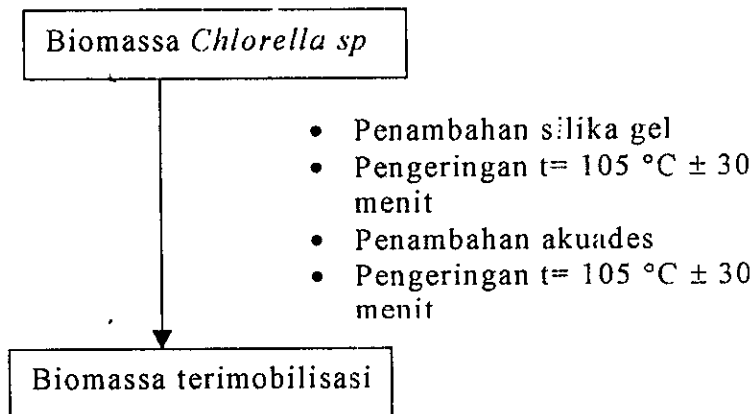


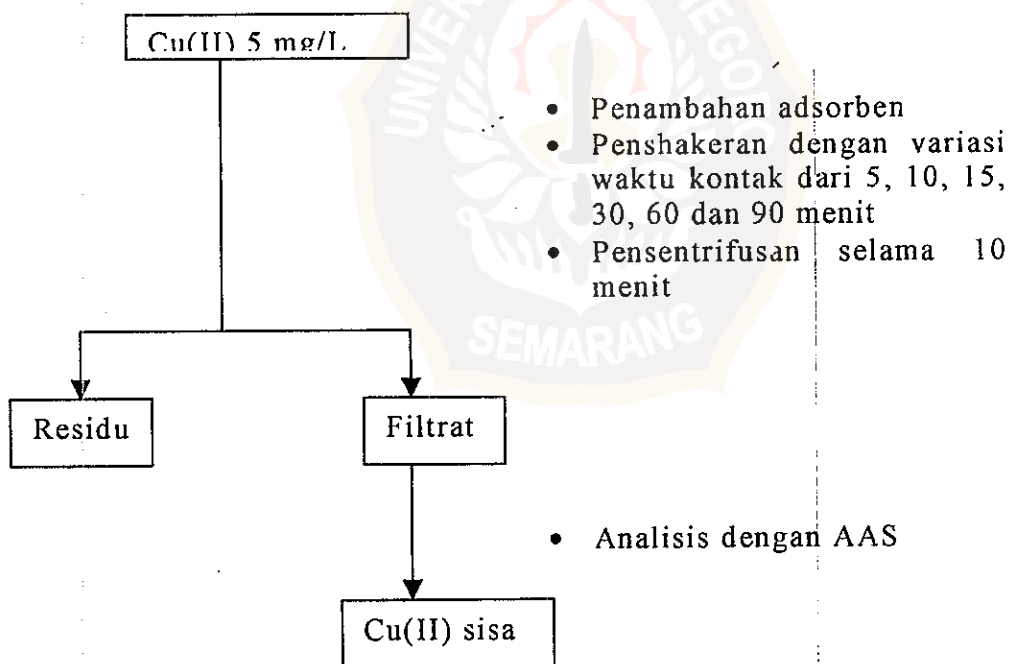
Lampiran 1

Skema Kerja

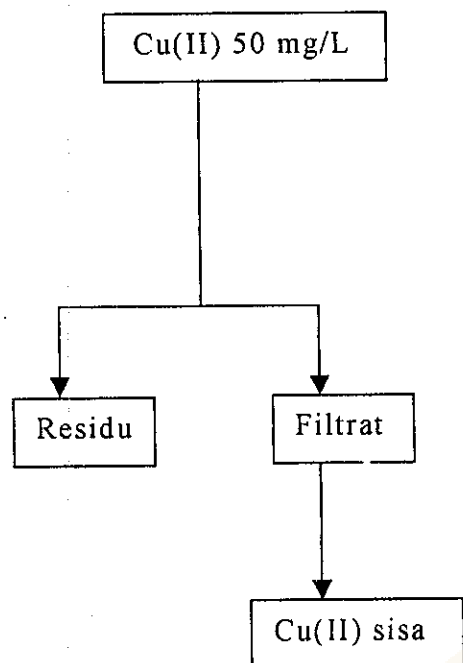
1.1 Pembuatan Biomassa terimobilisasi dengan Silika Gel



1.2 Pengaruh waktu kontak terhadap larutan Cu(II)



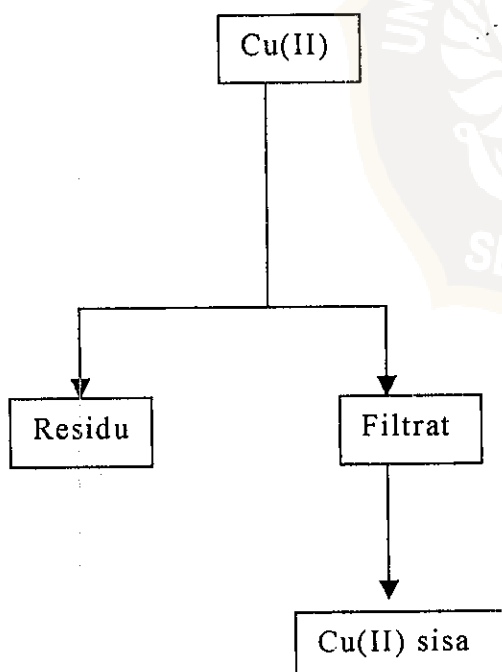
1.3 Pengaruh pH larutan terhadap adsorpsi Cu(II)



- Pemvariasian pH 1-10
- Penambahan adsorben
- Penschakeran \pm 30 menit
- Pentsentrifusan \pm 10 menit

- Analisis dengan AAS

1.4 Pengaruh konsentrasi terhadap adsorpsi Cu(II)



- Pemvariasian konsentrasi 5, 10, 20, 30, 40 dan 50 mg/L
- Penambahan adsorben
- Penschakeran \pm 30 menit
- Pentsentrifusan \pm 10 menit

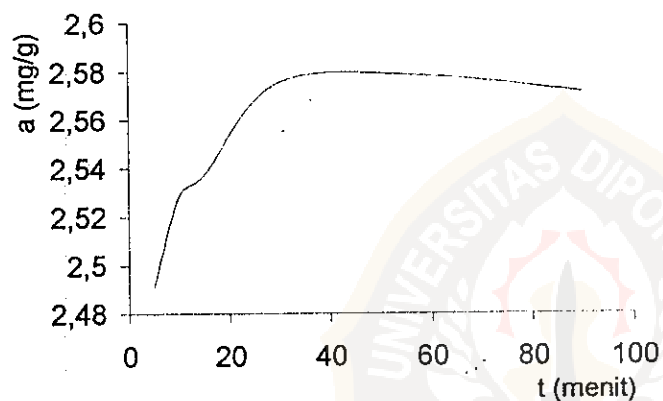
- Analisis dengan AAS

Lampiran 2

Hasil Penelitian (AAS)

2.1 Pengaruh waktu kontak terhadap adsorpsi Cu(II)

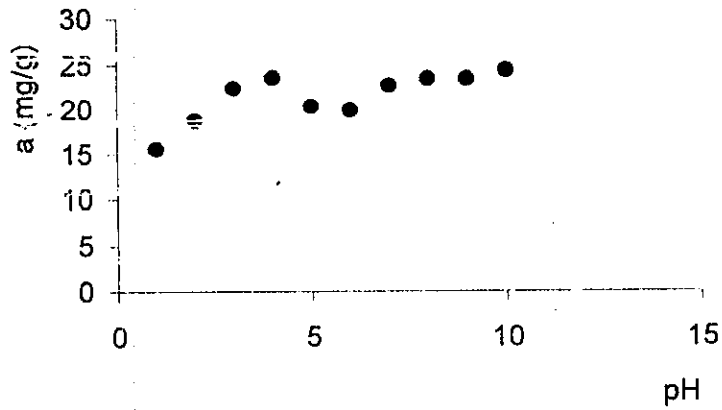
Waktu (menit)	C_{eq} (mg/L)	C_{adsp} (mg/L)	Kap. Adsp. (mg/g)
5	0,178	4,983	2,4915
10	0,104	5,057	2,5285
15	0,087	5,074	2,5370
30	0,010	5,151	2,5755
60	0,005	5,156	2,5780
90	0,018	5,143	2,5715



2.2 Pengaruh pH terhadap adsorpsi Cu(II)

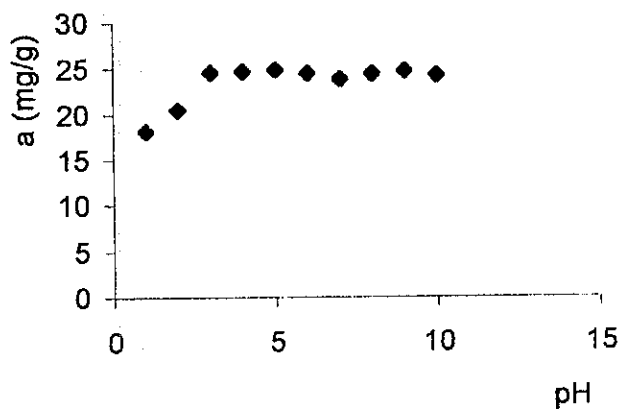
2.2.1 Pengaruh pH terhadap adsorpsi Cu(II) oleh biomassa *Chlorella sp*

pH	C_{eq} (mg/L)	C_{adsp} (mg/L)	Kapasitas adsorpsi (mg/g)
1	22,930	27,070	15,535
2	12,420	37,580	18,790
3	5,170	44,830	22,415
4	2,850	47,150	23,575
5	9,250	40,750	20,375
6	10,130	39,870	19,935
7	4,670	45,830	22,665
8	3,150	46,850	23,425
9	3,060	46,940	23,470
10	1,200	48,800	24,400



2.2.2 Pengaruh pH terhadap adsorpsi Cu(II) oleh biomassa *Chlorella sp* terimobilisasi

pH	C_{eq} (mg/L)	C_{adsp} (mg/L)	Kapasitas adsorpsi (mg/g)
1	13,730	36,270	18,135
2	8,970	41,030	20,515
3	0,830	49,170	24,585
4	0,540	49,460	24,730
5	0,188	49,812	24,906
6	0,860	49,140	24,570
7	2,140	47,860	23,930
8	1,050	48,950	24,475
9	0,420	49,580	24,790
10	0,360	49,640	24,320



2.3 Pengaruh konsentrasi terhadap adsorpsi Cu(II)

2.3.1 Pengaruh konsentrasi terhadap adsorpsi Cu(II) oleh biomassa

Chlorella sp

C (mg/L)	C _{eq} (mg/L)	C _{adsp} (mg/L)	Kapasitas adsorpsi (mg/g)	C _{eq} / a
5	0,200	4,800	2,400	0,0833
10	1,580	8,420	4,210	0,3753
20	4,020	15,980	7,990	0,5031
30	7,550	22,450	11,225	0,6726
40	13,755	26,245	13,123	1,0481
50	18,950	31,050	15,525	1,2206

2.3.2 Pengaruh konsentrasi terhadap adsorpsi Cu(II) oleh biomassa

Chlorella sp terimobilisasi pada silika ge:

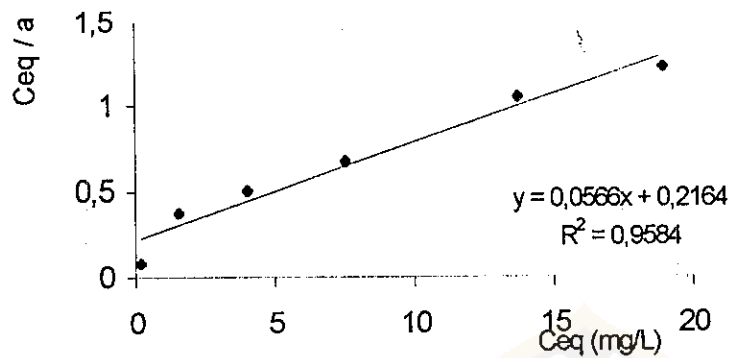
C (mg/L)	C _{eq} (mg/L)	C _{adsp} (mg/L)	Kapasitas adsorpsi (mg/g)	C _{eq} / a
5	0,094	4,906	2,453	0,0383
10	0,210	9,790	4,895	0,0429
20	0,430	19,570	9,785	0,0440
30	0,720	29,280	14,640	0,0492
40	0,985	39,015	19,508	0,0505
50	1,280	48,720	24,360	0,0525

Lampiran 3

Perhitungan Persamaan isoterm Langmuir

3.1. Pengaruh konsentrasi terhadap adsorpsi Cu(II) oleh biomassa

Chlorella sp



Persamaan garis: $y = 0,0566x + 0,2164$

$$\frac{1}{a_m} = 0,0566$$

$$a_m = \frac{1}{0,0566}$$

$$= 17,67 \text{ mg/g}$$

$$= \frac{17,67 \text{ mg/g}}{(63,54 \text{ g/mol} \cdot 1000 \text{ mg/g})}$$

$$= 2,78 \cdot 10^{-4} \text{ mol/g}$$



$$K = \frac{1}{a_m \cdot \text{intersep}}$$

$$= \frac{1}{2,78 \cdot 10^{-4} \cdot 0,2164}$$

$$= 1,66 \cdot 10^4 \text{ mol/g}$$

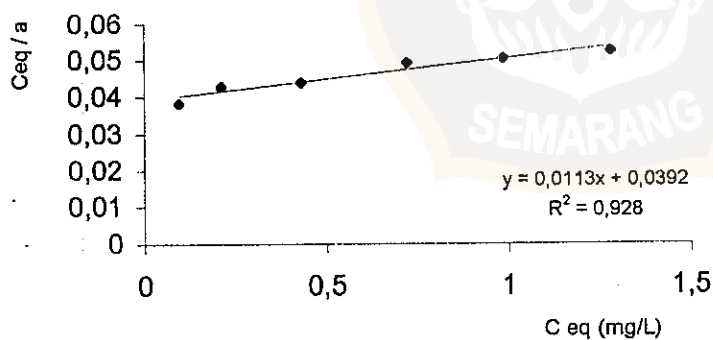
$$E = -\Delta G = R T \ln K$$

$$= 8,314 \text{ J/mol K} \cdot 300 \text{ K} \cdot \ln 1,66 \cdot 10^4$$

$$= 24236 \text{ J/mol}$$

$$= 24,236 \text{ kJ/mol}$$

3.2. Pengaruh konsentrasi terhadap adsorpsi Cu(II) oleh Biomassa *Chlorella* sp yang terimobilisasi pada silika gel



Persamaan garis: $y = 0,0113x + 0,0392$

$$\frac{1}{am} = 0,0113$$

$$\begin{aligned}
 a_m &= \frac{1}{0,0113} \\
 &= 88,50 \text{ mg/g} \\
 &= \frac{88,50 \text{ mg/g}}{(63,54 \text{ g/mol} \cdot 1000 \text{ mg/g})} \\
 &= 1,39 \cdot 10^{-3} \text{ mol/g}
 \end{aligned}$$

$$\begin{aligned}
 K &= \frac{1}{a_m \cdot \text{intersep}} \\
 &= \frac{1}{1,39 \cdot 10^{-3} \cdot 0,0392} \\
 &= 1,84 \cdot 10^4 \text{ mol/g}
 \end{aligned}$$

$$\begin{aligned}
 E = -\Delta G &= RT \ln K \\
 &= 8,314 \text{ J mol}^{-1} \text{ K}^{-1} \cdot 300 \text{ K} \cdot \ln 1,84 \cdot 10^4 \\
 &= 24493,31 \text{ J. mol}^{-1} \\
 &= 24,49 \text{ kJ. mol}^{-1}
 \end{aligned}$$

