LAMPIRAN – LAMPIRAN

Lampiran 1. Dokumentasi Kegiatan Pembuatan Produk Tugas Akhir

a. Produk Bio-Oil Jerami dan Buah Ketapang

- **Bio-oil jerami maserasi 24 jam**

Karakteristik	Hasil
Massa Jenis (kg/m^3)	1260
Alkaloid	-
Saponin	-
Triterpenoid	+
Tannin (pmm)	0,121
Flavonoid (ppm)	28,996
Fenol (ppm)	0,052

- **Bio-oil jerami maserasi 48 jam**

Karakteristik	Hasil
Massa jenis (kg/m^3)	1156
Alkaloid	-
Saponin	+
Triterpenoid	+
Tannin (pmm)	0,609
Flavonoid (ppm)	45,71
Fenol (ppm)	0,031

- **Bio-oil jerami dan buah ketapang maserasi 24 jam**

Karakteristik	Hasil
Massa Jenis (kg/m^3)	1160
Alkaloid	-
Saponin	-
Triterpenoid	+
Tannin (pmm)	1,111
Flavonoid (ppm)	77,348
Fenol (ppm)	0,266

- **Bio-oil jerami dan buah ketapang maserasi 48 jam**

Karakteristik	Hasil
Massa Jenis (kg/m^3)	1240
Alkaloid	+
Saponin	-
Triterpenoid	+
Tannin (pmm)	2,021
Flavonoid (ppm)	74,875
Fenol (ppm)	0,714

- **Bio-oil buah ketapang maserasi 24 jam**

Karakteristik	Hasil
Massa Jenis kg/m^3)	1265
Alkaloid	+
Saponin	+
Triterpenoid	+
Tannin (pmm)	0,261
Flavonoid (ppm)	91,505
Fenol (ppm)	0,477

- **Bio-oil buah ketapang maserasi 48 jam**

Karakteristik	Hasil
Massa Jenis (kg/m^3)	1314
Alkaloid	+
Saponin	+
Triterpenoid	+
Tannin (pmm)	0,478
Flavonoid (ppm)	140,284
Fenol (ppm)	0,591

b. Pembuatan Bio-Oil




c. Analisis Alkaloid

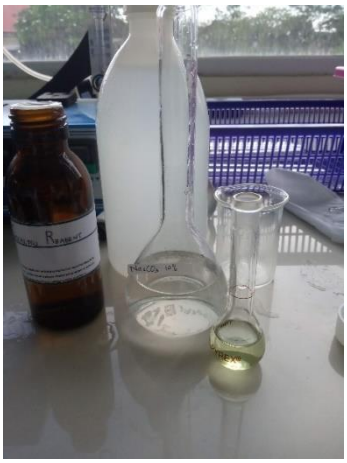
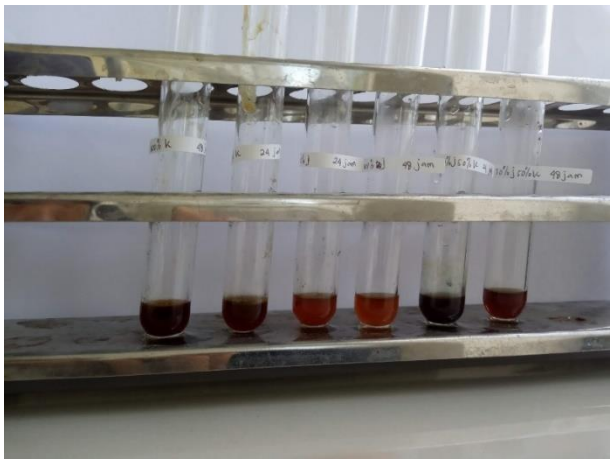
d. Analisis Saponin





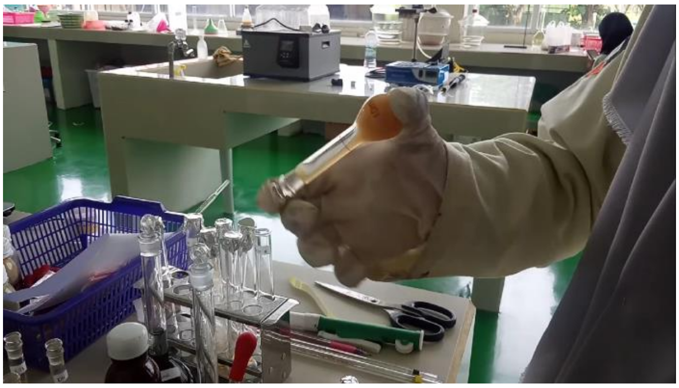


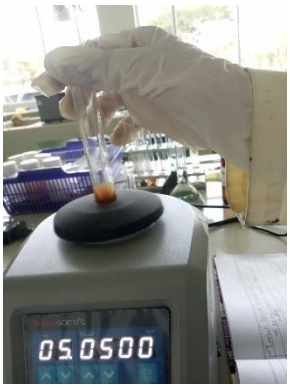

e. Analisis Triterpenoid

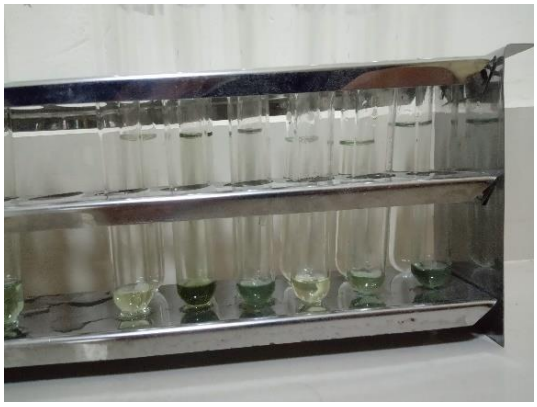
f. Analisis pH

g. Analisis Total Tanin

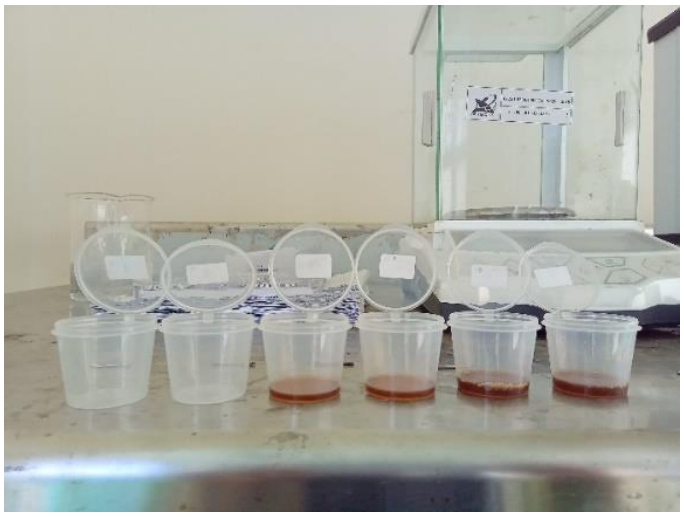


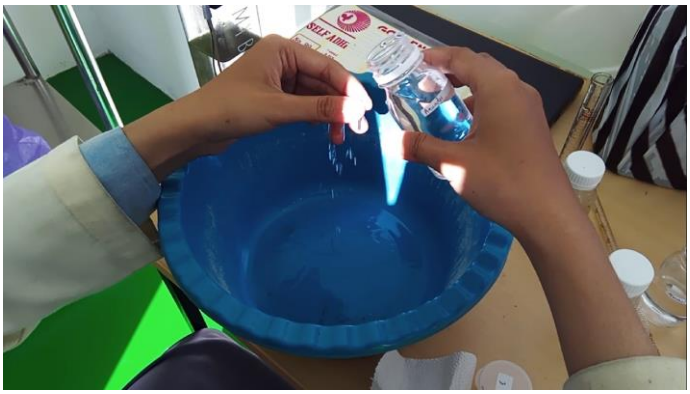


h. Analisis Total Flavonoid

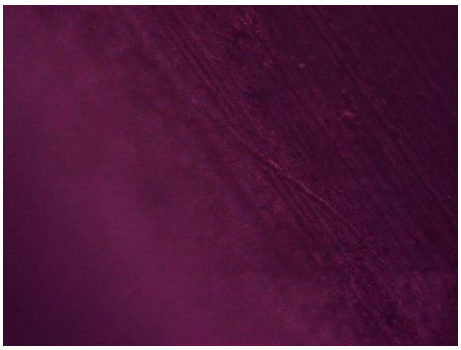


i. Analisis Laju Korosi

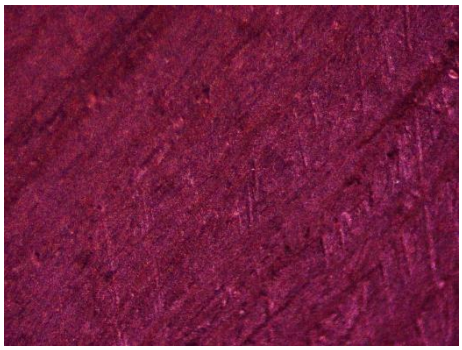




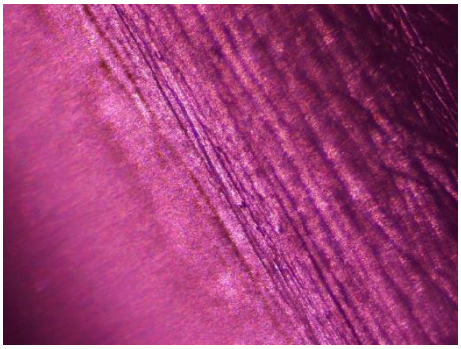
i. Permukaan korosi logam besi dan *mild steel*



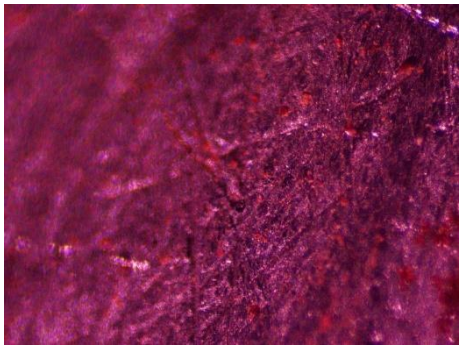
KA0B



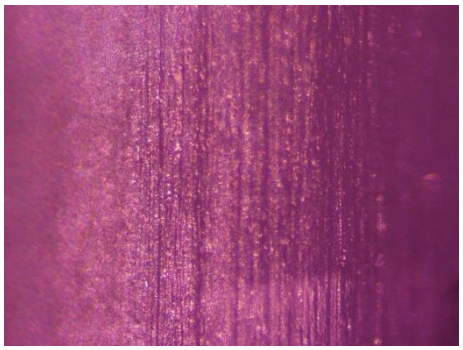
KA0M



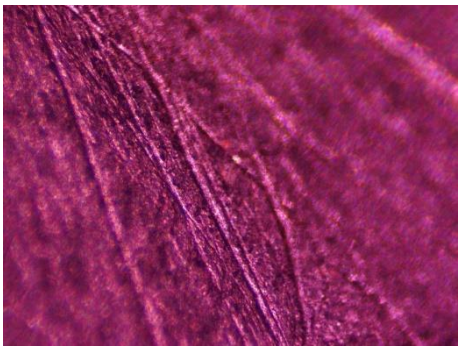
BA1B



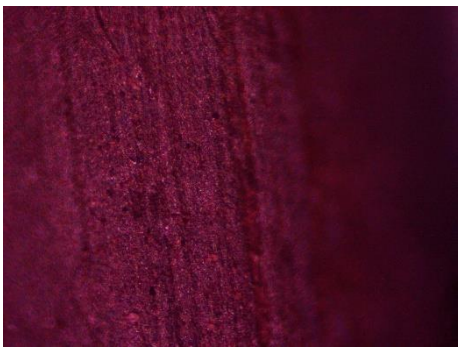
BA1M



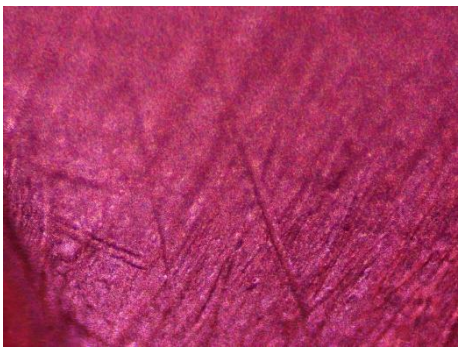
BA2B



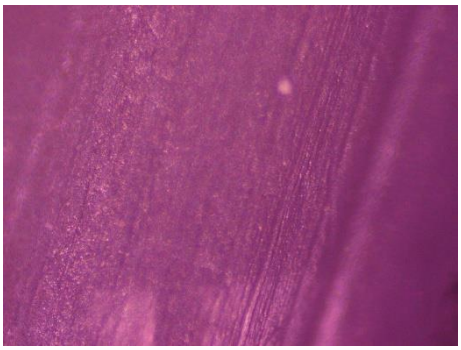
BA2B

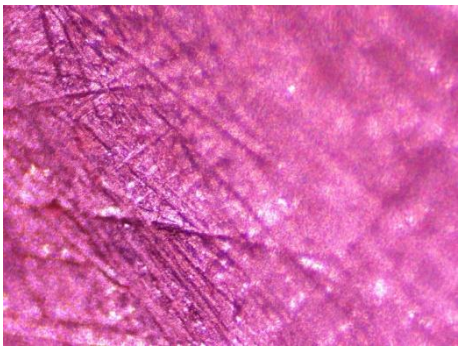


KL0B

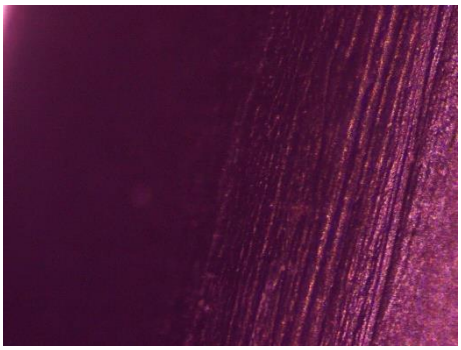


KL0M

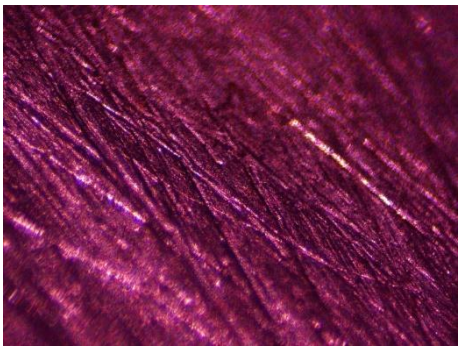




KL1B



KL1M



KL2B

KL2M

Lampiran 2. Hasil Analisis Laboratorium dan Perhitungan

a. Analisis Rendemen

1) Sampel J1 (100% Jerami maserasi 24 jam)

Massa ketapang sebelum maserasi = 100 gram

Volume pelarut sebelum maserasi = 1000 ml

Massa ketapang setelah maserasi = 99,08 gram

Volume pelarut setelah maserasi = 500 ml

- Rendemen Bahan Baku = $\frac{massa\ sebelum\ maserasi - massa\ setelah\ maserasi}{massa\ sebelum\ masserasi}$ x100%

  = $\frac{100-99,08}{100}$ x100%

  = 0,92%

- Rendemen Ekstraksi= $\frac{Volume\ \ sebelum\ maserasi - Volume\ setelah\ maserasi}{massa\ sebelum\ masserasi}$ x100%

  = $\frac{1000-700}{1000}$ x100%

  = 30%

2) Sampel J2 (100% Jerami maserasi 48 jam)

Massa ketapang sebelum maserasi = 100 gram

Volume pelarut sebelum maserasi = 1000 ml

Massa ketapang setelah maserasi = 99 gram

Volume pelarut setelah maserasi = 500 ml

- Rendemen Bahan Baku = $\frac{massa\ sebelum\ maserasi - massa\ setelah\ maserasi}{massa\ sebelum\ masserasi}$ x100%

  = $\frac{100-99}{100}$ x100%

  = 1%

- Rendemen Ekstraksi= $\frac{Volume\ \ sebelum\ maserasi - Volume\ setelah\ maserasi}{massa\ sebelum\ masserasi}$ x100%

  = $\frac{1000-600}{1000}$ x100%

  = 40%

3) Sampel JK1 (50% Jerami 50% Ketapang maserasi 24 jam)

Massa ketapang sebelum maserasi = 100 gram

Volume pelarut sebelum maserasi = 1000 ml

Massa ketapang setelah maserasi = 97 gram

Volume pelarut setelah maserasi = 500 ml

- Rendemen Bahan Baku = $\frac{massa\ sebelum\ maserasi - massa\ setelah\ maserasi}{massa\ sebelum\ masserasi}$ x100%

  = $\frac{100-97}{100}$ x100%

  = 3%

- Rendemen Ekstraksi= $\frac{Volume\ \ sebelum\ maserasi - Volume\ setelah\ maserasi}{massa\ sebelum\ masserasi}$ x100%

  = $\frac{1000-500}{1000}$ x100%

  = 50%

4) Sampel JK2 (50% Jerami 50% Ketapang maserasi 48 jam)

Massa ketapang sebelum maserasi = 100 gram

Volume pelarut sebelum maserasi = 1000 ml

Massa ketapang setelah maserasi = 99 gram

Volume pelarut setelah maserasi = 500 ml

- Rendemen Bahan Baku = $\frac{massa\ sebelum\ maserasi - massa\ setelah\ maserasi}{massa\ sebelum\ masserasi}$ x100%

  = $\frac{100-99}{100}$ x100%

  = 1%

- Rendemen Ekstraksi= $\frac{Volume\ \ sebelum\ maserasi - Volume\ setelah\ maserasi}{massa\ sebelum\ masserasi}$ x100%

  = $\frac{1000-500}{1000}$ x100%

  = 50%

5) Sampel K1 (100% Ketapang maserasi 24 jam)

Massa ketapang sebelum maserasi = 300 gram

Volume pelarut sebelum maserasi = 3000 ml

Massa ketapang setelah maserasi = 261 gram

Volume pelarut setelah maserasi = 1500 ml

- Rendemen Bahan Baku = $\frac{massa\ sebelum\ maserasi - massa\ setelah\ maserasi}{massa\ sebelum\ masserasi}$ x100%

  = $\frac{300-261}{300}$ x100%

  = 13%

- Rendemen Ekstraksi= $\frac{Volume\ \ sebelum\ maserasi - Volume\ setelah\ maserasi}{massa\ sebelum\ masserasi}$ x100%

  = $\frac{3000-1500}{3000}$ x100%

  = 50%

6) Sampel K2 (100% Ketapang maserasi 24 jam)

Massa ketapang sebelum maserasi = 300 gram

Volume pelarut sebelum maserasi = 3000 ml

Massa ketapang setelah maserasi = 289 gram

Volume pelarut setelah maserasi = 1500 ml

- Rendemen Bahan Baku = $\frac{massa\ sebelum\ maserasi - massa\ setelah\ maserasi}{massa\ sebelum\ masserasi}$ x100%

  = $\frac{300-289}{300}$ x100%

  = 4,93%

- Rendemen Ekstraksi= $\frac{Volume\ \ sebelum\ maserasi - Volume\ setelah\ maserasi}{massa\ sebelum\ masserasi}$ x100%

  = $\frac{3000-1500}{3000}$ x100%

  = 50%

b. Analisis Alkaloid

- Pembuatan Larutan HCL 2N dari HCl 37%

  Konsentrasi Molaritas HCl 37%

  M = $\frac{\%HCl\ x\ \rho\ x\ 1000}{Mr\ HCl}$

  M = $\frac{37\%\ x\ 1{,}18\ \frac{g}{ml}\ x\ 1000}{36{,}5}$

  M = 11,96 M

Konsentrasi Molaritas larutan yang akan dibuat

N = M x electron

$M = \frac{N}{elektron}$

$M = \frac{2N}{1}$

M = 2N = 2M

M1 V1 = M2 V2

11,96 M x V1 = 2M x 100 ml

$V1 = \frac{2M\ x\ 100ml}{11{,}96M}$

V1 = 16,722 ml

c. Analisis Saponin

Pembuatan Larutan HCL 2N dari HCl 37%

Konsentrasi Molaritas HCl 37%

$M = \frac{\%HCl\ x\ \rho\ x\ 1000}{Mr\ HCl}$

$M = \frac{37\%\ x\ 1{,}18\ \frac{g}{ml}\ x\ 1000}{36{,}5}$

M = 11,96 M

Konsentrasi Molaritas larutan yang akan dibuat

N = M x electron

$M = \frac{N}{elektron}$

$M = \frac{2N}{1}$

M = 2N = 2M

M1 V1 = M2 V2

11,96 M x V1 = 2M x 100 ml

$V1 = \frac{2M\ x\ 100ml}{11{,}96M}$

V1 = 16,722 ml

d. Analisis Total Tannin

- Pembuatan larutan $Na_2CO_3$20%

  $Na_2CO_3$20% = $\frac{massa\ \text{Na2CO3 (mg)}}{100\ mg\ pelarut\ (akuades)}$ x 100%

  Massa $Na_2CO_3$20 = 20 mg

  Pelarut (Akuades) = 100 mg = 100 ml

- Pengenceran larutan standar

  Larutan standar induk dibuat pengenceran 5x, 10x, 20x, dan 100x

  5x pengenceran = $\frac{10\ ml}{5x}$ =2 ml larutan induk dalam 10 ml larutan

  10x pengenceran = $\frac{10\ ml}{10x}$ =1 ml larutan induk dalam 10 ml larutan

  20x pengenceran = $\frac{10\ ml}{20x}$ =0,5 ml larutan induk dalam 10 ml larutan

  100x pengenceran = $\frac{10\ ml}{100x}$ =0,1 ml larutan induk dalam 10 ml larutan

- Konsentrasi kurva standar (ppm)

  Larutan standar dibuat dari larutan induk asam tanat

  1 mg asam tanat dalam 100 ml larutan = $\frac{1\ mg}{100\ ml}$ = 0,01 ppm

  Lakukan pengenceran 5x, 10x, 20x, 100x dan hitung konsentrasi larutan dalam ppm

  5x pengenceran = $\frac{0{,}01ppm}{5\ x}$ = 0,002 ppm

  10x pengenceran = $\frac{0{,}01\ ppm}{10\ x}$ = 0,001 ppm

  20x pengenceran = $\frac{0{,}01\ ppm}{20\ x}$ = 0,0005 ppm

  100x pengenceran = $\frac{0{,}01\ ppm}{100\ x}$ = 0,0001 ppm

e. Analisis Total Flavonoid

- Pembuatan Larutan Na_2CO_3 10%

  $Na_2CO_3$10% = $\frac{massa\ \text{Na2CO3 (mg)}}{100\ mg\ pelarut\ (akuades)}$ x 100%

  Massa $Na_2CO_3$20 = 10 mg

  Pelarut (Akuades) = 100 mg = 100 ml

f. Analisis Total Fenol

- Pembuatan Larutan Na_2CO_3 10%

  Na_2CO_3 5% = $\frac{massa\ Na2CO3\ (mg)}{100\ mg\ pelarut\ (akuades)}$ x 100%

  Massa $Na_2CO_3$20 = 5 mg

  Pelarut (Akuades) = 100 mg = 100 ml

- Perhitungan Deret Standar dari larutan induk asam galat

  a. 0,1 ml

     $m_1v_1 = m_2v_2$

     100 ppm x 0,1 ml = m_2 x 0,5 ml

     $m_2 = \frac{100\ ppm\ x\ 0,1\ ml}{0,5\ ml}$

     m_2 = 20 ppm

  b. 0,2 ml

     $m_1v_1 = m_2v_2$

     100 ppm x 0,2 ml = m_2 x 0,5 ml

     $m_2 = \frac{100\ ppm\ x\ 0,3\ ml}{0,5\ ml}$

     m_2 = 40 ppm

  c. 0,3 ml

     $m_1v_1 = m_2v_2$

     100 ppm x 0,3 ml = m_2 x 0,5 ml

     $m_2 = \frac{100\ ppm\ x\ 0,3\ ml}{0,5\ ml}$

     m_2 = 60 ppm

  d. 0,4 ml

     $m_1v_1 = m_2v_2$

     100 ppm x 0,4 ml = m_2 x 0,5 ml

     $m_2 = \frac{100\ ppm\ x\ 0,4\ ml}{0,5\ ml}$

     m_2 = 80 ppm

e. 0,5 ml

$m_1v_1 = m_2v_2$

100 ppm x 0,5 ml = m_2 x 0,5 ml

$m_2 = \frac{100 \text{ ppm x } 0{,}5 \text{ ml}}{0{,}5\ ml}$

m_2 = 100 ppm

g. Analisis Laju Korosi

- Media Akuades

1. sampel KA0M

W_0 = 20,9876 gram

W_f = 20,9820 gram

A = 1151,438 mm^2 = 0,1151438 cm^2

t = 7 hari

$$R = \frac{Wo - Wf}{A\ x\ t} = \frac{20{,}9876 \text{ gr} - 20{,}9820 \text{ gr}}{0{,}1151438 \text{ cm2}\ x\ 7\ hari} = 6{,}95E\text{-}05 \text{ gr/cm}^2\text{.hari}$$

2. sampel KA0B

W_0 = 0,3914 gram

W_f =0,3900 gram

A = 113,04 mm^2 = 0,011304 cm^2

t = 7 hari

$$R = \frac{Wo - Wf}{A\ x\ t} = \frac{0{,}3914 \text{ gr} - 0{,}3900 \text{ gr}}{0{,}011304 \text{ cm2}\ x\ 7\ hari} = 0{,}000176929 \text{ gr/cm}^2\text{.hari}$$

3. sampel BA1M

W_0 = 18,8233 gram

W_f = 18,8142 gram

A = 1127,574 mm^2 = 0,1127574 cm^2

t = 7 hari

$$R = \frac{Wo - Wf}{A\ x\ t} = \frac{18{,}8233 \text{ gr} - 18{,}8142 \text{ gr}}{0{,}1127574 \text{ cm2}\ x\ 7\ hari} = 0{,}000115292 \text{ gr/cm}^2\text{.hari}$$

4. sampel BA1B

   W_0 = 0,3737 gram

   W_f = 0,3717 gram

   A = 107,5136 mm^2 = 0,01075136 cm^2

   t = 7 hari

   $$R = \frac{Wo - Wf}{A\ x\ t} = \frac{0{,}3737\ gr - 0{,}3717\ gr}{0{,}1075136\ cm2\ x\ 7\ hari} = 0{,}000265747\ gr/cm^2.hari$$

5. sampel BA2M

   W_0 = 19,5587 gram

   W_f = 19,5482 gram

   A = 1133,54 mm^2 = 0,113354 cm^2

   t = 7 hari

   $$R = \frac{Wo - Wf}{A\ x\ t} = \frac{19{,}5587\ gr - 19{,}5482\ gr}{0{,}113354\ cm2\ x\ 7\ hari} = 0{,}00028559\ gr/cm^2.hari$$

6. sampel BA2B

   W_0 = 0,4572 gram

   W_f = 0,4514 gram

   A = 130,1216 mm^2 = 0,01301216 cm^2

   t = 7 hari

   $$R = \frac{Wo - Wf}{A\ x\ t} = \frac{0{,}4572\ gr - 0{,}4514\ gr}{0{,}01301216\ cm2\ x\ 7\ hari} = 0{,}000636767\ gr/cm^2.hari$$

- Media Air Laut

1. sampel KL0M

   W_0 = 16,8154 gram

   W_f = 16,8072 gram

   A = 1079,846 mm^2 = 0,1079846 cm^2

   t = 7 hari

$$R = \frac{Wo - Wf}{A\ x\ t} = \frac{16{,}8154\ gr - 16{,}8072\ gr}{0{,}1079846\ cm2\ x\ t} = 0{,}000108481\ gr/cm^2.hari$$

2. sampel KL0B

   W_0 = 0,4080 gram

   W_f = 0,4062 gram

   A =120,579 mm^2 = 0,0120579 cm^2

   t = 7 hari

$$R = \frac{Wo - Wf}{A\ x\ t} = \frac{0{,}4080\ gr - 0{,}4062\ gr}{0{,}0120579\ cm2\ x\ 7\ hari} = 0{,}000213257\ gr/cm^2.hari$$

3. sampel BL1M

   W_0 = 19,5587 gram

   W_f = 19,5482 gram

   A = 1133,54 mm^2 = 0,113354 cm^2

   t = 7 hari

$$R = \frac{Wo - Wf}{A\ x\ t} = \frac{19{,}5587\ gr - 19{,}5482\ gr}{0{,}113354\ cm2\ x\ 7\ hari} = 0{,}000132329\ gr/cm^2.hari$$

4. sampel BL1B

   W_0 = 0,3470 gram

   W_f = 0,3435 gram

   A = 107,5136 mm^2 = 0,01075136 cm^2

   t = 7 hari

$$R = \frac{Wo - Wf}{A\ x\ t} = \frac{0{,}3470\ gr - 0{,}3435\ gr}{0{,}01075136\ cm2\ x\ 7\ hari} = 0{,}000465057\ gr/cm^2.hari$$

5. sampel BL2M

   W_0 = 17,7473 gram

   W_f = 17,7310 gram

   A = 1085,812 mm^2 = 0,1085812 cm^2

t = 7 hari

$$R = \frac{Wo - Wf}{A\ x\ t} = \frac{17{,}7473\ gr - 17{,}7310\ gr}{0{,}1085812\ cm2\ \ x\ 7\ hari} = 0{,}000214454\ gr/cm^2.hari$$

6. sampel BL2B

   W_0 = 0,3513 gram

   W_f = 0,3460 gram

   A =102,4896 mm^2 = 0,01024896 cm^2

   t = 7 hari

$$R = \frac{Wo - Wf}{A\ x\ t} = \frac{0{,}3513\ gr - 0{,}3460\ gr}{0{,}01024896\ cm2\ \ x\ 7\ hari} = 0{,}000738751\ gr/cm^2.hari$$

Lampiran 3. Hasil Analisis

a. Hasil Analisis Alkaloid



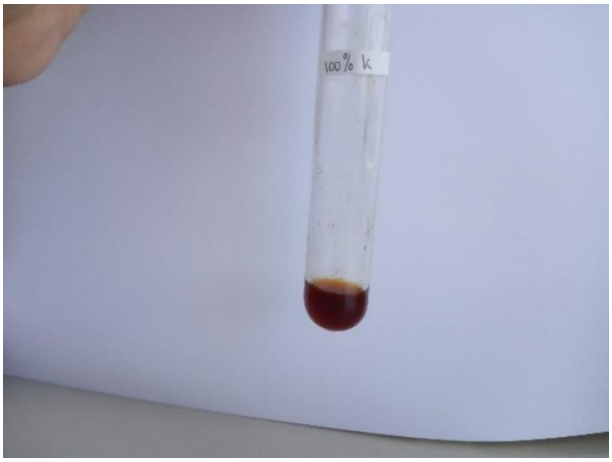


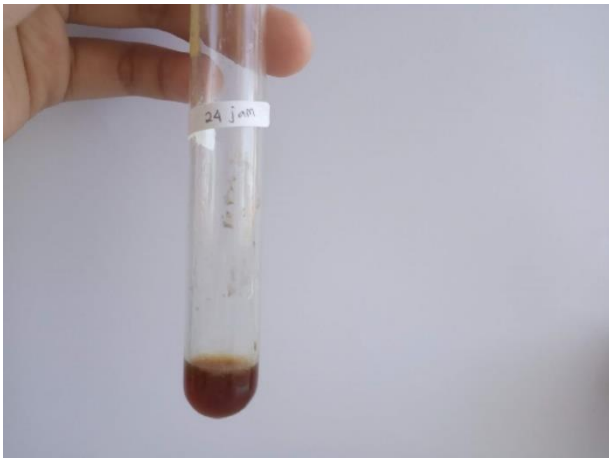
b. Hasil Analisis Saponin

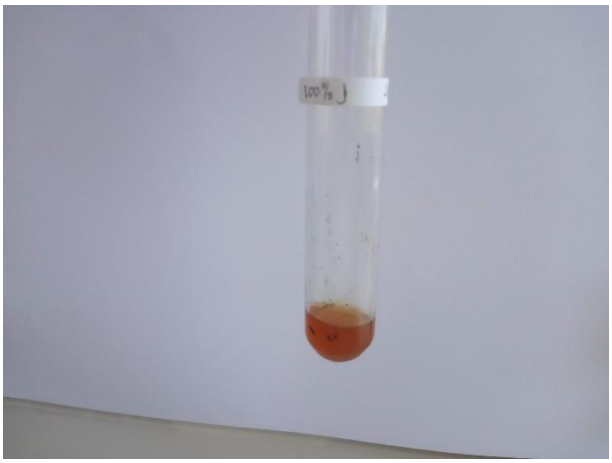


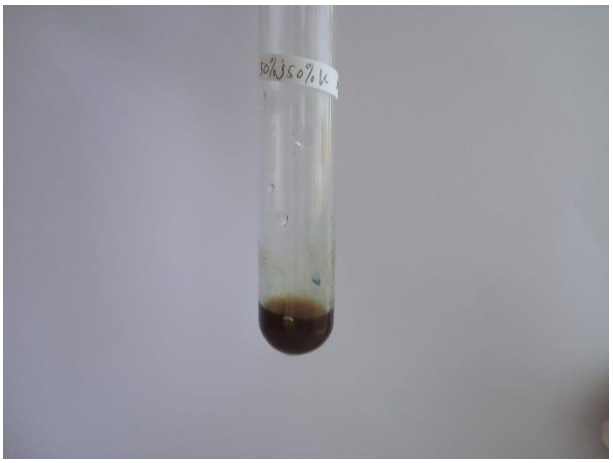


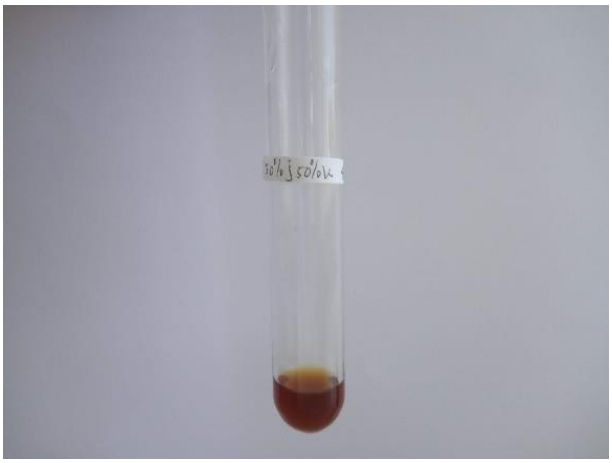

c. Hasil Analisis Triterpenoid

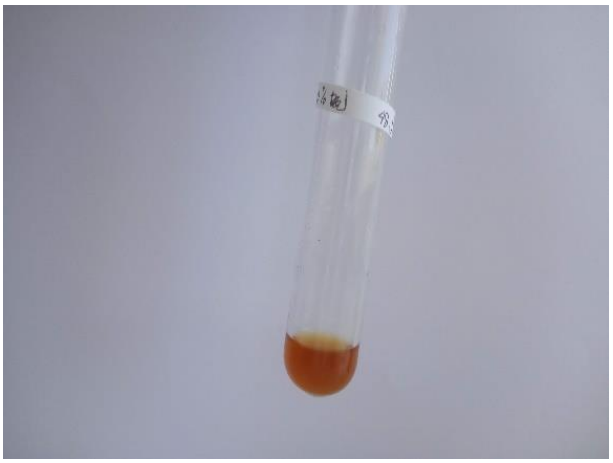




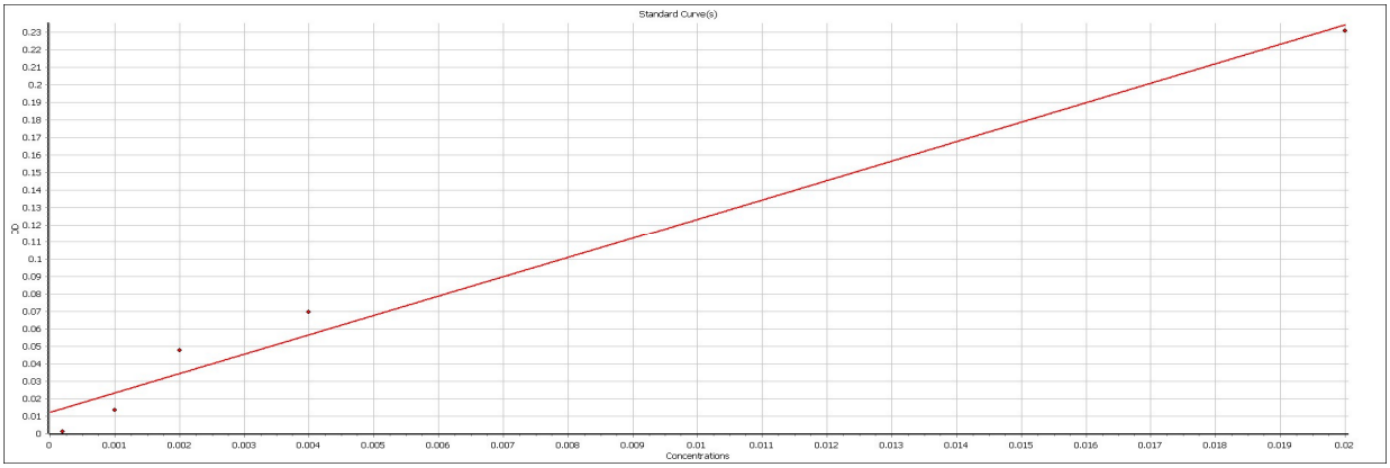




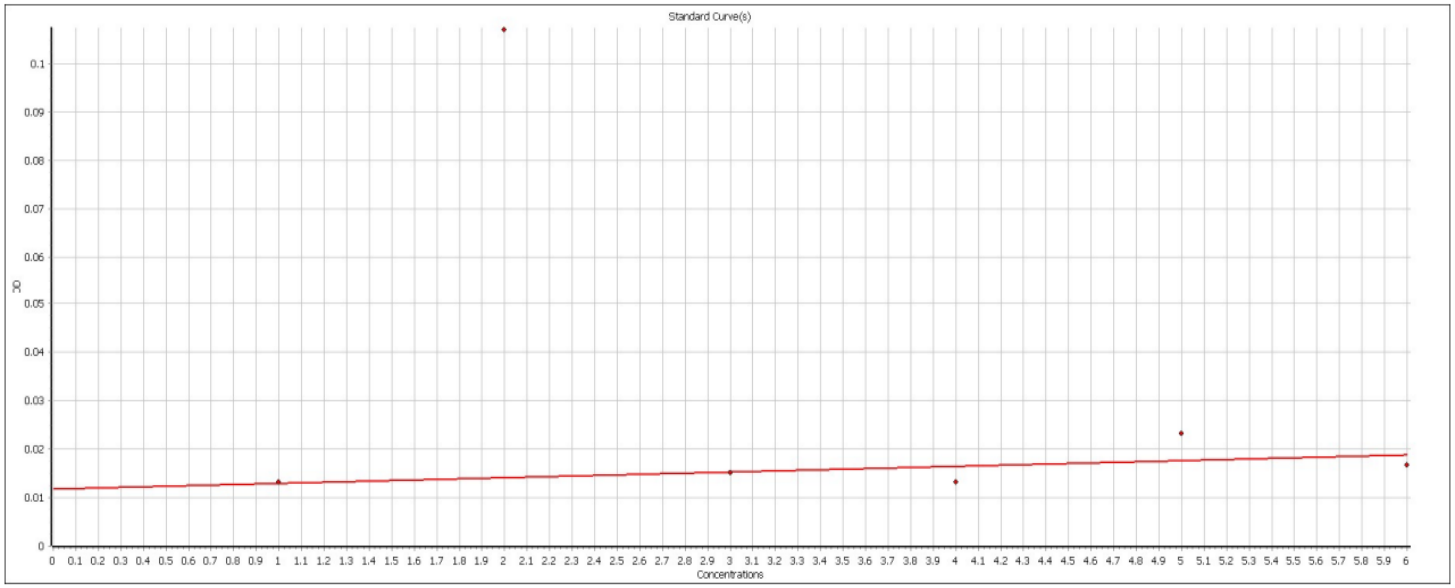




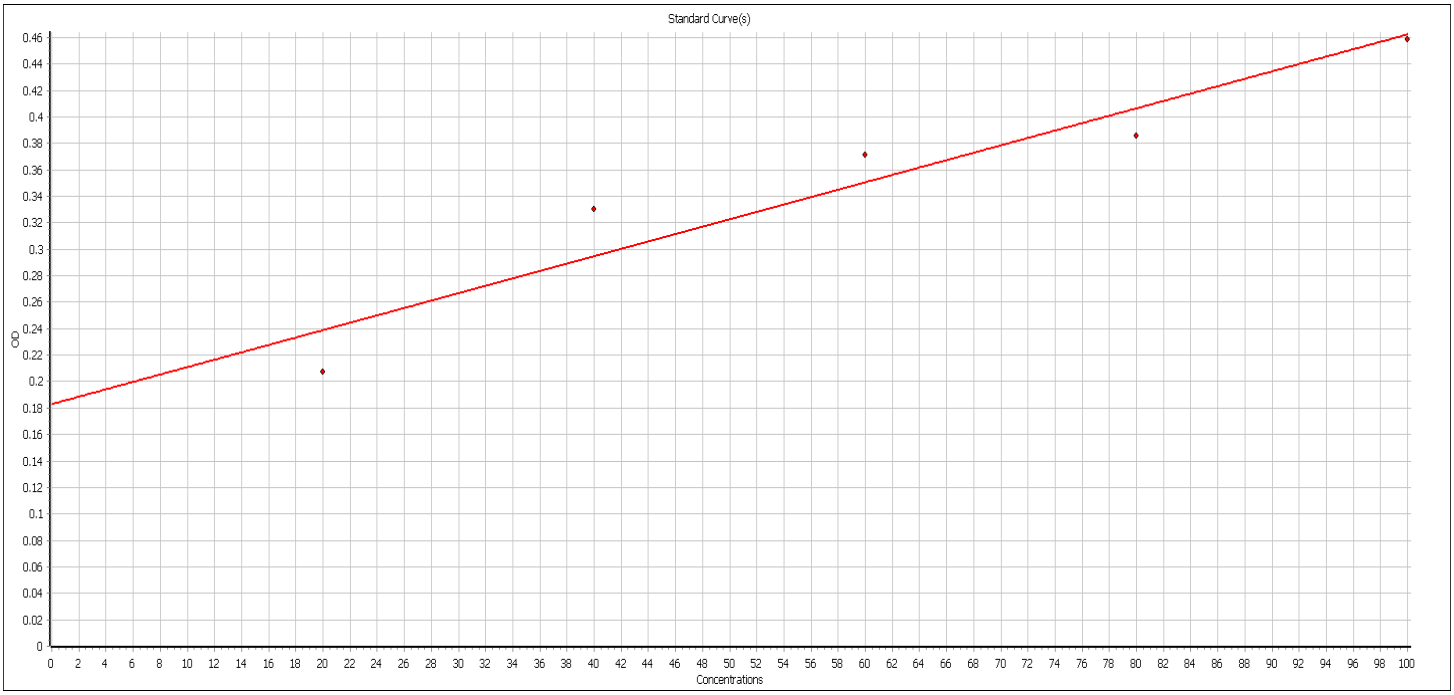
d. Kurva standar asam tanat menggunakan spektrofotometer *uv-vis*



e. Kurva standar flavonoid menggunakan spektrofotometer *uv-vis*



f. Kurva standar fenol menggunakan spektrofotometer *uv-vis*



g. Hasil analisis laju korosi

Tabel laju korosi besi dan *mild steel* dengan metode oles bio-oil

No	Keterangan sampel	Luas permukaan cm^2	Massa sebelum perendaman	Massa setelah perendaman	Nama sampel	Laju korosi
1	Jerami 100% 24 jam kontrol mild steel	10,91778	18,0495	18,0485	J1KM	1,3e-05
2	Jerami 100% 24 jam air laut mild steel	11,27574	19,3931	19,3603	J1LM	4,2e-04
3	Jerami 100% 24 jam akuades mild steel	11,09676	18,3544	18,3411	J1AM	1,7e-04
4	Jerami 100% 48 jam kontrol mild steel	11,27574	19,5414	19,5412	J2KM	2,5e-06
5	Jerami 100% 48 jam air laut mild steel	10,1422	15,2262	15,207	J2LM	2,7e-04
6	Jerami 100% 24 jam akuades mild steel	11,39506	18,2055	18,1889	J2AM	2,1e-04
7	Jerami 50% ketapang 50% 24 jam kontrol mild steel	10,1422	15,187	15,1882	JK1KM	-1,7e-05
8	Jerami 50% ketapang 50% 24 jam air laut mild steel	10,79846	17,7482	17,7133	JK1LM	4,6e-04

No	Keterangan sampel	Luas permukaan cm^2	Massa sebelum perendaman	Massa setelah perendaman	Nama sampel	Laju korosi
9	Jerami 50% ketapang 50% 24 jam akuades mild steel	10,38084	16,6065	16,5761	JK1AM	4,2e-04
10	Jerami 50% ketapang 50% 48 jam kontrol mild steel	11,0371	18,0606	18,0606	JK2KM	0
11	Jerami 50% ketapang 50% 48 jam air laut mild steel	11,45472	19,7489	19,726	JK2LM	0,000285597
12	Jerami 50% ketapang 50% 48 jam akuades mild steel	10,67914	16,7373	16,7178	JK2AM	0,000260856
13	Ketapang 100% 24 jam kontrol mild steel	11,15642	19,1686	19,1623	K1KM	8,1e-05
14	Ketapang 100% 24 jam air laut mild steel	11,51438	20,588	20,5535	K1LM	4,3e-04
15	Ketapang 100% 24 jam akuades mild steel	12,17064	23,0938	23,0541	K1AM	4,7e-04
16	Ketapang 100% 48 jam kontrol mild steel	11,3354	19,1977	19,1881	K2KM	1,2e-04
17	Ketapang 100% 48 jam air laut mild steel	10,38084	18,5353	18,5053	K2LM	4,1e-04
18	Ketapang 100% 48 jam akuades mild steel	10,7388	16,82	16,7937	K2AM	3,5e-04
19	Jerami 100% 24 jam kontrol besi	1,245952	0,444	0,4438	J1KB	2,3e-05
20	Jerami 100% 24 jam air laut besi	1,1304	0,3895	0,3865	J1LB	3,8e-04
21	Jerami 100% 24 jam akuades besi	1,065088	0,3876	0,3863	J1AB	1,7e-04
22	Jerami 100% 48 jam kontrol besi	1,240928	0,3912	0,3912	J2KB	0,0e+00
23	Jerami 100% 48 jam air laut besi	1,200736	0,403	0,4008	J2LB	2,6e-04
24	Jerami 100% 48 jam akuades besi	1,235904	0,4555	0,4538	J2AB	2,0e-04
25	Jerami 50% ketapang 50% 24 jam kontrol besi	1,075136	0,3711	0,3711	JK1KB	0,0e+00
26	Jerami 50% ketapang 50% 24 jam air laut besi	1,085184	0,351	0,35	JK1LB	1,3e-04
27	Jerami 50% ketapang 50% 24 jam akuades besi	1,10528	0,39	0,3865	JK1AB	4,5e-04

No	Keterangan sampel	Luas permukaan cm^2	Massa sebelum perendaman	Massa setelah perendaman	Nama sampel	Laju korosi
28	Jerami 50% ketapang 50% 48 jam kontrol besi	1,065088	0,3506	0,3499	JK2KB	9,3889e-05
29	Jerami 50% ketapang 50% 48 jam air laut besi	1,075136	0,3899	0,381	JK2LB	0,001182575
30	Jerami 50% ketapang 50% 48 jam akuades besi	1,125376	0,3697	0,3667	JK2AB	0,000380825
31	Ketapang 100% 24 jam kontrol besi	1,065088	0,3505	0,3485	K1KB	2,7e-04
32	Ketapang 100% 24 jam air laut besi	1,301216	0,4532	0,4501	K1LB	3,4e-04
33	Ketapang 100% 24 jam akuades besi	1,250976	0,3966	0,3936	K1AB	3,4e-04
34	Ketapang 100% 48 jam kontrol besi	1,065088	0,3433	0,3432	K2KB	1,3e-05
35	Ketapang 100% 48 jam air laut besi	1,185664	0,4213	0,4154	K2LB	7,1e-04
36	Ketapang 100% 48 jam akuades besi	1,165568	0,3772	0,3766	K2AB	7,4e-05
37	Kontrol tanpa penambahan bio-oil mild steel	10,61948	15,915	15,915	KU0M	0,0e+00
38	Kontrol tanpa penambahan bio-oil besi	1,024896	0,3446	0,3446	KU0B	0,0e+00

Tabel pH akuades sebelum dan sesudah perendaman besi dan *mild steel*

Sampel akuades sebelum perendaman	pH	Sampel akuades setelah perendaman	pH
KAO	7	KAOM	7
		KAOB	6
BA1	4	BA1M	4
		BA1B	4
BA2	3	BA2M	3
		BA2B	3

Tabel pH air laut sebelum dan sesudah perendaman besi dan *mild steel*

Sampel air laut sebelum perendaman	pH	Sampel air laut setelah perendaman	pH
KAO	7	KAOM	6
		KAOB	6
BA1	5	BA1M	4
		BA1B	4
BA2	4	BA2M	3
		BA2B	3

Lampiran 4. Riwayat Hidup Mahasiswa

Biodata Penulis

Nama	: Anisa Ikaromah
Tempat/tanggal lahir	: Cilacap, 14 April 2001
Alamat	: Dusun Karangtengah rt 04 rw 01, Desa Bangunreja, Kecamatan Kedungreja, Kabupaten Cilacap, Jawa Tengah
Telepon	: 082195298600
Hobi	: Olahraga dan Travelling
Motto	: “Jangan terlalu dipikirkan, karena bagian tersulit dari mengerjakan sesuatu adalah memikirkannya terlalu lama”
Riwayat Pendidikan	:
SD N Bangunreja 01	Tahun 2007 – 2013
MTs Alhikmah 2	Tahun 2013 – 2016
MA Alhikmah 2	Tahun 2016 – 2019
Politeknik Negeri Cilacap	Tahun 2019 – 2023