LAMPIRAN

LAMPIRAN 1. PERHITUNGAN

1. Pembuatan larutan baku standar Fe 100 ppm

Larutan standar Fe 100 ppm dibuat dari padatan $FeCl_3.6H_2O$ dengan perhitungan.

$$\frac{\text{ppm Fe}}{\text{ppm FeCl3.6H2O}} = \frac{\text{Ar Fe}}{\text{Mr FeCl3.6H2O}}$$

$$\text{ppm } FeCl_3.6H_2O = \frac{\text{ppm Fe} \times \text{Mr FeCl3.6H2O}}{\text{Ar Fe}}$$

$$= \frac{100 \text{ ppm} \times 270{,}32 \text{ g/mol}}{55{,}85 \text{ g/mol}}$$

$$= 484{,}011 \text{ ppm}$$

Massa $FeCl_3.6H_2O$ = ppm $FeCl_3.6H_2O$ × volume akuades (L)

= 484,011 mg/L × 0,1 L

= 48,401 mg

= 0,0484 g

2. Pembuatan larutan baku standar Fe 50 ppm

Larutan standar Fe 50 ppm dibuat dari padatan $FeCl_3.6H_2O$ dengan perhitungan.

$$\frac{\text{ppm Fe}}{\text{ppm FeCl3.6H2O}} = \frac{\text{Ar Fe}}{\text{Mr FeCl3.6H2O}}$$

$$\text{ppm } FeCl_3.6H_2O = \frac{\text{ppm Fe} \times \text{Mr FeCl3.6H2O}}{\text{Ar Fe}}$$

$$= \frac{50 \text{ ppm} \times 270{,}32 \text{ g/mol}}{55{,}85 \text{ g/mol}}$$

$$= 242 \text{ ppm}$$

Massa $FeCl_3.6H_2O$ = ppm $FeCl_3.6H_2O$ × volume akuades (L)

= 242 mg/L × 0,1 L

= 24,2 mg

= 0,024 g

3. Pembuatan larutan H_2SO_4 4 N

a. Normalitas H_2SO_4 Pekat

$$N = \frac{10 \times \%H2SO4 \times \text{Berat Jenis}}{\text{Berat Molekul}} \times \text{valensi}$$

$$= \frac{10 \times 98 \times 1{,}84\ \text{g/mL}}{98{,}08\ \text{g/mol}} \times 2$$

$$= 36{,}8\ \text{N}$$

b. Volume pemipetan larutan H_2SO_4 pekat

$$V_1 N_1 = V_2 N_2$$

$$V_1 \times 36{,}8\ \text{N} = 100\ \text{mL} \times 4\ \text{N}$$

$$V_1 = \frac{400}{36{,}8}$$

$$= 10{,}9\ \text{mL}$$

4. Pembuatan Larutan HCl 1 N

a. Normalitas HCl Pekat

$$N = \frac{10 \times \%HCl \times \text{Berat Jenis}}{\text{Berat Molekul}} \times \text{valensi}$$

$$= \frac{10 \times 37 \times 1{,}19\ \text{g/mL}}{36{,}5\ \text{g/mol}} \times 1$$

$$= 12{,}06\ \text{N}$$

b. Volume pemipetan larutan HCl pekat

$$V_1 N_1 = V_2 N_2$$

$$V_1 \times 12{,}06\ \text{N} = 300\ \text{mL} \times 1\ \text{N}$$

$$V_1 = \frac{300}{12{,}06}$$

$$= 24{,}9\ \text{mL}$$

5. Pembuatan larutan KSCN 20%

$$\frac{20\ \text{gram}}{100\ \text{mL}} = \frac{15\ \text{gram}}{\text{volume akuades}}$$

$$20 \times \text{vol. akuades} = 100 \times 15$$

$$\text{Vol. akuades} = \frac{1.500}{20}$$

$$= 75\ \text{mL}$$

6. Pembuatan Larutan Standar Kerja Fe (2, 4, 6, 8, 10 ppm)

a. 2 ppm

$V_1 M_1 = V_2 M_2$

$V_1 \times 100 \text{ ppm} = 10 \text{ mL} \times 2 \text{ ppm}$

$V_1 = \frac{20}{100}$

$= 0{,}2 \text{ mL}$

b. 4 ppm

$V_1 M_1 = V_2 M_2$

$V_1 \times 100 \text{ ppm} = 10 \text{ mL} \times 4 \text{ ppm}$

$V_1 = \frac{40}{100}$

$= 0{,}4 \text{ mL}$

c. 6 ppm

$V_1 M_1 = V_2 M_2$

$V_1 \times 100 \text{ ppm} = 10 \text{ mL} \times 6 \text{ ppm}$

$V_1 = \frac{60}{100}$

$= 0{,}6 \text{ mL}$

d. 8 ppm

$V_1 M_1 = V_2 M_2$

$V_1 \times 100 \text{ ppm} = 10 \text{ mL} \times 8 \text{ ppm}$

$V_1 = \frac{80}{100}$

$= 0{,}8 \text{ mL}$

e. 10 ppm

$V_1 M_1 = V_2 M_2$

$V_1 \times 100 \text{ ppm} = 10 \text{ mL} \times 10 \text{ ppm}$

$V_1 = \frac{100}{100}$

$= 1 \text{ mL}$

7. Konsentrasi Larutan Standar Fe 50 ppm Setelah Diadsorpsi

a. Massa 5 gram R1 (A : 0,605)

y = 0,1063x + 0,0221

0,605 = 0,1063x + 0,0221

0,605 – 0,0221 = 0,1063x

$x = \frac{0,5829}{0,1063}$

x = 5,483 ppm

b. Massa 5 gram R2 (A : 0,602)

y = 0,1063x + 0,0221

0,602 = 0,1063x + 0,0221

0,602 – 0,0221 = 0,1063x

$x = \frac{0,5799}{0,1063}$

x = 5,455 ppm

c. Massa 10 gram R1 (A : 0,465)

y = 0,1063x + 0,0221

0,465 = 0,1063x + 0,0221

0,465 – 0,0221 = 0,1063x

$x = \frac{0,4429}{0,1063}$

x = 4,166 ppm

d. Massa 10 gram R2 (A : 0,488)

y = 0,1063x + 0,0221

0,488 = 0,1063x + 0,0221

0,488 – 0,0221 = 0,1063x

$x = \frac{0,4659}{0,1063}$

x = 4,383 ppm

e. Massa 15 gram R1 (A : 0,361)

y = 0,1063x + 0,0221

0,361 = 0,1063x + 0,0221

0,361 – 0,0221 = 0,1063x

$x = \frac{0,3389}{0,1063}$

x = 3,188 ppm

f. Massa 15 gram R1 (A : 0,363)

y = 0,1063x + 0,0221

0,363 = 0,1063x + 0,0221

0,363 – 0,0221 = 0,1063x

$x = \frac{0,3409}{0,1063}$

x = 3,207 ppm

8. Konsentrasi Larutan Uji Air Sumur Fe 50 ppm

a. Massa 5 gram R1 (A : 0,663)

y = 0,1063x + 0,0221

0,663 = 0,1063x + 0,0221

0,663 – 0,0221 = 0,1063x

$x = \frac{0,6409}{0,1063}$

x = 6,029 ppm

b. Massa 5 gram R2 (A : 0,677)

y = 0,1063x + 0,0221

0,677 = 0,1063x + 0,0221

0,677 – 0,0221 = 0,1063x

$x = \frac{0,6549}{0,1063}$

x = 6,161 ppm

c. Massa 10 gram R1 (A : 0,582)

y = 0,1063x + 0,0221

0,582 = 0,1063x + 0,0221

0,582 – 0,0221 = 0,1063x

$x = \frac{0,5599}{0,1063}$

x = 5,267 ppm

d. Massa 10 gram R2 (A : 0,569)

y = 0,1063x + 0,0221

0,569 = 0,1063x + 0,0221

0,569 – 0,0221 = 0,1063x

$x = \frac{0,5469}{0,1063}$

x = 5,145 ppm

e. Massa 15 gram R1 (A : 0,453)

y = 0,1063x + 0,0221

0,453 = 0,1063x + 0,0221

0,453 – 0,0221 = 0,1063x

$x = \frac{0,4309}{0,1063}$

x = 4,054 ppm

f. Massa 15 gram R2 (A : 0,448)

y = 0,1063x + 0,0221

0,448 = 0,1063x + 0,0221

0,448 – 0,0221 = 0,1063x

$x = \frac{0,4259}{0,1063}$

x = 4,006 ppm

9. Kapasitas Adsorpsi Arang Aktif Ampas Kopi Pada Larutan Standar Fe 50 ppm

a. Massa 5 gram (R1)

$$\text{Kapasitas adsorpsi} = \frac{\text{C awal (ppm)} - \text{C akhir (ppm)}}{\text{massa adsorben (g)}} \times \text{V adsorbat (L)}$$

$$= \frac{73{,}4553 \text{ ppm} - 5{,}483 \text{ ppm}}{5 \text{ gram}} \times 0{,}1 \text{ L}$$

$$= \frac{67{,}9723}{5} \times 0{,}1$$

$$= 1{,}3594 \text{ mg/g}$$

b. Massa 5 gram (R2)

$$\text{Kapasitas adsorpsi} = \frac{\text{C awal (ppm)} - \text{C akhir (ppm)}}{\text{massa adsorben (g)}} \times \text{V adsorbat (L)}$$

$$= \frac{73{,}4553 \text{ ppm} - 5{,}455 \text{ ppm}}{5 \text{ gram}} \times 0{,}1 \text{ L}$$

$$= \frac{68{,}0003}{5} \times 0{,}1$$

$$= 1{,}36 \text{ mg/g}$$

c. Massa 10 gram (R1)

$$\text{Kapasitas adsorpsi} = \frac{\text{C awal (ppm)} - \text{C akhir (ppm)}}{\text{massa adsorben (g)}} \times \text{V adsorbat (L)}$$

$$= \frac{73{,}4553 \text{ ppm} - 4{,}166 \text{ ppm}}{10 \text{ gram}} \times 0{,}1 \text{ L}$$

$$= \frac{69{,}2893}{10} \times 0{,}1$$

$$= 0{,}6929 \text{ mg/g}$$

d. Massa 10 gram (R2)

$$\text{Kapasitas adsorpsi} = \frac{\text{C awal (ppm)} - \text{C akhir (ppm)}}{\text{massa adsorben (g)}} \times \text{V adsorbat (L)}$$

$$= \frac{73{,}4553 \text{ ppm} - 4{,}383 \text{ ppm}}{10 \text{ gram}} \times 0{,}1 \text{ L}$$

$$= \frac{69{,}0723}{10} \times 0{,}1$$

$$= 0{,}6907 \text{ mg/g}$$

e. Massa 15 gram (R1)

$$\text{Kapasitas adsorpsi} = \frac{\text{C awal (ppm)} - \text{C akhir (ppm)}}{\text{massa adsorben (g)}} \times \text{V adsorbat (L)}$$

$$= \frac{73{,}4553 \text{ ppm} - 3{,}188 \text{ ppm}}{15 \text{ gram}} \times 0{,}1 \text{ L}$$

$$= \frac{70{,}2673}{15} \times 0{,}1$$

$$= 0{,}4684 \text{ mg/g}$$

f. Massa 15 gram (R2)

$$\text{Kapasitas adsorpsi} = \frac{\text{C awal (ppm)} - \text{C akhir (ppm)}}{\text{massa adsorben (g)}} \times \text{V adsorbat (L)}$$

$$= \frac{73{,}4553 \text{ ppm} - 3{,}207 \text{ ppm}}{15 \text{ gram}} \times 0{,}1 \text{ L}$$

$$= \frac{70{,}4283}{15} \times 0{,}1$$

$$= 0{,}4695 \text{ mg/g}$$

10. Kapasitas Adsoprsi Pada Larutan Uji Air Sumur Fe 50 ppm

a. Massa 5 gram (R1)

$$\text{Kapasitas adsorpsi} = \frac{\text{C awal (ppm)} - \text{C akhir (ppm)}}{\text{massa adsorben (g)}} \times \text{V adsorbat (L)}$$

$$= \frac{73{,}5283 \text{ ppm} - 6{,}029 \text{ ppm}}{5 \text{ gram}} \times 0{,}1 \text{ L}$$

$$= \frac{67{,}4993}{5} \times 0{,}1$$

$$= 1{,}35 \text{ mg/g}$$

b. Massa 5 gram (R2)

$$\text{Kapasitas adsorpsi} = \frac{\text{C awal (ppm)} - \text{C akhir (ppm)}}{\text{massa adsorben (g)}} \times \text{V adsorbat (L)}$$

$$= \frac{73{,}5283 \text{ ppm} - 6{,}161 \text{ ppm}}{5 \text{ gram}} \times 0{,}1 \text{ L}$$

$$= \frac{67{,}3673}{5} \times 0{,}1$$

$$= 1{,}3473 \text{ mg/g}$$

c. Massa 10 gram (R1)

$$\text{Kapasitas adsorpsi} = \frac{\text{C awal (ppm) – C akhir (ppm)}}{\text{massa adsorben (g)}} \times \text{V adsorbat (L)}$$

$$= \frac{73{,}5283 \text{ ppm} - 5{,}267 \text{ ppm}}{10 \text{ gram}} \times 0{,}1 \text{ L}$$

$$= \frac{68{,}2613}{10} \times 0{,}1$$

$$= 0{,}6826 \text{ mg/g}$$

d. Massa 10 gram (R2)

$$\text{Kapasitas adsorpsi} = \frac{\text{C awal (ppm) – C akhir (ppm)}}{\text{massa adsorben (g)}} \times \text{V adsorbat (L)}$$

$$= \frac{73{,}5283 \text{ ppm} - 5{,}145 \text{ ppm}}{10 \text{ gram}} \times 0{,}1 \text{ L}$$

$$= \frac{68{,}3833}{10} \times 0{,}1$$

$$= 0{,}6838 \text{ mg/g}$$

e. Massa 15 gram (R1)

$$\text{Kapasitas adsorpsi} = \frac{\text{C awal (ppm) – C akhir (ppm)}}{\text{massa adsorben (g)}} \times \text{V adsorbat (L)}$$

$$= \frac{73{,}5283 \text{ ppm} - 4{,}054 \text{ ppm}}{15 \text{ gram}} \times 0{,}1 \text{ L}$$

$$= \frac{69{,}4743}{15} \times 0{,}1$$

$$= 0{,}4632 \text{ mg/g}$$

f. Massa 15 gram (R2)

$$\text{Kapasitas adsorpsi} = \frac{\text{C awal (ppm) – C akhir (ppm)}}{\text{massa adsorben (g)}} \times \text{V adsorbat (L)}$$

$$= \frac{73{,}5283 \text{ ppm} - 4{,}006 \text{ ppm}}{15 \text{ gram}} \times 0{,}1 \text{ L}$$

$$= \frac{69{,}5223}{15} \times 0{,}1$$

$$= 0{,}4635 \text{ mg/g}$$

11. Penentuan Kadar Air Arang Aktif Ampas Kopi

Diketahui: W_0 = 27.713,2mg

W_1 = 29.713,5 mg

W_2 = 29.655,3 mg

Ditanya : kadar air ?

% kadar air = $\left(\frac{W1-W2}{W1-W0}\right) \times 100\%$

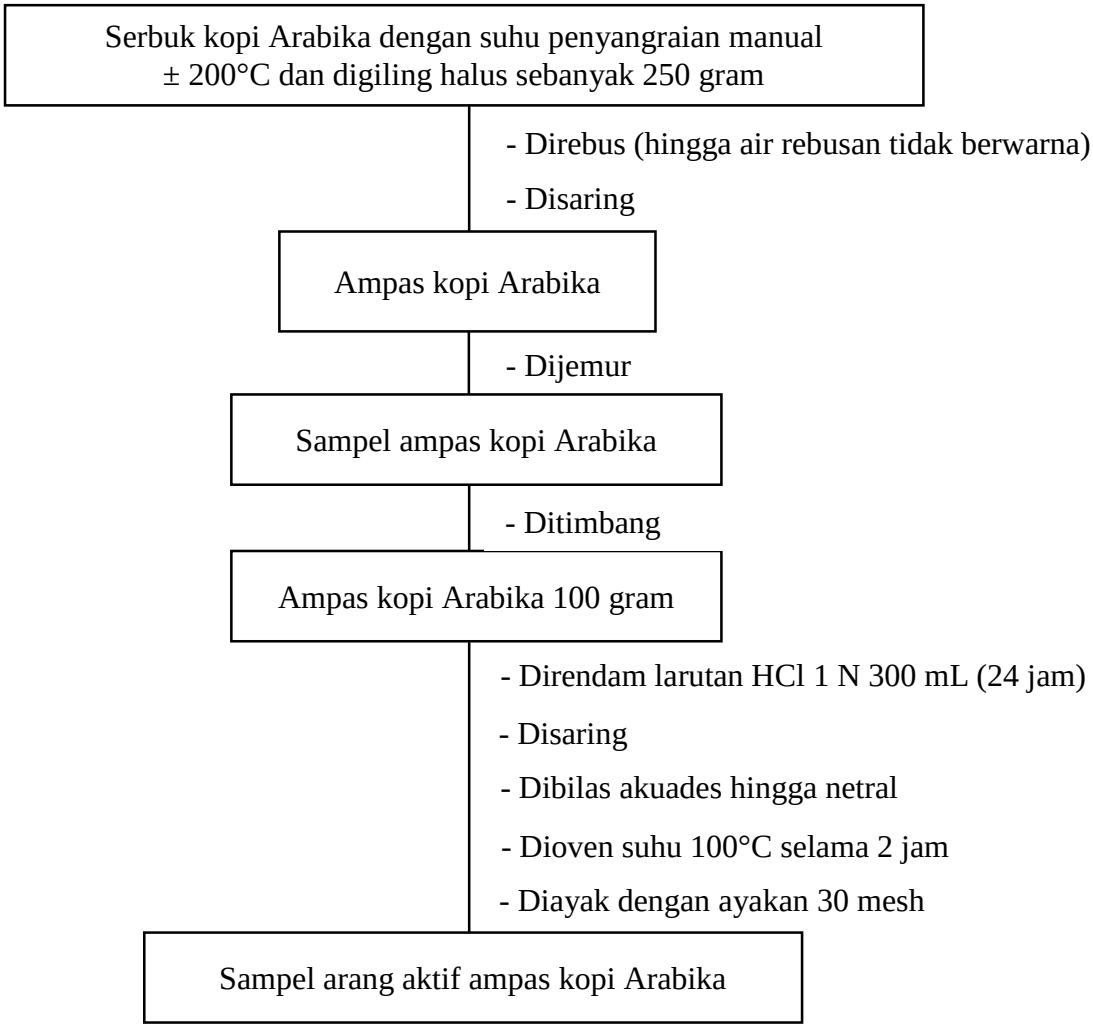
= $\left(\frac{29.713,5-29.655,3}{29.713,5-27.713,2}\right) \times 100\%$

= $\left(\frac{58,2}{2000,3}\right) \times 100\%$

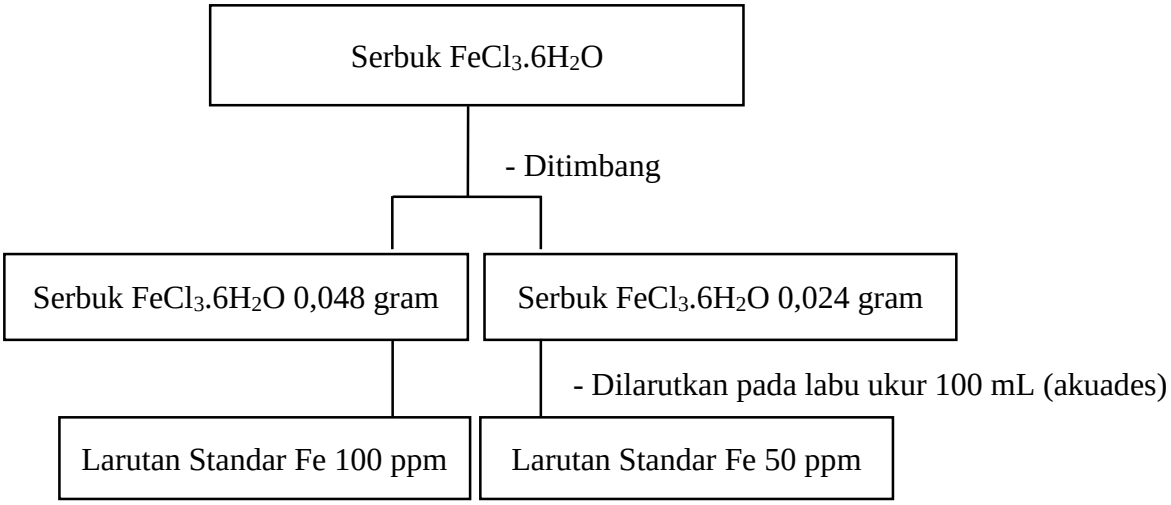
= 2,9 %

LAMPIRAN 2. SKEMA PROSEDUR

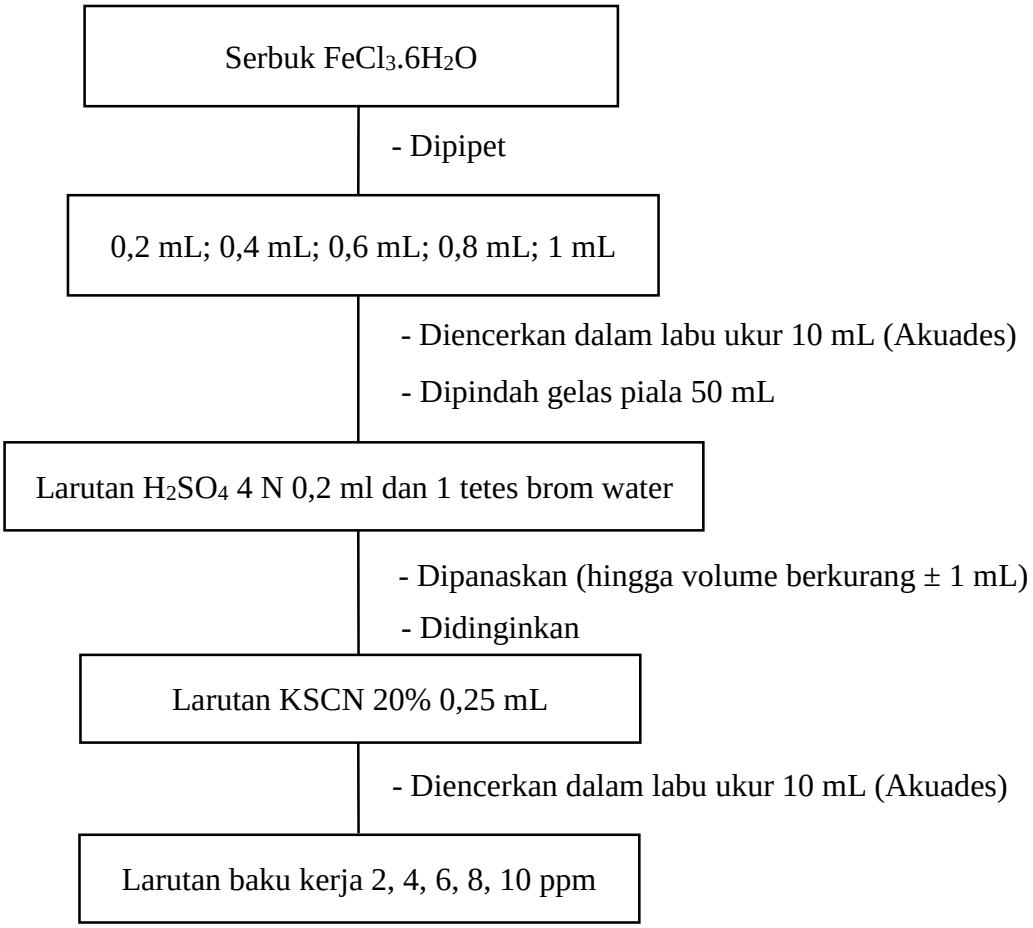
1. Preparasi Sampel



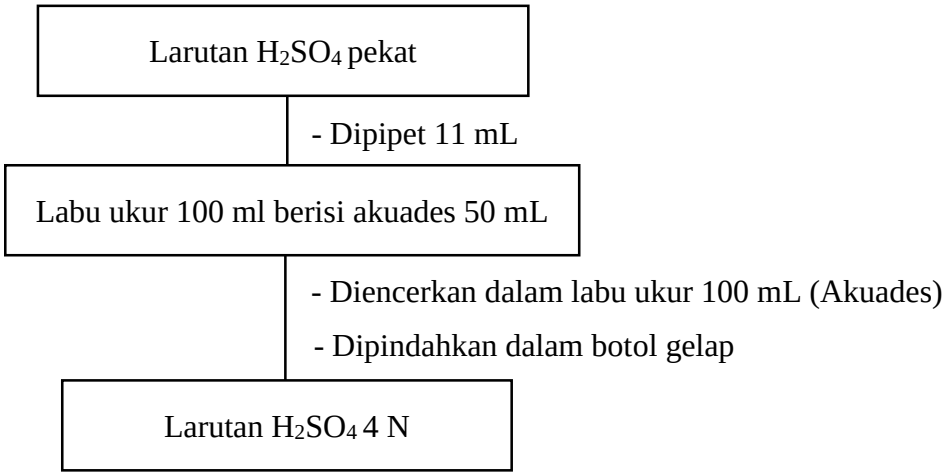
2. Pembuatan Larutan Standar Fe



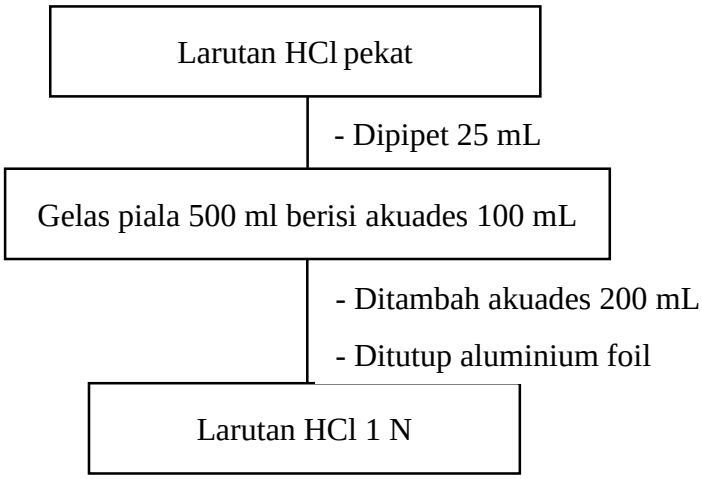
3. Pembuatan Larutan Standar Kerja



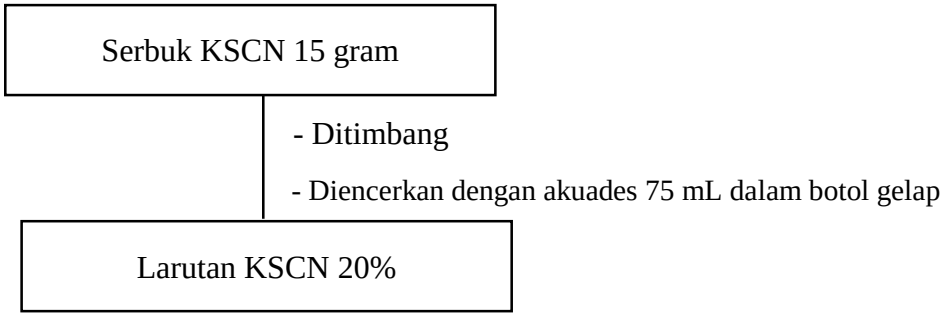
4. Pembuatan Larutan H_2SO_4 4 N



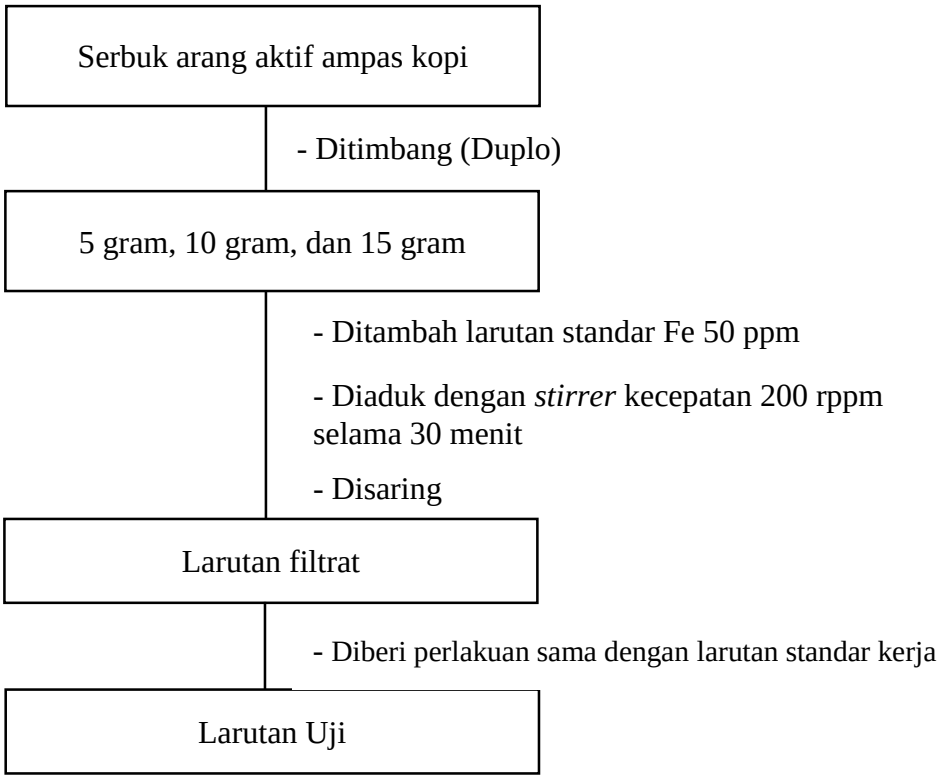
5. Pembuatan Larutan HCl 1 N



6. Pembuatan Larutan KSCN 20%

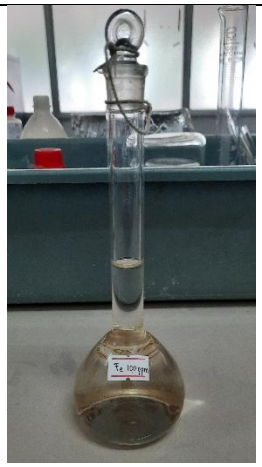
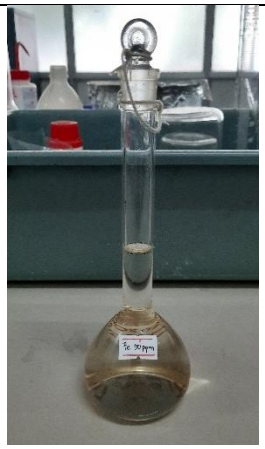
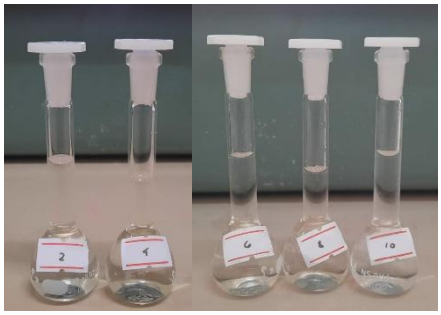


7. Pembuatan Larutan Uji



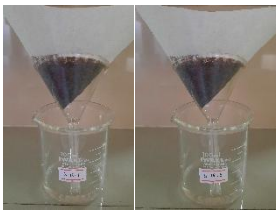
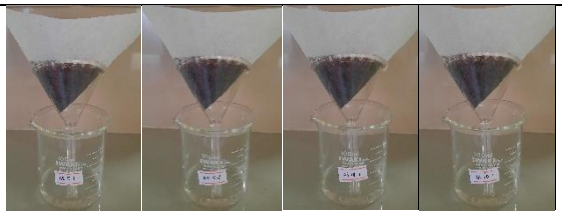
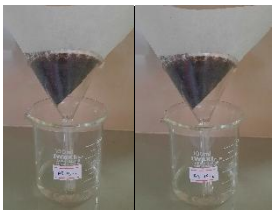
LAMPIRAN 3. GAMBAR

 Arang aktif ampas kopi arabika	 Aktivasi ampas kopi arabika
 Menyaring larutan untuk diambil ampas kopi	 Ampas kopi dikeringkan suhu 100°C
 Menimbang serbuk $FeCl_3.6H_2O$ 0,048 gram	 Menimbang serbuk $FeCl_3.6H_2O$ 0,024 gram

 Larutan standar Fe 100 ppm	 Larutan standar Fe 50 ppm
 Larutan standar Fe dipipet dan diencerkan akuades 10 ml	 Larutan dipindah ke dalam gelas piala dan ditambah larutan H_2SO_4 4 N dan brom water
 Setelah dingin ditambah larutan KSCN 20% dan akuades sampain tanda	 Larutan Standar kerja Fe

 Larutan standar Fe 50 ppm dan sampel air sumur 50 ppm	 Larutan uji penambahan massa arang aktif 5, 10,15 gram
 Larutan standar Fe 50 ppm ditambah massa arang aktif 5, 10, 15 gram	 Larutan air sumur 50 ppm ditambah massa 5, 10, 15 gram
 Menimbang arang aktif ampas kopi 5 gram	 Menimbang arang aktif ampas kopi 10 gram

 Menimbang arang aktif ampas kopi 15 gram	 Larutan standar Fe 50 ppm + 5 gram ampas kopi di aduk dengan stirrer kecepatan 200 rpm selama 45 menit
 Larutan standar Fe 50 ppm + 10 gram ampas kopi di aduk dengan stirrer kecepatan 200 rpm selama 45 menit	 Larutan standar Fe 50 ppm + 15 gram ampas kopi di aduk dengan stirrer kecepatan 200 rpm selama 45 menit
 Larutan air sumur Fe 50 ppm + 5 gram ampas kopi di aduk dengan stirrer kecepatan 200 rpm selama 45 menit	 Larutan air sumur Fe 50 ppm + 10 gram ampas kopi di aduk dengan stirrer kecepatan 200 rpm selama 45 menit

 Larutan air sumur Fe 50 ppm + 15 gram ampas kopi di aduk dengan stirrer kecepatan 200 rpm selama 45 menit	  Larutan uji standar Fe 50 disaring untuk diambil filtratnya
  Larutan uji air sumur 50 ppm disaring untuk diambil filtratnya	 Botol timbang ditara dengan dipanaskan suhu 105°C selama 30 menit hingga bobot tetap
 Botol timbang didinginkan dalam desikator	 Botol timbang berisi arang aktif ampas kopi di oven suhu 105°C selama 3 jam hingga bobot tetap

<table>
<tr>
<td> 
Massa botol timbang kosong</td>
<td> 
Massa arang aktif ampas kopi 2 gram</td>
</tr>
<tr>
<td colspan="2"> 
Massa botol timbang setelah dioven</td>
</tr>
</table>