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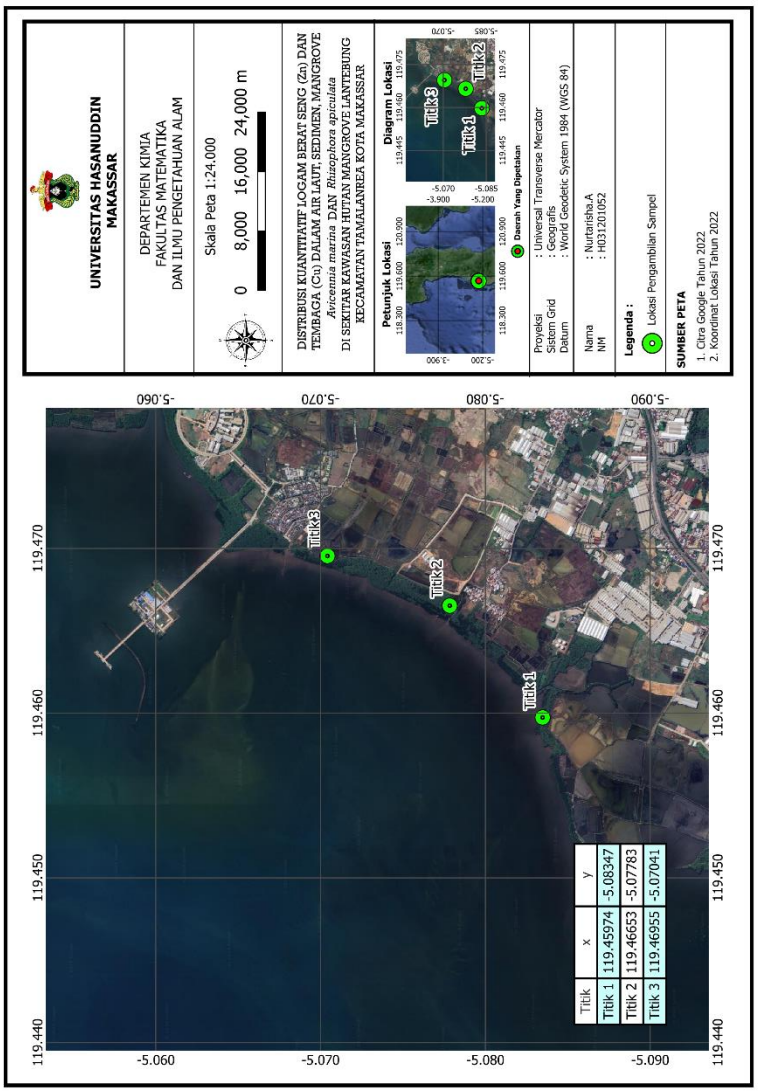
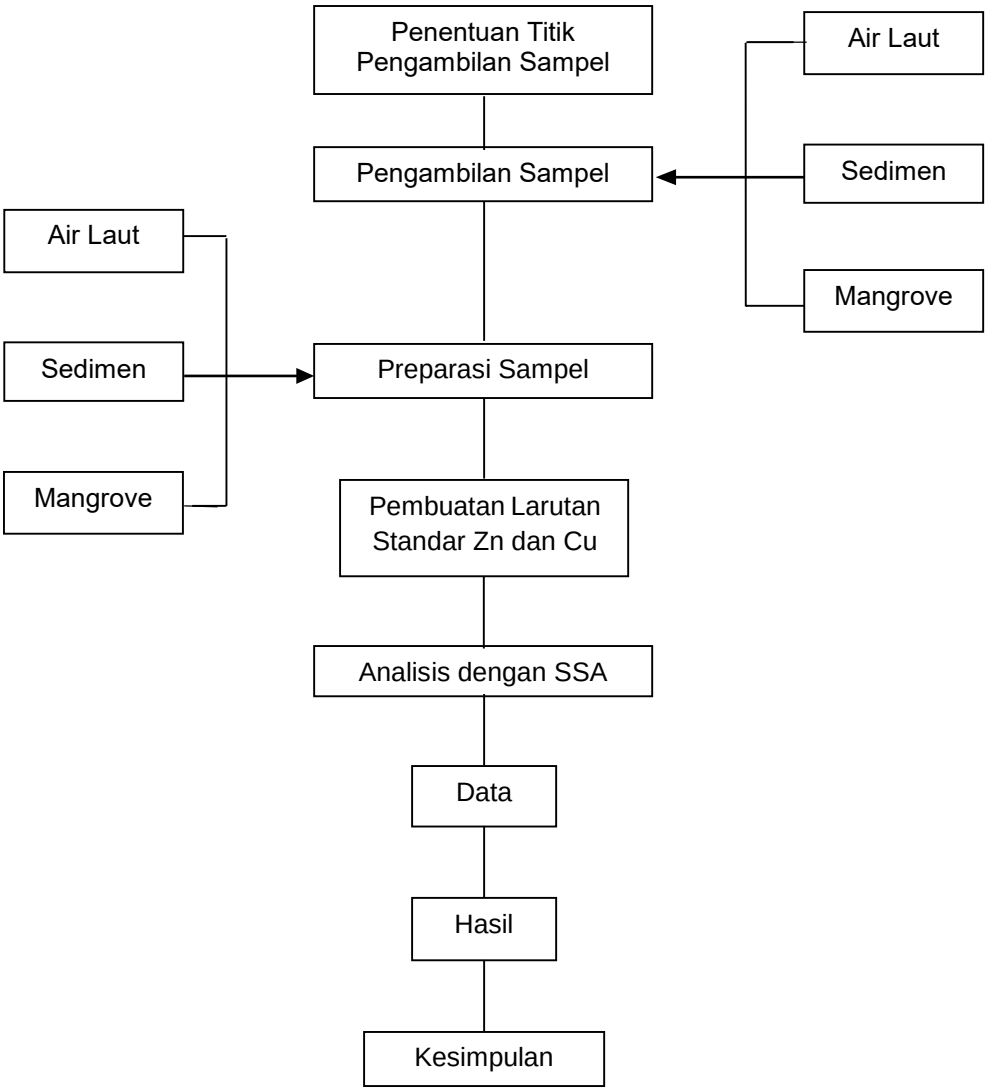
Lampiran 1. Peta Lokasi Pengambilan Sampel



Gambar 10. Peta Lokasi Penelitian

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 Sampel 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 4 jam
- Didinginkan dalam desikator
- Ditimbang hingga bobot konstan untuk mengetahui jumlah air yang hilang.

Kadar Air

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

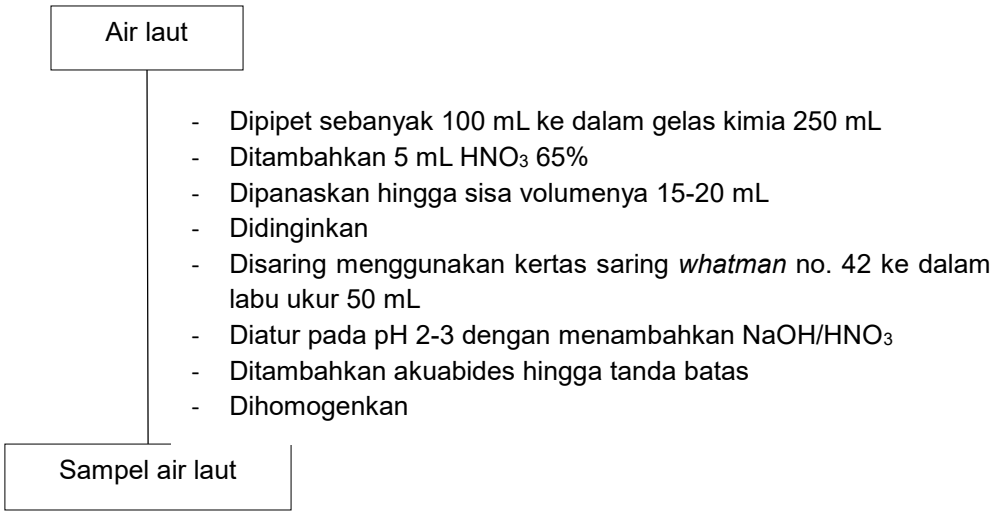
Mangrove

- 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

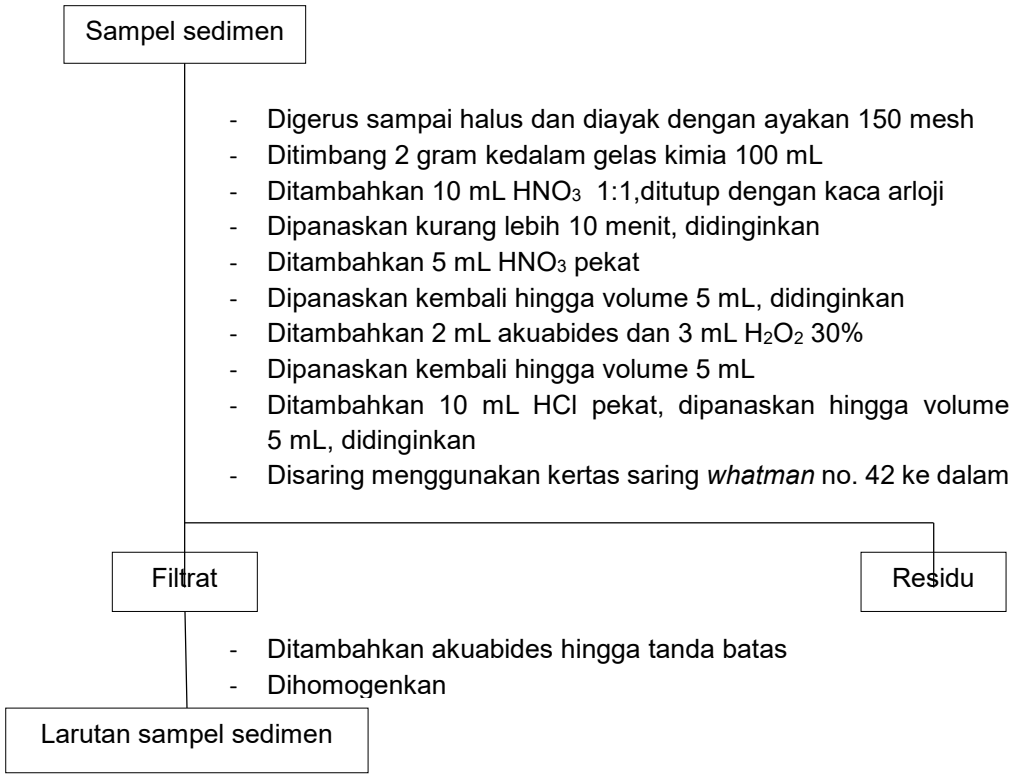
Kadar Air

3. Preparasi Sampel

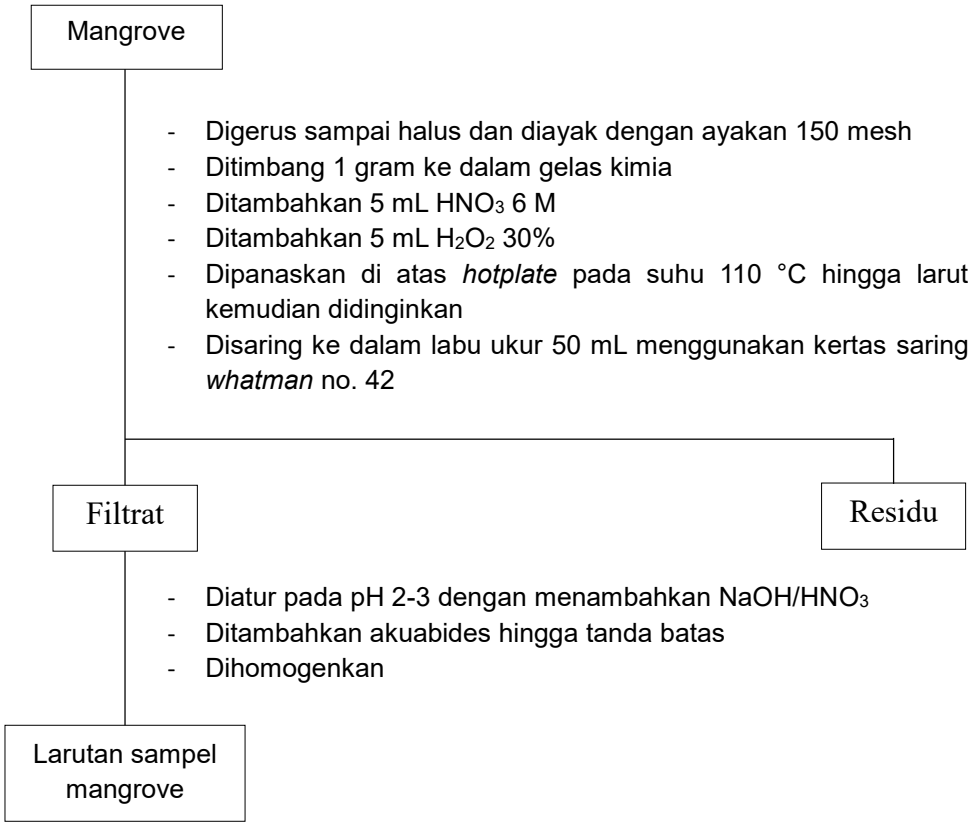
3.1 Preparasi Sampel Air Laut (SNI 8995:2021)



2.2 Preparasi Sampel Sedimen (SNI 8910:2021)

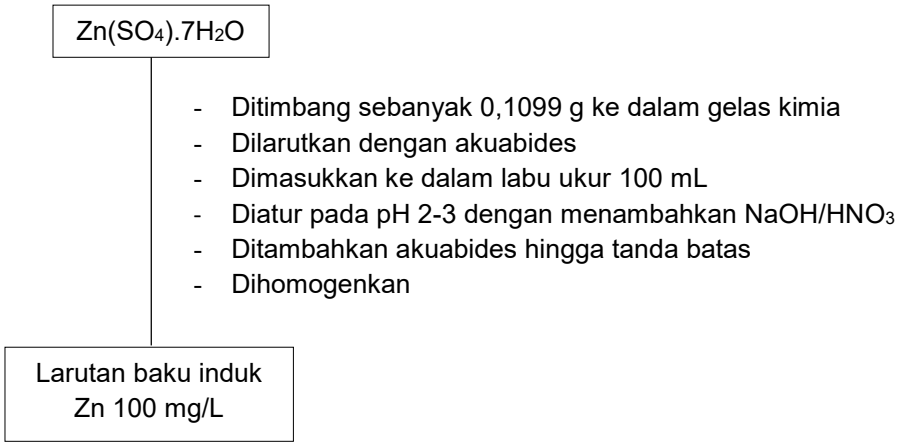


2.3 Preparasi Sampel Mangrove (Rachmawati dkk., 2018)



4. Pembuatan Larutan Baku Zn

3.1 Pembuatan Larutan Baku Induk Zn 100 mg/L



4.2 Pembuatan Larutan Baku Intermediet Zn 25 mg/L

Larutan baku induk
Zn 100 mg/L

- Dipipet sebanyak 25 mL ke dalam labu ukur 100 mL
- Ditambahkan akuabides hingga tanda batas
- Dihomogenkan

Larutan baku intermediet
Zn 25 mg/L

4.3 Pembuatan Larutan Deret Standar Zn

Larutan baku intermediet
Zn 25 mg/L

- Dipipet masing-masing 0,2; 0,4; 0,8; 1,6; 3,2 dan 6,4 mL
- Dimasukkan ke dalam labu ukur 50 mL
- Ditambahkan HNO_3 hingga pH 2-3
- Ditambahkan akuabides hingga tanda batas
- Dihomogenkan

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

5. Pembuatan Larutan Baku Cu

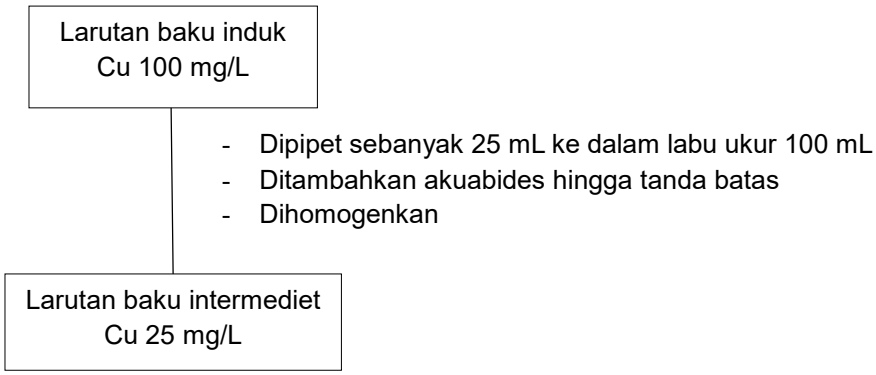
4.1 Pembuatan Larutan Baku Induk Cu 100 mg/L

$CuSO_4.5H_2O$

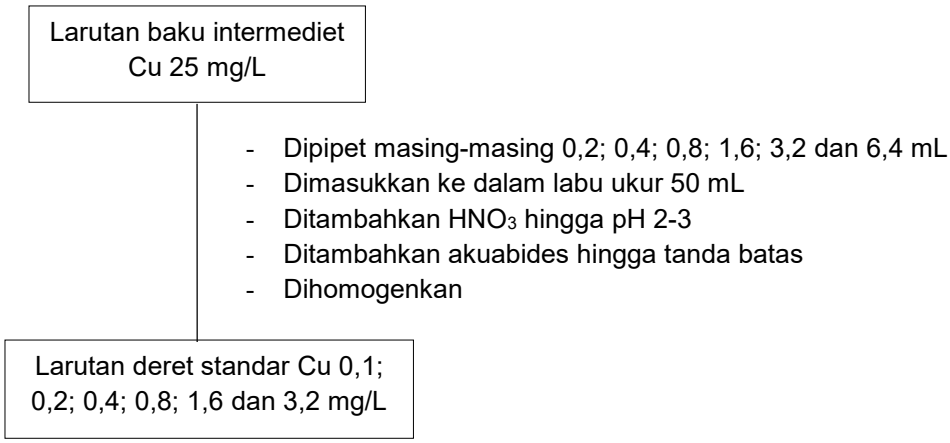
- Ditimbang sebanyak 0,0982 g ke dalam gelas kimia
- Dilarutkan dengan akuabides
- Dimasukkan ke dalam labu ukur 100 mL
- Diatur pada pH 2-3 dengan menambahkan NaOH/HNO_3
- Ditambahkan akuabides hingga tanda batas
- Dihomogenkan

Larutan baku induk
Cu 100 mg/L

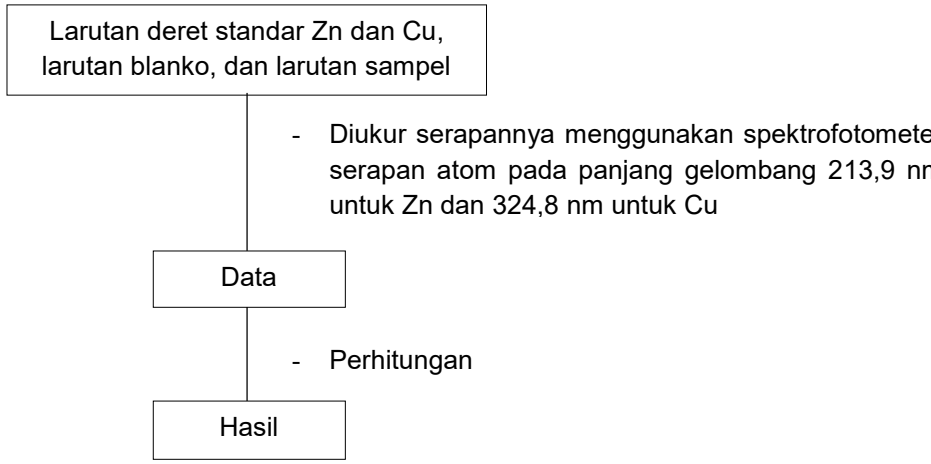
4.2 Pembuatan Larutan Baku Intermediet Cu 25 mg/L



4.2 Pembuatan Larutan Deret Standar Cu



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



Lampiran 4. Perhitungan

A. Perhitungan Pembuatan Larutan Baku Zn

1. Pembuatan larutan baku induk Zn 100 mg/L

$$\text{ppm} = \frac{\text{Ar Zn}}{\text{Mr } ZnSO_4.7H_2O} \times \frac{\text{massa}}{\text{volume}}$$

$$\text{massa} = \frac{\text{ppm x Mr } ZnSO_4.7H_2O \text{ x volume}}{\text{Ar Zn}}$$

$$\text{massa} = \frac{100 \text{ mg/L x } 287{,}53 \text{ g/mol x } 0{,}1 \text{ L}}{65{,}38 \text{ g/mol}}$$

massa = 43,99 mg

= 0,04399 g

2. Pembuatan larutan baku intermediet Zn 25 mg/L

$V_1 \times C_1 = V_2 \times C_2$

$V_1 \times 100 \text{ mg/L} = 100 \text{ mL} \times 25 \text{ mg/L}$

$$V_1 = \frac{100 \text{ mL} \times 25 \text{ mg/L}}{100 \text{ mg/L}}$$

$V_1 = 25$ mL

3. Pembuatan deret larutan standar Zn

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

  $V_1 \times C_1 = V_2 \times C_2$

  $V_1 \times 25 \text{ mg/L} = 50 \text{ mL} \times 0{,}1 \text{ mg/L}$

  $V_1 = 0{,}2$ mL

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

  $V_1 \times C_1 = V_2 \times C_2$

  $V_1 \times 25 \text{ mg/L} = 50 \text{ mL} \times 0{,}2 \text{ mg/L}$

  $V_1 = 0{,}4$ mL

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

  $V_1 \times C_1 = V_2 \times C_2$

  $V_1 \times 25 \text{ mg/L} = 50 \text{ mL} \times 0{,}4 \text{ mg/L}$

  $V_1 = 0{,}8$ mL

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

  $V_1 \times C_1 = V_2 \times C_2$

  $V_1 \times 25 \text{ mg/L} = 50 \text{ mL} \times 0{,}8 \text{ mg/L}$

  $V_1 = 1{,}6$ mL

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

  $V_1 \times C_1 = V_2 \times C_2$

  $V_1 \times 25 \text{ mg/L} = 50 \text{ mL} \times 1{,}6 \text{ mg/L}$

  $V_1 = 3{,}2$ mL

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

  $V_1 \times C_1 = V_2 \times C_2$

  $V_1 \times 25 \text{ mg/L} = 50 \text{ mL} \times 3{,}2 \text{ mg/L}$

  $V_1 = 6{,}4$ mL

B. Perhitungan Pembuatan Larutan Baku Cu

1. Pembuatan larutan baku induk Cu 100 mg/L

$$\text{ppm} = \frac{\text{Ar Cu}}{\text{Mr } CuSO_4.5H_2O} \times \frac{\text{massa}}{\text{volume}}$$

$$\text{massa} = \frac{\text{ppm x Mr } CuSO_4.5H_2O \text{ x volume}}{\text{Ar Cu}}$$

$$\text{massa} = \frac{100 \text{ mg/L x } 249{,}5 \text{ g/mol x } 0{,}1 \text{ L}}{63{,}5 \text{ g/mol}}$$

massa = 39,29 mg

= 0,0392 g

2. Pembuatan larutan baku intermediet Cu 25 mg/L

$V_1 \times C_1 = V_2 \times C_2$

$V_1 \times 100 \text{ mg/L} = 100 \text{ mL} \times 25 \text{ mg/L}$

$$V_1 = \frac{100 \text{ mL} \times 25 \text{ mg/L}}{100 \text{ mg/L}}$$

$V_1 = 25$ mL

3. **Pembuatan deret larutan standar Fe**

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

  $V_1 \times C_1 = V_2 \times C_2$

  $V_1 \times 25 \text{ mg/L} = 50 \text{ mL} \times 0{,}1 \text{ mg/L}$

  $V_1 = 0{,}2$ mL

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

  $V_1 \times C_1 = V_2 \times C_2$

  $V_1 \times 25 \text{ mg/L} = 50 \text{ mL} \times 0{,}2 \text{ mg/L}$

  $V_1 = 0{,}4$ mL

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

  $V_1 \times C_1 = V_2 \times C_2$

  $V_1 \times 25 \text{ mg/L} = 50 \text{ mL} \times 0{,}4 \text{ mg/L}$

  $V_1 = 0{,}8$ mL

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

  $V_1 \times C_1 = V_2 \times C_2$

  $V_1 \times 25 \text{ mg/L} = 50 \text{ mL} \times 0{,}8 \text{ mg/L}$

  $V_1 = 1{,}6$ mL

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

  $V_1 \times C_1 = V_2 \times C_2$

  $V_1 \times 25 \text{ mg/L} = 50 \text{ mL} \times 1{,}6 \text{ mg/L}$

  $V_1 = 3{,}2$ mL

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

  $V_1 \times C_1 = V_2 \times C_2$

  $V_1 \times 25 \text{ mg/L} = 50 \text{ mL} \times 3{,}2 \text{ mg/L}$

  $V_1 = 6{,}4$ 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**

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

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

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

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

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

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

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

E. Perhitungan BCF dan TF

1. Nilai BCF dan TF logam Zn pada *Avicennia Marina*

- **Nilai BCF dan TF titik 1**

$$BCF = \frac{\text{[M] rata-rata dalam jaringan tumbuhan } (\frac{mg}{kg})}{\text{[M] rata-rata dalam sedimen } (\frac{mg}{kg})} \qquad TF = \frac{\text{[M] dalam daun } (\frac{mg}{kg})}{\text{[M] dalam akar } (\frac{mg}{kg})}$$

$$BCF = \frac{(86{,}5441/3)\ mg/kg}{53\ mg/kg} \qquad TF = \frac{30{,}7060\ mg/kg}{39.75\ mg/kg}$$

$$BCF = 0{,}54 \qquad TF = 0{,}77$$

- **Nilai BCF dan TF titik 2**

$$BCF = \frac{\text{[M] rata-rata dalam jaringan tumbuhan } (\frac{mg}{kg})}{\text{[M] rata-rata dalam sedimen } (\frac{mg}{kg})} \qquad TF = \frac{\text{[M] dalam daun } (\frac{mg}{kg})}{\text{[M] dalam akar } (\frac{mg}{kg})}$$

$$BCF = \frac{(77{,}9346/3)\ mg/kg}{58{,}8451\ mg/kg} \qquad TF = \frac{27{,}7036\ mg/kg}{37{,}3145\ mg/kg}$$

$$BCF = 0{,}44 \qquad TF = 0{,}74$$

- **Nilai BCF dan TF**

titik 3

$$BCF = \frac{\text{[M] rata-rata dalam jaringan tumbuhan } (\frac{mg}{kg})}{\text{[M] rata-rata dalam sedimen } (\frac{mg}{kg})}$$

$$BCF = \frac{(106{,}6508/3)\ mg/kg}{44{,}7250\ mg/kg}$$

$$BCF = 0{,}79$$

$$TF = \frac{\text{[M] dalam daun } (\frac{mg}{kg})}{\text{[M] dalam akar } (\frac{mg}{kg})}$$

$$TF = \frac{39{,}7062\ mg/kg}{44{,}2626\ mg/kg}$$

$$TF = 0{,}89$$

2. Nilai BCF dan TF logam Zn pada *Rhizophora apiculata*

- **Nilai BCF dan TF titik 1**

$$BCF = \frac{\text{[M] rata-rata dalam jaringan tumbuhan } (\frac{mg}{kg})}{\text{[M] rata-rata dalam sedimen } (\frac{mg}{kg})}$$

$$BCF = \frac{(77{,}9103/3)\ mg/kg}{53\ mg/kg}$$

$$BCF = 0{,}49$$

$$TF = \frac{\text{[M] dalam daun } (\frac{mg}{kg})}{\text{[M] dalam akar } (\frac{mg}{kg})}$$

$$TF = \frac{23{,}3966\ mg/kg}{31{,}2067\ mg/kg}$$

$$TF = 0{,}75$$

- **Nilai BCF dan TF titik 2**

$$BCF = \frac{\text{[M] rata-rata dalam jaringan tumbuhan } (\frac{mg}{kg})}{\text{[M] rata-rata dalam sedimen } (\frac{mg}{kg})}$$

$$BCF = \frac{(91{,}8357/3)\ mg/kg}{58{,}8451\ mg/kg}$$

$$BCF = 0{,}52$$

$$TF = \frac{\text{[M] dalam daun } (\frac{mg}{kg})}{\text{[M] dalam akar } (\frac{mg}{kg})}$$

$$TF = \frac{5{,}2034\ mg/kg}{24{,}7048\ mg/kg}$$

$$TF = 0{,}21$$

- **Nilai BCF dan TF titik 3**

$$BCF = \frac{\text{[M] rata-rata dalam jaringan tumbuhan } (\frac{mg}{kg})}{\text{[M] rata-rata dalam sedimen } (\frac{mg}{kg})}$$

$$BCF = \frac{(66{,}1238/3)\ mg/kg}{44{,}7250\ mg/kg}$$

$$BCF = 0{,}49$$

$$TF = \frac{\text{[M] dalam daun } (\frac{mg}{kg})}{\text{[M] dalam akar } (\frac{mg}{kg})}$$

$$TF = \frac{14{,}9184\ mg/kg}{28{,}2348\ mg/kg}$$

$$TF = 0{,}53$$

3. Nilai BCF dan TF logam Cu pada *Avicennia Marina*

- **Nilai BCF dan TF titik 1**

$$BCF = \frac{\text{[M] rata-rata dalam jaringan tumbuhan } (\frac{mg}{kg})}{\text{[M] rata-rata dalam sedimen } (\frac{mg}{kg})} \qquad TF = \frac{\text{[M] dalam daun } (\frac{mg}{kg})}{\text{[M] dalam akar } (\frac{mg}{kg})}$$

$$BCF = \frac{(43{,}1099/3)\ mg/kg}{9{,}4223\ mg/kg} \qquad TF = \frac{17{,}7199\ mg/kg}{15{,}965\ mg/kg}$$

$$BCF = 1{,}52 \qquad TF = 1{,}11$$

- **Nilai BCF dan TF titik 2**

$$BCF = \frac{\text{[M] rata-rata dalam jaringan tumbuhan } (\frac{mg}{kg})}{\text{[M] rata-rata dalam sedimen } (\frac{mg}{kg})} \qquad TF = \frac{\text{[M] dalam daun } (\frac{mg}{kg})}{\text{[M] dalam akar } (\frac{mg}{kg})}$$

$$BCF = \frac{(42{,}1884/3)\ mg/kg}{10{,}3418\ mg/kg} \qquad TF = \frac{17{,}2989\ mg/kg}{16{,}4550\ mg/kg}$$

$$BCF = 1{,}36 \qquad TF = 1{,}05$$

- **Nilai BCF dan TF titik 3**

$$BCF = \frac{\text{[M] rata-rata dalam jaringan tumbuhan } (\frac{mg}{kg})}{\text{[M] rata-rata dalam sedimen } (\frac{mg}{kg})} \qquad TF = \frac{\text{[M] dalam daun } (\frac{mg}{kg})}{\text{[M] dalam akar } (\frac{mg}{kg})}$$

$$BCF = \frac{(41{,}7498/3)\ mg/kg}{21{,}1384\ mg/kg} \qquad TF = \frac{13{,}50\ mg/kg}{17{,}4864\ mg/kg}$$

$$BCF = 0{,}66 \qquad TF = 0{,}77$$

4. Nilai BCF dan TF logam Cu pada *Rhizopora apiculata*

- **Nilai BCF dan TF titik 1**

$$BCF = \frac{\text{[M] rata-rata dalam jaringan tumbuhan } (\frac{mg}{kg})}{\text{[M] rata-rata dalam sedimen } (\frac{mg}{kg})} \qquad TF = \frac{\text{[M] dalam daun } (\frac{mg}{kg})}{\text{[M] dalam akar } (\frac{mg}{kg})}$$

$$BCF = \frac{(43{,}7848/3)\ mg/kg}{9{,}4223\ mg/kg} \qquad TF = \frac{5{,}2034\ mg/kg}{24{,}7048\ mg/kg}$$

$$BCF = 1{,}55 \qquad TF = 0{,}21$$

- **Nilai BCF dan TF titik 2**

$$BCF = \frac{\text{[M] rata-rata dalam jaringan tumbuhan } (\frac{mg}{kg})}{\text{[M] rata-rata dalam sedimen } (\frac{mg}{kg})} \qquad TF = \frac{\text{[M] dalam daun } (\frac{mg}{kg})}{\text{[M] dalam akar } (\frac{mg}{kg})}$$

$$BCF = \frac{(33{,}1418/3)\ mg/kg}{10{,}3418\ mg/kg} \qquad TF = \frac{7{,}0314\ mg/kg}{20{,}0160\ mg/kg}$$

$$BCF = 1{,}07 \qquad TF = 0{,}35$$

- **Nilai BCF dan TF titik 3**

$$BCF = \frac{\text{[M] rata-rata dalam jaringan tumbuhan } (\frac{mg}{kg})}{\text{[M] rata-rata dalam sedimen } (\frac{mg}{kg})}$$

$$BCF = \frac{(45{,}0204/3)\ mg/kg}{21{,}1384\ mg/kg}$$

$$BCF = 0{,}71$$

$$TF = \frac{\text{[M] dalam daun } (\frac{mg}{kg})}{\text{[M] dalam akar } (\frac{mg}{kg})}$$

$$TF = \frac{3{,}4875\ mg/kg}{32{,}5318\ mg/kg}$$

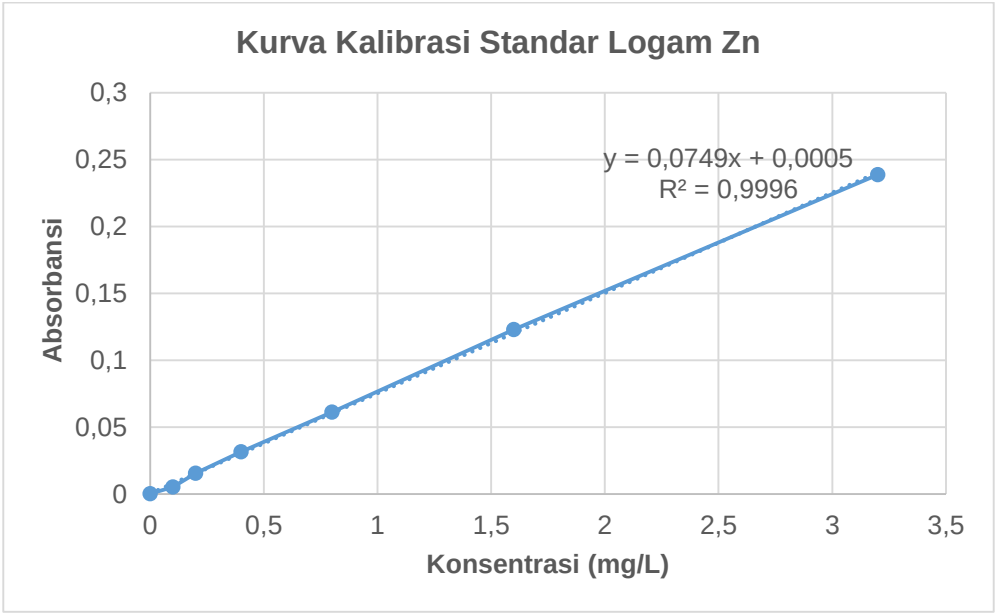
$$BCF = 0{,}11$$

Lampiran 5. Pengolahan Data

A. Analisis Logam Zn dengan SSA

1. Data pengukuran deret standar Zn

no	x	Y	x^2	y^2	xy
1	0	0,000146	0	2,1316E-08	0
2	0,1	0,005186	0,01	0,000026895	0,0005186
3	0,2	0,015579	0,04	0,000242705	0,0031158
4	0,4	0,031591	0,16	0,000997991	0,0126364
5	0,8	0,061306	0,64	0,003758426	0,0490448
6	1,6	0,122832	2,56	0,0150877	0,1965312
7	3,2	0,23872	10,24	0,056987238	0,763904
∑	**6,3**	**0,47536**	**13,65**	**0,077100977**	**1,0257508**



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

$$= \frac{7\,(1{,}0257508) - (6{,}3)(0{,}47536)}{7\,(13{,}65) - (6{,}3)^2}$$

$$= \frac{4{,}1854876}{55{,}86}$$

$$= 0{,}0749$$

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

$$= 0{,}06790857 - (0{,}0749)(0{,}9)$$

$$= 0{,}06790857 - 0{,}06741$$

$$= 0{,}00050857$$

2. Data hasil pengukuran logam Zn pada Air Laut

Lokasi	Absorbansi
Titik 1	0,0735
Titik 2	0,04755
Titik 3	0,0584

- Konsentrasi Logam Zn dalam Air Laut

- Titik 1

$y = 0{,}0749x + 0{,}0005$

$0{,}0735 = 0{,}0749x + 0{,}0005$

$x = \frac{0{,}0735 - 0{,}0005}{0{,}0749}$

$x = 0{,}9746 \text{ mg/L}$

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

$C\ Zn = \frac{0{,}9746 \text{ mg/L} \times 50 \text{ mL}}{100 \text{ mL}}$

$C\ Zn = 0{,}4873 \text{ mg/L}$

- Titik 2

$y = 0{,}0749x + 0{,}0005$

$0{,}04755 = 0{,}0749x + 0{,}0005$

$x = \frac{0{,}04755 - 0{,}0005}{0{,}0749}$

$x = 0{,}62817 \text{ mg/L}$

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

$C\ Zn = \frac{0{,}62817 \text{ mg/L} \times 50 \text{ mL}}{100 \text{ mL}}$

$C\ Zn = 0{,}3140 \text{ mg/L}$

- Titik 3

$y = 0{,}0749x + 0{,}0005$

$0{,}0584 = 0{,}0749x + 0{,}0005$

$x = \frac{0{,}0584 - 0{,}0005}{0{,}0749}$

$x = 0{,}7730 \text{ mg/L}$

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

$C\ Zn = \frac{0{,}7730 \text{ mg/L} \times 50 \text{ mL}}{100 \text{ mL}}$

$C\ Zn = 0{,}3865 \text{ mg/L}$

3. Data hasil pengukuran logam Zn pada Sedimen

Lokasi	Absorbansi
Titik 1	0,0799
Titik 2	0,08865
Titik 3	0,0675

- Konsentrasi Logam Zn dalam Sedimen

  - Titik 1

$$y = 0{,}0749x + 0{,}0005$$
$$0{,}0799 = 0{,}0749x + 0{,}0005$$
$$x = \frac{0{,}0799 - 0{,}0005}{0{,}0749}$$
$$x = 1{,}06008 \text{ mg/L}$$

$$\text{C Zn} = \frac{C_x \times V_{flask}}{\text{kg sampel}}$$
$$\text{C Zn} = \frac{1{,}06008 \text{ mg/L} \times 0{,}1 \text{ L}}{2{,}00015 \times 10^{-3} \text{ kg}}$$
$$\text{C Zn} = 53 \text{ mg/kg}$$

  - Titik 2

$$y = 0{,}0749x + 0{,}0005$$
$$0{,}08865 = 0{,}0749x + 0{,}0005$$
$$x = \frac{0{,}08865 - 0{,}0005}{0{,}0749}$$
$$x = 1{,}17690 \text{ mg/L}$$

$$\text{C Zn} = \frac{C_x \times V_{flask}}{\text{kg sampel}}$$
$$\text{C Zn} = \frac{1{,}1769 \text{ mg/L} \times 0{,}1 \text{ L}}{2{,}0000 \times 10^{-3} \text{ kg}}$$
$$\text{C Zn} = 58{,}8451 \text{ mg/kg}$$

  - Titik 3

$$y = 0{,}0749x + 0{,}0005$$
$$0{,}0675 = 0{,}0749x + 0{,}0005$$
$$x = \frac{0{,}0675 - 0{,}0005}{0{,}0749}$$
$$x = 0{,}89452 \text{ mg/L}$$

$$\text{C Zn} = \frac{C_x \times V_{flask}}{\text{kg sampel}}$$
$$\text{C Zn} = \frac{0{,}89452 \text{ mg/L} \times 0{,}1 \text{ L}}{2{,}00005 \times 10^{-3} \text{ kg}}$$
$$\text{C Zn} = 44{,}725 \text{ mg/kg}$$

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

Lokasi	Absorbansi		
	Akar	Batang	Daun
Titik 1	0,06005	0,0246	0,0465
Titik 2	0,0564	0,01985	0,0420
Titik 3	0,06735	0,01800	0,0450

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

$$y = 0{,}0749x + 0{,}0005$$
$$0{,}06005 = 0{,}0749x + 0{,}0005$$
$$x = \frac{0{,}06005 - 0{,}0005}{0{,}0749}$$
$$x = 0{,}79506 \text{ mg/L}$$

$$\text{C Zn} = \frac{C_x \times V_{flask}}{\text{kg sampel}}$$
$$\text{C Zn} = \frac{0{,}79506 \text{ mg/L} \times 0{,}05 \text{ L}}{1{,}0000 \times 10^{-3} \text{ kg}}$$
$$\text{C Zn} = 39{,}75 \text{ mg/kg}$$

- Batang

$y = 0{,}0749x + 0{,}0005$

$0{,}0246 = 0{,}0749x + 0{,}0005$

$x = \frac{0{,}0246 - 0{,}0005}{0{,}0749}$

$x = 0{,}32176 \text{ mg/L}$

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

$C\ Zn = \frac{0{,}32176 \text{ mg/L} \times 0{,}05 \text{ L}}{1{,}0000 \times 10^{-3} \text{ kg}}$

$C\ Zn = 16{,}0881 \text{ mg/kg}$

- Daun

$y = 0{,}0749x + 0{,}0005$

$0{,}0465 = 0{,}0749x + 0{,}0005$

$x = \frac{0{,}0465 - 0{,}0005}{0{,}0749}$

$x = 0{,}614152 \text{ mg/L}$

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

$C\ Zn = \frac{0{,}614152 \text{ mg/L} \times 0{,}05 \text{ L}}{1{,}00005 \times 10^{-3} \text{ kg}}$

$C\ Zn = 30{,}70606 \text{ mg/kg}$

- **Titik 2**
  - Akar

$y = 0{,}0749x + 0{,}0005$

$0{,}0564 = 0{,}0749x + 0{,}0005$

$x = \frac{0{,}0564 - 0{,}0005}{0{,}0749}$

$x = 0{,}746328 \text{ mg/L}$

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

$C\ Zn = \frac{0{,}746328 \text{ mg/L} \times 0{,}05 \text{ L}}{1{,}00005 \times 10^{-3} \text{ kg}}$

$C\ Zn = 37{,}31455 \text{ mg/kg}$

- Batang

$y = 0{,}0749x + 0{,}0005$

$0{,}01985 = 0{,}0749x + 0{,}0005$

$x = \frac{0{,}01985 - 0{,}0005}{0{,}0749}$

$x = 0{,}258344 \text{ mg/L}$

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

$C\ Zn = \frac{0{,}2583 \text{ mg/L} \times 0{,}05 \text{ L}}{1{,}0000 \times 10^{-3} \text{ kg}}$

$C\ Zn = 12{,}91657 \text{ mg/kg}$

- Daun

$y = 0{,}0749x + 0{,}0005$

$0{,}0420 = 0{,}0749x + 0{,}0005$

$x = \frac{0{,}0420 - 0{,}0005}{0{,}0749}$

$x = 0{,}5540 \text{ mg/L}$

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

$C\ Zn = \frac{0{,}5540 \text{ mg/L} \times 0{,}05 \text{ L}}{1{,}0000 \times 10^{-3} \text{ kg}}$

$C\ Zn = 27{,}7036 \text{ mg/kg}$

- **Titik 3**
  - Akar

$y = 0{,}0749x + 0{,}0005$

$0{,}06735 = 0{,}0749x + 0{,}0005$

$x = \frac{0{,}06735 - 0{,}0005}{0{,}0749}$

$x = 0{,}892523 \text{ mg/L}$

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

$C\ Zn = \frac{0{,}8925 \text{ mg/L} \times 0{,}05 \text{ L}}{1{,}0000 \times 10^{-3} \text{ kg}}$

$C\ Zn = 44{,}26168 \text{ mg/kg}$

  - Batang

$y = 0{,}0749x + 0{,}0005$

$0{,}01800 = 0{,}0749x + 0{,}0005$

$x = \frac{0{,}01800 - 0{,}0005}{0{,}0749}$

$x = 0{,}23364 \text{ mg/L}$

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

$C\ Zn = \frac{0{,}23364 \text{ mg/L} \times 0{,}05 \text{ L}}{1{,}0001 \times 10^{-3} \text{ kg}}$

$C\ Zn = 11{,}68107 \text{ mg/kg}$

  - Daun

$y = 0{,}0749x + 0{,}0005$

$0{,}0450 = 0{,}0749x + 0{,}0005$

$x = \frac{0{,}0450 - 0{,}0005}{0{,}0749}$

$x = 0{,}59412 \text{ mg/L}$

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

$C\ Zn = \frac{0{,}59412 \text{ mg/L} \times 0{,}05 \text{ L}}{1{,}0000 \times 10^{-3} \text{ kg}}$

$C\ Zn = 29{,}7062 \text{ mg/kg}$

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

Lokasi	Absorbansi		
	Akar	Batang	Daun
Titik 1	0,04725	0,0350	0,03555
Titik 2	0,06015	0,04008	0,03885
Titik 3	0,0428	0,03491	0,02285

- Konsentrasi Logam Zn dalam Mangrove *Rhizopora apiculata*

- **Titik 1**
  - Akar

$y = 0{,}0749x + 0{,}0005$

$0{,}04725 = 0{,}0749x + 0{,}0005$

$x = \frac{0{,}04725 - 0{,}0005}{0{,}0749}$

$x = 0{,}62416 \text{ mg/L}$

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

$C\ Zn = \frac{0{,}62416 \text{ mg/L} \times 0{,}05 \text{ L}}{1{,}00005 \times 10^{-3} \text{ kg}}$

$C\ Zn = 31{,}20671 \text{ mg/kg}$

- Batang

$y = 0{,}0749x + 0{,}0005$

$0{,}0350 = 0{,}0749x + 0{,}0005$

$x = \frac{0{,}0350 - 0{,}0005}{0{,}0749}$

$x = 0{,}4606 \text{ mg/L}$

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

$C\ Zn = \frac{0{,}4606 \text{ mg/L} \times 0{,}05 \text{ L}}{1{,}0000 \times 10^{-3} \text{ kg}}$

$C\ Zn = 23{,}30707 \text{ mg/kg}$

- Daun

$y = 0{,}0749x + 0{,}0005$

$0{,}03555 = 0{,}0749x + 0{,}0005$

$x = \frac{0{,}03555 - 0{,}0005}{0{,}0749}$

$x = 0{,}46795 \text{ mg/L}$

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

$C\ Zn = \frac{0{,}46795 \text{ mg/L} \times 0{,}05 \text{ L}}{1{,}00005 \times 10^{-3} \text{ kg}}$

$C\ Zn = 23{,}39669 \text{ mg/kg}$

- **Titik 2**
  - Akar

$y = 0{,}0749x + 0{,}0005$

$0{,}06015 = 0{,}0749x + 0{,}0005$

$x = \frac{0{,}06015 - 0{,}0005}{0{,}0749}$

$x = 0{,}79639 \text{ mg/L}$

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

$C\ Zn = \frac{0{,}79639 \text{ mg/L} \times 0{,}05 \text{ L}}{1{,}0000 \times 10^{-3} \text{ kg}}$

$C\ Zn = 39{,}8157 \text{ mg/kg}$

- Batang

$y = 0{,}0749x + 0{,}0005$

$0{,}04008 = 0{,}0749x + 0{,}0005$

$x = \frac{0{,}04008 - 0{,}0005}{0{,}0749}$

$x = 0{,}52843 \text{ mg/L}$

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

$C\ Zn = \frac{0{,}52843 \text{ mg/L} \times 0{,}05 \text{ L}}{1{,}0000 \times 10^{-3} \text{ kg}}$

$C\ Zn = 26{,}4218 \text{ mg/kg}$

- Daun

$y = 0{,}0749x + 0{,}0005$

$0{,}03885 = 0{,}0749x + 0{,}0005$

$x = \frac{0{,}03885 - 0{,}0005}{0{,}0749}$

$x = 0{,}51201 \text{ mg/L}$

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

$C\ Zn = \frac{0{,}51201 \text{ mg/L} \times 0{,}05 \text{ L}}{1{,}0000 \times 10^{-3} \text{ kg}}$

$C\ Zn = 25{,}5982 \text{ mg/kg}$

- **Titik 3**
  - Akar

$y = 0{,}0749x + 0{,}0005$

$0{,}0428 = 0{,}0749x + 0{,}0005$

$x = \frac{0{,}0428 - 0{,}0005}{0{,}0749}$

$x = 0{,}5647 \text{ mg/L}$

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

$C\ Zn = \frac{0{,}5647 \text{ mg/L} \times 0{,}05 \text{ L}}{1{,}0000 \times 10^{-3} \text{ kg}}$

$C\ Zn = 28{,}2348 \text{ mg/kg}$

  - Batang

$y = 0{,}0749x + 0{,}0005$

$0{,}03491 = 0{,}0749x + 0{,}0005$

$x = \frac{0{,}03491 - 0{,}0005}{0{,}0749}$

$x = 0{,}4594 \text{ mg/L}$

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

$C\ Zn = \frac{0{,}4594 \text{ mg/L} \times 0{,}05 \text{ L}}{1{,}0000 \times 10^{-3} \text{ kg}}$

$C\ Zn = 22{,}9706 \text{ mg/kg}$

  - Daun

$y = 0{,}0749x + 0{,}0005$

$0{,}02285 = 0{,}0749x + 0{,}0005$

$x = \frac{0{,}02285 - 0{,}0005}{0{,}0749}$

$x = 0{,}2983 \text{ mg/L}$

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

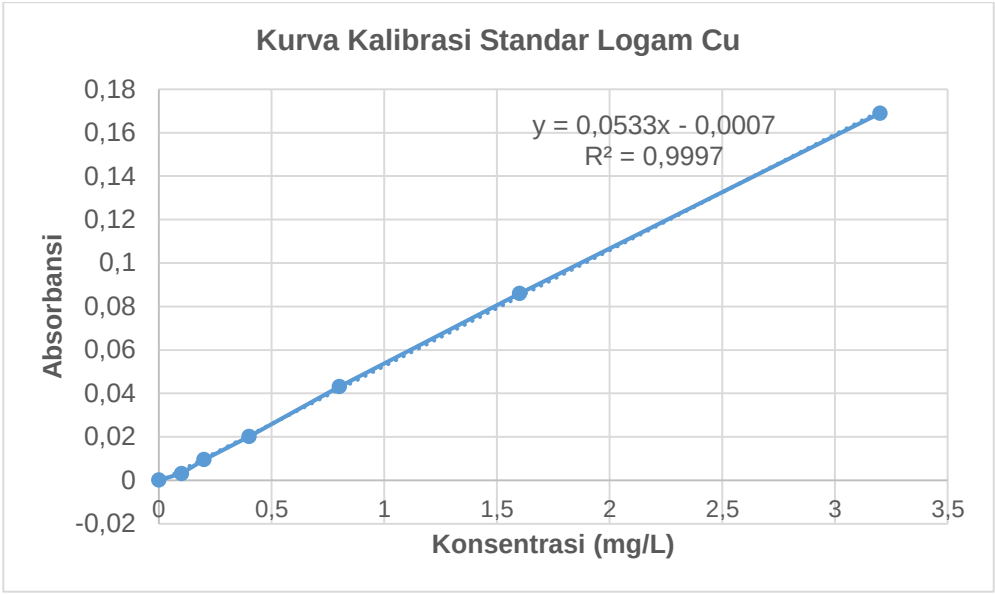
$C\ Zn = \frac{0{,}2983 \text{ mg/L} \times 0{,}05 \text{ L}}{1{,}0000 \times 10^{-3} \text{ kg}}$

$C\ Zn = 14{,}9184 \text{ mg/kg}$

B. Analisis Logam Cu dengan SSA

1. Data pengukuran deret standar Cu

No	**X**	**y**	**x^2**	**y^2**	**Xy**
1	0	0,000103	0	1,0609E-08	0
2	0,1	0,003112	0,01	0,000009685	0,0003112
3	0,2	0,009543	0,04	0,000091069	0,0019086
4	0,4	0,020103	0,16	0,000404131	0,0080412
6	0,8	0,043132	0,64	0,001860369	0,0345056
6	1,6	0,085971	2,56	0,007391013	0,1375536
7	3,2	0,168949	10,24	0,028543765	0,5406368
∑	**6,3**	**0,330913**	**13,65**	**0,038300041**	**0,722957**



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

$$= \frac{7\,(0{,}722957) - (6{,}3)(0{,}330913)}{7\,(13{,}65) - (6{,}3)^2}$$

$$= \frac{2{,}9759471}{55{,}86}$$

$$= 0{,}053327$$

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

$$= 0{,}0472732 - (0{,}053327)(0{,}9)$$

$$= 0{,}0472732 - 0{,}0479917$$

$$= -\,0{,}0007$$

2. Data hasil pengukuran logam Cu pada Air Laut

Lokasi	Absorbansi
Titik 1	0,08578
Titik 2	0,0186
Titik 3	0,02435

- Konsentrasi Logam Cu dalam Air Laut
  - Titik 1

$y = 0{,}053327x - 0{,}0007$

$0{,}08578 = 0{,}053327x - 0{,}0007$

$$x = \frac{0{,}08578 + 0{,}0007}{0{,}053327}$$

$x = 1{,}62169$ mg/L

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

$$C\ Cu = \frac{1{,}62169\ mg/L \times 50\ mL}{100\ mL}$$

$C\ Cu = 0{,}81163$ mg/L

- Titik 2

$y = 0{,}053327x - 0{,}0007$

$0{,}0186 = 0{,}053327x - 0{,}0007$

$x = \frac{0{,}0186 + 0{,}0007}{0{,}053327}$

$x = 0{,}3619 \text{ mg/L}$

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

$C\ Cu = \frac{0{,}3619 \text{ mg/L} \times 50 \text{ mL}}{100 \text{ mL}}$

$C\ Cu = 0{,}1809 \text{ mg/L}$

- Titik 3

$y = 0{,}053327x - 0{,}0007$

$0{,}02435 = 0{,}053327x - 0{,}0007$

$x = \frac{0{,}02435 + 0{,}0007}{0{,}053327}$

$x = 0{,}4697 \text{ mg/L}$

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

$C\ Cu = \frac{0{,}4697 \text{ mg/L} \times 50 \text{ mL}}{100 \text{ mL}}$

$C\ Cu = 0{,}2348 \text{ mg/L}$

3. Data hasil pengukuran logam Cu pada Sedimen

Lokasi	Absorbansi
Titik 1	0,00935
Titik 2	0,01033
Titik 3	0,02185

- Konsentrasi Logam Cu dalam Sedimen

- Titik 1

$y = 0{,}053327x - 0{,}0007$

$0{,}00935 = 0{,}053327x - 0{,}0007$

$x = \frac{0{,}00935 + 0{,}0007}{0{,}053327}$

$x = 0{,}1885 \text{ mg/L}$

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

$C\ Cu = \frac{0{,}1885 \text{ mg/L} \times 0{,}1 \text{ L}}{2{,}00015 \times 10^{-3} \text{ kg}}$

$C\ Cu = 9{,}4223 \text{ mg/kg}$

- Titik 2

$y = 0{,}053327x - 0{,}0007$

$0{,}01033 = 0{,}053327x - 0{,}0007$

$x = \frac{0{,}01033 + 0{,}0007}{0{,}053327}$

$x = 0{,}2068 \text{ mg/L}$

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

$C\ Cu = \frac{0{,}2068 \text{ mg/L} \times 0{,}1 \text{ L}}{2{,}0000 \times 10^{-3} \text{ kg}}$

$C\ Cu = 10{,}3418 \text{ mg/kg}$

- Titik 3

$y = 0{,}053327x - 0{,}0007$

$0{,}02185 = 0{,}053327x - 0{,}0007$

$x = \frac{0{,}02185 + 0{,}0007}{0{,}053327}$

$x = 0{,}4228 \text{ mg/L}$

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

$C\ Cu = \frac{0{,}4228 \text{ mg/L} \times 0{,}1 \text{ L}}{2{,}00015 \times 10^{-3} \text{ kg}}$

$C\ Cu = 21{,}1384 \text{ mg/kg}$

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

Lokasi	Absorbansi		
	Akar	Batang	Daun
Titik 1	0,01633	0,00935	0,0182
Titik 2	0,01685	0,0083	0,01775
Titik 3	0,01795	0,0108	0,0137

- Konsentrasi Logam Cu dalam Mangrove *Avicennia marina*

- **Titik 1**
  - Akar

$y = 0{,}053327x - 0{,}0007$

$0{,}01633 = 0{,}053327x - 0{,}0007$

$x = \frac{0{,}01633 + 0{,}0007}{0{,}053327}$

$x = 0{,}3193 \text{ mg/L}$

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

$C\ Cu = \frac{0{,}3193 \text{ mg/L} \times 0{,}05 \text{ L}}{1{,}0000 \times 10^{-3} \text{ kg}}$

$C\ Cu = 15{,}965 \text{ mg/kg}$

  - Batang

$y = 0{,}053327x - 0{,}0007$

$0{,}00935 = 0{,}053327x - 0{,}0007$

$x = \frac{0{,}00935 + 0{,}0007}{0{,}053327}$

$x = 0{,}1885 \text{ mg/L}$

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

$C\ Cu = \frac{0{,}1885 \text{ mg/L} \times 0{,}05 \text{ L}}{1{,}0000 \times 10^{-3} \text{ kg}}$

$C\ Cu = 9{,}4250 \text{ mg/kg}$

  - Daun

$y = 0{,}053327x - 0{,}0007$

$0{,}0182 = 0{,}053327x - 0{,}0007$

$x = \frac{0{,}0182 + 0{,}0007}{0{,}053327}$

$x = 0{,}3544 \text{ mg/L}$

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

$C\ Cu = \frac{0{,}3544 \text{ mg/L} \times 0{,}05 \text{ L}}{1{,}00005 \times 10^{-3} \text{ kg}}$

$C\ Cu = 17{,}7199 \text{ mg/kg}$

- **Titik 2**
  - Akar

$y = 0{,}053327x - 0{,}0007$

$0{,}01685 = 0{,}053327x - 0{,}0007$

$x = \frac{0{,}01685 + 0{,}0007}{0{,}053327}$

$x = 0{,}3291 \text{ mg/L}$

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

$C\ Cu = \frac{0{,}3291 \text{ mg/L} \times 0{,}05 \text{ L}}{1{,}0000 \times 10^{-3} \text{ kg}}$

$C\ Cu = 16{,}4550 \text{ mg/kg}$

  - Batang

$y = 0{,}053327x - 0{,}0007$

$0{,}0083 = 0{,}053327x - 0{,}0007$

$x = \frac{0{,}0083 + 0{,}0007}{0{,}053327}$

$x = 0{,}1687 \text{ mg/L}$

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

$C\ Cu = \frac{0{,}1687 \text{ mg/L} \times 0{,}05 \text{ L}}{1{,}00005 \times 10^{-3} \text{ kg}}$

$C\ Cu = 8{,}4345 \text{ mg/kg}$

  - Daun

$y = 0{,}053327x - 0{,}0007$

$0{,}01775 = 0{,}053327x - 0{,}0007$

$x = \frac{0{,}01775 + 0{,}0007}{0{,}053327}$

$x = 0{,}3459 \text{ mg/L}$

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

$C\ Cu = \frac{0{,}3459 \text{ mg/L} \times 0{,}05 \text{ L}}{1{,}0000 \times 10^{-3} \text{ kg}}$

$C\ Cu = 17{,}2989 \text{ mg/kg}$

- **Titik 3**
  - Akar

$y = 0{,}053327x - 0{,}0007$

$0{,}01795 = 0{,}053327x - 0{,}0007$

$x = \frac{0{,}01795 + 0{,}0007}{0{,}053327}$

$x = 0{,}3497 \text{ mg/L}$

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

$C\ Cu = \frac{0{,}3497 \text{ mg/L} \times 0{,}05 \text{ L}}{1{,}0000 \times 10^{-3} \text{ kg}}$

$C\ Cu = 17{,}4864 \text{ mg/kg}$

  - Batang

$y = 0{,}053327x - 0{,}0007$

$0{,}0108 = 0{,}053327x - 0{,}0007$

$x = \frac{0{,}0108 + 0{,}0007}{0{,}053327}$

$x = 0{,}2156 \text{ mg/L}$

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

$C\ Cu = \frac{0{,}2156 \text{ mg/L} \times 0{,}05 \text{ L}}{1{,}0001 \times 10^{-3} \text{ kg}}$

$C\ Cu = 10{,}7814 \text{ mg/kg}$

➢ Daun

$y = 0{,}053327x - 0{,}0007$

$0{,}0137 = 0{,}053327x - 0{,}0007$

$x = \frac{0{,}0137 + 0{,}0007}{0{,}053327}$

$x = 0{,}2700 \text{ mg/L}$

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

$C\ Cu = \frac{0{,}2700 \text{ mg/L} \times 0{,}05 \text{ L}}{1{,}0000 \times 10^{-3} \text{ kg}}$

$C\ Cu = 13{,}50 \text{ mg/kg}$

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

Lokasi	Absorbansi		
	Akar	Batang	Daun
Titik 1	0,02565	0,0141	0,00485
Titik 2	0,02065	0,0058	0,0068
Titik 3	0,034	0,0089	0,00302

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

➢ Akar

$y = 0{,}053327x - 0{,}0007$

$0{,}02565 = 0{,}053327x - 0{,}0007$

$x = \frac{0{,}02565 + 0{,}0007}{0{,}053327}$

$x = 0{,}4941 \text{ mg/L}$

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

$C\ Cu = \frac{0{,}4941 \text{ mg/L} \times 0{,}05 \text{ L}}{1{,}00005 \times 10^{-3} \text{ kg}}$

$C\ Cu = 24{,}7048 \text{ mg/kg}$

➢ Batang

$y = 0{,}053327x - 0{,}0007$

$0{,}0141 = 0{,}053327x - 0{,}0007$

$x = \frac{0{,}0141 + 0{,}0007}{0{,}053327}$

$x = 0{,}2775 \text{ mg/L}$

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

$C\ Cu = \frac{0{,}2775 \text{ mg/L} \times 0{,}05 \text{ L}}{1{,}0000 \times 10^{-3} \text{ kg}}$

$C\ Cu = 13{,}8766 \text{ mg/kg}$

➢ Daun

$y = 0{,}053327x - 0{,}0007$

$0{,}00485 = 0{,}053327x - 0{,}0007$

$x = \frac{0{,}0137 + 0{,}0007}{0{,}053327}$

$x = 0{,}10407 \text{ mg/L}$

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

$C\ Cu = \frac{0{,}10407 \text{ mg/L} \times 0{,}05 \text{ L}}{1{,}00005 \times 10^{-3} \text{ kg}}$

$C\ Cu = 5{,}2034 \text{ mg/kg}$

- **Titik 2**
  - Akar

$y = 0{,}053327x - 0{,}0007$

$0{,}02065 = 0{,}053327x - 0{,}0007$

$x = \frac{0{,}02065 + 0{,}0007}{0{,}053327}$

$x = 0{,}40036 \text{ mg/L}$

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

$C\ Cu = \frac{0{,}0{,}40036 \text{ mg/L} \times 0{,}05 \text{ L}}{1{,}0001 \times 10^{-3} \text{ kg}}$

$C\ Cu = 20{,}0160 \text{ mg/kg}$

  - Batang

$y = 0{,}053327x - 0{,}0007$

$0{,}0058 = 0{,}053327x - 0{,}0007$

$x = \frac{0{,}0058 + 0{,}0007}{0{,}053327}$

$x = 0{,}1218 \text{ mg/L}$

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

$C\ Cu = \frac{0{,}1218 \text{ mg/L} \times 0{,}05 \text{ L}}{1{,}0000 \times 10^{-3} \text{ kg}}$

$C\ Cu = 6{,}0944 \text{ mg/kg}$

  - Daun

$y = 0{,}053327x - 0{,}0007$

$0{,}0068 = 0{,}053327x - 0{,}0007$

$x = \frac{0{,}0068 + 0{,}0007}{0{,}053327}$

$x = 0{,}1406 \text{ mg/L}$

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

$C\ Cu = \frac{0{,}1406 \text{ mg/L} \times 0{,}05 \text{ L}}{1{,}0001 \times 10^{-3} \text{ kg}}$

$C\ Cu = 7{,}0314 \text{ mg/kg}$

- **Titik 3**
  - Akar

$y = 0{,}053327x - 0{,}0007$

$0{,}034 = 0{,}053327x - 0{,}0007$

$x = \frac{0{,}049 + 0{,}0007}{0{,}053327}$

$x = 0{,}6507 \text{ mg/L}$

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

$C\ Cu = \frac{0{,}6507 \text{ mg/L} \times 0{,}05 \text{ L}}{1{,}0001 \times 10^{-3} \text{ kg}}$

$C\ Cu = 32{,}5318 \text{ mg/kg}$

  - Batang

$y = 0{,}053327x - 0{,}0007$

$0{,}0089 = 0{,}053327x - 0{,}0007$

$x = \frac{0{,}0089 + 0{,}0007}{0{,}053327}$

$x = 0{,}18002 \text{ mg/L}$

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

$C\ Cu = \frac{0{,}18002 \text{ mg/L} \times 0{,}05 \text{ L}}{1{,}0000 \times 10^{-3} \text{ kg}}$

$C\ Cu = 9{,}0011 \text{ mg/kg}$

- Daun

$y = 0{,}053327x - 0{,}0007$

$0{,}00302 = 0{,}053327x - 0{,}0007$

$$x = \frac{0{,}00302 + 0{,}0007}{0{,}053327}$$

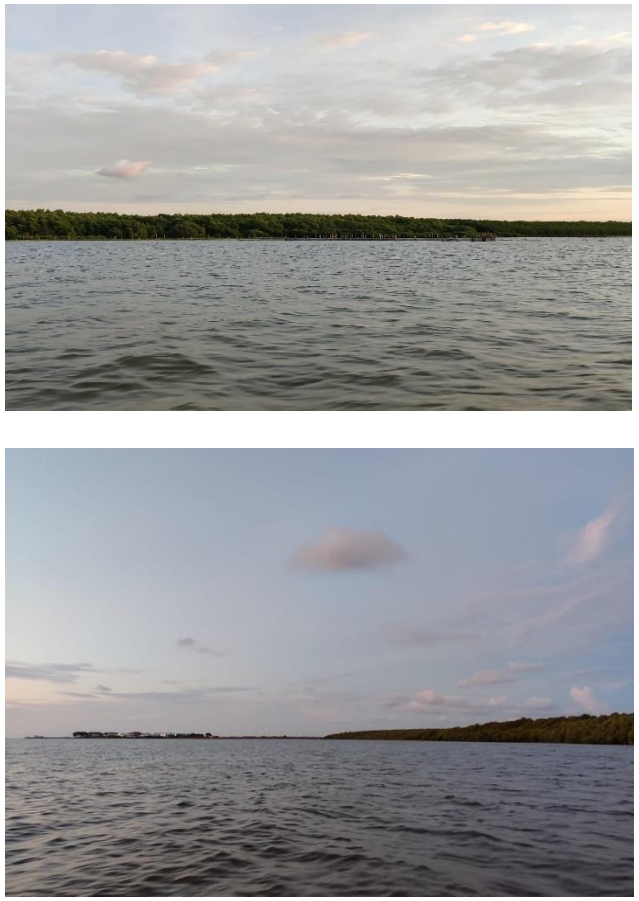
$x = 0{,}0697$ mg/L

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

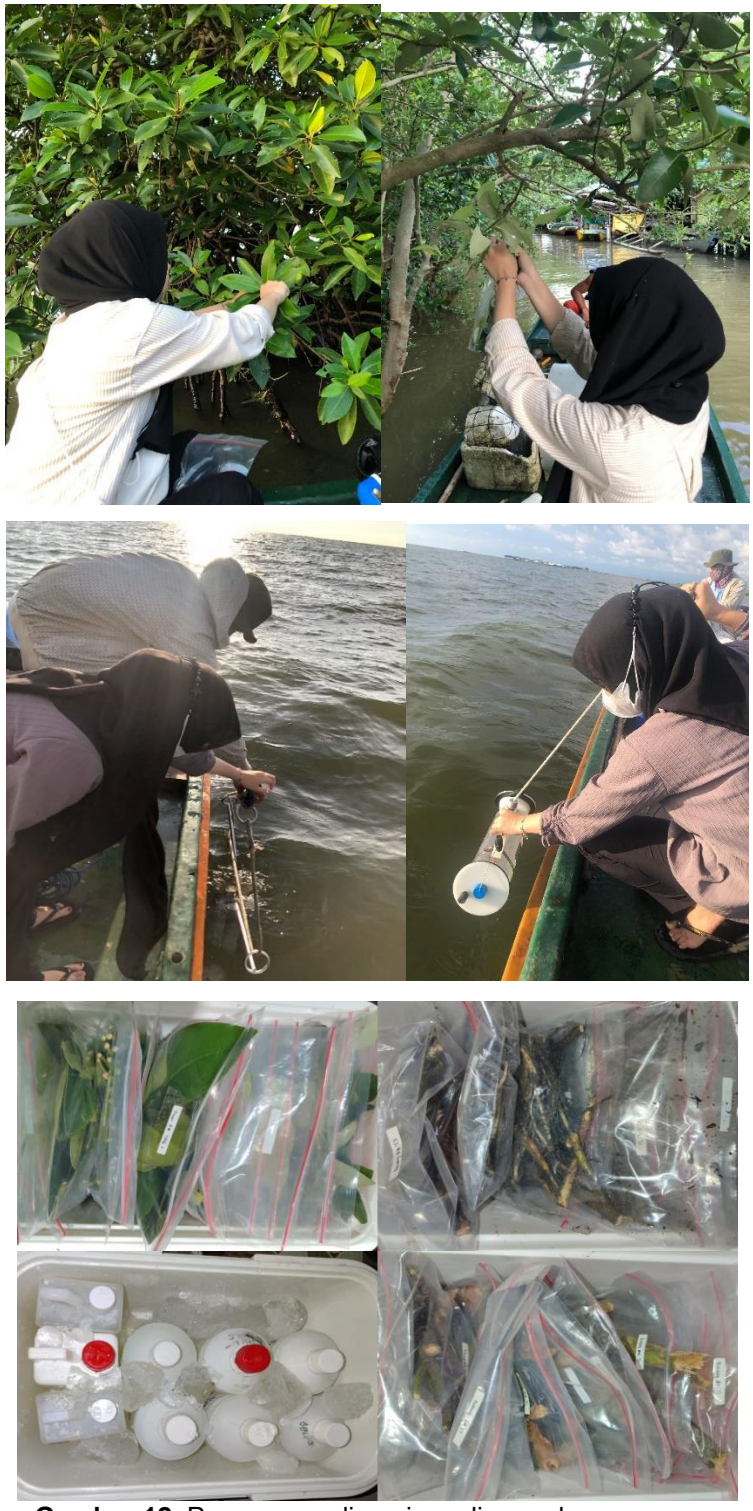
$$C\ Cu = \frac{0{,}0697\ mg/L \times 0{,}05\ L}{1{,}0001 \times 10^{-3}\ kg}$$

$C\ Cu = 3{,}4875$ mg/kg

Lampiran 6. Dokumentasi



Gambar 11. Lokasi Penelitian



Gambar 12. Proses sampling air, sedimen, dan mangrove

Gambar 13. Sampel dikering-anginkan

Gambar 14. Sampel dikeringkan di dalam oven

Gambar 15. Sampel setelah dikeringkan

Gambar 16. Sampel setelah digerus dan diayak

Gambar 17. Proses destruksi sampel dan penyaringan hasil destruksi

Gambar 18. Sampel siap dianalisis

Gambar 19. Proses analisis sampel dengan menggunakan SSA