

V. SIMPULAN DAN SARAN

A. Simpulan

Berdasarkan penelitian yang dilakukan, dapat disimpulkan bahwa:

1. Penggunaan pelarut, bagian tanaman, dan bakteri uji yang berbeda tidak menghasilkan daya antibakteri yang berbeda.
2. Konsentrasi hambat minimum ekstrak yang dapat menghambat *Pseudomonas aeruginosa* dan *Staphylococcus epidermidis* belum didapatkan pada ekstrak konsentrasi 5, 10, dan 15 mg/ml.

B. Saran

Saran yang diajukan untuk penelitian lebih lanjut yang terkait dengan penelitian antibakteri ekstrak umbi dan tangkai daun talas (*Colocasia esculenta* (L.) Schott.) yaitu:

1. Pengujian kuantitatif untuk alkaloid, tanin, saponin, serta triterpenoid yang diperlukan untuk melihat keterkaitan metabolit sekunder dengan aktivitas antibakteri.
2. Deret konsentrasi yang digunakan untuk uji konsentrasi hambat minimum ditingkatkan menjadi 25 mg/ml.

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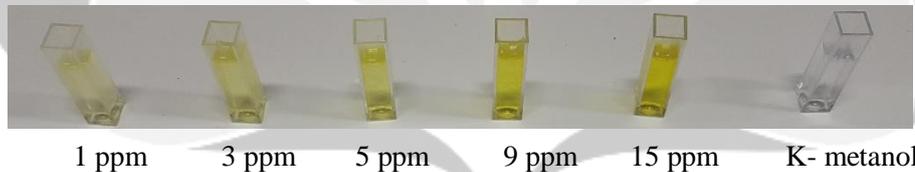
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LAMPIRAN

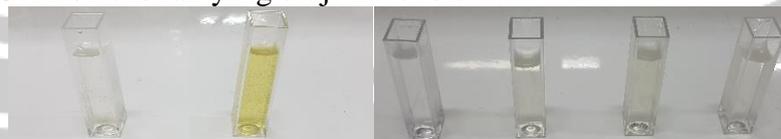
Lampiran 1. Jadwal pelaksanaan penelitian

Kegiatan	Waktu (tahun 2019)						
	Februari	Maret	April	Mei	Juni	Juli	Agustus
Uji kemurnian bakteri							
Beli bahan							
Pengeringan, pengecilan ukuran							
Ekstraksi senyawa							
Uji fitokimia							
Flavonoid kuantitatif							
Perbanyakkan bakteri uji							
Pengujian dan pengukuran luas zona hambat							
Pengukuran KHM							
Analisis Data							
Penyusunan naskah							

Lampiran 2. Hasil deret konsentasi standar kuersetin pengujian flavonoid kuantitatif



Lampiran 3. Hasil ekstrak yang diuji flavonoid kuantitatif



Ek. Metanol
Tangkai
1000 ppm

Ek. Etanol
Tangkai
1000 ppm

K-
Metanol

Ek. Etanol Umbi



K-
Metanol

Ek. Metanol Umbi

Lampiran 4. Data mentah diameter dan luas zona hambat ekstrak terhadap bakteri *Staphylococcus epidermidis* dan *Pseudomonas aeruginosa*

Perlakuan	Ulangan	Bakteri			
		<i>Staphylococcus epidermidis</i>		<i>Pseudomonas aeruginosa</i>	
		D (cm)	LZH (cm ²)	D (cm)	LZH (cm ²)
Ekstrak Umbi Talas Etanol	1	1,55	1,603	0,95	0,426
	2	2,1	3,179	0,7	0,102
	3	2,05	3,016	0,95	0,426
	4	1,45	1,368	0,75	0,159
	5	2,35	4,053	1	0,502
	Rata-rata	2,23	2,644	0,67	0,323
Ekstrak Umbi Talas Metanol	1	1,3	1,044	0,8	0,220
	2	2,3	3,870	0,6	0
	3	2,45	4,429	1,5	1,484
	4	1,85	2,404	1,4	1,256
	5	1,9	2,551	1,05	0,583
	Rata-rata	1,76	2,860	0,77	0,708
Ekstrak Tangkai Daun Talas Etanol	1	1,15	0,756	1,05	0,583
	2	1,45	1,368	0,7	0,102
	3	1,25	0,944	0,85	0,285
	4	1,15	0,756	0,8	0,220
	5	1,8	2,261	0,85	0,285
	Rata-rata	1,36	1,217	0,85	0,295
Ekstrak Tangkai Daun Talas Metanol	1	1,5	1,484	1	0,502
	2	1,55	1,603	0,95	0,426
	3	2,75	5,654	0,8	0,220
	4	1,25	0,944	0,95	0,426
	5	2,3	3,870	0,8	0,220
	Rata-rata	1,87	2,711	0,9	0,359
Kontrol Positif Kloramfenikol	1	2,05	3,016	1,9	2,551
	2	2,6	5,024	1,55	1,603
	3	2,25	3,691	1,4	1,256
	4	2,05	3,016	1,05	0,583
	5	2,2	3,517	1,5	1,484
	Rata-rata	2,23	3,653	1,48	1,495
Kontrol Negatif Dimethyl Sulfoxide (DMSO)	1	0	0	0	0
	2	0	0	0	0
	3	0	0	0	0
	4	0	0	0	0
	5	0	0	0	0
	Rata-rata	0	0	0	0

Lampiran 5. Hasil Rendemen Ekstrak Talas



Keterangan :

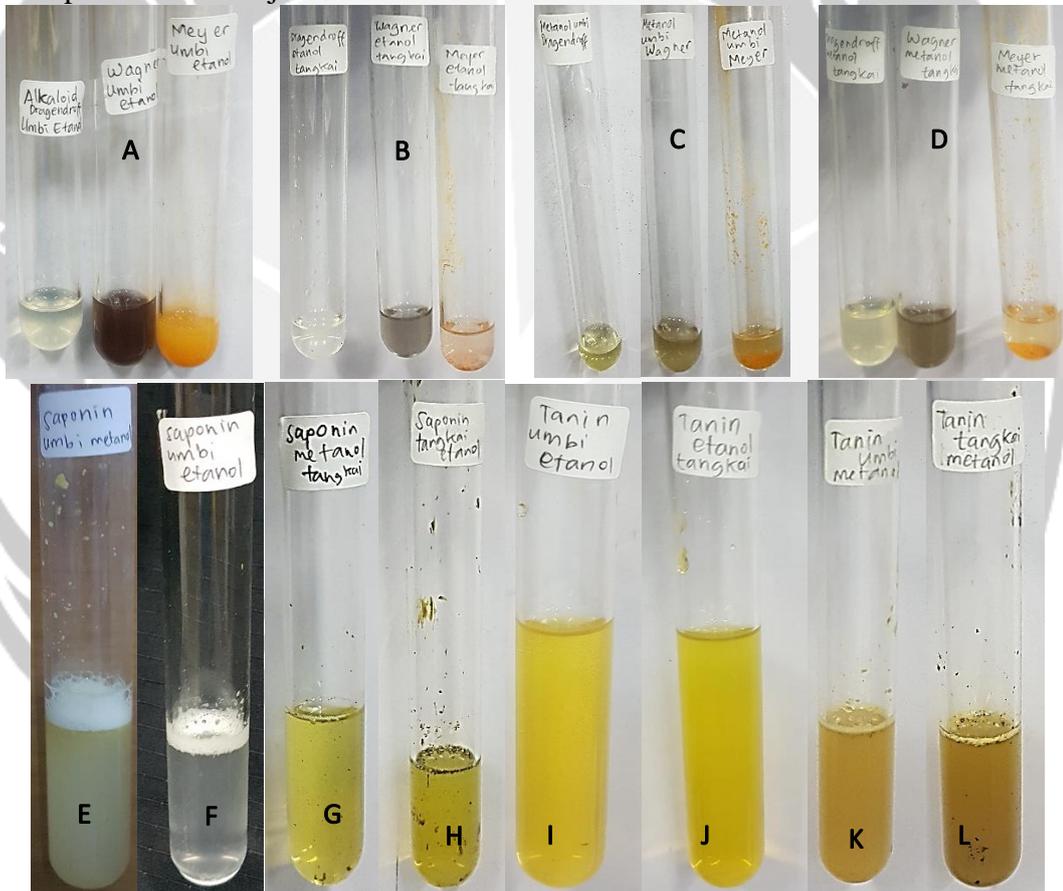
A: Etanol umbi talas

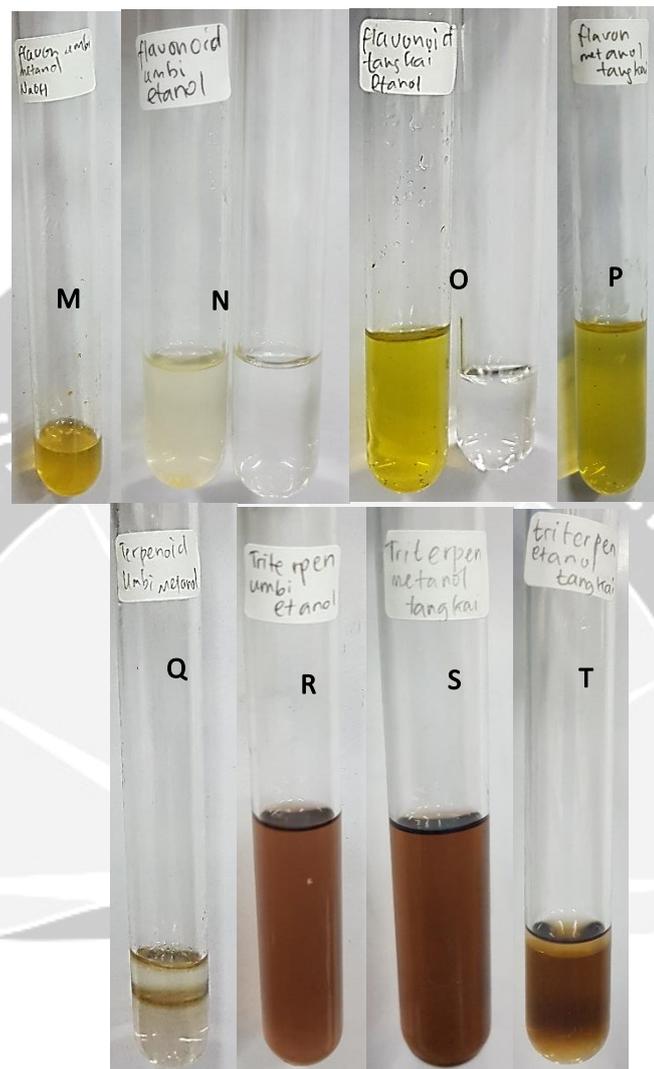
B: Metanol umbi talas

C: Etanol tangkai daun talas

D: Metanol tangkai daun talas

Lampiran 6. Hasil Uji Fitokimia Ekstrak Talas

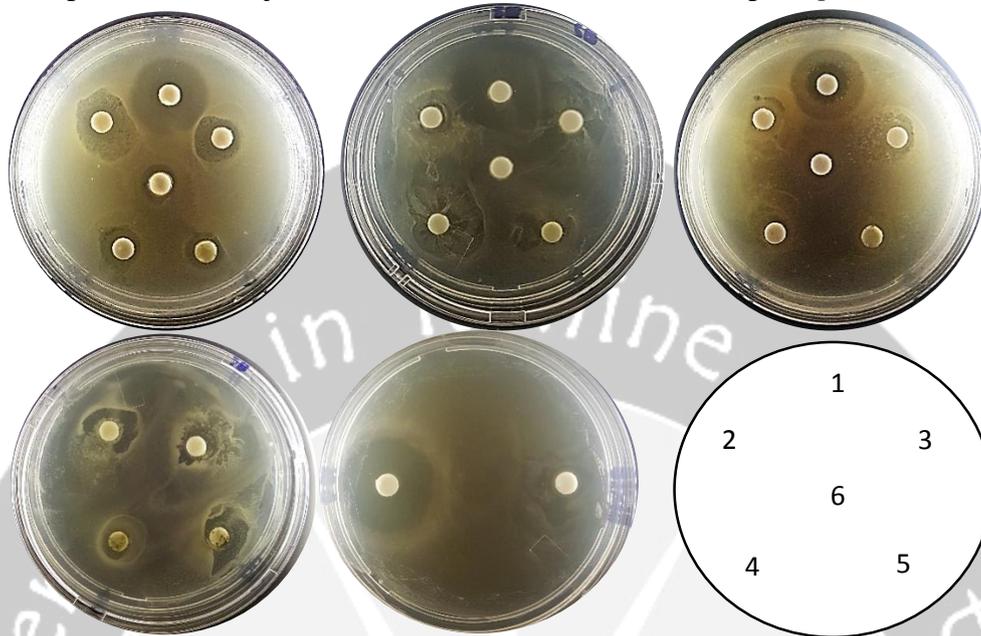




Keterangan gambar (kiri ke kanan secara berurutan):

- A, E, I, M, Q = alkaloid, saponin, tanin, flavonoid, dan triterpenoid-steroid ekstrak umbi etanol
- B, F, J, N, R = alkaloid, saponin, tanin, flavonoid, dan triterpenoid-steroid ekstrak tangkai daun etanol
- C, G, K, O, S = alkaloid, saponin, tanin, flavonoid, dan triterpenoid-steroid ekstrak umbi metanol
- D, H, L, P, T = alkaloid, saponin, tanin, flavonoid, dan triterpenoid-steroid ekstrak tangkai daun metanol

Lampiran 7. Hasil uji aktivitas antibakteri ekstrak terhadap *S. epidermidis*



Keterangan :

1 = Kontrol positif kloramfenikol

2 = Ekstrak umbi metanol konsentrasi 10 mg/ml

3 = Ekstrak umbi etanol konsentrasi 10 mg/ml

4 = Ekstrak tangkai metanol konsentrasi 10 mg/ml

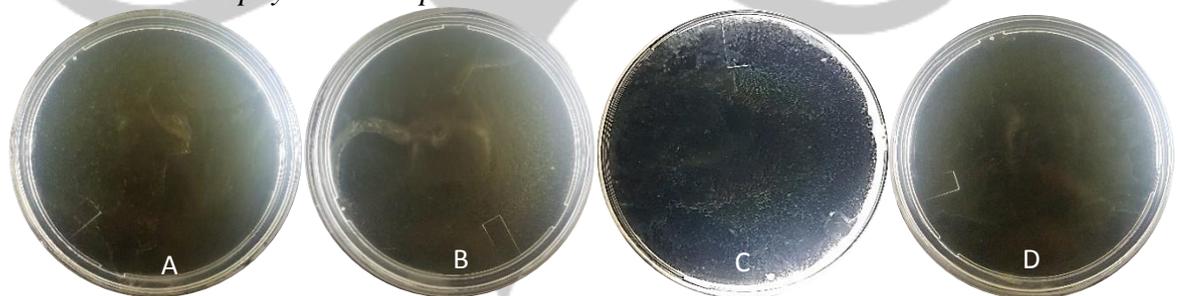
5 = Ekstrak tangkai etanol konsentrasi 10 mg/ml

6 = kontrol negatif DMSO

Gambar bawah: kiri atas – umbi etanol; kiri bawah – tangkai etanol; kanan atas – umbi metanol; kanan bawah – tangkai metanol,

Gambar tengah bawah: kiri – kloramfenikol; kanan – DMSO

Lampiran 8. Hasil konsentrasi hambat minimum ekstrak 5 mg/ml terhadap *Staphylococcus epidermidis*



Keterangan :

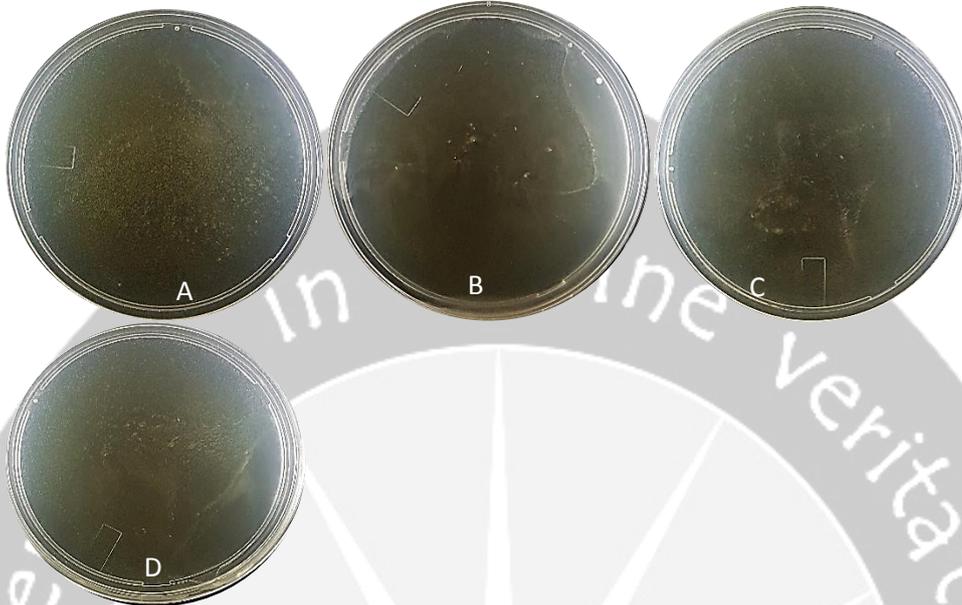
A = umbi metanol 5 mg/ml;

B = tangkai metanol 5 mg/ml;

C = umbi etanol 5 mg/ml;

D = tangkai etanol 5 mg/ml

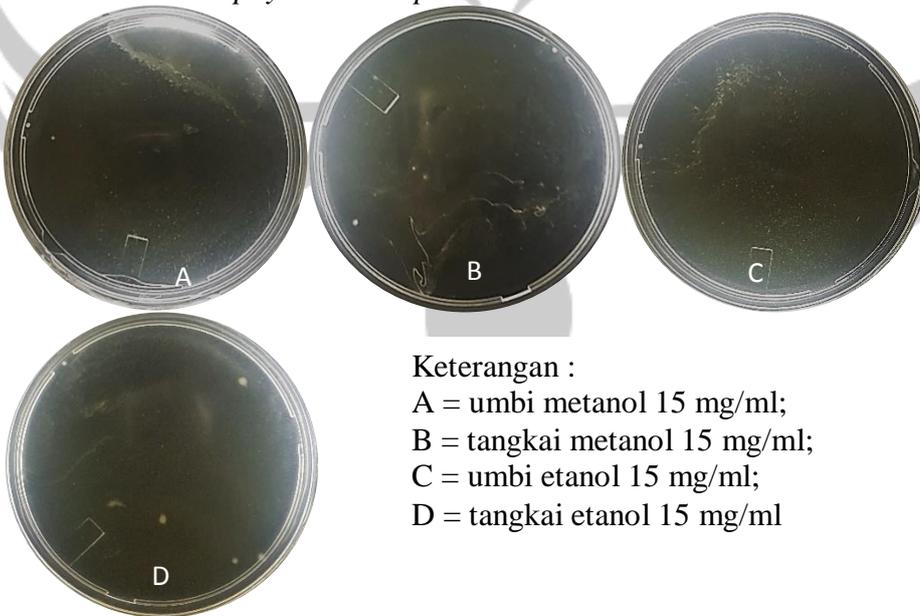
Lampiran 9. Hasil konsentrasi hambat minimum ekstrak 10 mg/ml terhadap *Staphylococcus epidermidis*



Keterangan :

- A = umbi metanol 10 mg/ml;
- B = tangkai metanol 10 mg/ml;
- C = umbi etanol 10 mg/ml;
- D = tangkai etanol 10 mg/ml

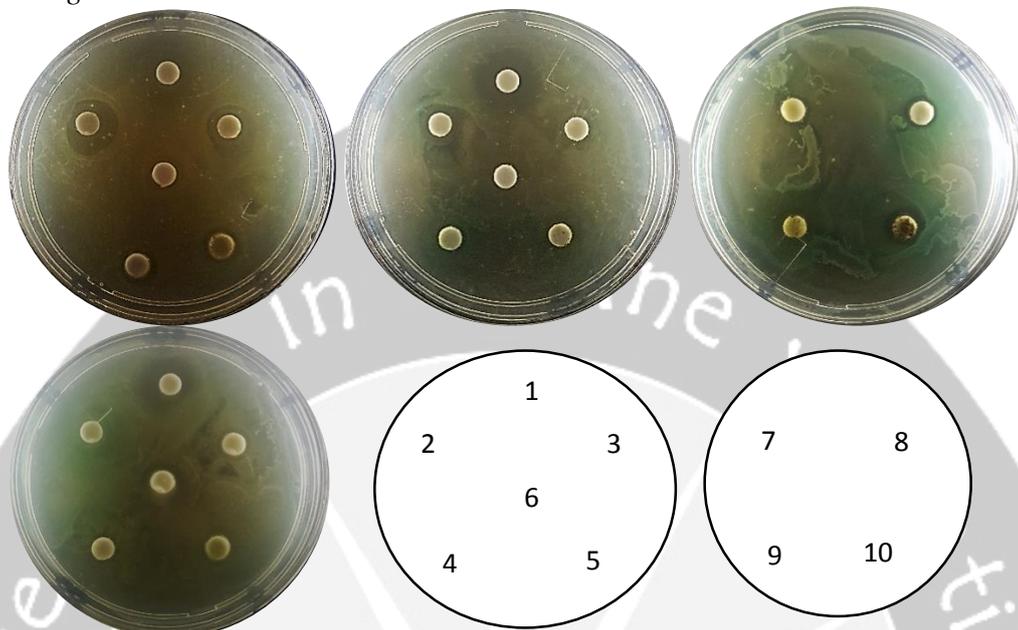
Lampiran 10. Hasil konsentrasi hambat minimum ekstrak 15 mg/ml terhadap *Staphylococcus epidermidis*



Keterangan :

- A = umbi metanol 15 mg/ml;
- B = tangkai metanol 15 mg/ml;
- C = umbi etanol 15 mg/ml;
- D = tangkai etanol 15 mg/ml

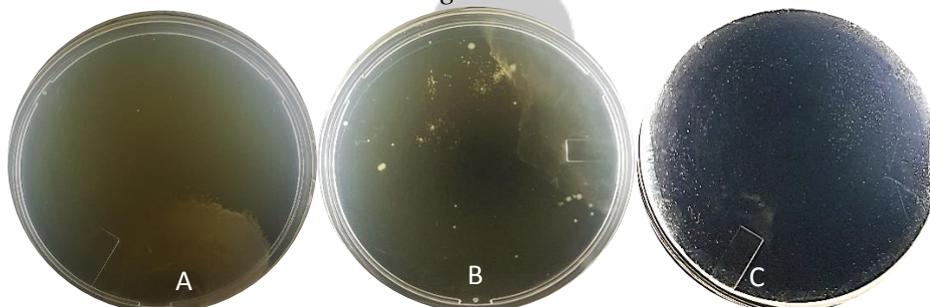
Lampiran 11. Hasil uji aktivitas antibakteri ekstrak terhadap *Pseudomonas aeruginosa*



Keterangan :

- 1 = Kontrol positif kloramfenikol
- 2 = Ekstrak umbi metanol konsentrasi 10 mg/ml
- 3 = Ekstrak umbi etanol konsentrasi 10 mg/ml
- 4 = Ekstrak tangkai metanol konsentrasi 10 mg/ml
- 5 = Ekstrak tangkai etanol konsentrasi 10 mg/ml
- 6 = kontrol negatif DMSO
- 7 = Ekstrak umbi etanol konsentrasi 10 mg/ml
- 8 = Ekstrak umbi metanol konsentrasi 10 mg/ml
- 9 = Ekstrak tangkai etanol konsentrasi 10 mg/ml
- 10 = Ekstrak tangkai metanol konsentrasi 10 mg/ml

Lampiran 12. Hasil konsentrasi hambat minimum ekstrak 5 mg/ml terhadap *Pseudomonas aeruginosa*





Keterangan :

A = umbi metanol 5 mg/ml;

B = tangkai metanol 5 mg/ml;

C = umbi etanol 5 mg/ml;

D = tangkai etanol 5 mg/ml

Lampiran 13. Hasil konsentrasi hambat minimum ekstrak 10 mg/ml terhadap *Pseudomonas aeruginosa*



Keterangan :

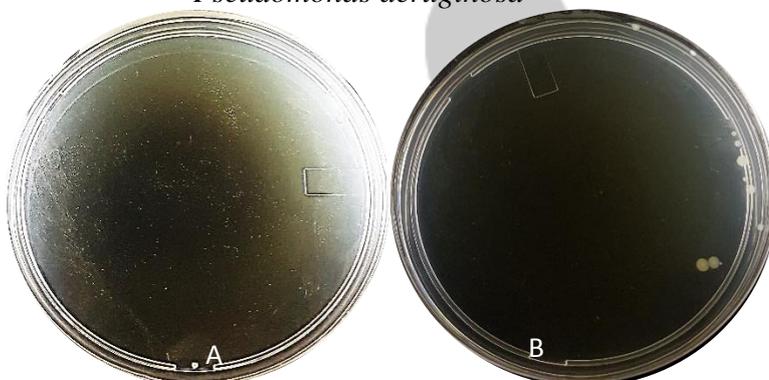
A = umbi metanol 10 mg/ml;

B = tangkai metanol 10 mg/ml;

C = umbi etanol 10 mg/ml;

D = tangkai etanol 10 mg/ml

Lampiran 14. Hasil konsentrasi hambat minimum ekstrak 15 mg/ml terhadap *Pseudomonas aeruginosa*





Keterangan :

- A = umbi metanol 15 mg/ml;
 B = tangkai metanol 15 mg/ml;
 C = umbi etanol 15 mg/ml;
 D = tangkai etanol 15 mg/ml

Lampiran 15. Sertifikat *Staphylococcus epidermidis* dan *Pseudomonas aeruginosa*



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SERTIFIKAT HASIL UJI

Pengujian Mikrobiologi

1. Contoh Uji : Stock Strain Balai Laboratorium Kesehatan Yogyakarta
2. Asal Contoh uji : Oksoid
3. Penguji : Dra. Darwani, M.Sc.
4. Jabatan : PLK Ahli Madya Balai Lab. Kesehatan Yogyakarta
5. Tanggal Pengujian : 1-6 Februari 2019
6. Peminta : Pauline Nathania
7. Alamat : Aniv. Atma Jaya Yogyakarta

Uraian : Biakan murni *Staphylococcus epidermidis* ATCC 12228

NO	PARAMETER	SATUAN	HASIL UJI	METODE
1	<i>Staphylococcus epidermidis</i> ATCC 12228	Tabung	Uji isolasi dan Identifikasi sesuai dengan karakteristik strain <i>Staphylococcus epidermidis</i> ATCC 12228.	Biakan & Identifikasi

Catatan :

1. Hasil uji ini hanya berlaku untuk contoh yang diuji

Yogyakarta, 6 Februari 2019.

 Sri Widayastuti, SSI, M.Kes.
 NIP. 497109061996032004



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SERTIFIKAT HASIL UJI

Pengujian Mikrobiologi

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6. Peminta : Pauline Nathania
7. Alamat : Aniv. Atma Jaya Yogyakarta

Uraian : Biakan murni *Pseudomonas aeruginosa* ATCC 27853

NO	PARAMETER	SATUAN	HASIL UJI	METODE
1	<i>Pseudomonas aeruginosa</i> ATCC 27853	Tabung	Uji isolasi dan Identifikasi sesuai dengan karakteristik strain <i>Pseudomonas aeruginosa</i> ATCC 27853.	Biakan & Identifikasi

Catatan :

1. Hasil uji ini hanya berlaku untuk contoh yang diuji

Yogyakarta, 6 Februari 2019.

 Sri Widayastuti, SSI, M.Kes.
 NIP. 497109061996032004

Lampiran 16. Hasil uji ANOVA SPSS luas zona hambat ekstrak terhadap bakteri *Staphylococcus epidermidis* dan *Pseudomonas aeruginosa*

Between-Subjects Factors

	Value Label	N
pengekstrak	1.00 metanol	20
	2.00 etanol	20
bagian	1.00 umbi	20
	2.00 tangkai	20
bakteri	1.00 S. epider	20
	2.00 P. aeru	20

Tests of Between-Subjects Effects

Dependent Variable: lzh

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	46.867 ^a	7	6.695	6.768	.000
Intercept	77.234	1	77.234	78.068	.000
pengekstrak	2.915	1	2.915	2.946	.096
bagian	2.386	1	2.386	2.412	.130
bakteri	37.504	1	37.504	37.909	.000
pengekstrak * bagian	.572	1	.572	.578	.452
pengekstrak * bakteri	.993	1	.993	1.004	.324
bagian * bakteri	.897	1	.897	.907	.348
pengekstrak * bagian * bakteri	1.600	1	1.600	1.617	.213
Error	31.658	32	.989		
Total	155.759	40			
Corrected Total	78.525	39			

a. R Squared = .597 (Adjusted R Squared = .509)

Lampiran 17. Perhitungan Rendemen Ekstrak Etanol dan Metanol Umbi dan Tangkai Daun Talas

$$\text{Rumus: Hasil rendemen} = \frac{\text{berat ekstrak}}{\text{berat sampel}} \times 100\%$$

$$\text{Umbi etanol} : \frac{1,5448+0,9448 \text{ gram}}{90 \text{ gram}} \times 100\% = 2,777 \%$$

$$\text{Umbi metanol} : \frac{9,8027 \text{ gram}}{60 \text{ gram}} \times 100\% = 16,34 \%$$

$$\text{Tangkai etanol} : \frac{1,3224+10,2522 \text{ gram}}{180 \text{ gram}} \times 100\% = 6,43 \%$$

$$\text{Tangkai metanol} : \frac{16,3264 \text{ gram}}{25 \text{ gram}} \times 100\% = 65,3056 \%$$

Lampiran 18. Perhitungan Nilai QE Flavonoid Kuantitatif (*Total Flavonoid Content/ TFC*)

Rumus: $\frac{R \times D, F \times V \times 100}{w}$ $R^2 = 0,9871$

Persamaan deret standar yang digunakan $\rightarrow y = 0,0641x - 0,0038$

TFC umbi etanol : $\frac{3,69 \frac{\mu\text{g}}{\text{ml}} \times 5 \times 4,6 \text{ ml} \times 100}{23 \text{ mg}} = 369 \mu\text{g QE/mg ekstrak}$

TFC umbi metanol : $\frac{2,34 \frac{\mu\text{g}}{\text{ml}} \times 5 \times 4 \text{ ml} \times 100}{20 \text{ mg}} = 234 \mu\text{g QE/mg ekstrak}$

TFC tangkai etanol : $\frac{17,76 \frac{\mu\text{g}}{\text{ml}} \times 5 \times 6,5 \text{ ml} \times 100}{32 \text{ mg}} = 1,803,75 \mu\text{g QE/mg ekstrak}$

TFC tangkai metanol : $\frac{4,35 \frac{\mu\text{g}}{\text{ml}} \times 5 \times 10,7 \text{ ml} \times 100}{53,5 \text{ mg}} = 435 \mu\text{g QE/mg ekstrak}$