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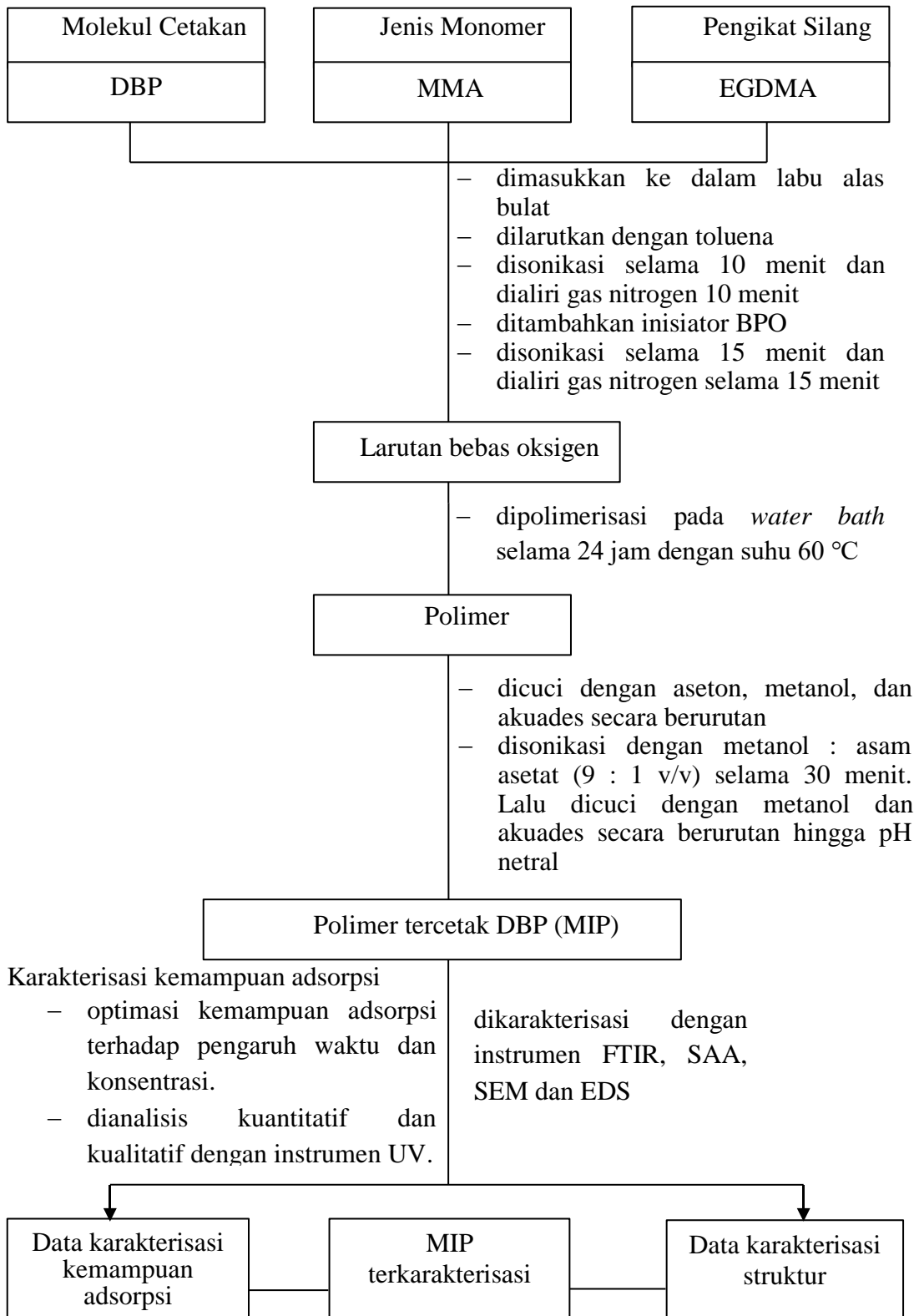
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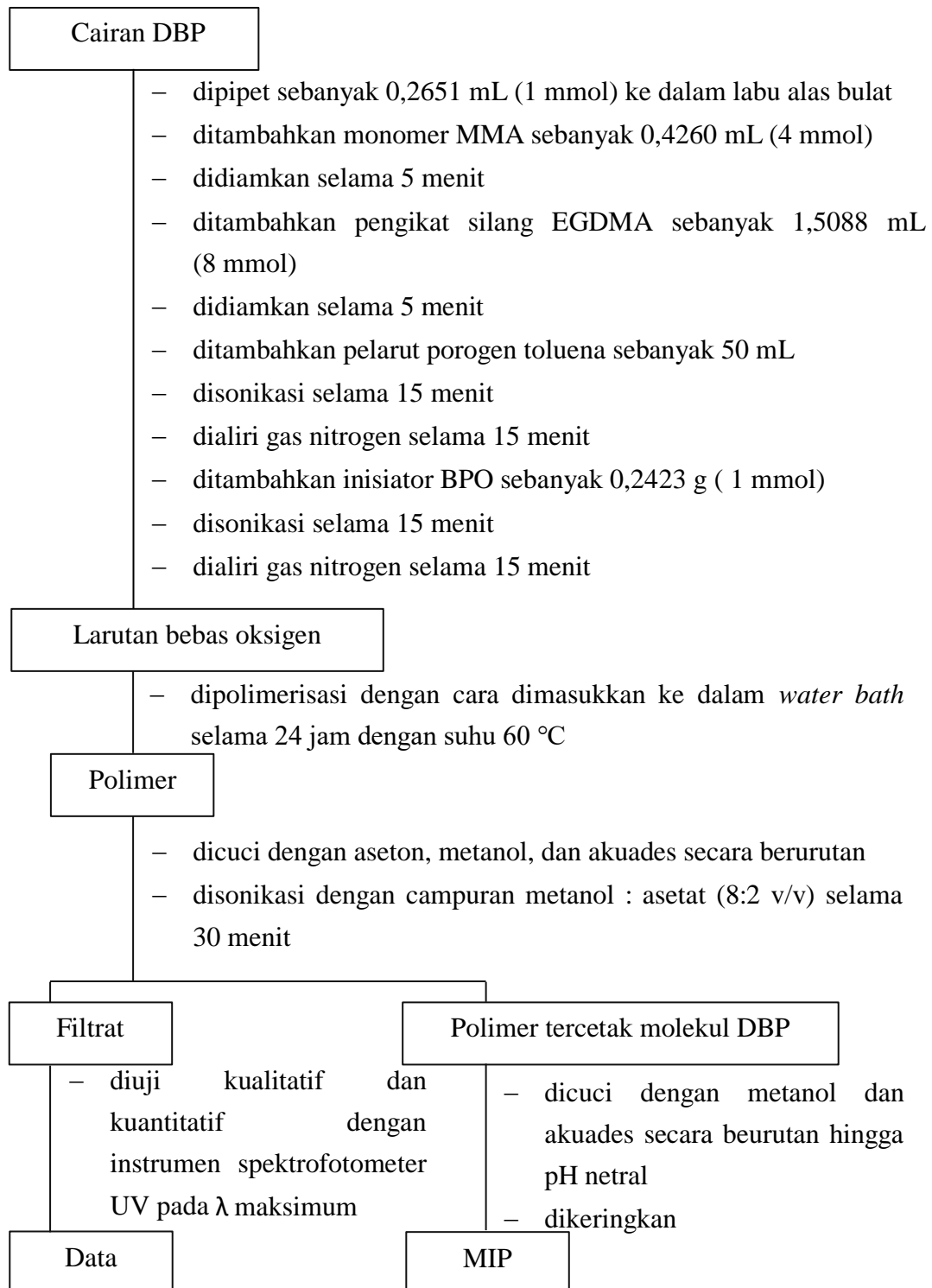
**Lampiran 1.** Skema sintesis Poolimer Bercetakan Molekul DBP menggunakan Metode Polimerisasi Presipitasi



**Catatan:** Sintesis NIP dibuat dengan metode yang sama dengan MIP, tapi tanpa DBP dan proses ekstraksi

## Lampiran 2. Bagan Alir Prosedur Kerja

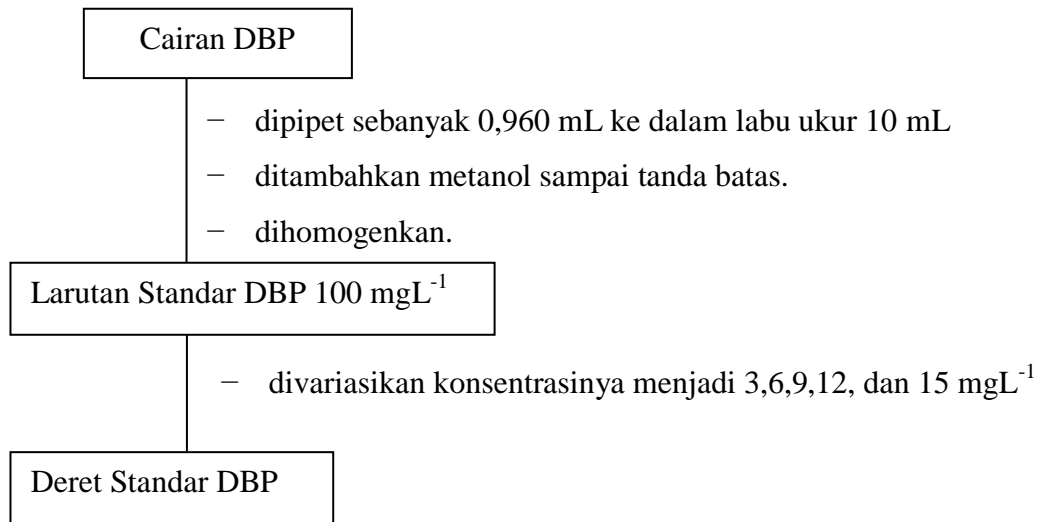
### 1. Sintesis MIP DBP dan NIP



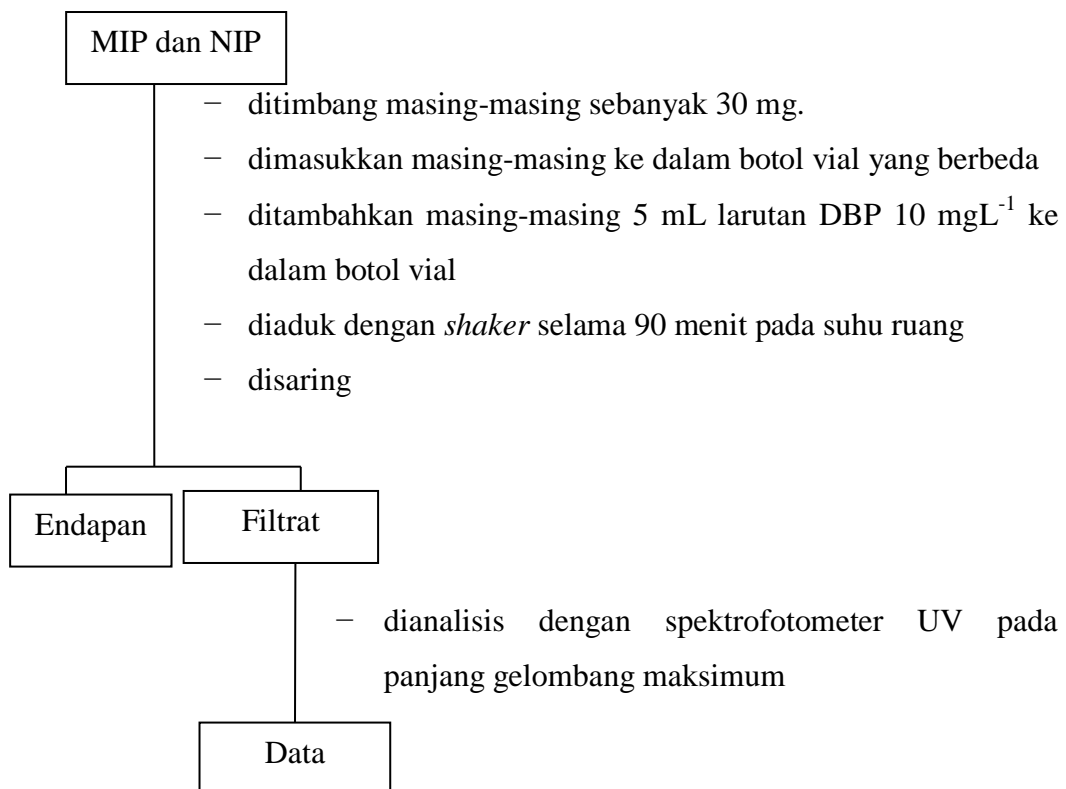
Catatan: Sintesis NIP dibuat dengan metode yang sama dengan MIP, tetapi tanpa menggunakan molekul cetakan DBP



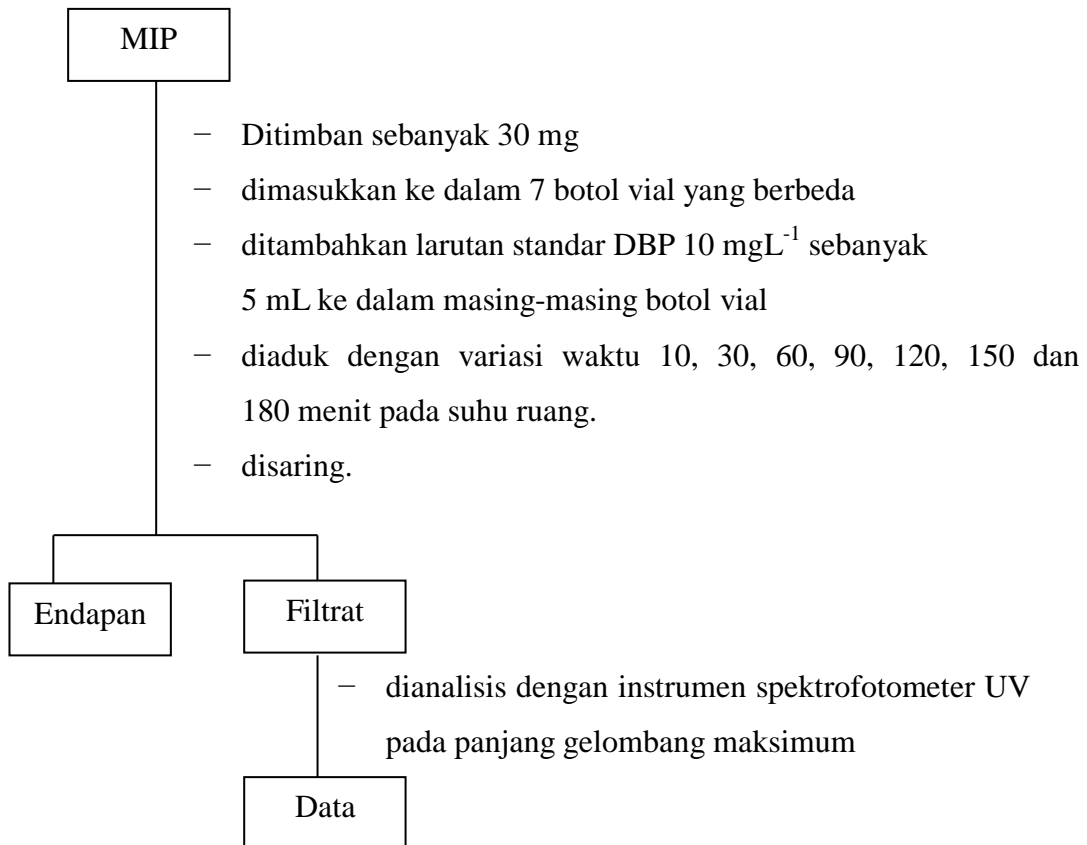
## 2. Pembuatan Larutan Standar DBP 100 mgL<sup>-1</sup>



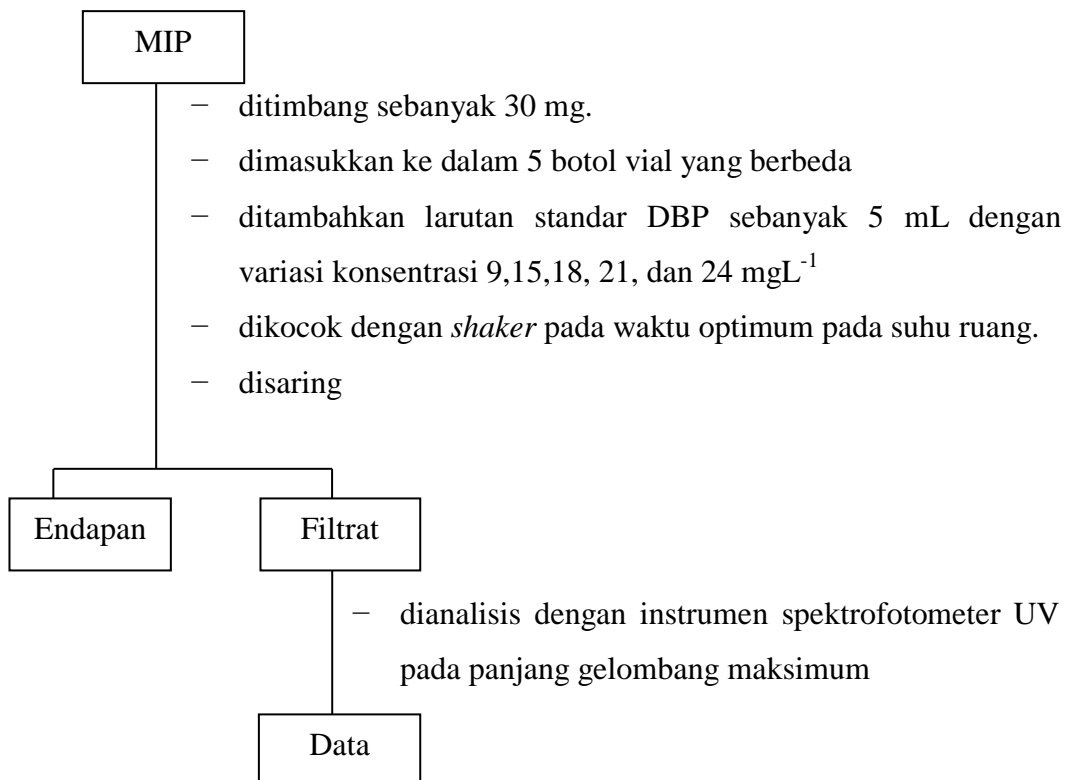
## 3. Uji Kemampuan Adsorpsi MIP DBP dan NIP



#### 4. Pengaruh Waktu terhadap Kemampuan Adsorpsi MIP DBP



#### 5. Pengaruh Konsentrasi terhadap Kemampuan Adsorpsi MIP DBP

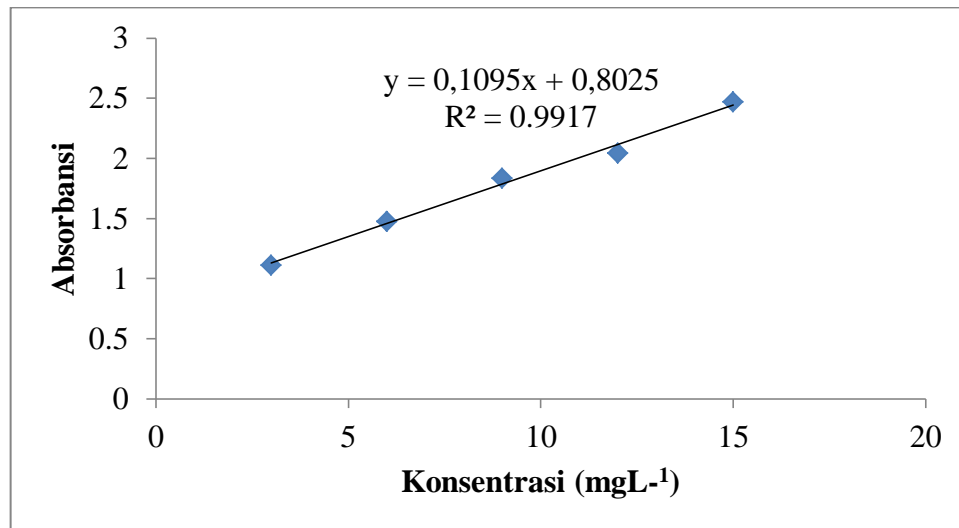


### Lampiran 3. Data Spektrofotometer UV-Vis

#### 1. Data absorbansi larutan standar DBP

No.	Sampel	Konsentrasi ( $\text{mgL}^{-1}$ )	Absorbansi
1	DBP 1	3	1,112
2	DBP 2	6	1,478
3	DBP 3	9	1,835
4	DBP 4	12	2,043
5	DBP 5	15	2,472

#### 2. Kurva hubungan antara absorbansi Vs konsentrasi larutan standar DBP



#### 3. Data absorbansi kemampuan adsorpsi MIP dan NIP

No	Sampel	Absorbansi	$q_e$ (mg/g)	$\Delta q_e$ (mg/g)
1	Adsorpsi DBP oleh MIP	1,575	0,4909	0,2512
2	Adsorpsi DBP oleh NIP	1,740	0,2397	

#### 4. Data absorbansi adsorpsi DBP oleh MIP terhadap pengaruh waktu

No.	Sampel	Waktu (menit)	Absorbansi
1	DBP	10	1,695
2	DBP	30	1,671
3	DBP	60	1,66
4	DBP	90	1,634
5	DBP	120	1,577
6	DBP	150	1,55
7	DBP	180	1,596

#### 5. Data penentuan kinetika adsorpsi orde satu semu dan orde dua semu

No.	Waktu	$C_e$ (mgL <sup>-1</sup> )	$q_t$ (mg/g)	$q_e - q_t$	$\log(q_e - q_t)$	$t/q_t$
1	0	0	0	0,52892	-0,27661	0
2	10	8,151	0,30822	0,2207	-0,6562	32,4444
3	30	7,932	0,34475	0,18417	-0,73478	87,0199
4	60	7,831	0,36149	0,16743	-0,77617	165,979
5	90	7,594	0,40107	0,12785	-0,89329	224,402
6	120	7,073	0,48782	0,0411	-1,3862	245,991
7	150	6,826	<b>0,52892</b>	0	0	283,597
8	180	7,247	0,4589	0,07002	-1,15481	392,239

Catatan:

$q_t$  adalah  $q_e$  pada waktu  $t$

$q_e$  adalah  $q_t$  pada waktu optimum

#### 6. Data absorbansi adsorpsi DBP oleh MIP terhadap pengaruh konsentrasi

No.	Sampel	Konsentrasi (mgL <sup>-1</sup> )	Absorbansi
1	DBP	9	1,005
2	DBP	15	1,385
3	DBP	18	1,592
4	DBP	21	1,796
5	DBP	24	1,969

## 7. Data persamaan isotermal Langmuir dan Freundlich

No.	Sampel	Konsentrasi (mgL <sup>-1</sup> )	C <sub>e</sub> (mgL <sup>-1</sup> )	q <sub>e</sub> (mg/g)	log C <sub>e</sub>	log q <sub>e</sub>	1/C <sub>e</sub>	1/q <sub>e</sub>
1	MIP_DBP	9	1,8493	1,192	0,26701	0,0762	0,54074	0,83908
2	MIP_DBP	15	5,3196	1,613	0,72588	0,20774	0,18798	0,661981
3	MIP_DBP	18	7,21	1,798	0,85794	0,25487	0,1387	0,55607
4	MIP_DBP	21	9,0731	1,988	0,95775	0,29838	0,11022	0,50306
5	MIP_DBP	24	10,653	2,225	1,02747	0,34723	0,09387	0,44954

#### Lampiran 4. Perhitungan

##### 1. Nilai konsentrasi adsorpsi DBP oleh MIP dan NIP

$$y = 0,1095x + 0,8025$$

###### a. Adsorpsi DBP oleh MIP

$$y = 1,575$$

$$y = 0,1095x + 0,8025$$

$$1,575 = 0,1095x + 0,8025$$

$$x = \frac{1,575 - 0,8025}{0,1095}$$

$$x = 7,0548 \text{ mgL}^{-1}$$

###### b. Adsorpsi DBP oleh NIP

$$y = 1,74$$

$$y = 0,1095x + 0,8025$$

$$1,74 = 0,1095x + 0,8025$$

$$x = \frac{1,74 - 0,8025}{0,1095}$$

$$x = 8,5616 \text{ mgL}^{-1}$$

##### 2. Nilai Kemampuan Adsorpsi DBP oleh MIP dan NIP

$$q_e = \frac{(C_o - C_e) V}{W}$$

Diketahui:  $C_o = 10 \text{ mgL}^{-1}$      $W = 0,03 \text{ g}$

$V = 0,005 \text{ L}$      $C_e = \text{Konsentrasi setelah adsorpsi}$

**a. Kemampuan Adsorpsi DBP oleh MIP**

$$q_e = \frac{(10 - 7,0548) 0,005}{0,03}$$

$$q_e = \frac{0,014726}{0,03}$$

$$q_e = 0,4909 \text{ mg/g}$$

**b. Kemampuan Adsorpsi DBP oleh NIP**

$$q_e = \frac{(10 - 8,5616) 0,005}{0,03}$$

$$q_e = \frac{0,007192}{0,03}$$

$$q_e = 0,2387 \text{ mg/g}$$

**3. Nilai konsentrasi adsorpsi dan kemampuan adsorpsi DBP oleh MIP terhadap pengaruh waktu**

Waktu (menit)	y (absorbansi)	x (konsentrasi) (mgL <sup>-1</sup> )	q <sub>e</sub> (mg/g)
10	1,695	8,1507	0,3082
30	1,671	7,9315	0,3448
60	1,66	7,8311	0,3615
90	1,634	7,5936	0,4011
120	1,577	7,0731	0,4878
150	1,55	6,8265	0,5289
180	1,596	7,2465	0,4589

Contoh perhitungan konsentrasi adsorpsi dan kemampuan adsorpsi DBP oleh MIP terhadap pengaruh waktu:

**a. Konsentrasi Adsorpsi DBP oleh MIP 10 menit**

$$y = 0,1095x + 0,8025$$

$$y = 1,695$$

$$y = 0,1095x + 0,8025$$

$$1,695 = 0,1095x + 0,8025$$

$$x = \frac{1,695 - 0,8025}{0,1095}$$

$$x = 8,1507 \text{ mgL}^{-1}$$

**b. Kemampuan Adsorpsi DBP oleh MIP 10 menit**

$$q_e = \frac{(C_o - C_e) V}{W}$$

Diketahui:  $C_o = 10 \text{ mgL}^{-1}$   $W = 0,03 \text{ g}$

$C_e = \text{Konsentrasi setelah adsorpsi}$   $V = 0,005 \text{ L}$

$$q_e = \frac{(10 - 8,1507) 0,005}{0,03}$$

$$q_e = \frac{0,0092465}{0,03}$$

$$q_e = 0,3082 \text{ mg/g}$$



**4. Nilai konsentrasi adsorpsi dan kemampuan adsorpsi DBP oleh MIP terhadap pengaruh konsentrasi**

Konsentrasi awal (mgL <sup>-1</sup> )	y (absorbansi)	x (konsentrasi) (mgL <sup>-1</sup> )	q <sub>e</sub> (mg/g)
9	1,005	1,8493	1,1918
15	1,385	5,3196	1,6134
18	1,592	7,2100	1,7983
21	1,796	9,0731	1,9878
24	1,969	10,6530	2,2245

Contoh perhitungan konsentrasi adsorpsi dan kemampuan adsorpsi DBP oleh MIP terhadap pengaruh konsentrasi:

**a. Adsorpsi DBP oleh MIP 9 mgL<sup>-1</sup>**

$$y = 0,1095x + 0,8025$$

$$y = 1,005$$

$$y = 0,1095x + 0,8025$$

$$1,005 = 0,1095x + 0,8025$$

$$x = \frac{1,005 - 0,8025}{0,1095}$$

$$x = 1,8493 \text{ mgL}^{-1}$$

**b. Kemampuan Adsorpsi DEHP oleh MIP 9 mgL<sup>-1</sup>**

$$q_e = \frac{(C_o - C_e) V}{W}$$

Diketahui: C<sub>o</sub> = konsentrasi awal W = 0,03 g

C<sub>e</sub> = Konsentrasi setelah adsorpsi V = 0,005 L

$$q_e = \frac{(9 - 1,8493) 0,005}{0,03}$$

$$q_e = \frac{0,0357535}{0,03}$$

$$q_e = 1,1918 \text{ mg/g}$$

**Lampiran 5. Foto Hasil Penelitian**



Proses persiapan alat dan bahan



Proses pencampuran bahan dan prapolimerisasi



Sonikasi



Pengaliran gas nitrogen untuk menghilangkan gas oksigen



Polimerisasi dalam *waterbath*



Polimer terbentuk berwarna putih



Pengeringan polimer



Proses pencucian polimer dengan aseton, metanol, dan akuades agar bersih dari pengotor



Proses ekstraksi (sonikasi)



Pencucian polimer dengan akuades



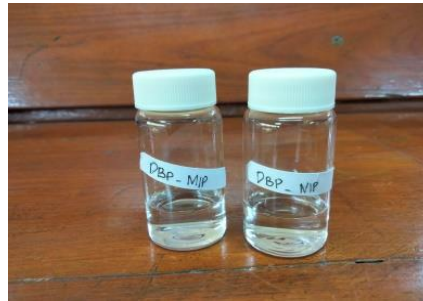
Penentuan pH



Penimbangan polimer hasil sintesis



Pembuatan deret standar DBP



Uji kemampuan adsorpsi MIP dan NIP



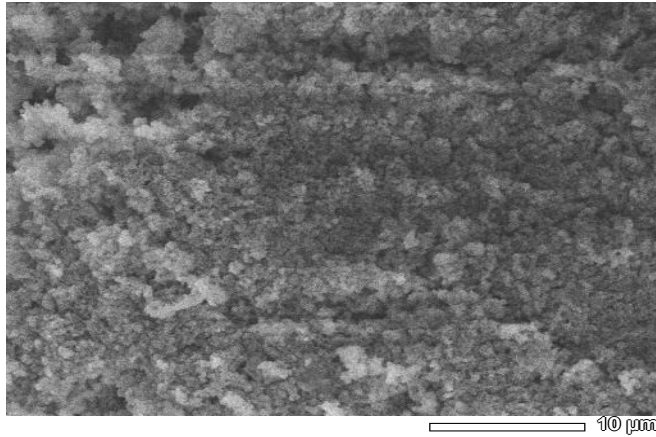
Pengocokan dengan alat *shaker* untuk pengaruh waktu dan konsentrasi terhadap adsorpsi DEHP



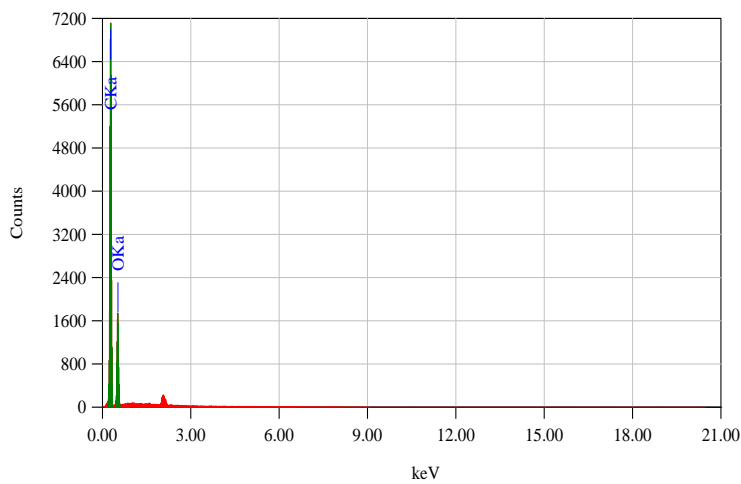
Polimer hasil sintesis MIP\_DBP\_MMA-co-EGDMA dan NIP\_MMA-co-EGDMA

## Lampiran 6. Karakterisasi EDS

### 1. NIP\_MMA-co-EGDMA



Title : IMG1  
-----  
Instrument : 6510 (LA)  
Volt : 10.00 kV  
Mag. : x 3,000  
Date : 2022/02/09  
Pixel : 512 x 384



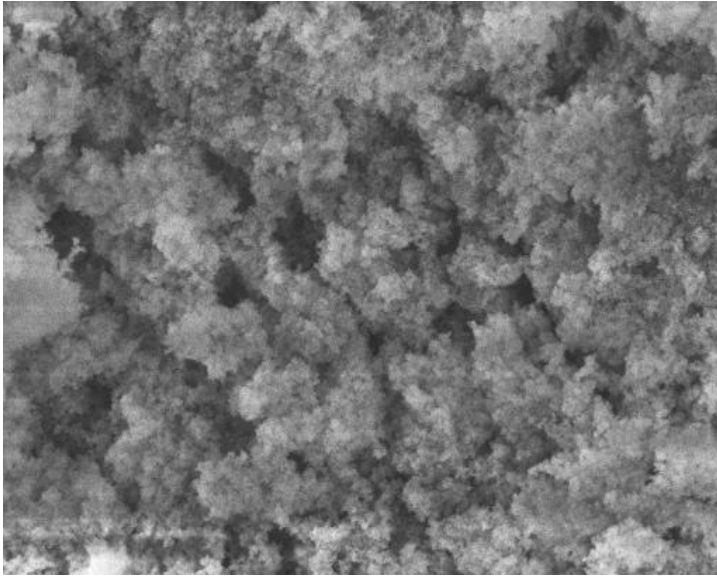
Acquisition Parameter  
Instrument : 6510 (LA)  
Acc. Voltage : 10.0 kV  
Probe Current: 1.00000 nA  
PHA mode : T3  
Real Time : 50.54 sec

ZAF Method Standardless Quantitative Analysis

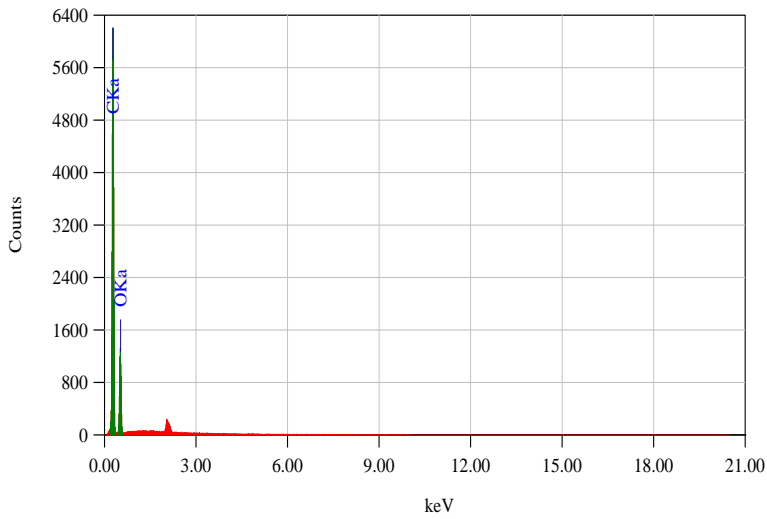
Fitting Coefficient : 0.0289

Element	(keV)	Mass%	Sigma	Atom%	Compound	Mass%	Cation	K
C K	0.277	72.70	0.05	78.01				79.0486
O K	0.525	27.30	0.11	21.99				20.9514
Total		100.00		100.00				

## 2. MIP\_DBP\_MMA-co-EGDMA<sub>(BE)</sub>



Title : IMG1  
 -----  
 Instrument : 6510 (LA)  
 Volt : 10.00 kV  
 Mag. : x 3,000  
 Date : 2022/02/09  
 Pixel : 512 x 384



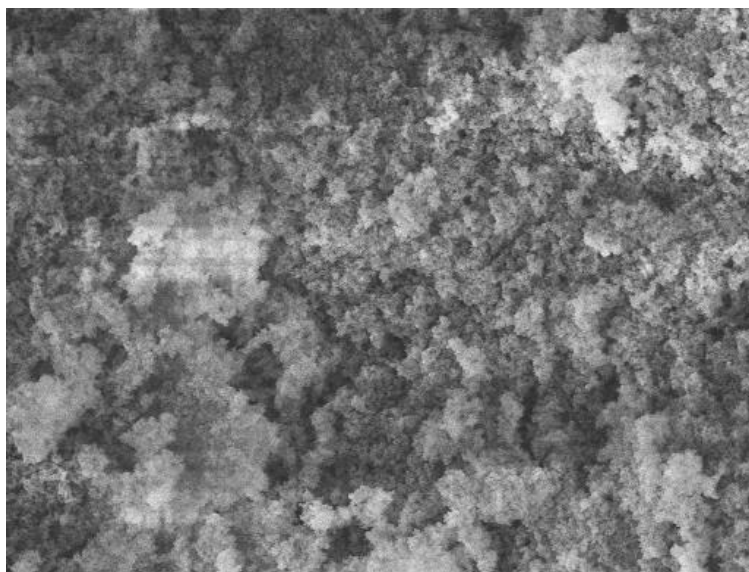
Acquisition Parameter  
 Instrument : 6510 (LA)  
 Acc. Voltage : 10.0 kV  
 Probe Current: 1.00000 nA  
 PHA mode : T3  
 Real Time : 50.51 sec

ZAF Method Standardless Quantitative Analysis

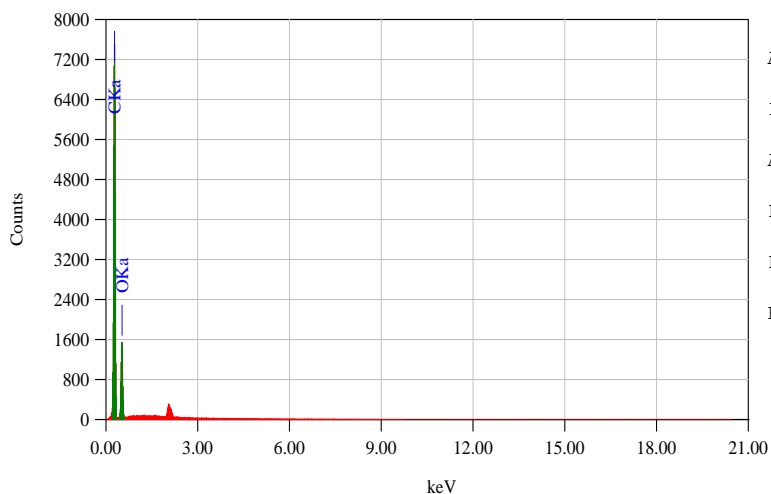
Fitting Coefficient : 0.0317

Element	(keV)	Mass%	Sigma	Atom%	Compound	Mass%	Cation	K
C K	0.277	75.26	0.22	80.21				81.8204
O K	0.525	24.74	0.28	19.79				18.1796
Total		100.00		100.00				

### 3. MIP\_DBP\_MMA-co-EGDMA<sub>(TE)</sub>



Title : IMG1  
 -----  
 Instrument : 6510 (LA)  
 Volt : 10.00 kV  
 Mag. : x 3,000  
 Date : 2022/02/09  
 Pixel : 512 x 384



Acquisition Parameter  
 Instrument : 6510 (LA)  
 Acc. Voltage : 10.0 kV  
 Probe Current: 1.00000 nA  
 PHA mode : T3  
 Real Time : 50.59 sec

#### ZAF Method Standardless Quantitative Analysis

Fitting Coefficient : 0.0324

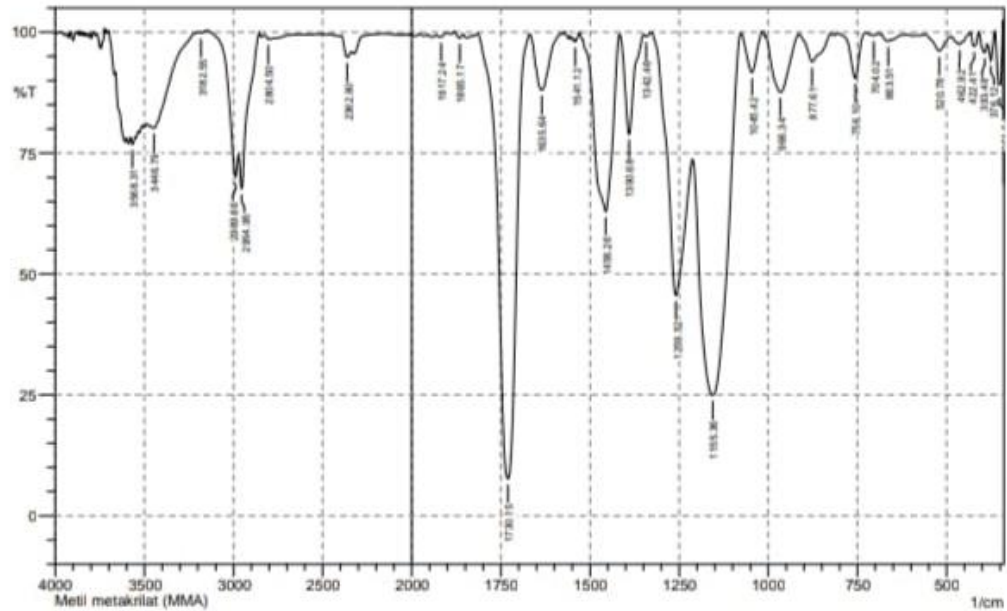
Element	(keV)	Mass%	Sigma	Atom%	Compound	Mass%	Cation	K
C K	0.277	72.15	0.24	77.11				81.6018
O K	0.525	27.85	0.31	22.89				18.4982
Total		100.00		100.00				



## Lampiran 7. Karakterisasi FTIR

### 1. Spektrum Monomer MMA

SHIMADZU



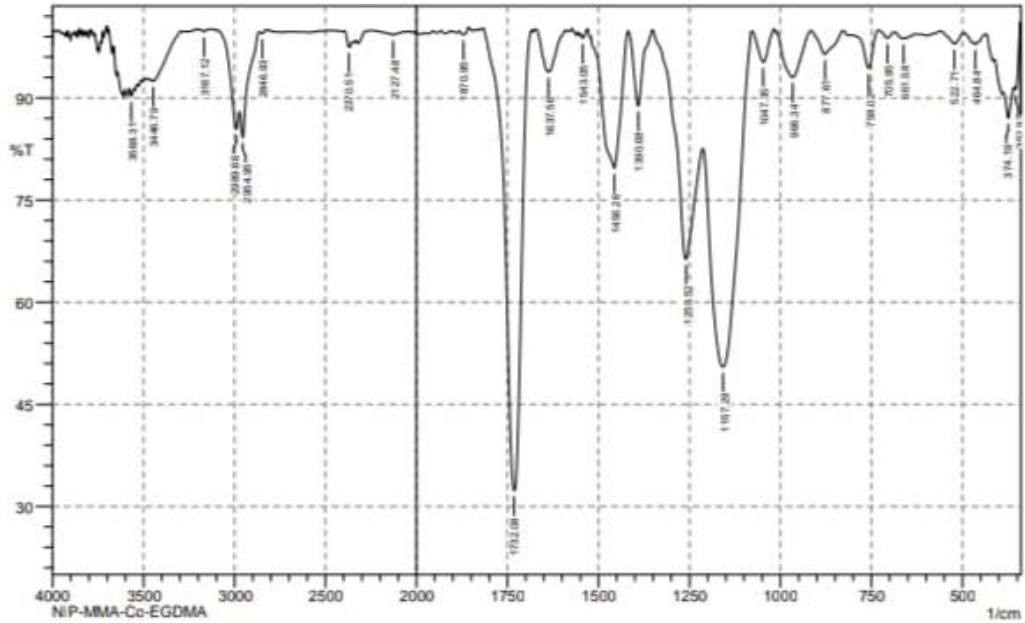
No.	Peak	Intensity	Corr. Intensity	Base (H)	Base (L)	Area	Corr. Area
1	351.04	87.56	13.926	364.55	341.4	0.722	0.848
2	376.12	94.238	4.408	385.76	364.55	0.313	0.197
3	393.48	95.78	2.501	410.84	385.76	0.298	0.159
4	422.41	97.112	2.808	432.06	410.84	0.184	0.176
5	462.92	97.471	0.81	487.99	455.2	0.274	0.072
6	520.78	96.086	3.256	563.21	487.99	0.683	0.475
7	663.51	98.138	0.666	682.8	655.8	0.17	0.056
8	704.02	99.303	0.304	715.59	690.52	0.058	0.016
9	756.1	90.517	9.28	802.39	727.16	1.18	1.111
10	877.61	93.878	5.746	912.33	825.53	1.313	1.182
11	966.34	87.56	11.789	1006.84	914.26	2.999	2.751
12	1045.42	91.69	8.284	1076.28	1018.41	1.126	1.117
13	1155.36	24.936	59.596	1211.3	1078.21	45.218	36.375
14	1259.52	45.581	38.795	1327.03	1213.23	18.989	11.339
15	1342.46	99.092	0.566	1348.24	1327.03	0.051	0.03
16	1390.68	78.95	20.546	1415.75	1350.17	2.781	2.638
17	1456.26	62.906	36.253	1519.91	1417.68	10.702	10.268
18	1541.12	98.051	1.011	1546.91	1529.55	0.097	0.043
19	1635.64	88.049	11.528	1666.5	1581.63	2.275	2.134
20	1730.15	7.664	91.911	1815.02	1670.35	43.294	43.039
21	1865.17	98.8	0.976	1880.6	1857.45	0.074	0.062
22	1917.24	98.993	0.644	1930.74	1903.74	0.084	0.042
23	2362.8	94.789	2.675	2393.66	2335.8	0.989	0.355
24	2804.5	98.483	0.943	2827.64	2659.84	0.706	0.31
25	2954.95	67.618	10.245	2970.38	2856.58	8.43	1.328
26	2989.66	70.012	7.133	3145.9	2972.31	8.205	0.95
27	3182.55	99.826	0.296	3192.19	3147.83	-0.018	0.02
28	3446.79	80.207	1.226	3460.3	3194.12	10.241	0.301
29	3568.31	76.803	1.373	3577.95	3554.81	2.577	0.103

Comment;  
Metil metakrilat (MMA)

Date/Time; 2/14/2022 3:11:17 PM  
No. of Scans;  
Resolution;  
Apodization;

## 2. Spektrum NIP\_MMA-co-EGDMA

SHIMADZU

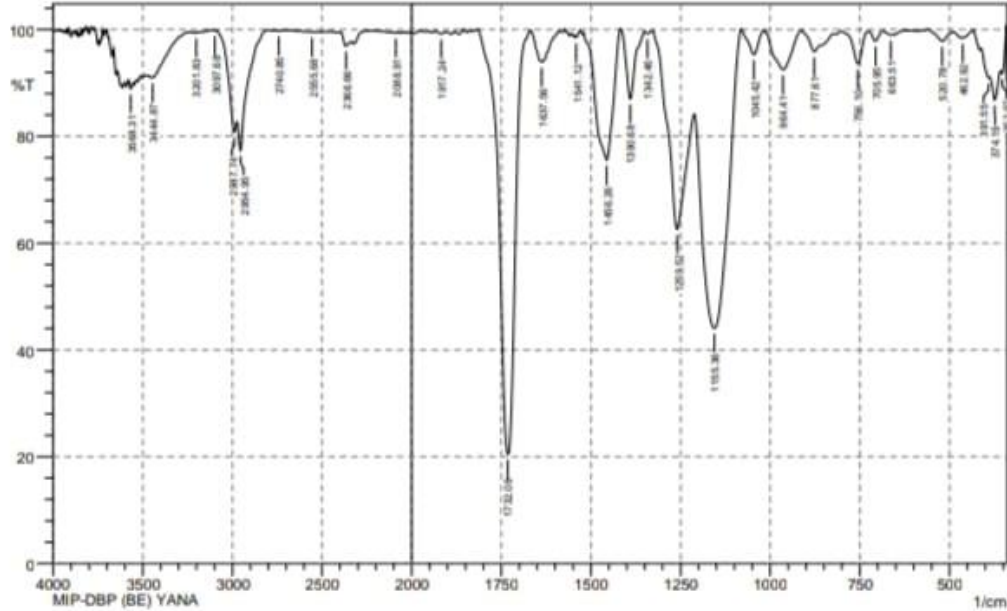


No.	Peak	Intensity	Corr. Intensity	Base (H)	Base (L)	Area	Corr. Area
1	352.97	91.28	3.465	358.76	341.4	0.471	0.181
2	374.19	87.108	3.934	387.69	360.69	1.354	0.255
3	464.84	97.888	0.726	495.71	455.2	0.258	0.072
4	522.71	97.936	1.757	561.29	495.71	0.315	0.233
5	661.58	98.71	0.33	682.8	655.8	0.12	0.033
6	705.95	98.787	0.972	731.02	688.59	0.121	0.082
7	758.02	94.371	5.281	800.46	731.02	0.742	0.612
8	877.61	96.423	3.468	916.19	829.39	0.737	0.695
9	966.34	93.032	6.706	1008.77	916.19	1.654	1.555
10	1047.35	95.252	4.726	1078.21	1018.41	0.643	0.636
11	1157.29	50.495	39.228	1213.23	1078.21	23.346	17.766
12	1259.52	66.346	21.862	1350.17	1215.15	11.172	5.433
13	1390.68	88.884	11.03	1417.68	1352.1	1.373	1.352
14	1456.26	79.727	19.646	1519.91	1419.61	5.29	4.961
15	1543.05	98.796	0.678	1546.91	1529.55	0.049	0.027
16	1637.56	93.783	6.222	1670.35	1591.27	1.099	1.096
17	1732.08	32.362	67.692	1815.02	1683.86	20.115	20.164
18	1870.95	99.299	0.789	1882.52	1857.45	0.045	0.057
19	2127.48	99.271	0.5	2250.93	2077.33	0.306	0.162
20	2370.51	97.45	1.347	2395.59	2355.08	0.287	0.109
21	2846.93	99.458	0.362	2862.36	2821.86	0.054	0.028
22	2954.95	84.264	5.579	2972.31	2864.29	3.607	0.622
23	2989.66	85.424	4.015	3093.82	2974.23	3.398	0.526
24	3167.12	99.753	0.358	3205.69	3136.25	0.008	0.042
25	3446.79	92.476	0.77	3460.3	3296.35	3.018	0.306
26	3568.31	90.283	1.067	3579.88	3554.81	1.056	0.07

Comment:  
NIP-MMA-Co-EGDMA

Date/Time: 2/14/2022 2:34:22 PM  
No. of Scans;  
Resolution;  
Apodization;

### 3. Spektrum MIP\_DBP\_MMA-co-EGDMA<sub>(BE)</sub>

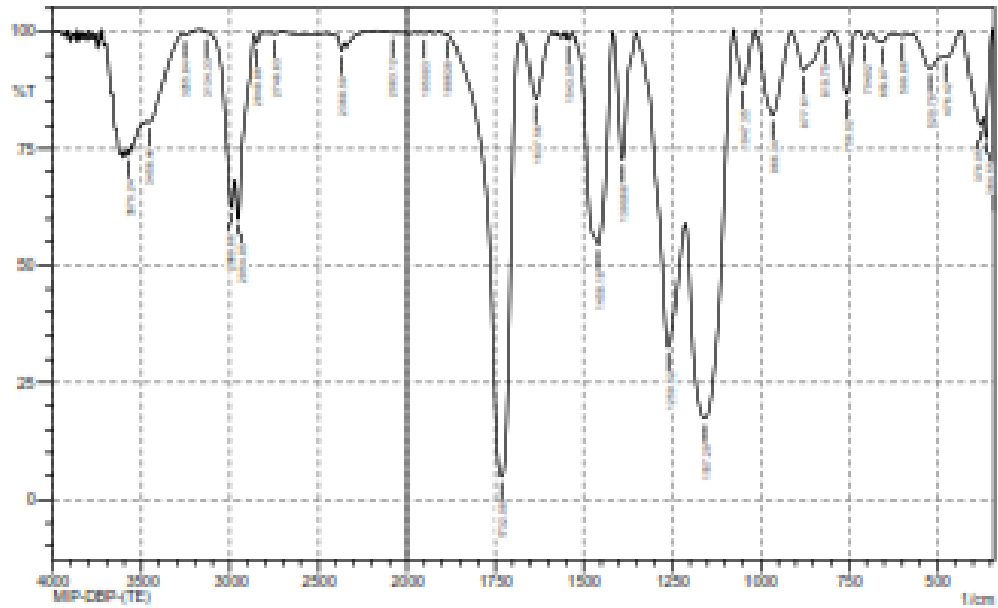


No.	Peak	Intensity	Corr. Intensity	Base (H)	Base (L)	Area	Corr. Area
1	352.97	91.773	3.31	358.76	341.4	0.464	0.189
2	374.19	86.819	4.794	387.69	358.76	1.432	0.341
3	391.55	90.956	1.013	410.84	387.69	0.738	0.085
4	462.92	98.375	0.512	470.63	432.05	0.167	0.043
5	520.78	97.821	1.932	563.21	489.92	0.33	0.264
6	663.51	98.969	0.337	682.8	655.8	0.092	0.025
7	705.95	97.845	1.858	725.23	682.8	0.207	0.153
8	756.1	93.586	6.099	802.39	725.23	0.858	0.753
9	877.61	95.878	3.679	912.33	823.6	0.885	0.686
10	964.41	92.482	7.373	1016.49	912.33	1.89	1.824
11	1045.42	95.328	4.657	1082.07	1018.41	0.635	0.633
12	1155.36	44.046	46.979	1211.3	1082.07	26.533	21.772
13	1259.52	62.65	27.805	1327.03	1213.23	11.811	7.394
14	1342.46	99.237	0.46	1350.17	1327.03	0.055	0.026
15	1390.68	87.054	12.85	1415.75	1352.1	1.61	1.563
16	1456.26	75.572	24.266	1519.91	1417.68	6.298	6.183
17	1541.12	98.506	0.68	1544.98	1529.55	0.067	0.028
18	1637.56	93.913	5.857	1666.5	1589.34	1.106	1.025
19	1732.08	20.448	79.447	1815.02	1670.35	26.347	28.296
20	1917.24	99.189	0.428	1930.74	1907.6	0.064	0.027
21	2088.91	99.42	0.063	2102.41	2077.33	0.061	0.005
22	2366.66	96.954	1.736	2395.59	2333.87	0.6	0.231
23	2555.68	99.552	0.028	2700.34	2546.04	0.195	0.007
24	2740.85	99.745	0.121	2791	2700.34	0.072	0.019
25	2954.95	77.419	7.022	2972.31	2804.5	6.325	0.809
26	2987.74	80.828	3.942	3088.03	2974.23	4.543	0.503
27	3097.68	99.788	0.084	3113.11	3088.03	0.018	0.004
28	3201.83	99.422	0.042	3207.62	3184.48	0.053	0.002
29	3444.87	90.978	0.868	3460.3	3257.77	4.122	0.203
30	3568.31	88.96	1.247	3577.95	3554.81	1.121	0.079

Comment;  
MIP-DBP (BE) YANA

Date/Time; 2/14/2022 2:40:32 PM  
No. of Scans;  
Resolution;  
Apodization;

#### 4. Spektrum MIP\_DBP\_MMA-co-EGDMA<sub>(TE)</sub>



No.	Peak	Intensity	Corr. Intensity	Base (H)	Base (L)	Area	Corr. Area
1	364.55	77.555	0.185	370.33	345.28	1.452	0.404
2	378.05	80.596	0.349	432.05	372.28	3.301	0.832
3	478.42	94.577	0.871	482.2	432.05	0.738	0.135
4	520.78	92.128	4.835	588	482.2	1.997	0.329
5	589.88	98.987	0.479	628.79	580.57	0.183	0.045
6	623.87	97.323	0.195	628.8	628.79	0.147	-0.005
7	704.02	98.845	1.119	725.23	688.59	0.118	0.033
8	758.02	98.612	13.355	800.48	725.23	1.848	1.838
9	819.75	98.282	0.301	823.8	800.48	0.105	0.019
10	877.81	91.744	7.921	910.4	823.8	1.861	1.803
11	988.34	82.284	17.006	1098.77	912.33	4.478	4.199
12	1047.35	88.57	11.382	1074.38	1018.41	1.538	1.53
13	1157.29	17.253	58.555	1213.23	1078.28	60.551	45.124
14	1256.52	32.678	39.582	1386.17	1213.15	30.304	14.584
15	1390.88	72.715	26.987	1417.88	1352.1	3.748	3.659
16	1458.18	54.431	44.812	1521.84	1419.81	14.717	14.238
17	1543.85	98.373	1.064	1548.91	1531.48	0.062	0.032
18	1637.58	85.588	13.898	1674.21	1591.27	2.612	2.475
19	1732.88	4.819	94.59	1882.52	1878.14	60.279	56.758
20	1888.38	89.35	0.184	1909.53	1882.52	0.051	0.013
21	1950.03	99.587	0.286	1955.82	1938.53	0.027	0.018
22	2083.12	98.748	0.642	2173.78	2079.28	0.016	-0.004
23	2368.59	98.034	2.19	2393.88	2353.18	0.474	0.188
24	2748.83	89.483	0.224	2771.71	2704.2	0.103	0.027
25	2848.88	97.844	1.788	2884.29	2823.79	0.241	0.149
26	2954.83	88.652	13.13	2972.31	2888.22	10.848	2.027
27	2989.88	82.481	8.983	3116.97	2974.23	10.7	1.437
28	3134.33	89.888	0.339	3157.47	3118.97	0.019	0.021
29	3255.84	99.334	0.342	3289.34	3184.48	0.69	0.071
30	3456.44	88.72	0.471	3480.3	3371.27	8.217	0.289
31	3570.24	73.74	1.475	3579.88	3558.74	2.984	0.102

Date/Time: 3/17/2022 3:08:29 PM

No. of Scans:

Resolution:

Apodization:

## Lampiran 8. Karakterisasi SAA



TriStar II 3020 2.00

TriStar II 3020 Version 2.00 Unit  
1 Port 1

Serial #: 1108

Page 1

Sample: MIP\_DBP\_MMA-Co-EGDMA (TE)  
Operator: Sarah  
Submitter: 30391  
File: C:\TriStar II 3020\data\SAMPE...MIP\_DBP\_MMA-Co-EGDMA-TE.BMP

Started: 3/9/2022 7:18:50 AM  
Completed: 3/9/2022 3:44:43 PM  
Report Time: 3/11/2022 8:09:22 AM  
Sample Mass: 0.2273 g  
Cold Free Space: 32.1591 cm<sup>3</sup>  
Low Pressure Dose: None  
Automatic Degas: No

Analysis Adsorptive: N<sub>2</sub>  
Analysis Bath Temp.: -195.850 °C  
Thermal Correction: No  
Warm Free Space: 11.2384 cm<sup>3</sup> Measured  
Equilibration Interval: 5 s  
Sample Density: 1.000 g/cm<sup>3</sup>

### Summary Report

#### Surface Area

Single point surface area at P/P<sub>0</sub> = 0.304038660: 154.4254 m<sup>2</sup>/g

BET Surface Area: 157.1970 m<sup>2</sup>/g

t-Plot Micropore Area: 44.7217 m<sup>2</sup>/g

t-Plot External Surface Area: 112.4754 m<sup>2</sup>/g

BJH Adsorption cumulative surface area of pores  
between 1.7000 nm and 300.0000 nm diameter: 76.812 m<sup>2</sup>/g

BJH Desorption cumulative surface area of pores  
between 1.7000 nm and 300.0000 nm diameter: 83.8432 m<sup>2</sup>/g

D-H Adsorption cumulative surface area of pores  
between 1.7000 nm and 300.0000 nm diameter: 88.556 m<sup>2</sup>/g

D-H Desorption cumulative surface area of pores  
between 1.7000 nm and 300.0000 nm diameter: 75.4948 m<sup>2</sup>/g

#### Pore Volume

Single point adsorption total pore volume of pores  
less than 171.1684 nm diameter at P/P<sub>0</sub> = 0.988677175: 0.244900 cm<sup>3</sup>/g

t-Plot micropore volume: 0.023223 cm<sup>3</sup>/g

BJH Adsorption cumulative volume of pores  
between 1.7000 nm and 300.0000 nm diameter: 0.197929 cm<sup>3</sup>/g

BJH Desorption cumulative volume of pores  
between 1.7000 nm and 300.0000 nm diameter: 0.192406 cm<sup>3</sup>/g

#### Pore Size

Adsorption average pore width (4V/A by BET): 6.23167 nm

BJH Adsorption average pore diameter (4V/A): 10.3071 nm

BJH Desorption average pore diameter (4V/A): 9.1793 nm

D-H Adsorption average pore diameter (4V/A): 9.2271 nm

D-H Desorption average pore diameter (4V/A): 9.7970 nm



TriStar II 3020 2.00

TriStar II 3020 Version 2.00 Unit  
1 Port 1

Serial #: 1108

Page 3

Sample: MIP\_DBP\_MMA-Co-EGDMA (TE)  
Operator: Sarah  
Submitter: 30391  
File: C:\TriStar II 3020\data\SAMPE...MIP\_DBP\_MMA-Co-EGDMA-TE.SMP

Started: 3/9/2022 7:18:50 AM  
Completed: 3/9/2022 3:44:43 PM  
Report Time: 3/11/2022 8:05:22 AM  
Sample Mass: 0.2273 g  
Cold Free Space: 32.1591 cm<sup>3</sup>  
Low Pressure Dose: None  
Automatic Degas: No

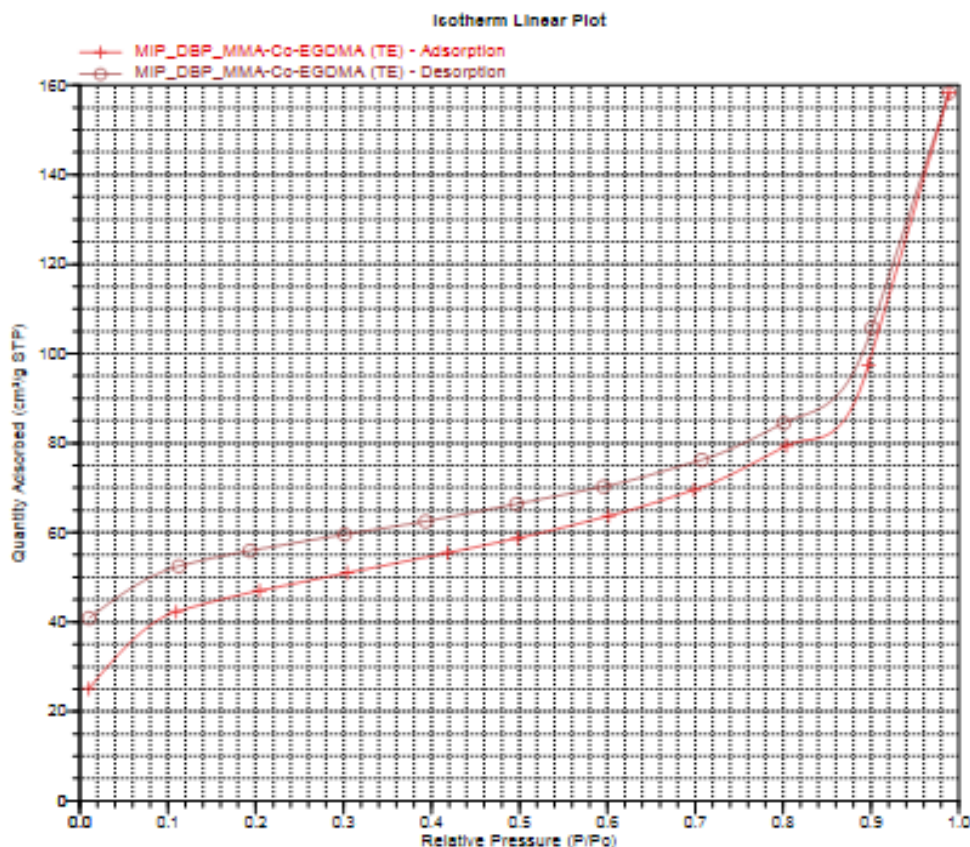
Analysis Adsorptive: N2  
Analysis Bath Temp.: -195.850 °C  
Thermal Correction: No  
Warm Free Space: 11.2384 cm<sup>3</sup> Measured  
Equilibration Interval: 5 s  
Sample Density: 1.000 g/cm<sup>3</sup>

#### Isotherm Tabular Report

Relative Pressure (P/P <sub>0</sub> )	Absolute Pressure (mmHg)	Quantity Adsorbed (cm <sup>3</sup> /g STP)	Elapsed Time (h:min)	Saturation Pressure (mmHg)
				760.000000
0.009928568	7.545712	25.0539	02:53	
0.109238082	83.020943	42.2710	05:08	
0.204374434	155.324570	46.9872	05:25	
0.304038660	231.069382	50.9712	05:38	
0.418241320	317.863403	55.4349	05:47	
0.498288406	378.699188	58.7549	05:54	
0.601668990	457.268433	63.6914	06:03	
0.698885067	531.137451	69.5482	06:11	
0.803899942	610.963196	79.3982	06:22	
0.897094807	681.792053	97.4385	06:33	
0.988677175	751.394653	158.3268	06:38	
0.901173883	684.892151	105.7902	06:53	
0.800705599	608.536255	84.4959	07:04	
0.707451509	537.663147	76.2484	07:10	
0.595522188	452.596863	70.2574	07:15	
0.496751685	377.531281	66.3865	07:20	
0.393303801	298.910889	62.5104	07:24	
0.301256903	228.955246	59.5891	07:28	
0.193523246	147.077667	55.9389	07:34	
0.112766145	85.702271	52.4791	07:42	
0.010461469	7.950716	40.8810	08:24	

Sample: MIP\_DBP\_MMA-Co-EGDMA (TE)  
 Operator: Sarah  
 Submitter: 30391  
 File: C:\TriStar II 3020\data\SAMPE...MIP\_DBP\_MMA-Co-EGDMA-TE.BMP

Started: 3/9/2022 7:18:50 AM	Analysis Adsorptive: N2
Completed: 3/9/2022 3:44:43 PM	Analysis Bath Temp.: -195.850 °C
Report Time: 3/11/2022 8:05:22 AM	Thermal Correction: No
Sample Mass: 0.2273 g	Warm Free Space: 11.2384 cm <sup>3</sup> Measured
Cold Free Space: 32.1551 cm <sup>3</sup>	Equilibration Interval: 5 s
Low Pressure Dose: None	Sample Density: 1.000 g/cm <sup>3</sup>
Automatic Degas: No	





TriStar II 3020 2.00

TriStar II 3020 Version 2.00 Unit  
1 Port 1

Serial #: 1108

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Sample: MIP\_DBP\_MMA-Co-EGDMA (TE)  
Operator: Sarah  
Submitter: 30391  
File: C:\TriStar II 3020\data\SAMPE...\MIP\_DBP\_MMA-Co-EGDMA-TE.SMP

Started: 3/9/2022 7:18:50 AM  
Completed: 3/9/2022 3:44:43 PM  
Report Time: 3/11/2022 8:05:22 AM  
Sample Mass: 0.2273 g  
Cold Free Space: 32.1591 cm<sup>3</sup>  
Low Pressure Dose: None  
Automatic Degas: No  
Analysis Adsorptive: N2  
Analysis Bath Temp.: -195.850 °C  
Thermal Correction: No  
Warm Free Space: 11.2384 cm<sup>3</sup> Measured  
Equilibration Interval: 5 s  
Sample Density: 1.000 g/cm<sup>3</sup>

### BJH Adsorption Pore Distribution Report

Faas Correction  
Harkins and Jura

$$t = [ 13.99 / ( 0.034 - \log(P/P_0) ) ] ^ 0.5$$

Diameter Range: 1.7000 nm to 300.0000 nm  
Adsorbate Property Factor: 0.95300 nm  
Density Conversion Factor: 0.0015468  
Fraction of Pores Open at Both Ends: 0.00

Pore Diameter Range (nm)	Average Diameter (nm)	Incremental Pore Volume (cm <sup>3</sup> /g)	Cumulative Pore Volume (cm <sup>3</sup> /g)	Incremental Pore Area (m <sup>2</sup> /g)	Cumulative Pore Area (m <sup>2</sup> /g)
171.0 - 20.0	21.7	0.119870	0.119870	22.080	22.080
20.0 - 10.7	12.5	0.031441	0.151311	10.022	32.102
10.7 - 6.9	7.9	0.015403	0.166714	7.782	39.884
6.9 - 5.1	5.7	0.008222	0.174936	5.789	45.673
5.1 - 3.9	4.3	0.006789	0.181724	6.328	52.001
3.9 - 3.2	3.5	0.004456	0.186181	5.156	57.157
3.2 - 2.4	2.7	0.006172	0.192353	9.102	66.259
2.4 - 1.9	2.1	0.005577	0.197929	10.553	76.812

Activate Windows



## Lampiran 9. Contoh Perhitungan Nilai $K_1$ dan $K_2$ berdasarkan Persamaan Orde Satu Semu dan Orde Dua Semu

### 1. Penentuan $K_1$ dari persamaan orde satu semu

Persamaan orde satu semu:

$$\log (q_e - q_t) = \log q_e - K_1 t/2,303$$

- $\log q_e$  = Intercept  
 $q_e$  = Inv. log Intercept  
  
 $\log q_e$  = -0,5801  
 $q_e$  = 0,2629
- $K_1/2,303$  = Slope  
 $K_1$  = Slope x 2,303  
 $K_1$  = -0,0019 x 2,303  
 $K_1$  = -0,0044

### 2. Penentuan $K_2$ dari persamaan orde dua semu

Persamaan orde satu semu:

$$t/q_t = 1/K_2 q_e^2 + t/q_e$$

- $1/q_e$  = Slope  
 $q_e$  = 1/Slope  
 $q_e$  = 1/1,9876  
 $q_e$  = 0,5031
- $1/K_2 q_e^2$  = Intercept  
 $K_2$  = 1/Intercept x  $q_e^2$   
 $K_2$  = 1/19,952 x  $(0,5031)^2$   
 $K_2$  = 0,0127

## Lampiran 10. Perhitungan Nilai Kapasitas Adsorpsi berdasarkan Model Persamaan Isotermal Langmuir dan Isotermal Freundlich

### 1. Isotermal Adsorpsi Langmuir

Persamaan:

$$\frac{1}{q_e} = \frac{1}{q_m K_L} \times \frac{1}{C_e} + \frac{1}{K_L}$$

Keterangan:

$C_e$  = Konsentrasi saat kesetimbangan (mg/L)

$q_e$  = Jumlah zat teradsorpsi saat kesetimbangan (mg/g)

$X_m$  = Kapasitas adsorpsi maksimum monolayer (mg/g)

$K_L$  = Konstanta afinitas adsorpsi atau konstanta kesetimbangan (L/mg)

Berdasarkan model isotermal Langmuir diperoleh persamaan garis:

$$y = 0,7885x + 0,4245$$

$$\frac{1}{q_m} = 0,4245 \quad \text{maka,} \quad q_m = \frac{1}{0,4245} = 2,3557$$

$$\frac{1}{q_m K_L} = 0,7885 \quad \text{maka,} \quad K_L = \frac{1}{0,7885 \times 2,3557} = 0,5384$$

### 2. Isotermal Adsorpsi Freundlich

Persamaan:

$$\log q_e = \frac{1}{n} \log C_e + \log K_F$$

Keterangan:

$C_e$  = Konsentrasi saat kesetimbangan (mg/L)

$q_e$  = Jumlah zat teradsorpsi saat kesetimbangan (mg/g)

$K_F$  = Konstanta Freundlich menyatakan tingkat adsorpsi (mg/g)

$\frac{1}{n}$  = Konstanta Freundlich menyatakan faktor heterogenitas

$n$  = Intensitas adsorpsi

Berdasarkan model isotermal Freundlich diperoleh persamaan garis:

$$y = 0,3395x - 0,0236$$
$$\frac{1}{n} = 0,3395 \quad \text{maka,} \quad n = \frac{1}{0,3395} = 2,9455$$

$$\log K_F = -0,0236$$

$$K_F = \text{Inv. log} (-0,0489)$$

$$K_F = 0,9479 \text{ mg/g}$$