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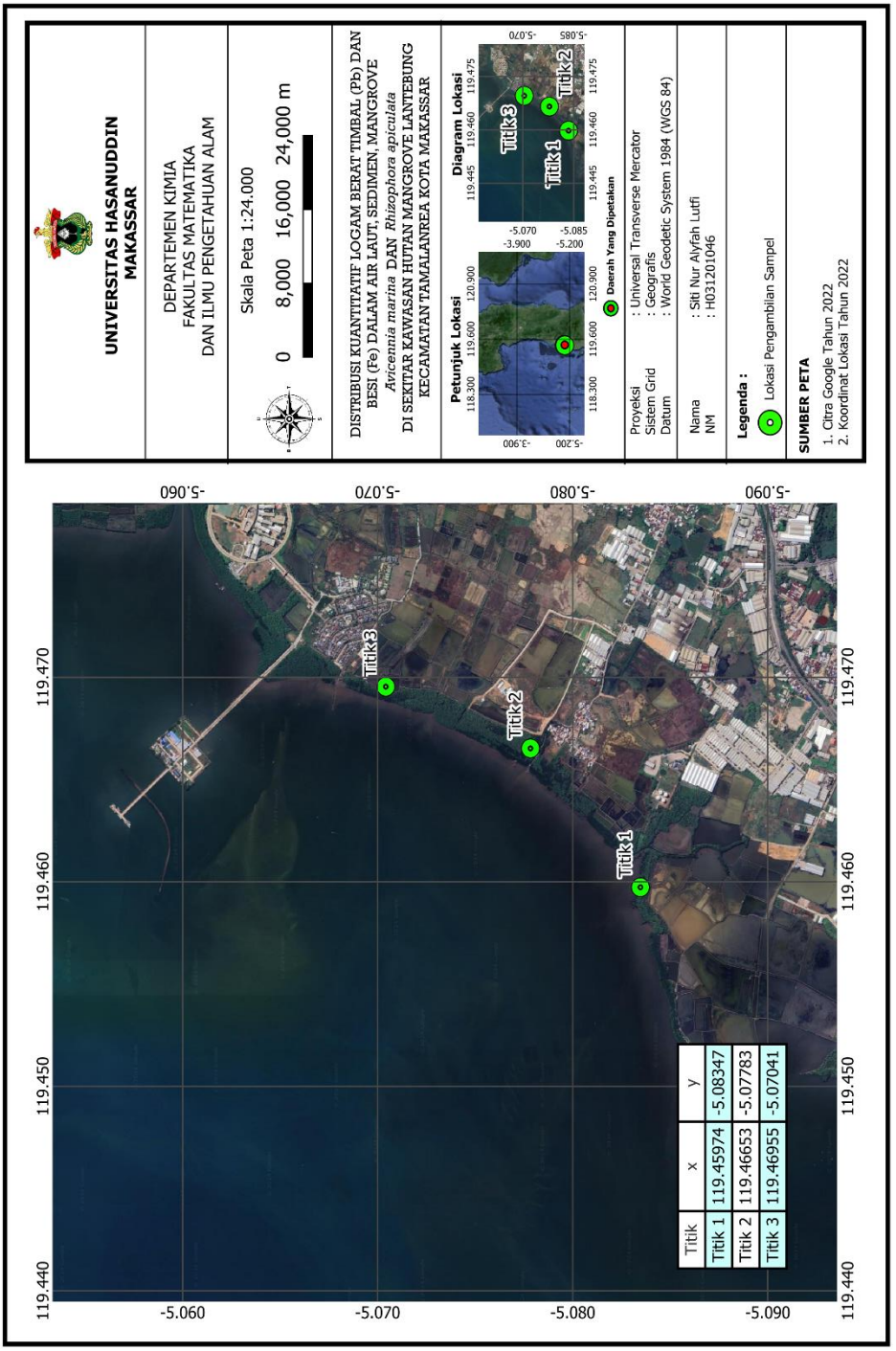
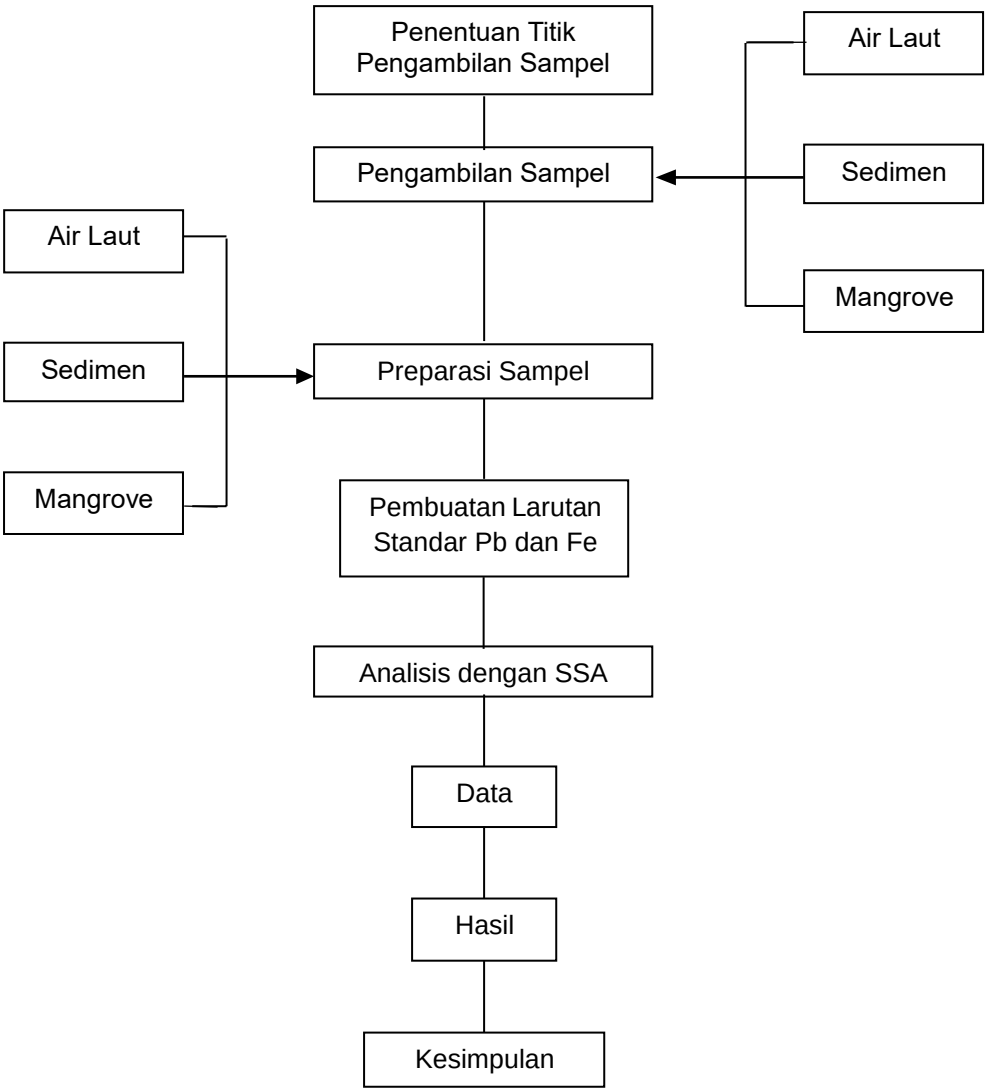
Lampiran 1. Peta Lokasi Pengambilan Sampel



Lampiran 2. Skema Kerja Penelitian



Lampiran 3. Bagan Kerja

1. Pengambilan Sampel

Air Laut

- Diambil menggunakan *water sampler*
- Dimasukkan kedalam botol polietilen sebanyak 1 L
- Ditambahkan larutan HNO_3 pekat hingga pH ≤ 2
- Dimasukkan dalam *cool box*
- Dibawa ke laboratoium

Sampel air laut

Sedimen

- Diambil sebanyak 700 g menggunakan alat *eckman grab*
- Dimasukkan ke dalam plastik sampel
- Dimasukkan ke dalam *cool box*
- Dibawa ke laboratorium

Sampel sedimen

Mangrove

- Diambil akar, batang dan daunnya yang tumbuh pada daerah pasang surut air laut menggunakan alat potong
- Dibersihkan
- Dimasukkan ke dalam plastik sampel
- Dimasukkan ke dalam *cool box*
- Dibawa ke laboratoium

Sampel mangrove

2. Penentuan Kadar Air

2.1 Penentuan Kadar Air pada Sedimen (SNI 8910:2021)

Sampel sedimen

- Dipisahkan dari benda asing yang bukan contoh uji, kemudian dikering-anginkan
- Ditimbang dengan teliti sebanyak 5 g menggunakan cawan petri yang telah diketahui bobot kosongnya
- Dimasukkan dalam oven pada suhu 105 °C selama 3 jam
- Didinginkan dalam desikator
- Ditimbang hingga bobot konstan untuk mengetahui jumlah air yang hilang.

Kadar Air

2.2 Penentuan Kadar Air pada Mangrove (Rachmawati dkk., 2018)

Mangrove

- Dibilas sampel akar, batang dan daun masing-masing mengggunakan akuabides, kemudian dikering-anginkan
- Dipotong kecil-kecil
- Ditimbang dengan teliti sebanyak 5 g menggunakan cawan petri yang telah diketahui bobot kosongnya
- Dimasukkan dalam oven pada suhu 80 °C selama 24 jam
- Didinginkan dengan desikator
- Ditimbang bagian-bagian mangrove hingga bobot konstan untuk mengetahui jumlah air yang hilang
- Dihitung kadar air

Kadar Air

3. Preparasi Sampel

3.1 Preparasi Sampel Air Laut (SNI 8995:2021)

Air laut

- Dipipet sebanyak 100 mL ke dalam gelas kimia 250 mL
- Ditambahkan 5 mL HNO_3 65%
- Dipanaskan hingga sisa volumenya 15-20 mL
- Didinginkan
- Disaring menggunakan kertas saring *Whatman* no. 42 ke dalam labu ukur 50 mL
- Diatur pada pH 2-3 dengan menambahkan NaOH/HNO_3
- Ditambahkan akuabides hingga tanda batas
- Dihomogenkan

Sampel air laut

3.2 Preparasi Sampel Sedimen (SNI 8910:2021)

Sampel sedimen

- Digerus sampai halus dan diayak dengan ayakan 150 *mesh*
- Ditimbang 2 gram kedalam gelas kimia 100 mL
- Ditambahkan 10 mL HNO_3 1:1,ditutup dengan kaca arloji
- Dipanaskan kurang lebih 10 menit, didinginkan
- Ditambahkan 5 mL HNO_3 pekat
- Dipanaskan kembali hingga volume 5 mL, didinginkan
- Ditambahkan 2 mL akuabides dan 3 mL H_2O_2 30%
- Dipanaskan kembali hingga volume 5 mL
- Ditambahkan 10 mL HCl pekat, dipanaskan hingga volume 5 mL, didinginkan
- Disaring menggunakan kertas saring *Whatman* no. 42 ke dalam labu ukur 100 mL

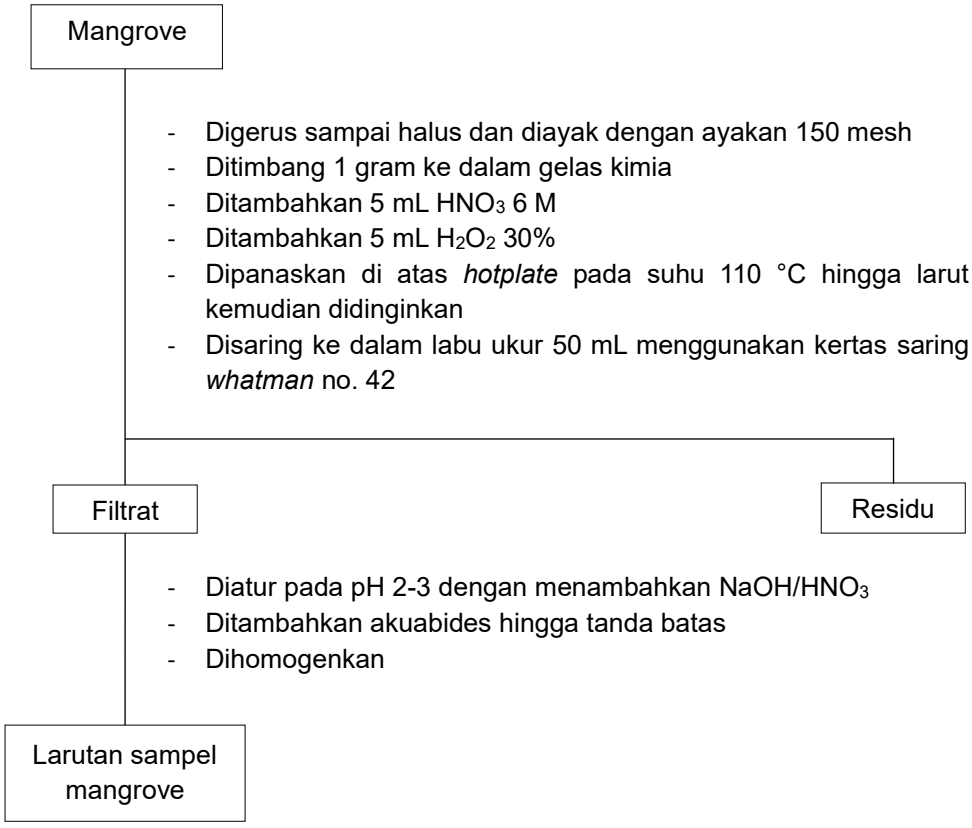
Filtrat

Residu

- Ditambahkan akuabides hingga tanda batas
- Dihomogenkan

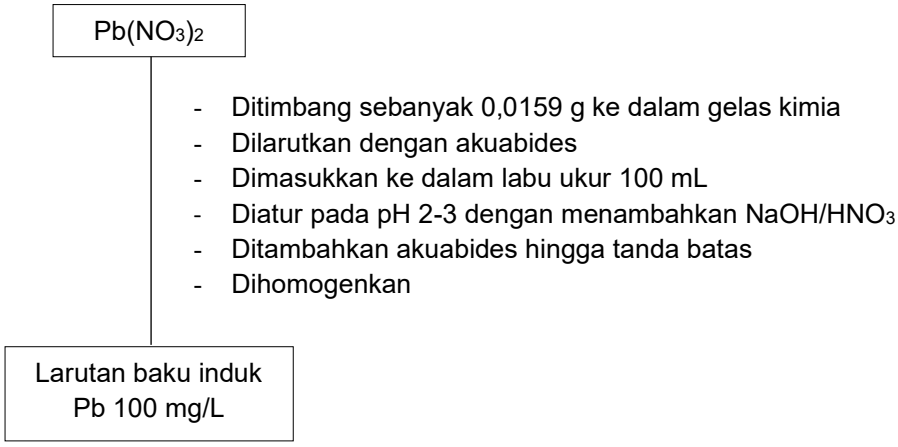
Larutan sampel sedimen

3.3 Preparasi Sampel Mangrove (Rachmawati dkk., 2018)



4. Pembuatan Larutan Baku Pb

4.1 Pembuatan Larutan Baku Induk Pb 100 mg/L



4.2 Pembuatan Larutan Baku Intermediet Pb 10 mg/L

Larutan baku induk Pb 100 mg/L

- Dipipet sebanyak 10 mL ke dalam labu ukur 100 mL
- Ditambahkan akuabides hingga tanda batas
- Dihomogenkan

Larutan baku intermediet Pb 10 mg/L

4.3 Pembuatan Larutan Deret Standar Pb

Larutan baku intermediet Pb 10 mg/L

- Dipipet masing-masing 0,5; 1; 2; 4; 8 dan 16 mL
- Dimasukkan ke dalam labu ukur 50 mL
- Ditambahkan HNO_3 hingga pH 2-3
- Ditambahkan akuabides hingga tanda batas
- Dihomogenkan

Larutan deret standar Pb 0,1; 0,2; 0,4; 0,8; 1,6 dan 3,2 mg/L

5. Pembuatan Larutan Baku Fe

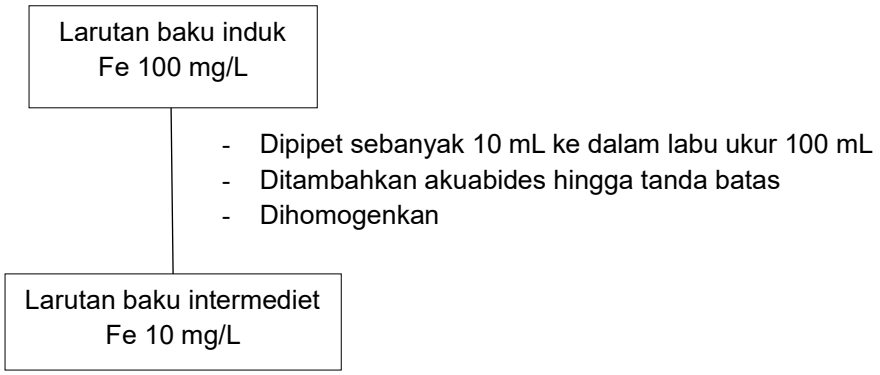
5.1 Pembuatan Larutan Baku Induk Fe 100 mg/L

$FeSO_4.7H_2O$

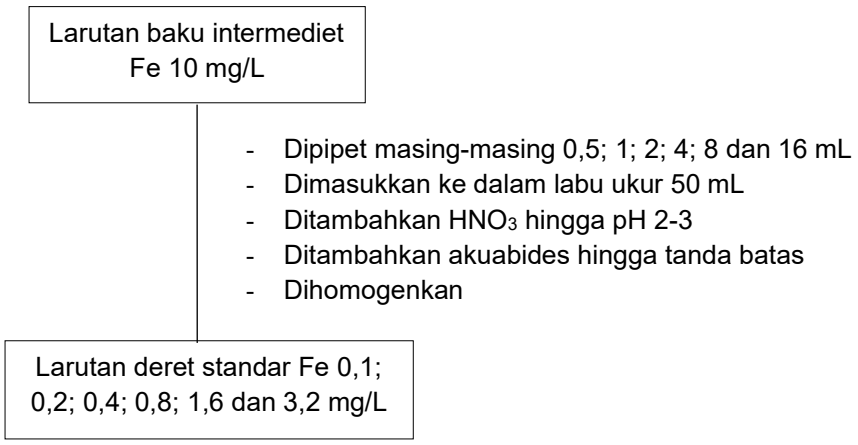
- Ditimbang sebanyak 0,0496 g ke dalam gelas kimia
- Dilarutkan dengan akuabides
- Dimasukkan ke dalam labu ukur 100 mL
- Diatur pada pH 2-3 dengan menambahkan $NaOH/HNO_3$
- Ditambahkan akuabides hingga tanda batas
- Dihomogenkan

Larutan baku induk Fe 100 mg/L

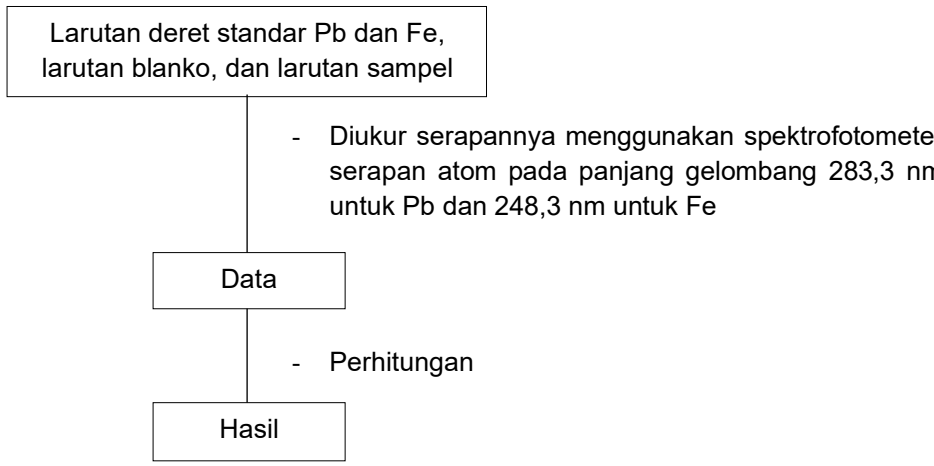
5.2 Pembuatan Larutan Baku Intermediet Fe 10 mg/L



5.3 Pembuatan Larutan Deret Standar Fe



6 **Analisis Logam Pb dan Fe pada Sampel Air Laut, Sedimen, dan Mangrove**



Lampiran 4. Perhitungan

A. Perhitungan Pembuatan Larutan Baku Pb

1. Pembuatan larutan baku induk Pb 100 mg/L

$$\text{ppm} = \frac{\text{Ar Pb}}{\text{Mr Pb}(NO_3)_2} \times \frac{\text{massa}}{\text{volume}}$$

$$\text{massa} = \frac{\text{ppm x Mr Pb}(NO_3)_2 \text{ x volume}}{\text{Ar Pb}}$$

$$\text{massa} = \frac{100 \text{ mg/L x } 331 \text{ g/mol x } 0{,}1 \text{ L}}{207 \text{ g/mol}}$$

massa = 15,99 mg

= 0,01599 g

2. Pembuatan larutan baku intermediet Pb 10 mg/L

$V_1 \times C_1 = V_2 \times C_2$

$V_1 \times 100 \text{ mg/L} = 100 \text{ mL} \times 10 \text{ mg/L}$

$$V_1 = \frac{100 \text{ mL} \times 10 \text{ mg/L}}{100 \text{ mg/L}}$$

$V_1 = 10$ mL

3. Pembuatan deret larutan standar Pb

- **Larutan Standar 0,1 mg/L**

  $V_1 \times C_1 = V_2 \times C_2$

  $V_1 \times 10 \text{ mg/L} = 50 \text{ mL} \times 0{,}1 \text{ mg/L}$

  $V_1 = 0{,}5$ mL

- **Larutan Standar 0,2 mg/L**

  $V_1 \times C_1 = V_2 \times C_2$

  $V_1 \times 10 \text{ mg/L} = 50 \text{ mL} \times 0{,}2 \text{ mg/L}$

  $V_1 = 1$ mL

- **Larutan Standar 0,4 mg/L**

  $V_1 \times C_1 = V_2 \times C_2$

  $V_1 \times 10 \text{ mg/L} = 50 \text{ mL} \times 0{,}4 \text{ mg/L}$

  $V_1 = 2$ mL

- **Larutan Standar 0,8 mg/L**

  $V_1 \times C_1 = V_2 \times C_2$

  $V_1 \times 10 \text{ mg/L} = 50 \text{ mL} \times 0{,}8 \text{ mg/L}$

  $V_1 = 4$ mL

- **Larutan Standar 1,6 mg/L**

  $V_1 \times C_1 = V_2 \times C_2$

  $V_1 \times 10 \text{ mg/L} = 50 \text{ mL} \times 1{,}6 \text{ mg/L}$

  $V_1 = 8$ mL

- **Larutan Standar 3,2 mg/L**

  $V_1 \times C_1 = V_2 \times C_2$

  $V_1 \times 10 \text{ mg/L} = 50 \text{ mL} \times 3{,}2 \text{ mg/L}$

  $V_1 = 16$ mL

B. Perhitungan Pembuatan Larutan Baku Fe

1. Pembuatan larutan baku induk Fe 100 mg/L

$$\text{ppm} = \frac{\text{Ar Fe}}{\text{Mr } FeSO_4.7H_2O} \times \frac{\text{massa}}{\text{volume}}$$

$$\text{massa} = \frac{\text{ppm x Mr } FeSO_4.7H_2O \text{ x volume}}{\text{Ar Fe}}$$

$$\text{massa} = \frac{100 \text{ mg/L x } 278 \text{ g/mol x } 0{,}1 \text{ L}}{56 \text{ g/mol}}$$

massa = 49,64 mg

= 0,0496 g

2. Pembuatan larutan baku intermediet Fe 10 mg/L

$V_1 \times C_1 = V_2 \times C_2$

$V_1 \times 100 \text{ mg/L} = 100 \text{ mL} \times 10 \text{ mg/L}$

$$V_1 = \frac{100 \text{ mL} \times 10 \text{ mg/L}}{100 \text{ mg/L}}$$

$V_1 = 10$ mL

3. Pembuatan deret larutan standar Fe

- **Larutan Standar 0,1 mg/L**

  $V_1 \times C_1 = V_2 \times C_2$

  $V_1 \times 10 \text{ mg/L} = 50 \text{ mL} \times 0{,}1 \text{ mg/L}$

  $V_1 = 0{,}5$ mL

- **Larutan Standar 0,2 mg/L**

  $V_1 \times C_1 = V_2 \times C_2$

  $V_1 \times 10 \text{ mg/L} = 50 \text{ mL} \times 0{,}2 \text{ mg/L}$

  $V_1 = 1$ mL

- **Larutan Standar 0,4 mg/L**

  $V_1 \times C_1 = V_2 \times C_2$

  $V_1 \times 10 \text{ mg/L} = 50 \text{ mL} \times 0{,}4 \text{ mg/L}$

  $V_1 = 2$ mL

- **Larutan Standar 0,8 mg/L**

  $V_1 \times C_1 = V_2 \times C_2$

  $V_1 \times 10 \text{ mg/L} = 50 \text{ mL} \times 0{,}8 \text{ mg/L}$

  $V_1 = 4$ mL

- **Larutan Standar 1,6 mg/L**

  $V_1 \times C_1 = V_2 \times C_2$

  $V_1 \times 10 \text{ mg/L} = 50 \text{ mL} \times 1{,}6 \text{ mg/L}$

  $V_1 = 8$ mL

- **Larutan Standar 3,2 mg/L**

  $V_1 \times C_1 = V_2 \times C_2$

  $V_1 \times 10 \text{ mg/L} = 50 \text{ mL} \times 3{,}2 \text{ mg/L}$

  $V_1 = 16$ mL

C. Perhitungan Kadar Air pada Sedimen

$$\text{Kadar air (\%)} = \frac{W_1 - W_2}{W_1 - W_0} \times 100\%$$

Keterangan:
W_0 = bobot cawan petri kosong (g)
W_1 = bobot cawan petri + sampel sebelum pemanasan (g)
W_2 = bobot cawan petri + sampel setelah pemanasan (g)

- **Titik 1**

$$\text{Kadar air (\%) simplo} = \frac{W_1 - W_2}{W_1 - W_0} \times 100\%$$
$$= \frac{(56{,}9220 - 56{,}6158)\ g}{(56{,}9220 - 51{,}9219)\ g} \times 100\%$$
$$= 6{,}12\%$$
$$\text{Kadar air (\%) duplo} = \frac{W_1 - W_2}{W_1 - W_0} \times 100\%$$
$$= \frac{(55{,}0789 - 54{,}7712)\ g}{(55{,}0789 - 50{,}0788)\ g} \times 100\%$$
$$= 6{,}15\%$$

$$\text{Kadar air rata-rata (\%)} = \frac{(6{,}12 + 6{,}15)\ \%}{2} = 6{,}135\%$$

- **Titik 2**

$$\text{Kadar air (\%) simplo} = \frac{W_1 - W_2}{W_1 - W_0} \times 100\%$$
$$= \frac{(55{,}2315 - 54{,}9612)\ g}{(55{,}2315 - 50{,}2315)\ g} \times 100\%$$
$$= 5{,}41\%$$
$$\text{Kadar air (\%) duplo} = \frac{W_1 - W_2}{W_1 - W_0} \times 100\%$$
$$= \frac{(57{,}6678 - 57{,}3695)\ g}{(57{,}6678 - 52{,}6677)\ g} \times 100\%$$
$$= 5{,}97\%$$

$$\text{Kadar air rata-rata (\%)} = \frac{(5{,}41 + 5{,}97)\ \%}{2} = 5{,}69\%$$

- **Titik 3**

$$\text{Kadar air (\%) simplo} = \frac{W_1\text{-}W_2}{W_1\text{-}W_0} \times 100\%$$

$$= \frac{(56{,}4567 - 56{,}3488)\ g}{(56{,}4567 - 51{,}4566)\ g} \times 100\%$$

$$= 2{,}16\%$$

$$\text{Kadar air (\%) duplo} = \frac{W_1\text{-}W_2}{W_1\text{-}W_0} \times 100\%$$

$$= \frac{(53{,}6872 - 53{,}5851)\ g}{(53{,}6872 - 48{,}6872)\ g} \times 100\%$$

$$= 2{,}08\%$$

$$\text{Kadar air rata-rata (\%)} = \frac{(2{,}16 + 2{,}08)\ \%}{2} = 2{,}12\%$$

D. Perhitungan Kadar Air pada Mangrove

- **Mangrove *Avicennia marina* titik 1**
  - **Akar**

$$\text{Kadar air (\%) simplo} = \frac{W_1\text{-}W_2}{W_1\text{-}W_0} \times 100\%$$

$$= \frac{(48{,}5645 - 47{,}1403)\ g}{(48{,}5645 - 43{,}5609)\ g} \times 100\%$$

$$= 28{,}46\%$$

$$\text{Kadar air (\%) duplo} = \frac{W_1\text{-}W_2}{W_1\text{-}W_0} \times 100\%$$

$$= \frac{(50{,}2730 - 48{,}8631)\ g}{(50{,}2730 - 45{,}2710)\ g} \times 100\%$$

$$= 28{,}19\%$$

$$\text{Kadar air rata-rata (\%)} = \frac{(28{,}46 + 28{,}19)\ \%}{2} = 28{,}33\%$$

  - **Batang**

$$\text{Kadar air (\%) simplo} = \frac{W_1\text{-}W_2}{W_1\text{-}W_0} \times 100\%$$

$$= \frac{(41{,}4221 - 39{,}3279)\ g}{(41{,}4221 - 36{,}4210)\ g} \times 100\%$$

$$= 41{,}87\%$$

$$\text{Kadar air (\%) duplo} = \frac{W_1 - W_2}{W_1 - W_0} \times 100\%$$

$$= \frac{(47{,}2454 - 45{,}2908)\ g}{(47{,}2454 - 42{,}2416)\ g} \times 100\%$$

$$= 39{,}06\%$$

$$\text{Kadar air rata-rata (\%)} = \frac{(41{,}87 + 39{,}06)\ \%}{2} = 40{,}47\%$$

- **Daun**

$$\text{Kadar air (\%) simplo} = \frac{W_1 - W_2}{W_1 - W_0} \times 100\%$$

$$= \frac{(51{,}4121 - 48{,}1429)\ g}{(51{,}4121 - 46{,}4111)\ g} \times 100\%$$

$$= 65{,}37\%$$

$$\text{Kadar air (\%) duplo} = \frac{W_1 - W_2}{W_1 - W_0} \times 100\%$$

$$= \frac{(45{,}8658 - 42{,}5843)\ g}{(45{,}8658 - 40{,}8639)\ g} \times 100\%$$

$$= 65{,}60\%$$

$$\text{Kadar air rata-rata (\%)} = \frac{(65{,}37 + 65{,}60)\ \%}{2} = 65{,}49\%$$

- **Mangrove *Avicennia marina* titik 2**
  - **Akar**

$$\text{Kadar air (\%) simplo} = \frac{W_1 - W_2}{W_1 - W_0} \times 100\%$$

$$= \frac{(54{,}7787 - 53{,}3746)\ g}{(54{,}7787 - 49{,}7767)\ g} \times 100\%$$

$$= 28{,}07\%$$

$$\text{Kadar air (\%) duplo} = \frac{W_1 - W_2}{W_1 - W_0} \times 100\%$$

$$= \frac{(50{,}5535 - 49{,}0795)\ g}{(50{,}5535 - 45{,}5523)\ g} \times 100\%$$

$$= 29{,}47\%$$

$$\text{Kadar air rata-rata (\%)} = \frac{(28{,}07 + 29{,}47)\ \%}{2} = 28{,}77\%$$

- **Batang**

$$\text{Kadar air (\%) simplo} = \frac{W_1 - W_2}{W_1 - W_0} \times 100\%$$

$$= \frac{(52{,}0158 - 50{,}3001)\ g}{(52{,}0158 - 47{,}0154)\ g} \times 100\%$$

$$= 34{,}31\%$$

$$\text{Kadar air (\%) duplo} = \frac{W_1 - W_2}{W_1 - W_0} \times 100\%$$

$$= \frac{(50{,}9295 - 49{,}2085)\ g}{(50{,}9295 - 45{,}9296)\ g} \times 100\%$$

$$= 34{,}39\%$$

$$\text{Kadar air rata-rata (\%)} = \frac{(34{,}31 + 34{,}39)\ \%}{2} = 34{,}35\%$$

- **Daun**

$$\text{Kadar air (\%) simplo} = \frac{W_1 - W_2}{W_1 - W_0} \times 100\%$$

$$= \frac{(51{,}5004 - 48{,}5620)\ g}{(51{,}5004 - 46{,}4998)\ g} \times 100\%$$

$$= 58{,}76\%$$

$$\text{Kadar air (\%) duplo} = \frac{W_1 - W_2}{W_1 - W_0} \times 100\%$$

$$= \frac{(52{,}1704 - 49{,}2316)\ g}{(52{,}1704 - 47{,}1699)\ g} \times 100\%$$

$$= 58{,}77\%$$

$$\text{Kadar air rata-rata (\%)} = \frac{(58{,}76 + 58{,}77)\ \%}{2} = 58{,}765\%$$

- **Mangrove *Avicennia marina* titik 3**

- **Akar**

$$\text{Kadar air (\%) simplo} = \frac{W_1 - W_2}{W_1 - W_0} \times 100\%$$

$$= \frac{(51{,}9597 - 50{,}5438)\ g}{(51{,}9597 - 46{,}9590)\ g} \times 100\%$$

$$= 28{,}31\%$$

$$\text{Kadar air (\%) duplo} = \frac{W_1 - W_2}{W_1 - W_0} \times 100\%$$

$$= \frac{(38{,}7834 - 37{,}4523)\ g}{(38{,}7834 - 33{,}7832)\ g} \times 100\%$$

$$= 26{,}62\%$$

$$\text{Kadar air rata-rata (\%)} = \frac{(28{,}31 + 26{,}62)\ \%}{2} = 27{,}465\%$$

- **Batang**

$$\text{Kadar air (\%) simplo} = \frac{W_1 - W_2}{W_1 - W_0} \times 100\%$$

$$= \frac{(40{,}3626 - 38{,}5765)\ g}{(40{,}3626 - 35{,}3598)\ g} \times 100\%$$

$$= 35{,}7\%$$

$$\text{Kadar air (\%) duplo} = \frac{W_1 - W_2}{W_1 - W_0} \times 100\%$$

$$= \frac{(52{,}9230 - 51{,}1970)\ g}{(52{,}9230 - 47{,}9227)\ g} \times 100\%$$

$$= 34{,}52\%$$

$$\text{Kadar air rata-rata (\%)} = \frac{(35{,}7 + 34{,}52)\ \%}{2} = 35{,}11\%$$

- **Daun**

$$\text{Kadar air (\%) simplo} = \frac{W_1 - W_2}{W_1 - W_0} \times 100\%$$

$$= \frac{(54{,}2215 - 50{,}8748)\ g}{(54{,}2215 - 49{,}2160)\ g} \times 100\%$$

$$= 66{,}86\%$$

$$\text{Kadar air (\%) duplo} = \frac{W_1 - W_2}{W_1 - W_0} \times 100\%$$

$$= \frac{(41{,}2131 - 37{,}8339)\ g}{(41{,}2131 - 36{,}2119)\ g} \times 100\%$$

$$= 67{,}57\%$$

$$\text{Kadar air rata-rata (\%)} = \frac{(66{,}86 + 67{,}57)\ \%}{2} = 67{,}215\%$$

- **Mangrove *Rhizophora apiculata* titik 1**

  - **Akar**

$$\text{Kadar air (\%) simplo} = \frac{W_1 - W_2}{W_1 - W_0} \times 100\%$$

$$= \frac{(53{,}2363 - 49{,}9881)\ g}{(53{,}2363 - 48{,}2323)\ g} \times 100\%$$

$$= 64{,}91\%$$

$$\text{Kadar air (\%) duplo} = \frac{W_1 - W_2}{W_1 - W_0} \times 100\%$$

$$= \frac{(53{,}4458 - 50{,}2276)\ g}{(53{,}4458 - 48{,}4449)\ g} \times 100\%$$

$$= 64{,}35\%$$

$$\text{Kadar air rata-rata (\%)} = \frac{(64{,}91 + 64{,}35)\ \%}{2} = 64{,}63\%$$

  - **Batang**

$$\text{Kadar air (\%) simplo} = \frac{W_1 - W_2}{W_1 - W_0} \times 100\%$$

$$= \frac{(49{,}0247 - 46{,}5578)\ g}{(49{,}0247 - 44{,}0231)\ g} \times 100\%$$

$$= 49{,}32\%$$

$$\text{Kadar air (\%) duplo} = \frac{W_1 - W_2}{W_1 - W_0} \times 100\%$$

$$= \frac{(44{,}5149 - 42{,}3824)\ g}{(44{,}5149 - 39{,}5115)\ g} \times 100\%$$

$$= 42{,}62\%$$

$$\text{Kadar air rata-rata (\%)} = \frac{(49{,}32 + 42{,}62)\ \%}{2} = 45{,}97\%$$

  - **Daun**

$$\text{Kadar air (\%) simplo} = \frac{W_1 - W_2}{W_1 - W_0} \times 100\%$$

$$= \frac{(52{,}7045 - 49{,}9953)\ g}{(52{,}7045 - 47{,}7038)\ g} \times 100\%$$

$$= 54{,}18\%$$

$$\text{Kadar air (\%) duplo} = \frac{W_1 - W_2}{W_1 - W_0} \times 100\%$$

$$= \frac{(45{,}4544 - 42{,}6713)\ g}{(45{,}4544 - 40{,}4538)\ g} \times 100\%$$

$$= 55{,}65\%$$

$$\text{Kadar air rata-rata (\%)} = \frac{(54{,}18 + 55{,}65)\ \%}{2} = 54{,}915\%$$

- **Mangrove *Rhizophora apiculata* titik 2**
  - **Akar**

$$\text{Kadar air (\%) simplo} = \frac{W_1 - W_2}{W_1 - W_0} \times 100\%$$

$$= \frac{(52{,}5728 - 49{,}2908)\ g}{(52{,}5728 - 47{,}5709)\ g} \times 100\%$$

$$= 65{,}61\%$$

$$\text{Kadar air (\%) duplo} = \frac{W_1 - W_2}{W_1 - W_0} \times 100\%$$

$$= \frac{(52{,}5247 - 49{,}1118)\ g}{(52{,}5247 - 47{,}5238)\ g} \times 100\%$$

$$= 68{,}24\%$$

$$\text{Kadar air rata-rata (\%)} = \frac{(65{,}61 + 68{,}24)\ \%}{2} = 66{,}92\%$$

  - **Batang**

$$\text{Kadar air (\%) simplo} = \frac{W_1 - W_2}{W_1 - W_0} \times 100\%$$

$$= \frac{(40{,}1560 - 38{,}0697)\ g}{(40{,}1560 - 35{,}1522)\ g} \times 100\%$$

$$= 41{,}69\%$$

$$\text{Kadar air (\%) duplo} = \frac{W_1 - W_2}{W_1 - W_0} \times 100\%$$

$$= \frac{(46{,}2826 - 44{,}4459)\ g}{(46{,}2826 - 41{,}4823)\ g} \times 100\%$$

$$= 40{,}75\%$$

$$\text{Kadar air rata-rata (\%)} = \frac{(41{,}69 + 40{,}75)\ \%}{2} = 41{,}22\%$$

- **Daun**

$$\text{Kadar air (\%) simplo} = \frac{W_1 - W_2}{W_1 - W_0} \times 100\%$$

$$= \frac{(52{,}3271 - 49{,}3657)\ g}{(52{,}3271 - 47{,}3260)\ g} \times 100\%$$

$$= 59{,}21\%$$

$$\text{Kadar air (\%) duplo} = \frac{W_1 - W_2}{W_1 - W_0} \times 100\%$$

$$= \frac{(41{,}4216 - 38{,}4903)\ g}{(41{,}4216 - 36{,}4209)\ g} \times 100\%$$

$$= 58{,}62\%$$

$$\text{Kadar air rata-rata (\%)} = \frac{(59{,}21 + 58{,}62)\ \%}{2} = 58{,}91\%$$

- **Mangrove *Rhizophora apiculata* titik 3**

- **Akar**

$$\text{Kadar air (\%) simplo} = \frac{W_1 - W_2}{W_1 - W_0} \times 100\%$$

$$= \frac{(39{,}2164 - 36{,}1487)\ g}{(39{,}2164 - 34{,}2142)\ g} \times 100\%$$

$$= 61{,}33\%$$

$$\text{Kadar air (\%) duplo} = \frac{W_1 - W_2}{W_1 - W_0} \times 100\%$$

$$= \frac{(49{,}3603 - 46{,}3025)\ g}{(49{,}3603 - 44{,}3571)\ g} \times 100\%$$

$$= 61{,}12\%$$

$$\text{Kadar air rata-rata (\%)} = \frac{(61{,}33 + 61{,}12)\ \%}{2} = 61{,}22\%$$

- **Batang**

$$\text{Kadar air (\%) simplo} = \frac{W_1 - W_2}{W_1 - W_0} \times 100\%$$

$$= \frac{(54{,}1675 - 52{,}1497)\ g}{(54{,}1675 - 49{,}1662)\ g} \times 100\%$$

$$= 40{,}34\%$$

$$\text{Kadar air (\%) duplo} = \frac{W_1 - W_2}{W_1 - W_0} \times 100\%$$

$$= \frac{(52{,}5818 - 50{,}5322)\ g}{(52{,}5818 - 47{,}5801)\ g} \times 100\%$$

$$= 40{,}97\%$$

$$\text{Kadar air rata-rata (\%)} = \frac{(40{,}34 + 40{,}97)\ \%}{2} = 40{,}65\%$$

- **Daun**

$$\text{Kadar air (\%) simplo} = \frac{W_1 - W_2}{W_1 - W_0} \times 100\%$$

$$= \frac{(49{,}6283 - 46{,}8183)\ g}{(49{,}6283 - 44{,}6265)\ g} \times 100\%$$

$$= 56{,}18\%$$

$$\text{Kadar air (\%) duplo} = \frac{W_1 - W_2}{W_1 - W_0} \times 100\%$$

$$= \frac{(48{,}6709 - 45{,}6535)\ g}{(48{,}6709 - 43{,}6697)\ g} \times 100\%$$

$$= 60{,}33\%$$

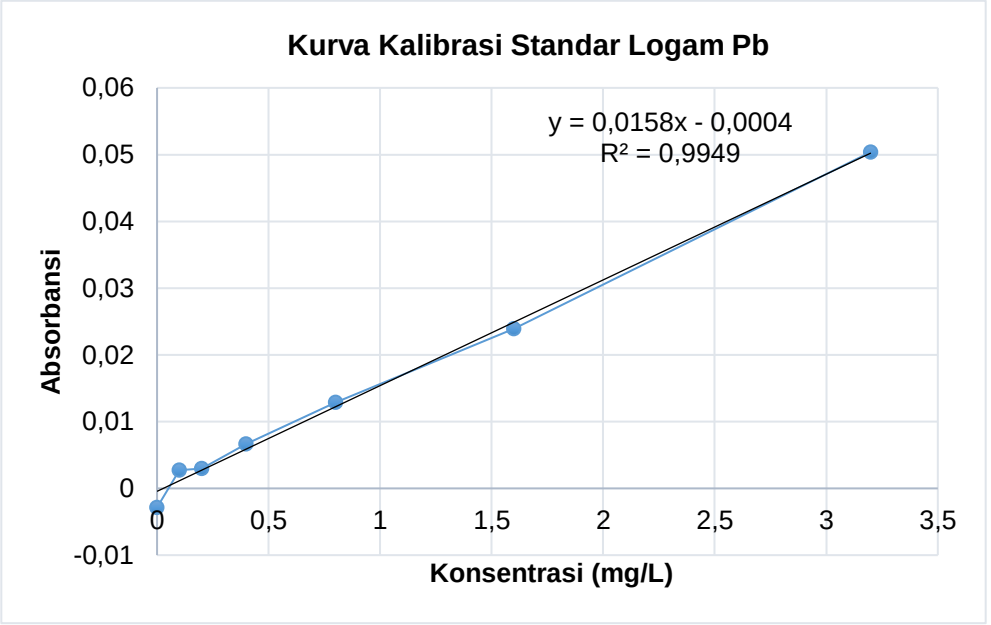
$$\text{Kadar air rata-rata (\%)} = \frac{(56{,}18 + 60{,}33)\ \%}{2} = 58{,}25\%$$

Lampiran 5. Pengolahan Data

A. Analisis Logam Pb dengan SSA

1. Data pengukuran deret standar Pb

no	x	y	x^2	y^2	xy
1	0	-0,002851	0	8,1282E-06	0
2	0,1	0,002707	0,01	7,32785E-06	0,0002707
3	0,2	0,002964	0,04	8,7853E-06	0,0005928
4	0,4	0,006682	0,16	4,46491E-05	0,0026728
5	0,8	0,012857	0,64	0,000165302	0,0102856
6	1,6	0,023951	2,56	0,00057365	0,0383216
7	3,2	0,0504	10,24	0,00254016	0,16128
∑	**6,3**	**0,09671**	**13,65**	**0,003348003**	**0,2134235**



$$a \text{ (slope)} = \frac{n\,(\sum xy) - (\sum x)(\sum y)}{n\,(\sum x^2) - (\sum x)^2}$$

$$= \frac{7\,(0{,}2134235) - (6{,}3)(0{,}09671)}{7\,(13{,}65) - (6{,}3)^2}$$

$$= \frac{0{,}8846915}{55{,}86}$$

$$= 0{,}01584$$

$$b \text{ (intercept)} = \bar{y} - ax$$

$$= 0{,}013816 - (0{,}01584)(0{,}9)$$

$$= 0{,}013816 - 0{,}014256$$

$$= -\,0{,}00044$$

2. Data hasil pengukuran logam Pb pada Air Laut

Lokasi	Absorbansi
Titik 1	0,006065
Titik 2	0,005645
Titik 3	0,00518

- Konsentrasi Logam Pb dalam Air Laut

- Titik 1

$y = 0{,}01584x - 0{,}00044$

$0{,}006065 = 0{,}01584x - 0{,}00044$

$x = \frac{0{,}006065 + 0{,}00044}{0{,}01584}$

$x = 0{,}4107 \text{ mg/L}$

$C\ Pb = \frac{C_x \times V_{flask}}{V \text{ sampel}}$

$C\ Pb = \frac{0{,}4107 \text{ mg/L} \times 50 \text{ mL}}{100 \text{ mL}}$

$C\ Pb = 0{,}2053 \text{ mg/L}$

- Titik 2

$y = 0{,}01584x - 0{,}00044$

$0{,}005645 = 0{,}01584x - 0{,}00044$

$x = \frac{0{,}005645 + 0{,}00044}{0{,}01584}$

$x = 0{,}3841 \text{ mg/L}$

$C\ Pb = \frac{C_x \times V_{flask}}{V \text{ sampel}}$

$C\ Pb = \frac{0{,}3841 \text{ mg/L} \times 50 \text{ mL}}{100 \text{ mL}}$

$C\ Pb = 0{,}192 \text{ mg/L}$

- Titik 3

$y = 0{,}01584x - 0{,}00044$

$0{,}00518 = 0{,}01584x - 0{,}00044$

$x = \frac{0{,}00518 + 0{,}00044}{0{,}01584}$

$x = 0{,}3548 \text{ mg/L}$

$C\ Pb = \frac{C_x \times V_{flask}}{V \text{ sampel}}$

$C\ Pb = \frac{0{,}3548 \text{ mg/L} \times 50 \text{ mL}}{100 \text{ mL}}$

$C\ Pb = 0{,}1774 \text{ mg/L}$

3. Data hasil pengukuran logam Pb pada Sedimen

Lokasi	Absorbansi
Titik 1	0,00721
Titik 2	0,0063
Titik 3	0,00543

- Konsentrasi Logam Pb dalam Sedimen

  - Titik 1

$$y = 0{,}01584x - 0{,}00044$$
$$0{,}00721 = 0{,}01584x - 0{,}00044$$
$$x = \frac{0{,}00721 + 0{,}00044}{0{,}01584}$$
$$x = 0{,}4829 \text{ mg/L}$$

$$\text{C Pb} = \frac{C_x \times V_{flask}}{\text{kg sampel}}$$
$$\text{C Pb} = \frac{0{,}4829 \text{ mg/L} \times 0{,}1 \text{ L}}{2{,}00015 \times 10^{-3} \text{ kg}}$$
$$\text{C Pb} = 24{,}1432 \text{ mg/kg}$$

  - Titik 2

$$y = 0{,}01584x - 0{,}00044$$
$$0{,}0063 = 0{,}01584x - 0{,}00044$$
$$x = \frac{0{,}0063 + 0{,}00044}{0{,}01584}$$
$$x = 0{,}4255 \text{ mg/L}$$

$$\text{C Pb} = \frac{C_x \times V_{flask}}{\text{kg sampel}}$$
$$\text{C Pb} = \frac{0{,}4255 \text{ mg/L} \times 0{,}1 \text{ L}}{2{,}0000 \times 10^{-3} \text{ kg}}$$
$$\text{C Pb} = 21{,}275 \text{ mg/kg}$$

  - Titik 3

$$y = 0{,}01584x - 0{,}00044$$
$$0{,}00543 = 0{,}01584x - 0{,}00044$$
$$x = \frac{0{,}00543 + 0{,}00044}{0{,}01584}$$
$$x = 0{,}3706 \text{ mg/L}$$

$$\text{C Pb} = \frac{C_x \times V_{flask}}{\text{kg sampel}}$$
$$\text{C Pb} = \frac{0{,}3706 \text{ mg/L} \times 0{,}1 \text{ L}}{2{,}00005 \times 10^{-3} \text{ kg}}$$
$$\text{C Pb} = 18{,}529 \text{ mg/kg}$$

4. Data hasil pengukuran logam Pb pada Mangrove *Avicennia marina*

Lokasi	Absorbansi		
	Akar	Batang	Daun
Titik 1	0,00143	0,001415	0,00235
Titik 2	0,00265	0,001845	0,002145
Titik 3	0,00228	0,001315	0,0023

- Konsentrasi Logam Pb dalam Mangrove *Avicennia marina*
  - **Titik 1**
    - Akar

$$y = 0{,}01584x - 0{,}00044$$
$$0{,}00143 = 0{,}01584x - 0{,}00044$$
$$x = \frac{0{,}00143 + 0{,}00044}{0{,}01584}$$
$$x = 0{,}118 \text{ mg/L}$$

$$\text{C Pb} = \frac{C_x \times V_{flask}}{\text{kg sampel}}$$
$$\text{C Pb} = \frac{0{,}118 \text{ mg/L} \times 0{,}05 \text{ L}}{1{,}0000 \times 10^{-3} \text{ kg}}$$
$$\text{C Pb} = 5{,}9 \text{ mg/kg}$$

➢ Batang

$y = 0{,}01584x - 0{,}00044$

$0{,}001415 = 0{,}01584x - 0{,}00044$

$x = \frac{0{,}001415 + 0{,}00044}{0{,}01584}$

$x = 0{,}1171 \text{ mg/L}$

$C\ Pb = \frac{C_x \times V_{flask}}{\text{kg sampel}}$

$C\ Pb = \frac{0{,}1171 \text{ mg/L} \times 0{,}05 \text{ L}}{1{,}0000 \times 10^{-3} \text{ kg}}$

$C\ Pb = 5{,}855 \text{ mg/kg}$

➢ Daun

$y = 0{,}01584x - 0{,}00044$

$0{,}00235 = 0{,}01584x - 0{,}00044$

$x = \frac{0{,}00235 + 0{,}00044}{0{,}01584}$

$x = 0{,}1761 \text{ mg/L}$

$C\ Pb = \frac{C_x \times V_{flask}}{\text{kg sampel}}$

$C\ Pb = \frac{0{,}1761 \text{ mg/L} \times 0{,}05 \text{ L}}{1{,}00005 \times 10^{-3} \text{ kg}}$

$C\ Pb = 8{,}8045 \text{ mg/kg}$

- **Titik 2**

➢ Akar

$y = 0{,}01584x - 0{,}00044$

$0{,}00265 = 0{,}01584x - 0{,}00044$

$x = \frac{0{,}00265 + 0{,}00044}{0{,}01584}$

$x = 0{,}19507 \text{ mg/L}$

$C\ Pb = \frac{C_x \times V_{flask}}{\text{kg sampel}}$

$C\ Pb = \frac{0{,}19507 \text{ mg/L} \times 0{,}05 \text{ L}}{1{,}00005 \times 10^{-3} \text{ kg}}$

$C\ Pb = 9{,}753 \text{ mg/kg}$

➢ Batang

$y = 0{,}01584x - 0{,}00044$

$0{,}001845 = 0{,}01584x - 0{,}00044$

$x = \frac{0{,}001845 + 0{,}00044}{0{,}01584}$

$x = 0{,}1442 \text{ mg/L}$

$C\ Pb = \frac{C_x \times V_{flask}}{\text{kg sampel}}$

$C\ Pb = \frac{0{,}1442 \text{ mg/L} \times 0{,}05 \text{ L}}{1{,}0000 \times 10^{-3} \text{ kg}}$

$C\ Pb = 7{,}21 \text{ mg/kg}$

➢ Daun

$y = 0{,}01584x - 0{,}00044$

$0{,}002145 = 0{,}01584x - 0{,}00044$

$x = \frac{0{,}002145 + 0{,}00044}{0{,}01584}$

$x = 0{,}1632 \text{ mg/L}$

$C\ Pb = \frac{C_x \times V_{flask}}{\text{kg sampel}}$

$C\ Pb = \frac{0{,}1632 \text{ mg/L} \times 0{,}05 \text{ L}}{1{,}0000 \times 10^{-3} \text{ kg}}$

$C\ Pb = 8{,}16 \text{ mg/kg}$

- **Titik 3**
  - Akar

$y = 0{,}01584x - 0{,}00044$

$0{,}00228 = 0{,}01584x - 0{,}00044$

$x = \frac{0{,}00228 + 0{,}00044}{0{,}01584}$

$x = 0{,}1717 \text{ mg/L}$

$C\ Pb = \frac{C_x \times V_{flask}}{\text{kg sampel}}$

$C\ Pb = \frac{0{,}1717 \text{ mg/L} \times 0{,}05 \text{ L}}{1{,}0000 \times 10^{-3} \text{ kg}}$

$C\ Pb = 8{,}585 \text{ mg/kg}$

  - Batang

$y = 0{,}01584x - 0{,}00044$

$0{,}001315 = 0{,}01584x - 0{,}00044$

$x = \frac{0{,}001315 + 0{,}00044}{0{,}01584}$

$x = 0{,}1108 \text{ mg/L}$

$C\ Pb = \frac{C_x \times V_{flask}}{\text{kg sampel}}$

$C\ Pb = \frac{0{,}1108 \text{ mg/L} \times 0{,}05 \text{ L}}{1{,}0001 \times 10^{-3} \text{ kg}}$

$C\ Pb = 5{,}539 \text{ mg/kg}$

  - Daun

$y = 0{,}01584x - 0{,}00044$

$0{,}0023 = 0{,}01584x - 0{,}00044$

$x = \frac{0{,}0023 + 0{,}00044}{0{,}01584}$

$x = 0{,}173 \text{ mg/L}$

$C\ Pb = \frac{C_x \times V_{flask}}{\text{kg sampel}}$

$C\ Pb = \frac{0{,}173 \text{ mg/L} \times 0{,}05 \text{ L}}{1{,}0000 \times 10^{-3} \text{ kg}}$

$C\ Pb = 8{,}65 \text{ mg/kg}$

5. Data hasil pengukuran logam Pb pada Mangrove *Rhizophora apiculata*

Lokasi	Absorbansi		
	Akar	Batang	Daun
Titik 1	0,00208	0,001495	0,001015
Titik 2	0,00368	0,001845	0,00231
Titik 3	0,001315	0,00128	0,001245

- Konsentrasi Logam Pb dalam Mangrove *Avicennia marina*
  - **Titik 1**
    - Akar

$y = 0{,}01584x - 0{,}00044$

$0{,}00208 = 0{,}01584x - 0{,}00044$

$x = \frac{0{,}00208 + 0{,}00044}{0{,}01584}$

$x = 0{,}1591 \text{ mg/L}$

$C\ Pb = \frac{C_x \times V_{flask}}{\text{kg sampel}}$

$C\ Pb = \frac{0{,}1591 \text{ mg/L} \times 0{,}05 \text{ L}}{1{,}00005 \times 10^{-3} \text{ kg}}$

$C\ Pb = 7{,}9546 \text{ mg/kg}$

➢ Batang

$y = 0{,}01584x - 0{,}00044$

$0{,}001495 = 0{,}01584x - 0{,}00044$

$x = \frac{0{,}001495 + 0{,}00044}{0{,}01584}$

$x = 0{,}1221 \text{ mg/L}$

$C\ Pb = \frac{C_x \times V_{flask}}{\text{kg sampel}}$

$C\ Pb = \frac{0{,}1221 \text{ mg/L} \times 0{,}05 \text{ L}}{1{,}0000 \times 10^{-3} \text{ kg}}$

$C\ Pb = 6{,}105 \text{ mg/kg}$

➢ Daun

$y = 0{,}01584x - 0{,}00044$

$0{,}001015 = 0{,}01584x - 0{,}00044$

$x = \frac{0{,}001015 + 0{,}00044}{0{,}01584}$

$x = 0{,}0918 \text{ mg/L}$

$C\ Pb = \frac{C_x \times V_{flask}}{\text{kg sampel}}$

$C\ Pb = \frac{0{,}0918 \text{ mg/L} \times 0{,}05 \text{ L}}{1{,}00005 \times 10^{-3} \text{ kg}}$

$C\ Pb = 4{,}5898 \text{ mg/kg}$

- **Titik 2**

➢ Akar

$y = 0{,}01584x - 0{,}00044$

$0{,}00368 = 0{,}01584x - 0{,}00044$

$x = \frac{0{,}00368 + 0{,}00044}{0{,}01584}$

$x = 0{,}2601 \text{ mg/L}$

$C\ Pb = \frac{C_x \times V_{flask}}{\text{kg sampel}}$

$C\ Pb = \frac{0{,}2601 \text{ mg/L} \times 0{,}05 \text{ L}}{1{,}00005 \times 10^{-3} \text{ kg}}$

$C\ Pb = 13{,}0037 \text{ mg/kg}$

➢ Batang

$y = 0{,}01584x - 0{,}00044$

$0{,}001845 = 0{,}01584x - 0{,}00044$

$x = \frac{0{,}001845 + 0{,}00044}{0{,}01584}$

$x = 0{,}1442 \text{ mg/L}$

$C\ Pb = \frac{C_x \times V_{flask}}{\text{kg sampel}}$

$C\ Pb = \frac{0{,}1442 \text{ mg/L} \times 0{,}05 \text{ L}}{1{,}0000 \times 10^{-3} \text{ kg}}$

$C\ Pb = 7{,}21 \text{ mg/kg}$

➢ Daun

$y = 0{,}01584x - 0{,}00044$

$0{,}00231 = 0{,}01584x - 0{,}00044$

$x = \frac{0{,}00231 + 0{,}00044}{0{,}01584}$

$x = 0{,}1736 \text{ mg/L}$

$C\ Pb = \frac{C_x \times V_{flask}}{\text{kg sampel}}$

$C\ Pb = \frac{0{,}1736 \text{ mg/L} \times 0{,}05 \text{ L}}{1{,}0001 \times 10^{-3} \text{ kg}}$

$C\ Pb = 8{,}679 \text{ mg/kg}$

- **Titik 3**
  - Akar

$y = 0{,}01584x - 0{,}00044$

$0{,}001315 = 0{,}01584x - 0{,}00044$

$x = \frac{0{,}001315 + 0{,}00044}{0{,}01584}$

$x = 0{,}1108 \text{ mg/L}$

$C\ Pb = \frac{C_x \times V_{flask}}{\text{kg sampel}}$

$C\ Pb = \frac{0{,}1108 \text{ mg/L} \times 0{,}05 \text{ L}}{1{,}0001 \times 10^{-3} \text{ kg}}$

$C\ Pb = 5{,}5394 \text{ mg/kg}$

  - Batang

$y = 0{,}01584x - 0{,}00044$

$0{,}00128 = 0{,}01584x - 0{,}00044$

$x = \frac{0{,}00128 + 0{,}00044}{0{,}01584}$

$x = 0{,}1086 \text{ mg/L}$

$C\ Pb = \frac{C_x \times V_{flask}}{\text{kg sampel}}$

$C\ Pb = \frac{0{,}1086 \text{ mg/L} \times 0{,}05 \text{ L}}{1{,}0000 \times 10^{-3} \text{ kg}}$

$C\ Pb = 5{,}43 \text{ mg/kg}$

  - Daun

$y = 0{,}01584x - 0{,}00044$

$0{,}001245 = 0{,}01584x - 0{,}00044$

$x = \frac{0{,}001245 + 0{,}00044}{0{,}01584}$

$x = 0{,}1064 \text{ mg/L}$

$C\ Pb = \frac{C_x \times V_{flask}}{\text{kg sampel}}$

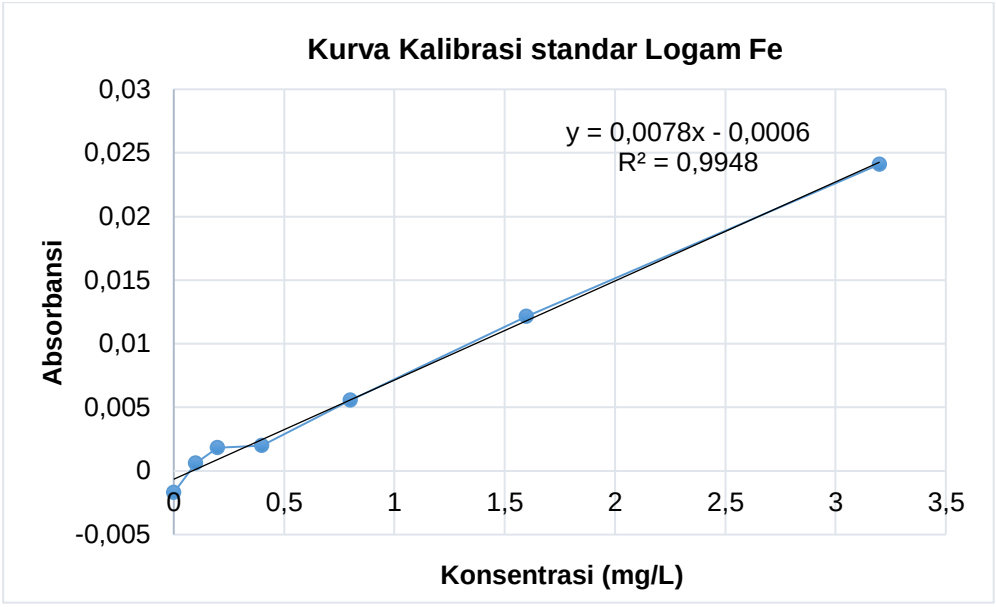
$C\ Pb = \frac{0{,}1064 \text{ mg/L} \times 0{,}05 \text{ L}}{1{,}0001 \times 10^{-3} \text{ kg}}$

$C\ Pb = 5{,}3195 \text{ mg/kg}$

B. Analisis Logam Fe dengan SSA

1. Data pengukuran deret standar Fe

no	x	y	x^2	y^2	xy
1	0	-0,001705	0	2,90703E-06	0
2	0,1	0,000622	0,01	3,86884E-07	0,0000622
3	0,2	0,001817	0,04	3,30149E-06	0,0003634
4	0,4	0,00201	0,16	4,0401E-06	0,000804
6	0,8	0,00554	0,64	3,06916E-05	0,004432
6	1,6	0,012139	2,56	0,000147355	0,0194224
7	3,2	0,02411	10,24	0,000581292	0,077152
∑	**6,3**	**0,044533**	**13,65**	**0,000769975**	**0,102236**



$$a\ (\text{slope}) = \frac{n\ (\sum xy) - (\sum x)(\sum y)}{n\ (\sum x^2) - (\sum x)^2}$$

$$= \frac{7\ (0{,}102236) - (6{,}3)(0{,}044533)}{7\ (13{,}65) - (6{,}3)^2}$$

$$= \frac{0{,}4350941}{55{,}86}$$

$$= 0{,}00779$$

$$b\ (\text{intercept}) = \bar{y} - ax$$

$$= 0{,}006362 - (0{,}00779)(0{,}9)$$

$$= 0{,}006362 - 0{,}007011$$

$$= -\ 0{,}00065$$

2. Data hasil pengukuran logam Fe pada Air Laut

Lokasi	Absorbansi
Titik 1	0,00153
Titik 2	0,00193
Titik 3	0,0044

- Konsentrasi Logam Fe dalam Air Laut
  - Titik 1

$$y = 0{,}00779x - 0{,}00065$$

$$0{,}00153 = 0{,}00779x - 0{,}00065$$

$$x = \frac{0{,}00153 + 0{,}00065}{0{,}00779}$$

$$x = 0{,}279846\ \text{mg/L}$$

$$\text{C Fe} = \frac{C_x \times V_{flask}}{V\ \text{sampel}} \times fp$$

$$\text{C Fe} = \frac{0{,}279846\ \text{mg/L} \times 50\ \text{mL}}{100\ \text{mL}} \times 100$$

$$\text{C Fe} = 13{,}9923\ \text{mg/L}$$

- Titik 2

$y = 0{,}00779x - 0{,}00065$

$0{,}00193 = 0{,}00779x - 0{,}00065$

$x = \frac{0{,}00193 + 0{,}00065}{0{,}00779}$

$x = 0{,}331194 \text{ mg/L}$

$C\ Fe = \frac{C_x \times V_{flask}}{V\ sampel} \times fp$

$C\ Fe = \frac{0{,}331194 \text{ mg/L} \times 50 \text{ mL}}{100 \text{ mL}} \times 100$

$C\ Fe = 16{,}5597 \text{ mg/L}$

- Titik 3

$y = 0{,}00779x - 0{,}00065$

$0{,}0044 = 0{,}00779x - 0{,}00065$

$x = \frac{0{,}0044 + 0{,}00065}{0{,}00779}$

$x = 0{,}648267 \text{ mg/L}$

$C\ Fe = \frac{C_x \times V_{flask}}{V\ sampel} \times fp$

$C\ Fe = \frac{0{,}648267 \text{ mg/L} \times 50 \text{ mL}}{100 \text{ mL}} \times 100$

$C\ Fe = 32{,}4133 \text{ mg/L}$

3. Data hasil pengukuran logam Fe pada Sedimen

Lokasi	Absorbansi
Titik 1	0,01135
Titik 2	0,0151
Titik 3	0,0156

- Konsentrasi Logam Fe dalam Sedimen

- Titik 1

$y = 0{,}00779x - 0{,}00065$

$0{,}01135 = 0{,}00779x - 0{,}00065$

$x = \frac{0{,}01135 + 0{,}00065}{0{,}00779}$

$x = 1{,}5404 \text{ mg/L}$

$C\ Fe = \frac{C_x \times V_{flask}}{kg\ sampel} \times fp$

$C\ Fe = \frac{1{,}5404 \text{ mg/L} \times 0{,}1 \text{ L}}{2{,}00015 \times 10^{-3} \text{ kg}} \times 10$

$C\ Fe = 770{,}14 \text{ mg/kg}$

- Titik 2

$y = 0{,}00779x - 0{,}00065$

$0{,}0151 = 0{,}00779x - 0{,}00065$

$x = \frac{0{,}0151 + 0{,}00065}{0{,}00779}$

$x = 2{,}0218 \text{ mg/L}$

$C\ Fe = \frac{C_x \times V_{flask}}{kg\ sampel} \times fp$

$C\ Fe = \frac{2{,}0218 \text{ mg/L} \times 0{,}1 \text{ L}}{2{,}0000 \times 10^{-3} \text{ kg}} \times 10$

$C\ Fe = 1.010{,}9 \text{ mg/kg}$

- Titik 3

$y = 0{,}00779x - 0{,}00065$

$0{,}0156 = 0{,}00779x - 0{,}00065$

$x = \frac{0{,}0156 + 0{,}00065}{0{,}00779}$

$x = 2{,}086 \text{ mg/L}$

$C\ Fe = \frac{C_x \times V_{flask}}{\text{kg sampel}} \times fp$

$C\ Fe = \frac{2{,}086 \text{ mg/L} \times 0{,}1 \text{ L}}{2{,}00005 \times 10^{-3} \text{ kg}} \times 10$

$C\ Fe = 1.042{,}97 \text{ mg/kg}$

4. Data hasil pengukuran logam Fe pada Mangrove *Avicennia marina*

Lokasi	Absorbansi		
	Akar	Batang	Daun
Titik 1	0,00621	0,00078	0,002415
Titik 2	0,006945	0,001365	0,00316
Titik 3	0,011165	0,00175	0,004245

- Konsentrasi Logam Fe dalam Mangrove *Avicennia marina*

- **Titik 1**
  - Akar

$y = 0{,}00779x - 0{,}00065$

$0{,}00621 = 0{,}00779x - 0{,}00065$

$x = \frac{0{,}00621 + 0{,}00065}{0{,}00779}$

$x = 0{,}8806 \text{ mg/L}$

$C\ Fe = \frac{C_x \times V_{flask}}{\text{kg sampel}} \times fp$

$C\ Fe = \frac{0{,}8806 \text{ mg/L} \times 0{,}05 \text{ L}}{1{,}0000 \times 10^{-3} \text{ kg}} \times 10$

$C\ Fe = 440{,}3 \text{ mg/kg}$

  - Batang

$y = 0{,}00779x - 0{,}00065$

$0{,}00078 = 0{,}00779x - 0{,}00065$

$x = \frac{0{,}00078 + 0{,}00065}{0{,}00779}$

$x = 0{,}1836 \text{ mg/L}$

$C\ Fe = \frac{C_x \times V_{flask}}{\text{kg sampel}} \times fp$

$C\ Fe = \frac{0{,}1836 \text{ mg/L} \times 0{,}05 \text{ L}}{1{,}0000 \times 10^{-3} \text{ kg}} \times 10$

$C\ Fe = 91{,}8 \text{ mg/kg}$

  - Daun

$y = 0{,}00779x - 0{,}00065$

$0{,}002415 = 0{,}00779x - 0{,}00065$

$x = \frac{0{,}002415 + 0{,}00065}{0{,}00779}$

$x = 0{,}3934 \text{ mg/L}$

$C\ Fe = \frac{C_x \times V_{flask}}{\text{kg sampel}} \times fp$

$C\ Fe = \frac{0{,}3934 \text{ mg/L} \times 0{,}05 \text{ L}}{1{,}00005 \times 10^{-3} \text{ kg}} \times 10$

$C\ Fe = 196{,}69 \text{ mg/kg}$

- **Titik 2**
  - Akar

$y = 0{,}00779x - 0{,}00065$

$0{,}006945 = 0{,}00779x - 0{,}00065$

$x = \frac{0{,}006945 + 0{,}00065}{0{,}00779}$

$x = 0{,}975 \text{ mg/L}$

$C\ Fe = \frac{C_x \times V_{flask}}{\text{kg sampel}} \times fp$

$C\ Fe = \frac{0{,}975 \text{ mg/L} \times 0{,}05 \text{ L}}{1{,}00005 \times 10^{-3} \text{ kg}} \times 10$

$C\ Fe = 487{,}47 \text{ mg/kg}$

  - Batang

$y = 0{,}00779x - 0{,}00065$

$0{,}001365 = 0{,}00779x - 0{,}00065$

$x = \frac{0{,}001365 + 0{,}00065}{0{,}00779}$

$x = 0{,}2587 \text{ mg/L}$

$C\ Fe = \frac{C_x \times V_{flask}}{\text{kg sampel}} \times fp$

$C\ Fe = \frac{0{,}2587 \text{ mg/L} \times 0{,}05 \text{ L}}{1{,}0000 \times 10^{-3} \text{ kg}} \times 10$

$C\ Fe = 129{,}35 \text{ mg/kg}$

  - Daun

$y = 0{,}00779x - 0{,}00065$

$0{,}00316 = 0{,}00779x - 0{,}00065$

$x = \frac{0{,}00316 + 0{,}00065}{0{,}00779}$

$x = 0{,}4891 \text{ mg/L}$

$C\ Fe = \frac{C_x \times V_{flask}}{\text{kg sampel}} \times fp$

$C\ Fe = \frac{0{,}4891 \text{ mg/L} \times 0{,}05 \text{ L}}{1{,}0000 \times 10^{-3} \text{ kg}} \times 10$

$C\ Fe = 244{,}55 \text{ mg/kg}$

- **Titik 3**
  - Akar

$y = 0{,}00779x - 0{,}00065$

$0{,}011165 = 0{,}00779x - 0{,}00065$

$x = \frac{0{,}011165 + 0{,}00065}{0{,}00779}$

$x = 1{,}5167 \text{ mg/L}$

$C\ Fe = \frac{C_x \times V_{flask}}{\text{kg sampel}} \times fp$

$C\ Fe = \frac{1{,}5167 \text{ mg/L} \times 0{,}05 \text{ L}}{1{,}0000 \times 10^{-3} \text{ kg}} \times 10$

$C\ Fe = 758{,}35 \text{ mg/kg}$

  - Batang

$y = 0{,}00779x - 0{,}00065$

$0{,}00175 = 0{,}00779x - 0{,}00065$

$x = \frac{0{,}00175 + 0{,}00065}{0{,}00779}$

$x = 0{,}3081 \text{ mg/L}$

$C\ Fe = \frac{C_x \times V_{flask}}{\text{kg sampel}} \times fp$

$C\ Fe = \frac{0{,}3081 \text{ mg/L} \times 0{,}05 \text{ L}}{1{,}0001 \times 10^{-3} \text{ kg}} \times 10$

$C\ Fe = 154{,}03 \text{ mg/kg}$

➢ Daun

$y = 0{,}00779x - 0{,}00065$

$0{,}004245 = 0{,}00779x - 0{,}00065$

$x = \frac{0{,}004245 + 0{,}00065}{0{,}00779}$

$x = 0{,}6284$ mg/L

$C\ Fe = \frac{C_x \times V_{flask}}{kg\ sampel} \times fp$

$C\ Fe = \frac{0{,}6284\ mg/L \times 0{,}05\ L}{1{,}0000 \times 10^{-3}\ kg} \times 10$

$C\ Fe = 314{,}2$ mg/kg

5. Data hasil pengukuran logam Fe pada Mangrove *Rhizophora apiculata*

Lokasi	Absorbansi		
	Akar	Batang	Daun
Titik 1	0,00621	0,002915	0,004295
Titik 2	0,006745	0,003565	0,00483
Titik 3	0,007695	0,0047	0,006415

- Konsentrasi Logam Fe dalam Mangrove *Rhizophora apiculata*
  - **Titik 1**

➢ Akar

$y = 0{,}00779x - 0{,}00065$

$0{,}00621 = 0{,}00779x - 0{,}00065$

$x = \frac{0{,}00621 + 0{,}00065}{0{,}00779}$

$x = 0{,}8806$ mg/L

$C\ Fe = \frac{C_x \times V_{flask}}{kg\ sampel}$

$C\ Fe = \frac{0{,}8806\ mg/L \times 0{,}05\ L}{1{,}00005 \times 10^{-3}\ kg} \times 10$

$C\ Fe = 440{,}27$ mg/kg

➢ Batang

$y = 0{,}00779x - 0{,}00065$

$0{,}002915 = 0{,}00779x - 0{,}00065$

$x = \frac{0{,}002915 + 0{,}00065}{0{,}00779}$

$x = 0{,}4576$ mg/L

$C\ Fe = \frac{C_x \times V_{flask}}{kg\ sampel}$

$C\ Fe = \frac{0{,}4576\ mg/L \times 0{,}05\ L}{1{,}0000 \times 10^{-3}\ kg} \times 10$

$C\ Fe = 228{,}8$ mg/kg

➢ Daun

$y = 0{,}00779x - 0{,}00065$

$0{,}004295 = 0{,}00779x - 0{,}00065$

$x = \frac{0{,}004295 + 0{,}00065}{0{,}00779}$

$x = 0{,}6348$ mg/L

$C\ Fe = \frac{C_x \times V_{flask}}{kg\ sampel}$

$C\ Fe = \frac{0{,}6348\ mg/L \times 0{,}05\ L}{1{,}00005 \times 10^{-3}\ kg} \times 10$

$C\ Fe = 317{,}38$ mg/kg

- **Titik 2**
  - Akar

$y = 0{,}00779x - 0{,}00065$

$0{,}006745 = 0{,}00779x - 0{,}00065$

$x = \frac{0{,}006745 + 0{,}00065}{0{,}00779}$

$x = 0{,}9493 \text{ mg/L}$

$C\ Fe = \frac{C_x \times V_{flask}}{\text{kg sampel}}$

$C\ Fe = \frac{0{,}9493 \text{ mg/L} \times 0{,}05 \text{ L}}{1{,}0001 \times 10^{-3} \text{ kg}} \times 10$

$C\ Fe = 474{,}6 \text{ mg/kg}$

  - Batang

$y = 0{,}00779x - 0{,}00065$

$0{,}003565 = 0{,}00779x - 0{,}00065$

$x = \frac{0{,}003565 + 0{,}00065}{0{,}00779}$

$x = 0{,}541 \text{ mg/L}$

$C\ Fe = \frac{C_x \times V_{flask}}{\text{kg sampel}}$

$C\ Fe = \frac{0{,}541 \text{ mg/L} \times 0{,}05 \text{ L}}{1{,}0000 \times 10^{-3} \text{ kg}} \times 10$

$C\ Fe = 270{,}5 \text{ mg/kg}$

  - Daun

$y = 0{,}00779x - 0{,}00065$

$0{,}00483 = 0{,}00779x - 0{,}00065$

$x = \frac{0{,}00483 + 0{,}00065}{0{,}00779}$

$x = 0{,}7035 \text{ mg/L}$

$C\ Fe = \frac{C_x \times V_{flask}}{\text{kg sampel}}$

$C\ Fe = \frac{0{,}7035 \text{ mg/L} \times 0{,}05 \text{ L}}{1{,}0001 \times 10^{-3} \text{ kg}} \times 10$

$C\ Fe = 351{,}71 \text{ mg/kg}$

- **Titik 3**
  - Akar

$y = 0{,}00779x - 0{,}00065$

$0{,}007695 = 0{,}00779x - 0{,}00065$

$x = \frac{0{,}007695 + 0{,}00065}{0{,}00779}$

$x = 1{,}0712 \text{ mg/L}$

$C\ Fe = \frac{C_x \times V_{flask}}{\text{kg sampel}}$

$C\ Fe = \frac{1{,}0712 \text{ mg/L} \times 0{,}05 \text{ L}}{1{,}0001 \times 10^{-3} \text{ kg}} \times 10$

$C\ Fe = 535{,}54 \text{ mg/kg}$

  - Batang

$y = 0{,}00779x - 0{,}00065$

$0{,}0047 = 0{,}00779x - 0{,}00065$

$x = \frac{0{,}0047 + 0{,}00065}{0{,}00779}$

$x = 0{,}6868 \text{ mg/L}$

$C\ Fe = \frac{C_x \times V_{flask}}{\text{kg sampel}}$

$C\ Fe = \frac{0{,}6868 \text{ mg/L} \times 0{,}05 \text{ L}}{1{,}0000 \times 10^{-3} \text{ kg}} \times 10$

$C\ Fe = 343{,}4 \text{ mg/kg}$

- Daun

$y = 0{,}00779x - 0{,}00065$

$0{,}006415 = 0{,}00779x - 0{,}00065$

$$x = \frac{0{,}006415 + 0{,}00065}{0{,}00779}$$

$x = 0{,}9069$ mg/L

$$C\ Fe = \frac{C_x \times V_{flask}}{kg\ sampel}$$

$$C\ Fe = \frac{0{,}9069\ mg/L \times 0{,}05\ L}{1{,}0001 \times 10^{-3}\ kg} \times 10$$

$C\ Fe = 453{,}4$ mg/kg

Lampiran 6. *Bioconcentration Factors* (BCF) dan *Translocation Factors* (TF)

A. Logam Berat Pb

1. Mangrove *Avicennia marina*

Lokasi	Konsetrasi Logam Pb dalam Mangrove *Avicennia marina* (mg/kg)					Konsentrasi Logam Pb dalam Sedimen (mg/kg)
	Akar	Batang	Daun	Total	Rata-rata	
Titik 1	5,9	5,85	8,8	20,55	6,58	24,143
Titik 2	9,75	7,21	8,16	25,12	8,37	21,275
Titik 3	8,58	5,54	8,65	22,77	7,59	18,529

➢ **Nilai *Bioconcentration Faktors* (BCF)**

- **Titik 1**

$$BCF = \frac{C_{Pb} \text{ rata-rata dalam AM}}{C_{Pb} \text{ dalam sedimen}}$$

$$= \frac{6,58}{24,143}$$

$$= 0,27$$

- **Titik 2**

$$BCF = \frac{C_{Pb} \text{ rata-rata dalam AM}}{C_{Pb} \text{ dalam sedimen}}$$

$$= \frac{8,37}{21,275}$$

$$= 0,39$$

- **Titik 3**

$$BCF = \frac{C_{Pb} \text{ rata-rata dalam AM}}{C_{Pb} \text{ dalam sedimen}}$$

$$= \frac{7,59}{18,529}$$

$$= 0,41$$

➢ **Nilai *Translocation Factors* (TF)**

- **Titik 1**

$$TF = \frac{C_{Pb} \text{ dalam daun AM}}{C_{Pb} \text{ dalam akar AM}}$$

$$= \frac{8,8}{5,9}$$

$$= 1,49$$

- **Titik 2**

$$TF = \frac{C_{Pb} \text{ dalam daun AM}}{C_{Pb} \text{ dalam akar AM}}$$

$$= \frac{8,16}{9,75}$$

$$= 0,84$$

- **Titik 3**

$$TF = \frac{C_{Pb} \text{ dalam daun AM}}{C_{Pb} \text{ dalam akar AM}}$$

$$= \frac{8,65}{8,58}$$

$$= 1,01$$

2. Mangrove *Rhizophora apiculata*

Lokasi	Konsetrasi Logam Pb dalam Mangrove *Rhizophora apiculata* (mg/kg)					Konsentrasi Logam Pb dalam Sedimen (mg/kg)
	Akar	Batang	Daun	Total	Rata-rata	
Titik 1	7,95	6,1	4,59	18,64	6,21	24,143
Titik 2	13	7,21	8,68	28,89	9,63	21,275
Titik 3	5,54	5,43	5,32	16,29	5,43	18,529

➢ **Nilai *Bioconcentration Faktors* (BCF)**

- **Titik 1**

$$BCF = \frac{C_{Pb} \text{ rata-rata dalam RA}}{C_{Pb} \text{ dalam sedimen}}$$

$$= \frac{6,21}{24,143}$$

$$= 0,26$$

- **Titik 2**

$$BCF = \frac{C_{Pb} \text{ rata-rata dalam RA}}{C_{Pb} \text{ dalam sedimen}}$$

$$= \frac{9,63}{21,275}$$

$$= 0,45$$

- **Titik 3**

$$BCF = \frac{C_{Pb} \text{ rata-rata dalam RA}}{C_{Pb} \text{ dalam sedimen}}$$

$$= \frac{5,43}{18,529}$$

$$= 0,29$$

➢ **Nilai *Translocation Factors* (TF)**

- **Titik 1**

$$TF = \frac{C_{Pb} \text{ dalam daun RA}}{C_{Pb} \text{ dalam akar RA}}$$

$$= \frac{4,59}{7,95}$$

$$= 0,58$$

- **Titik 2**

$$TF = \frac{C_{Pb} \text{ dalam daun RA}}{C_{Pb} \text{ dalam akar RA}}$$

$$= \frac{8,68}{13}$$

$$= 0,67$$

- **Titik 3**

$$TF = \frac{C_{Pb} \text{ dalam daun RA}}{C_{Pb} \text{ dalam akar RA}}$$

$$= \frac{5,32}{5,54}$$

$$= 0,96$$

B. Logam Berat Fe

1. Mangrove *Avicennia marina*

Lokasi	Konsetrasi Logam Fe dalam Mangrove *Avicennia marina* (mg/kg)					Konsentrasi Logam Fe dalam Sedimen (mg/kg)
	Akar	Batang	Daun	Total	Rata-rata	
Titik 1	440,3	91,8	196,69	728,79	242,93	770,14
Titik 2	487,47	129,35	244,55	861,37	287,12	1.010,9
Titik 3	758,35	154,03	314,2	1.226,58	408,86	1.042,97

➢ **Nilai *Bioconcentration Faktors* (BCF)**

- **Titik 1**

$$BCF = \frac{C_{Fe} \text{ rata-rata dalam AM}}{C_{Fe} \text{ dalam sedimen}}$$

$$= \frac{242,93}{770,14}$$

$$= 0,31$$

- **Titik 2**

$$BCF = \frac{C_{Fe} \text{ rata-rata dalam AM}}{C_{Fe} \text{ dalam sedimen}}$$

$$= \frac{287,12}{1.010,9}$$

$$= 0,28$$

- **Titik 3**

$$BCF = \frac{C_{Fe} \text{ rata-rata dalam AM}}{C_{Fe} \text{ dalam sedimen}}$$

$$= \frac{408,86}{1.042,97}$$

$$= 0,39$$

➢ **Nilai *Translocation Factors* (TF)**

- **Titik 1**

$$TF = \frac{C_{Fe} \text{ dalam daun AM}}{C_{Fe} \text{ dalam akar AM}}$$

$$= \frac{196,69}{440,3}$$

$$= 0,45$$

- **Titik 2**

$$TF = \frac{C_{Fe} \text{ dalam daun AM}}{C_{Fe} \text{ dalam akar AM}}$$

$$= \frac{244,55}{487,47}$$

$$= 0,50$$

- **Titik 3**

$$TF = \frac{C_{Fe} \text{ dalam daun AM}}{C_{Fe} \text{ dalam akar AM}}$$

$$= \frac{314,2}{758,35}$$

$$= 0,41$$

2. Mangrove *Rhizophora apiculata*

Lokasi	Konsetrasi Logam Fe dalam Mangrove *Rhizophora apiculata* (mg/kg)					Konsentrasi Logam Fe dalam Sedimen (mg/kg)
	Akar	Batang	Daun	Total	Rata-rata	
Titik 1	440,27	228,8	317,38	986,45	328,82	770,14
Titik 2	474,6	270,5	351,71	1.096,81	365,60	1.010,9
Titik 3	535,54	343,4	453,4	1.332,34	444,11	1.042,97

➢ **Nilai *Bioconcentration Faktors* (BCF)**

- **Titik 1**

$$BCF = \frac{C_{Fe} \text{ rata-rata dalam RA}}{C_{Fe} \text{ dalam sedimen}}$$

$$= \frac{328,82}{770,14}$$

$$= 0,43$$

- **Titik 2**

$$BCF = \frac{C_{Fe} \text{ rata-rata dalam RA}}{C_{Fe} \text{ dalam sedimen}}$$

$$= \frac{365,60}{1.010,9}$$

$$= 0,36$$

- **Titik 3**

$$BCF = \frac{C_{Fe} \text{ rata-rata dalam RA}}{C_{Fe} \text{ dalam sedimen}}$$

$$= \frac{444,11}{1.042,97}$$

$$= 0,42$$

➢ **Nilai *Translocation Factors* (TF)**

- **Titik 1**

$$TF = \frac{C_{Fe} \text{ dalam daun RA}}{C_{Fe} \text{ dalam akar RA}}$$

$$= \frac{317,38}{440,27}$$

$$= 0,72$$

- **Titik 2**

$$TF = \frac{C_{Fe} \text{ dalam daun RA}}{C_{Fe} \text{ dalam akar RA}}$$

$$= \frac{351,71}{474,6}$$

$$= 0,74$$

- **Titik 3**

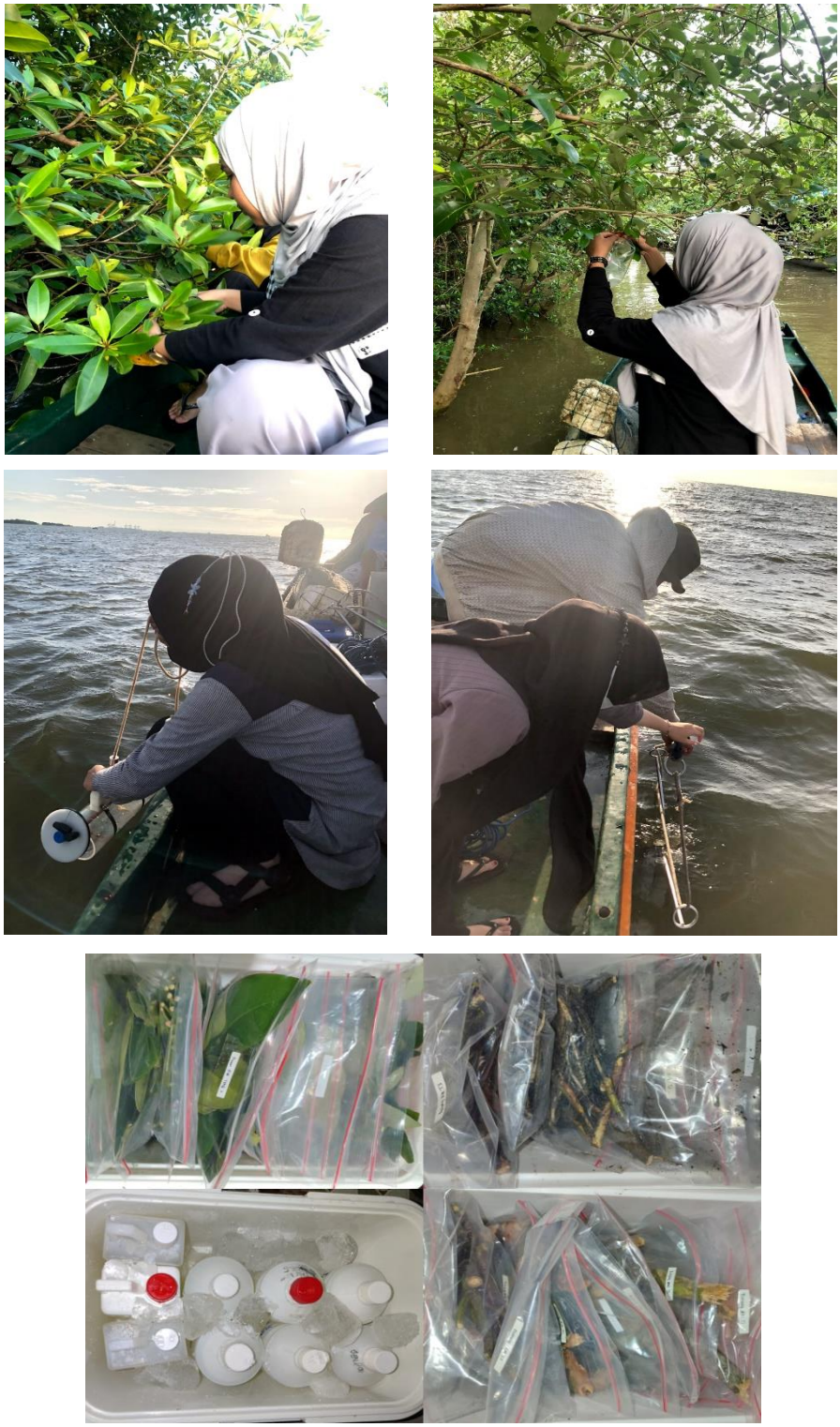
$$TF = \frac{C_{Fe} \text{ dalam daun RA}}{C_{Fe} \text{ dalam akar RA}}$$

$$= \frac{453,4}{535,54}$$

$$= 0,85$$

Lampiran 7. Dokumentasi

Gambar 7. Lokasi sampling



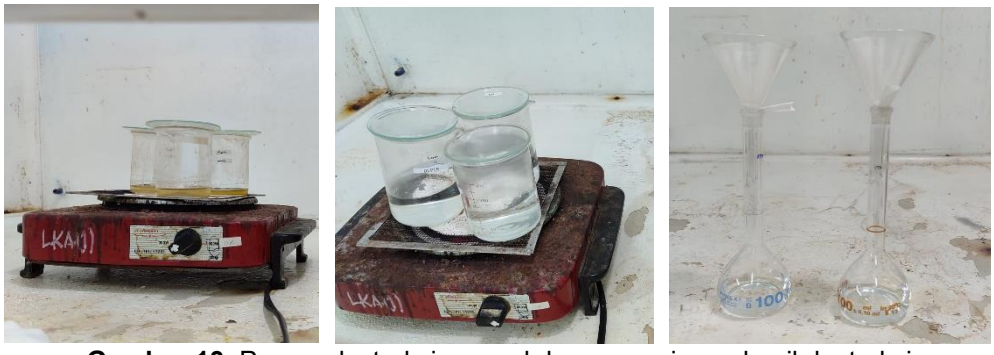
Gambar 8. Proses sampling air, sedimen, dan mangrove

Gambar 9. Sampel dikering-anginkan

Gambar 10. Sampel dikeringkan di dalam oven

Gambar 11. Sampel setelah dikeringkan

Gambar 12. Sampel setelah digerus dan diayak



Gambar 13. Proses destruksi sampel dan penyaringan hasil destruksi

Gambar 14. Sampel siap dianalisis

Gambar 15. Proses analisis sampel dengan menggunakan SSA