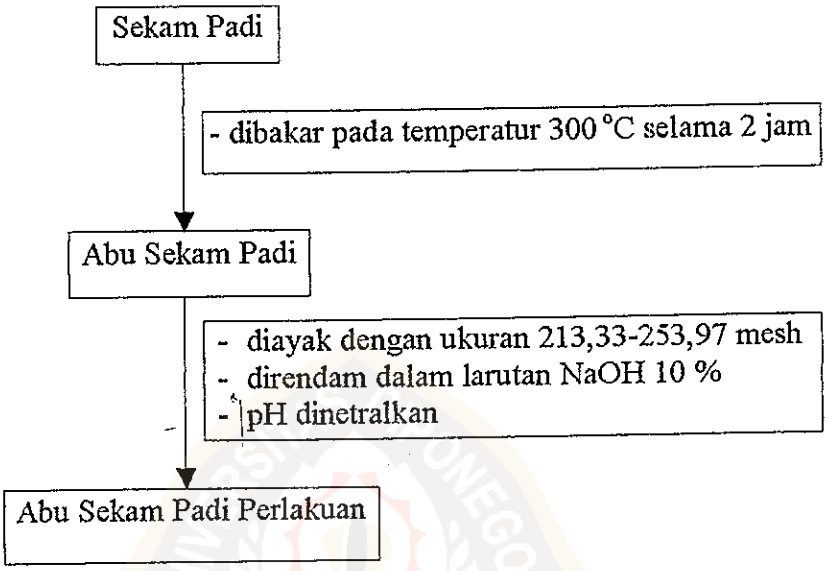
Lampiran 1

1.1. Pembuatan abu sekam padi/abu sekam padi perlakuan



- Abu Sekam Padi dengan Perlakuan NaOH (ASPP)
- Abu Sekam Padi tanpa Perlakuan NaOH (ASP)

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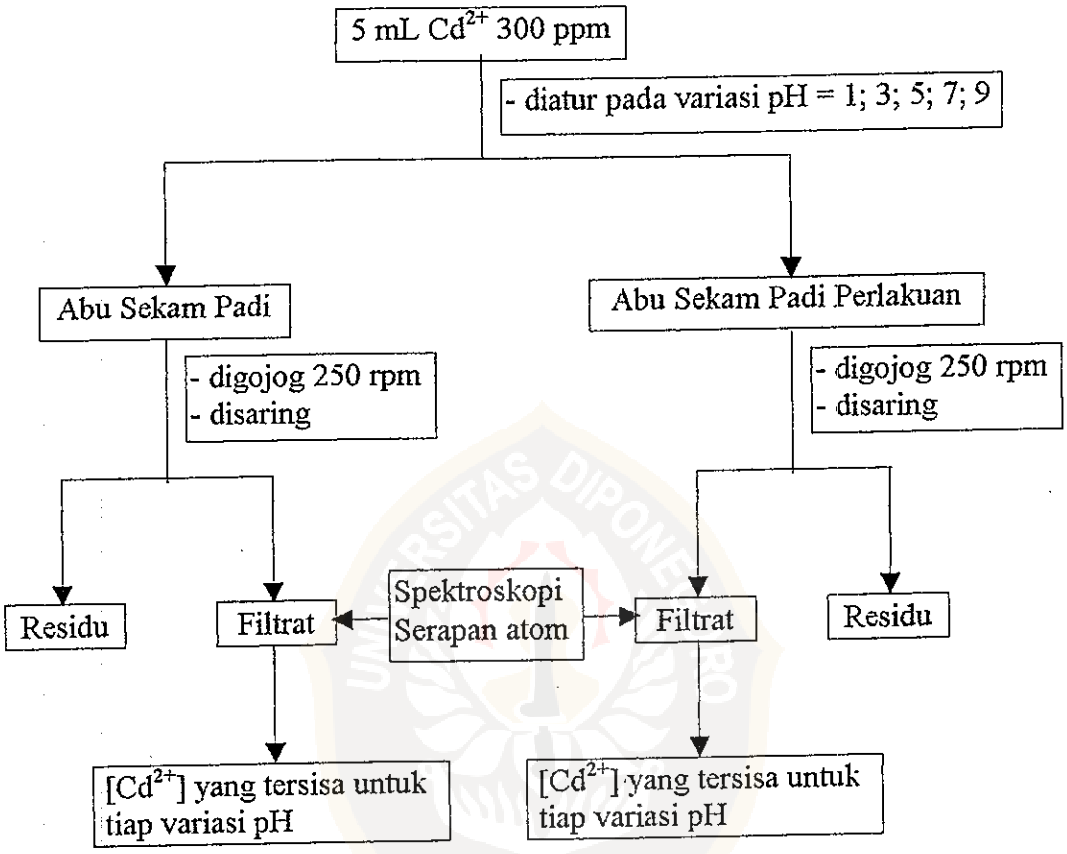
1.2. Pengaruh pH terhadap adsorpsi Cd^{2+}



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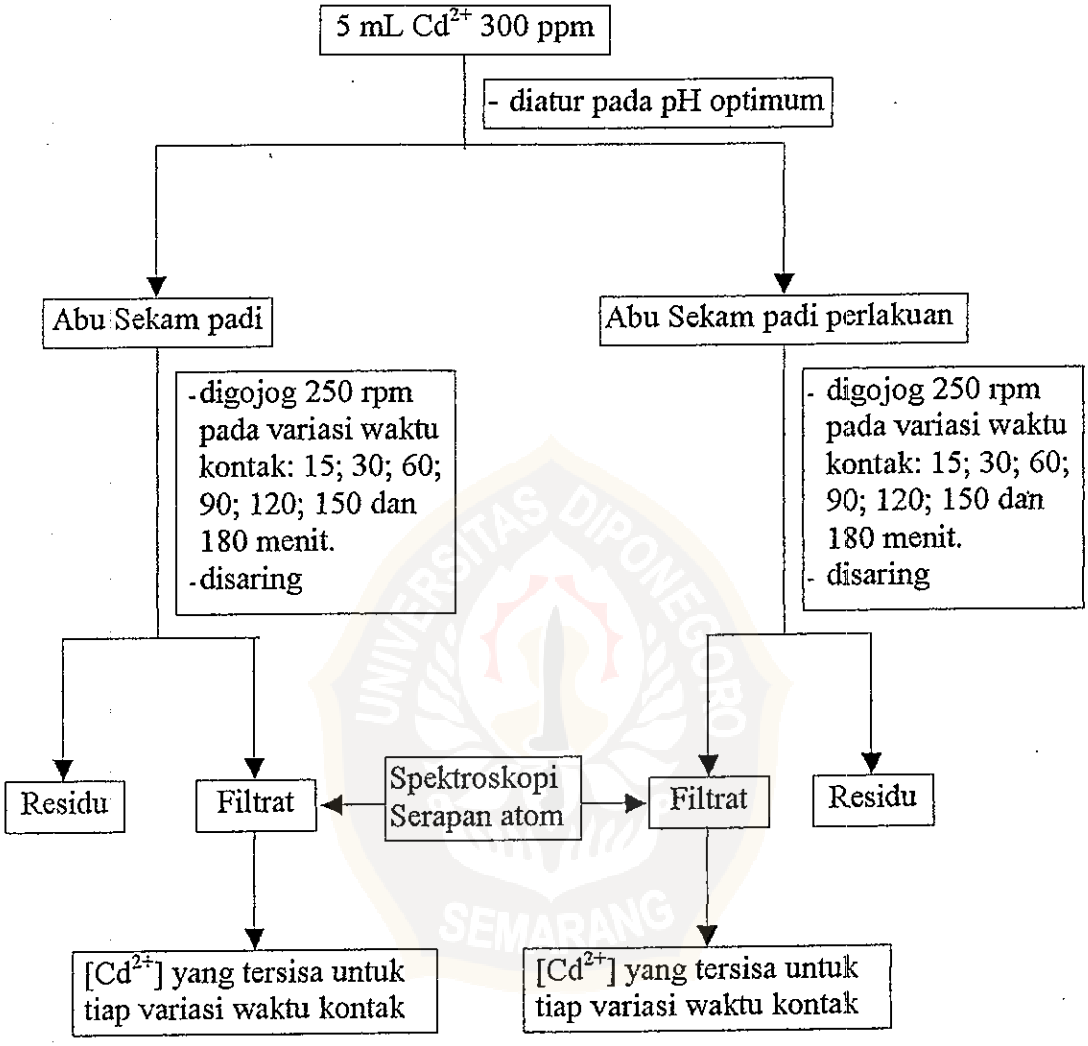
1.3. Pengaruh waktu kontak terhadap adsorpsi Cd^{2+}



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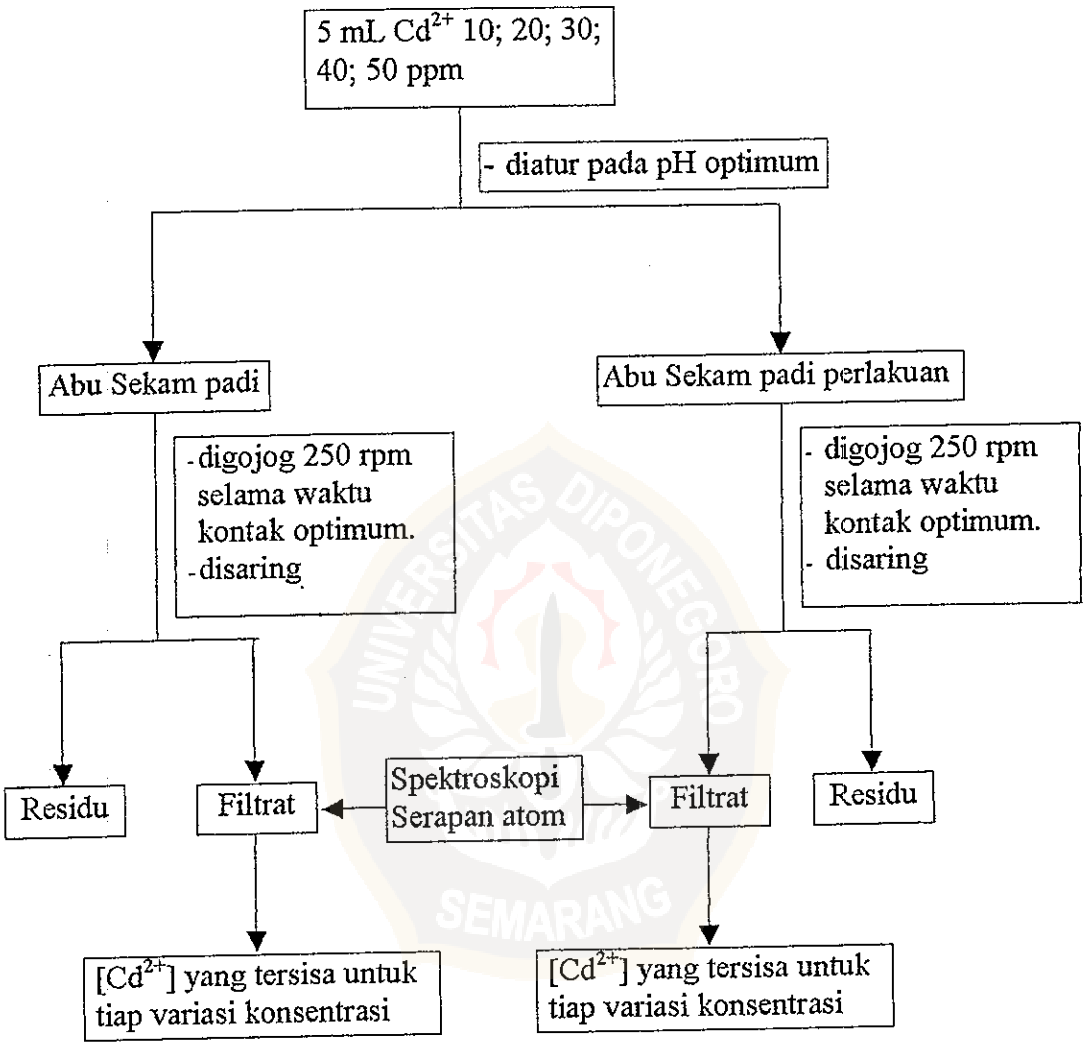
1.4. Pengaruh konsentrasi terhadap adsorpsi Cd^{2+}



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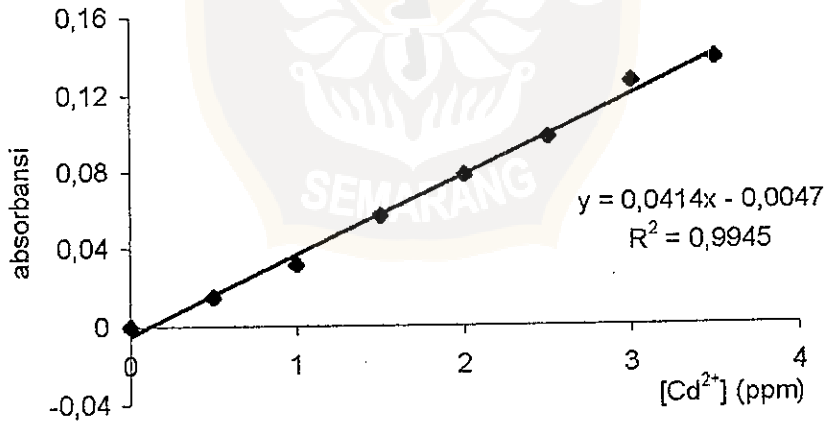
Lampiran 2

2.1. Larutan standar Cd^{2+}

No	$[Cd^{2+}]$ (ppm)	Absorbansi
1	0	0
2	0,5	0,0149
3	1	0,0316
4	1,5	0,0566
5	2	0,0781
6	2,5	0,0978
7	3	0,1261
8	3,5	0,1378



Gambar 8. Kurva larutan standar Cd^{2+}

dengan y: absorbansi

x: konsentrasi Cd^{2+}

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2.2. Absorbansi Cd^{2+} yang tidak teradsorpsi oleh ASPP ataupun ASP pada variasi pH

Setiap filtrat diambil 1 mL. Kemudian diencerkan sampai 100 mL dengan akuades.

pH	Absorbansi Cd^{2+} sisa	
	ASPP	ASP
1	0,0720	0,0732
3	0,0666	0,0724
5	0,0403	0,0487
7	0,0334	0,0411
9	0,0102	0,0203

2.3. Absorbansi Cd^{2+} yang tidak teradsorpsi oleh ASPP ataupun ASP pada variasi waktu kontak.

Setiap filtrat diambil 1 mL. Kemudian diencerkan sampai 100 mL dengan akuades.

Waktu kontak (menit)	Absorbansi Cd^{2+} sisa	
	ASPP	ASP
15	0,0425	0,0526
30	0,0423	0,0473
60	0,0340	0,0368
90	0,0282	0,0318
120	0,0159	0,0188
150	0,0095	0,0170
180	0,0104	0,0169

Untuk kedua variasi tersebut diatas, absorbansi Cd^{2+} yang tidak diperlakukan dengan ASPP dan ASP adalah 0,1222.

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2.4. Absorbansi Cd^{2+} yang tidak teradsorpsi oleh ASPP ataupun ASP pada variasi konsentrasi Cd^{2+}

Setiap filtrat diambil 1 mL. Kemudian diencerkan sampai 25 mL dengan akuades.

$[Cd^{2+}]$ (ppm)	Absorbansi Cd^{2+} sisa	
	ASPP	ASP
10	0,0039	0,0046
	0,0034	0,0049
	0,0029	0,0040
20	0,0054	0,0058
	0,0055	0,0065
	0,0051	0,0068
30	0,0091	0,0132
	0,0093	0,0141
	0,0090	0,0130
40	0,0156	0,0180
	0,0160	0,0186
	0,0167	0,0181
50	0,0342	0,0411
	0,0359	0,0409
	0,0366	0,0427

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Lampiran 3

3.1. Data pengaruh pH terhadap adsorpsi Cd^{2+}

pH	ASPP		ASP		Kapasitas adsorpsi	
	Cd^{2+} sisa (ppm)	Cd^{2+} terserap (ppm)	Cd^{2+} sisa (ppm)	Cd^{2+} terserap (ppm)	ASPP (mg. g^{-1})	ASP (mg. g^{-1})
1	185,266	121,256	188,164	118,358	6,063	5,918
3	172,222	134,300	186,232	120,290	6,715	6,014
5	108,696	197,826	128,986	177,536	9,891	8,877
7	92,029	214,493	110,628	195,894	10,725	9,795
9	35,990	270,532	60,386	246,136	13,527	12,307

3.2. Data pengaruh waktu kontak terhadap adsorpsi Cd^{2+}

Waktu (menit)	ASPP		ASP		Kapasitas adsorpsi	
	Cd^{2+} sisa (ppm)	Cd^{2+} terserap (ppm)	Cd^{2+} sisa (ppm)	Cd^{2+} terserap (ppm)	ASPP (mg. g^{-1})	ASP (mg. g^{-1})
15	114,010	192,512	138,406	168,116	9,626	8,406
30	113,527	192,995	125,604	180,918	9,650	9,046
60	93,478	213,044	100,242	206,280	10,652	10,314
90	79,469	227,053	88,164	218,358	11,353	10,918
120	49,758	256,764	56,763	249,759	12,838	12,488
150	34,300	272,222	52,415	254,107	13,611	12,705
180	36,473	270,049	52,174	254,348	13,502	12,717

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3.3. Data pengaruh konsentrasi terhadap adsorpsi Cd^{2+}

$[Cd^{2+}]$ (ppm)	ASPP		ASP		Kapasitas adsorpsi	
	Cd^{2+} sisa (ppm)	Cd^{2+} terserap (ppm)	Cd^{2+} sisa (ppm)	Cd^{2+} terserap (ppm)	ASPP (mg. g^{-1})	ASP (mg. g^{-1})
10	4,891	5,109	5,556	4,444	0,255	0,222
20	6,039	13,961	6,703	13,297	0,698	0,665
30	8,333	21,667	10,930	19,070	1,083	0.954
40	12,560	27,440	13,828	26,172	1,372	1,308
50	24,336	25,664	27,959	22,041	1,283	1,102

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Lampiran 4

Perhitungan metode statistik

Kapasitas adsorpsi optimum abu sekam padi perlakuan dan abu sekam padi tanpa perlakuan pada konsentrasi Cd^{2+} 40 ppm dikaji banding dengan metode statistik.

No	ASPP		ASP		Kapasitas adsorpsi	
	Cd^{2+} sisa (ppm)	Cd^{2+} terserap (ppm)	Cd^{2+} sisa (ppm)	Cd^{2+} terserap (ppm)	ASPP ($mg.g^{-1}$)	ASP ($mg.g^{-1}$)
1	12,258	27,742	13,708	26,292	1,387	1,315
2	12,500	27,500	14,070	27,500	1,375	1,296
3	12,923	27,077	13,768	26,232	1,354	1,312

$$\overline{X} = \sum_i \frac{X_i}{n}$$

$$\overline{X}_{ASPP} = \frac{1{,}387 + 1{,}375 + 1{,}354}{3} = 1{,}372$$

$$\overline{X}_{ASP} = \frac{1{,}315 + 1{,}296 + 1{,}312}{3} = 1{,}308$$

$$S^2 = \sum_i \frac{\left(X_i - \overline{X}\right)^2}{(n-1)}$$

$$S^2{}_{ASPP} = \frac{(1{,}387 - 1{,}372)^2 + (1{,}375 - 1{,}372)^2 + (1{,}354 - 1{,}372)^2}{2} = 2{,}790.10^{-4}$$

$$S^2{}_{ASP} = \frac{(1{,}315 - 1{,}308)^2 + (1{,}296 - 1{,}308)^2 + (1{,}312 - 1{,}308)^2}{2} = 1{,}045.10^{-4}$$

$$S = \sqrt{\frac{\{(3-1)2{,}790.10^{-4} + (3-1)1{,}045.10^{-4}\}}{(3+3-2)}} = 0{,}014$$

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maka statistik penguji t:

$$t_{eksperimen} = \frac{(1{,}372 - 1{,}308)}{0{,}014\sqrt{\left(\frac{1}{3} + \frac{1}{3}\right)}} = 5{,}599$$

mempunyai derajat kebebasan: 3 + 3 – 2 = 4

maka, pada selang kepercayaan (P) = 0,05, t_{tabel} = 2,78

Dapat dipastikan bahwa $t_{eksperimen} > t_{tabel}$. Jadi kedua kapasitas adsorpsi itu berbeda secara berarti.

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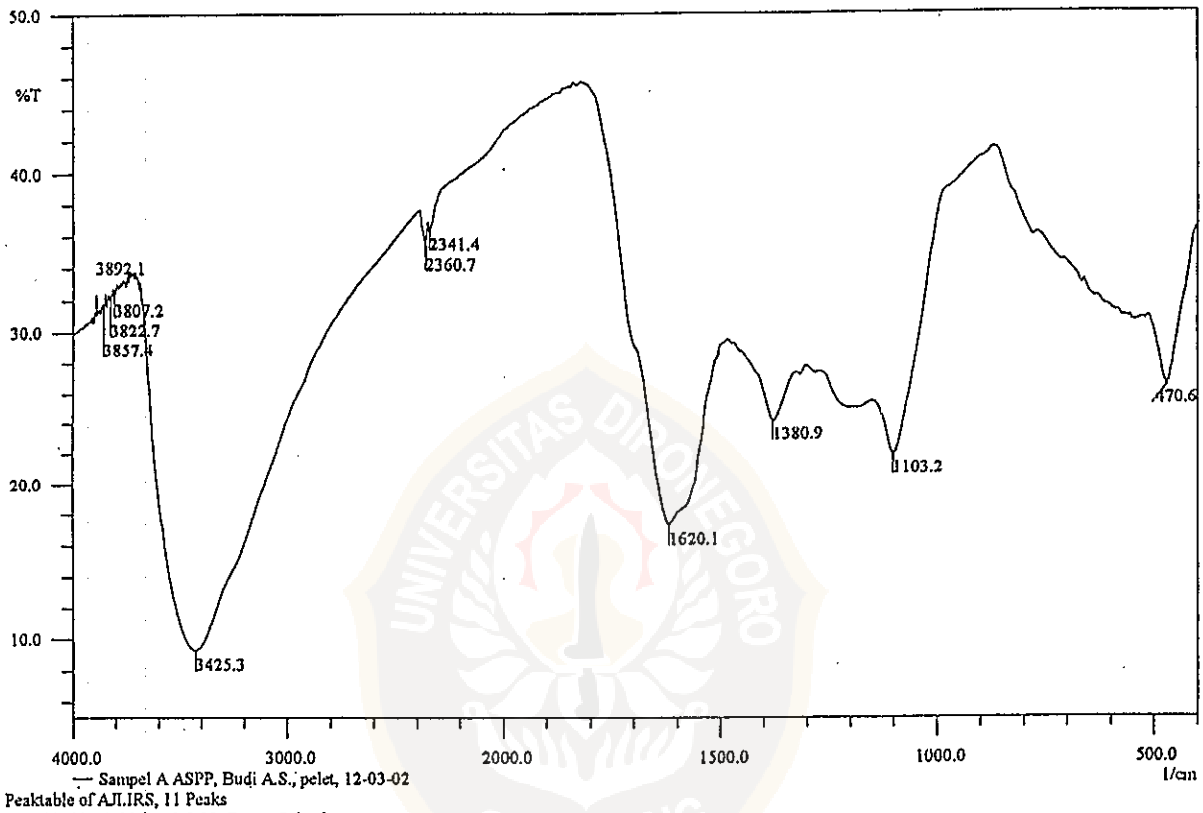
Lampiran 5

5.1. Spektra FTIR abu sekam padi perlakuan dengan NaOH sebelum adsorpsi Cd^{2+}



— Sampel A ASPP, Budi A.S., pelet, 12-03-02
Peaktable of AJI.IRS, 11 Peaks
Threshhold: 80, Noise: 0.5, No Range Selection

Nr.	Pos. (1/cm)	Inten. (%T)
1	470.6	26.368
2	1103.2	21.845
3	1380.9	24.102
4	1620.1	17.267
5	2341.4	36.398
6	2360.7	35.533
7	3425.3	9.249
8	3807.2	32.295
9	3822.7	32.003
10	3857.4	31.390
11	3892.1	31.151

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