
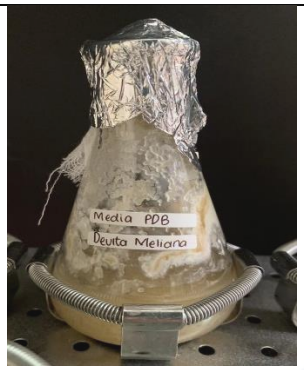
Kadar Gula

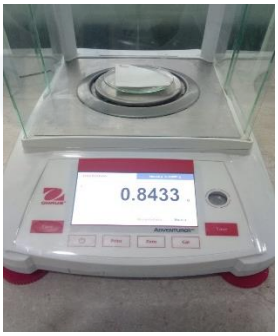
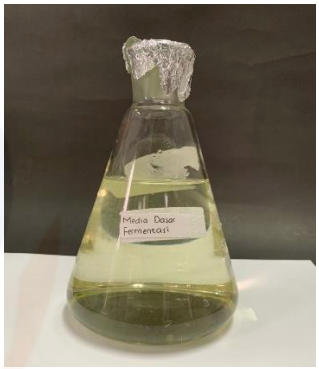
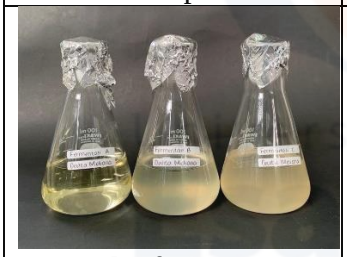
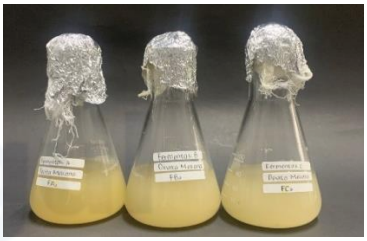
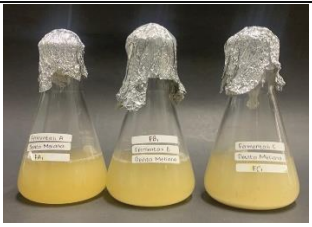
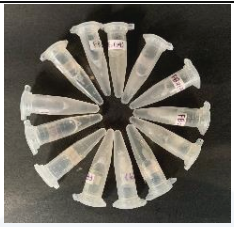
	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	1126510,173	2	563255,087	1,237	,301
Within Groups	17759203,708	39	455364,198		
Total	18885713,881	41			

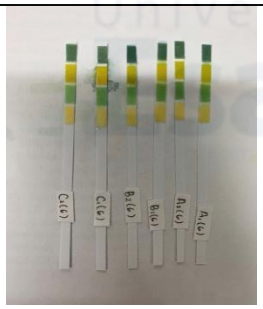
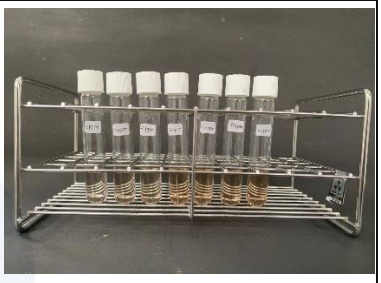
Lampiran 13. Alat dan Bahan

		
Spektrofotometri Uv-VIs	Microwive	Vertikal shaker
		
Autoklaf	Sentrifugasi	Freezer
		
Inkubator	Mikroskop	Neraca Analitik
		
Oven	*Laminar Air Flow*	Lemari Asam

		
Vortex	Mikropipet 200	Mikropipet 1000
		
Jangka Sorong	Waterbath	Kertas saring
		
PDA	NA	PDB
		
Methylen Blue	Asam Sulfat	NacL

 Fenol	 pH universal	 Antibiotik Ciprofloxacin
 Antibiotik Ketokonazol	 Peptone	 Phenylalaniene
 Hasil rekultur kapang endofit tanaman kayu putih	 Hasil identifikasi kapang endofit tanaman kayu putih dengan mikroskop	 Media pembuatan kurva pertumbuhan kapang endofit
 Pembuatan kurva pertumbuhan Kapang Endofit dengan Orbital Shaker	 Proses penyemplingan	 Proses pemisahan supernatan dan biomassa dengan sentrugasi kecepatan 3000 rpm

 Proses penyaringan biomassa dengan kertas saring	 Proses pengeringan biomassa dengan oven pada suhu 40°C selama 24 jam	 Penimbanganan biomassa kapang endofit
 Pencampuran limbah Cair tahu dan Air kelapa	 Kombinasi limbah cair tahu dan Air Kelapa	 Media dasar Fermentasi
 Media fermentasi dengan berbagai konsentrasi 0%, 25% dan 50%	 Media Fermentasi pada jam ke 12	 Media Fermentasi Pada jam ke 60
 Media Fermentasi Pada jam ke 90	 Hasil fermentasi berbagai konsentrasi	 Pengujian pH

		
Hasil pengujian pH	Bakteri Uji	Larutan Gula
		
Pengembangan warna	Hasil Uji Gula	Gula Standar