



LAPORAN HASIL PENELITIAN

“Pembuatan Adsorben Silika dari Daun Bambu dengan Metode Sol-Gel Menggunakan CH_3COOH ”

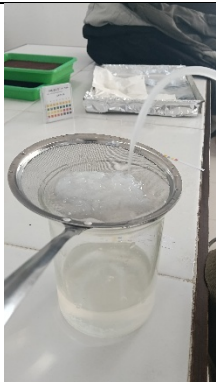
LAMPIRAN I

	
Gambar 1. Bahan Baku Daun Bambu	Gambar 2. Penggilingan Daun Bambu
	
Gambar 3. Hasil Daun Bambu yang Sudah Digiling	Gambar 4. Pengabuan daun bambu menggunakan furnace
	
Gambar 5. Pereaksian abu daun bambu dengan natrium hidroksida	Gambar 6. Penyaringan filtrat natrium silikat



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Gambar 7. Pereaksian natrium silikat dengan asam asetat	Gambar 8. Pembentukan silika gel
	
Gambar 9. Pengukuran pH larutan silika gel	Gambar 10. Pencucian silika gel dengan aquadest hingga pH 7
	
Gambar 11. Pengeringan silika gel dengan oven	Gambar 12. Adsorben silika dari daun bambu



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LAMPIRAN II

1. Pembuatan larutan NaOH 1M 500 ml

$$M = \frac{\text{massa}}{M_r} \times \frac{1000}{V}$$

$$1M = \frac{\text{massa}}{40 \text{ gr/mol}} \times \frac{1000}{500 \text{ ml}}$$

$$\text{massa} = 20 \text{ gr}$$

2. Pembuatan larutan CH_3COOH

$$M = \frac{\% \times \rho \times 10}{M_r}$$

$$M = \frac{100\% \times 1,049 \text{ gr/ml} \times 10}{60 \text{ gr/mol}}$$

$$M = 17,5M$$

- a. CH_3COOH 3M

$$M_1 \times V_1 = M_2 \times V_2$$

$$17,5 M \times V_1 = 3 M \times 250 \text{ ml}$$

$$V_1 = 42,85 \text{ ml}$$

- b. CH_3COOH 3,5M

$$M_1 \times V_1 = M_2 \times V_2$$

$$17,5 M \times V_1 = 3,5 M \times 250 \text{ ml}$$

$$V_1 = 50 \text{ ml}$$

- c. CH_3COOH 4M

$$M_1 \times V_1 = M_2 \times V_2$$

$$17,5 M \times V_1 = 4 M \times 250 \text{ ml}$$

$$V_1 = 57,14 \text{ ml}$$

- d. CH_3COOH 4,5M

$$M_1 \times V_1 = M_2 \times V_2$$

$$17,5 M \times V_1 = 4,5 M \times 250 \text{ ml}$$

$$V_1 = 64,28 \text{ ml}$$

- e. CH_3COOH 5M

$$M_1 \times V_1 = M_2 \times V_2$$



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$$17,5 \text{ M} \times V_1 = 5 \text{ M} \times 250 \text{ ml}$$

$$V_1 = 71,42 \text{ ml}$$

3. Perhitungan % efisiensi adsorpsi

$$\% \text{ efisiensi} = \frac{\text{Kandungan Mn}^{2+} \text{ mula-mula} - \text{Kandungan Mn}^{2+} \text{ akhir}}{\text{Kandungan Mn}^{2+} \text{ mula-mula}} \times 100\%$$

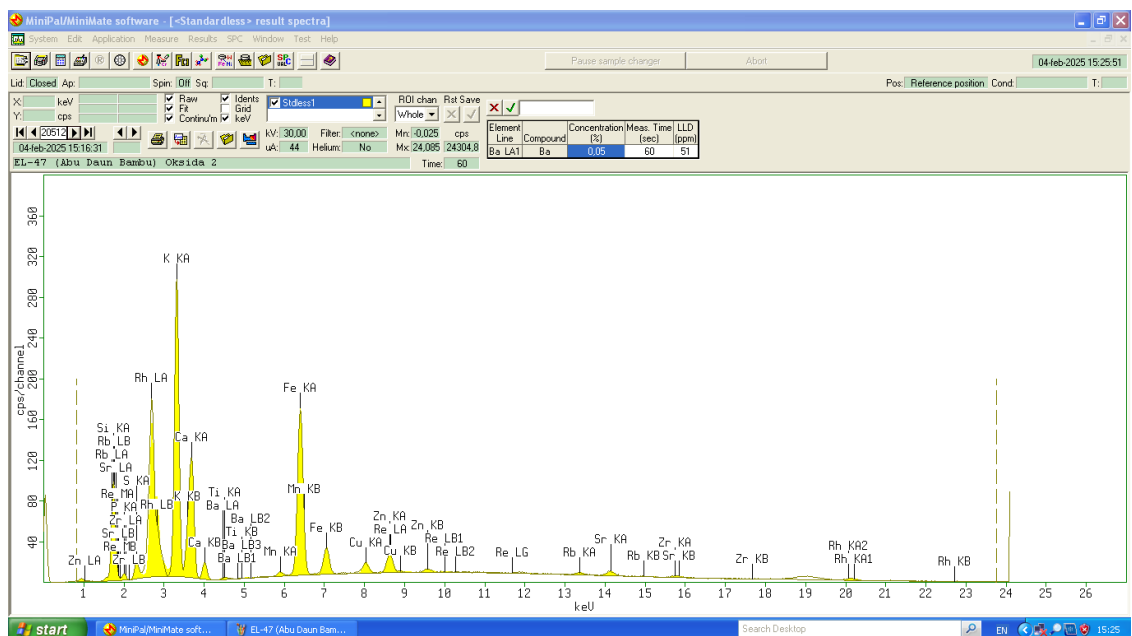
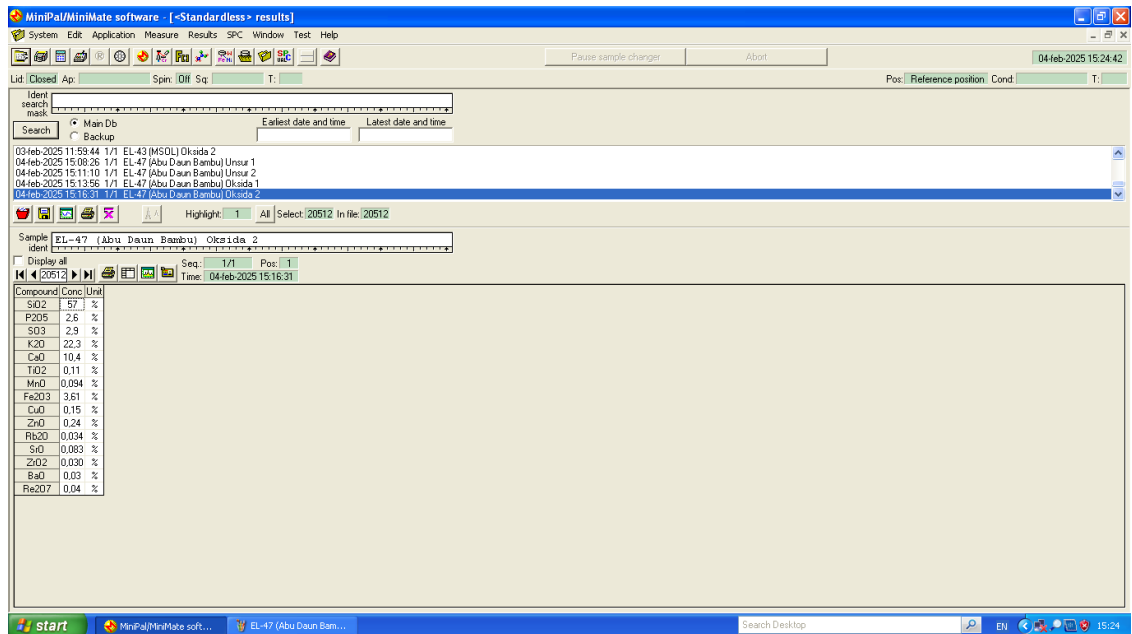


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LAMPIRAN III

1. Hasil uji kandungan senyawa pada daun bambu kuning menggunakan analisa XRF



2. Hasil uji kandungan senyawa pada adsorben menggunakan analisa XRF

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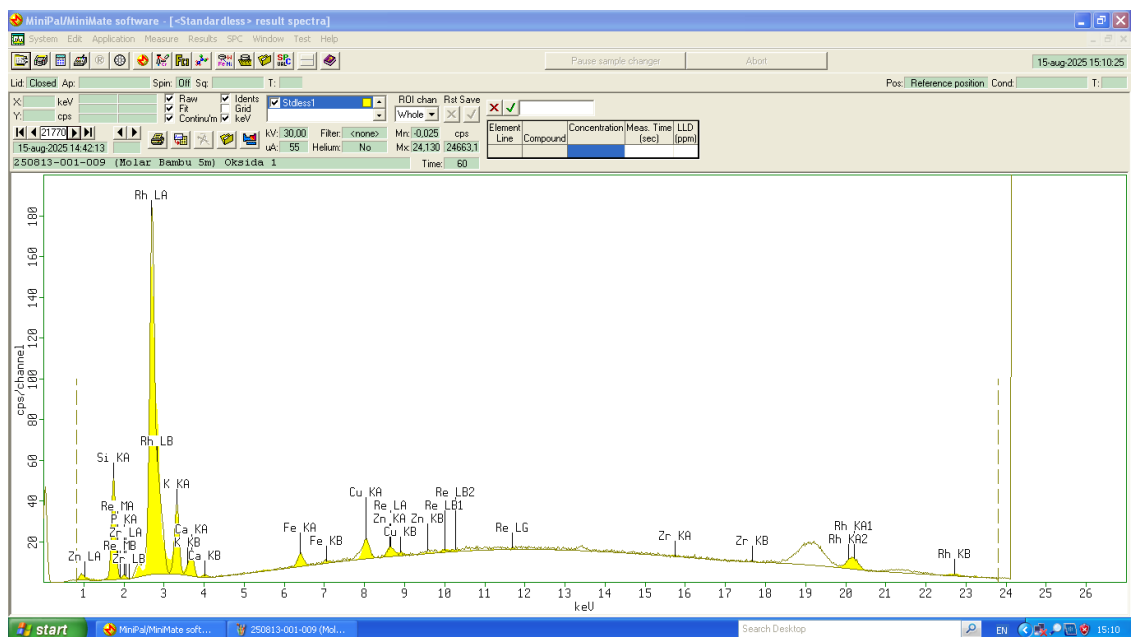
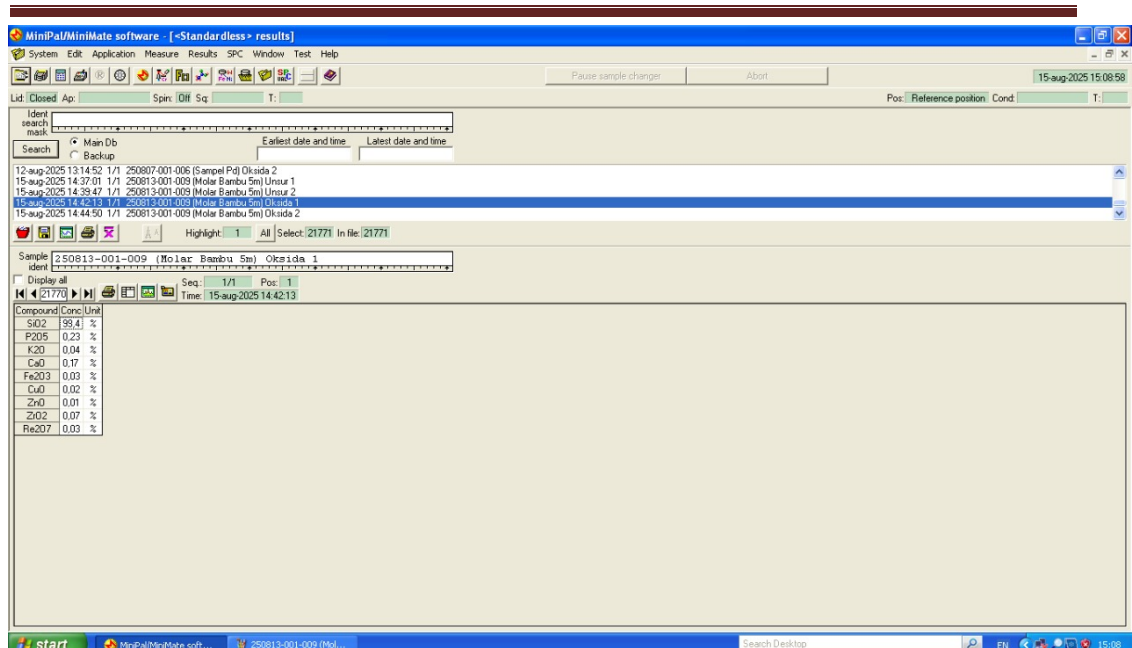
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3. Hasil uji BET pada sampel adsorben

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Jl. Kaliurang Km 14.5, Sleman Yogyakarta
LABORATORIUM TERPADU
Quantachrome TouchWin v1.22



Report date:	Thu Aug 7 2025	Operator:	Yusuf
Filename:	11600725_1 ulang.qcuPhysIso		
Analysis Information			
Sample	ID 1160_1 i	Weight	0.1143 g
Description	MJ 1		
Analysis	Data ID {74e6094e-3733-46ca-a55e-46362a646643}	Date	2025.08.05
Operator	Yusuf	Duration	104.9 min
Instrument	St 1 on NOVA touch 4LX [s/n:170170510001]	Firmware	1.07
Comments			
Ambient Temp.	21.15℃	Void Volume Mode	NOVA mode
Cell Type	9mm with rod	Thermal Delay	300 sec
Cell ID		Cell ID	11
Po Mode		Po Mode	Continuous
Adsorbate	Name Nitrogen	Molecular Weight	28.013 g/mol
Non-ideality	6.580000e-05 1/torr	Bath Temperature	77.35℃
Degas information		Cross Section Area	16.2 Å²/mol
Time	4.0 hours	Temp	300.000000℃
Data Reduction Parameters			
Thermal Transpiration	no		
Adsorbate Model	Name Nitrogen	Molecular Weight	28.0134 g
Bath Temperature	77.35℃	Cross Section Area	16.2 Å²/molec
BET Multi-point BET results			
Isotherm Branch		Adsorption	
Slope		8916.78	
Intercept		135.128	
Correlation coeff., r		0.883617	
C constant		66.9878	
Surface area		28.105 m²/g	
Table - BET Multi-point BET			
Relative Pressure	Volume Adsorbed @STP	1 / [W((P/Po) - 1)]	
	cc/g		
0.00984644	-0.188262	-42.2635	
0.207196	0.0750509	2786.1817	
0.304411	0.151506	2311.1454	



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Report date:	Thu Jul 31 2025	Operator:	Yusuf
Filename:	11600725_2.qcuPhysIso		
Analysis Information			
Sample ID	1160_2	Weight	0.0859 g
Description	MJ 2		
Analysis			
Data ID	{4bd60449-cfc8-4613-80bd-240fe3302efa}	Date	2025.07.30
Operator	Yusuf	Duration	182.8 min
Instrument	St 2 on NOVA touch 4LX [s/n:170170510001]	Firmware	1.07
Comments			
Ambient Temp.	19.94 °C	Void Volume Mode	NOVA mode
Cell Type	9mm with rod	Thermal Delay	300 sec
Cell ID		Cell ID	12
Po Mode		Po Mode	Continuous
Adsorbate Name	Nitrogen	Molecular Weight	28.013 g/mol
Non-ideality	6.580000e-05 1/torr	Bath Temperature	77.35 K
Cross Section Area			16.2 Å ² /mol
Degas information			
Time	4.0 hours	Temp	300.000000 °C
Data Reduction Parameters			
Thermal Transpiration	no		
Adsorbate Model			
Name	Nitrogen	Molecular Weight	28.0134 g
Bath Temperature	77.35 K	Cross Section Area	16.2 Å ² /molec
BET Multi-point BET results			
Isotherm Branch	Adsorption		
Slope	2390.5		
Intercept	-38.2841		
Correlation coeff., r	0.999801		
C constant	-61.441		
Surface area	37.205 m ² /g		
Table - BET Multi-point BET			
Relative Pressure	Volume Adsorbed @STP	1 / [W ((P/Po) - 1)]	
	cc/g		
0.0132634	-1.16098		-9.2636
0.207346	-0.449705		465.4100
0.304828	0.512135		685.0590



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Report date:	Thu Jul 31 2025	Operator:	Yusuf
Filename:	11600725_3.qcuPhysIso		
Analysis Information			
Sample	ID 1160_3	Weight	0.0774 g
Description	MJ 3		
Analysis	Data ID (0a417498-26d7-429c-8dcc-160c3fa7019e)		
Operator	Yusuf	Date	2025.07.30
Instrument	St 3 on NOVA touch 4LX [s/n:170170510001]	Duration	218.3 min
Comments		Firmware	1.07
Ambient Temp.	19.92℃	Void Volume Mode	NOVA mode
Cell Type	9mm with rod	Thermal Delay	300 sec
Cell ID		Cell ID	33
Adsorbate	Name Nitrogen	Molecular Weight	28.013 g/mol
Non-ideality	6.580000e-05 1/torr	Bath Temperature	77.35℃
Degas information		Cross Section Area	16.2 Å ² /mol
Time	4.0 hours	Temp	300.000000℃
Data Reduction Parameters			
Thermal Transpiration	no		
Adsorbate Model			
Name	Nitrogen	Molecular Weight	28.0134 g
Bath Temperature	77.35℃	Cross Section Area	16.2 Å ² /molec
BET Multi-point BET results			
Isotherm Branch	Adsorption		
Slope	475.276		
Intercept	-6.14224		
Correlation coeff., r	0.967045		
C constant	-76.3784		
Surface area	28.105 m ² /g		
Table - BET Multi-point BET			
Relative Pressure	Volume Adsorbed @STP	1 / [W((P/Po) - 1)]	
	cc/g		
0.0153123	-2.01777	-6.1662	
0.203271	1.83329	111.3484	
0.304338	2.80198	124.9232	



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Report date:	Thu Aug 7 2025	Operator:	Yusuf
File ame:	11600725_4.qcuPhysIso		
Analysis Information			
Sample	ID 1160_4	Weight	0.0952 g
Description	MJ 4		
Analysis	Data ID {be7c61fe-f60e-4cb1-a7ac-21bdd7f8f523}	Date	2025.07.30
Operator	Yusuf	Duration	185.3 min
Instrument	St 4 on NOVA touch 4LX [s/n:170170510001]	Firmware	1.07 I
Comments			
Ambient Temp.	19.95℃	Void Volume Mode	NOVA mode
Cell Type	9mm with rod	Thermal Delay	300sec
Cell ID		Cell ID	14
Po Mode		Po Mode	Continuous I
Adsorbate	Name Nitrogen	Molecular Weight	28.013 g/mol
Non-ideality	6.580000e-051/torr	Bath Temperature	77.35℃
Degas information		Cross Section Area	16.2 Å²/mol
Time	4.0 hours	Temp	300.000000℃
Data Reduction Parameters			
Thermal Transpiration	no		
Adsorbate Model	Name Nitrogen	Molecular Weight	28.0134 g
Bath Temperature	77.35℃	Cross Section Area	16.2 Å²/molec
BET Multi-point BET results			
Isotherm Branch	Adsorption		
Slope	-4507.07		
Intercept	153.988		
Correlation coeff., r	0.928576		
C constant	-28.269		
Surface area	19.237 m²/g		
Table - BET Multi-point BET			
Relative Pressure	Volume Adsorbed @STP	1 / [W ((P/Po) - 1)]	
	cc/g		
0.0136563	-1.23721	-8.9538	
0.110007	-0.705304	-140.2187	
0.207494	-0.237670	-881.4098	



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Report date:	Fri Aug 1 2025	Operator:	Yusuf
Filename:	11600725_5.qcuPhysIso		
Analysis Information			
Sample	ID 1160_5	Weight	0.0914 g
Description	MJS		
Analysis	Data ID (611d957f-8cb2-425c-80f1-6b22ed3899b2)	Date	2025.07.31
Operator	Yusuf	Duration	124.8 min
Instrument	St 1 on NOVA touch 4LX [s/n:170170510001]	Firmware	1.07 I
Comments			
Ambient Temp.	20.94 °C	Void Volume Mode	NOVA mode
Cell Type	9mm with rod	Thermal Delay	300 sec
Cell ID		Cell ID	11
Po Mode		Po Mode	Continuous
Adsorbate	Name Nitrogen	Molecular Weight	28.013 g/mol
Non-ideality	6.580000e-05 1/torr	Bath Temperature	77.35 K
Degas information		Cross Section Area	16.2 Å ² /mol
Time	4.0 hours	Temp	300.000000 °C
Data Reduction Parameters			
Thermal Transpiration	no		
Adsorbate Model			
Name	Nitrogen	Molecular Weight	28.0134 g
Bath Temperature	77.35 K	Cross Section Area	16.2 Å ² /molec
BET Multi-point BET results			
Isotherm Branch Adsorption			
Slope 219.788			
Intercept 8.90061			
Correlation coeff., r 0.999728			
C constant 25.6936			
Surface area 15.228 m ² /g			
Table - BET Multi-point BET			
Relative Pressure	Volume Adsorbed @STP	1 / [W ((P/Po) - 1)]	
	cc/g		
0.00723063	0.580760	10.0342	
0.108597	2.89277	33.6960	
0.204539	3.85314	53.3941	
0.304192	4.61777	75.7490	



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Report date:	Thu Aug 14 2025	Operator :	Yusuf
Filename:	11600725_6.qcuPhysIso		
Analysis Information			
Sample ID	1160_6	Weight	0.1189 g
Description	MJ6		
Analysis			
Data ID	{a6b19bfe-295b-4750-863a-77fba454a4b0}	Date	2025.07.31
Operator	Yusuf	Duration	138.2 min
Instrument	St 2 on NOVA touch 4LX [s/n:170170510001]	Firmware	1.07
Comments			
Ambient Temp.	20.90 °C	Void Volume Mode	NOVA mode
Cell Type	9mm with rod	Thermal Delay	300 sec
Cell ID		Cell ID	12
Po Mode		Po Mode	Continuous
Adsorbate			
Name	Nitrogen	Molecular Weight	28.013 g/mol
Non-ideality	6.580000e-05 1/torr	Bath Temperature	77.35 K
Cross Section Area			16.2 Å ² /mol
Degas information			
Time	4.0 hours	Temp	300.000000 °C
Data Reduction Parameters			
Thermal Transpiration	no		
Adsorbate Model			
Name	Nitrogen	Molecular Weight	28.0134 g
Bath Temperature	77.35 K	Cross Section Area	16.2 Å ² /molec
BET Multi-point BET results			
Isotherm Branch	Adsorption		
Slope	-1624.72		
Intercept	41.7748		
Correlation coeff., r	0.991385		
C constant	-37.8925		
Surface area	17.978 m ² /g		
Table - BET Multi-point BET			
Relative Pressure	Volume Adsorbed @STP	1 / [W ((P/Po) - 1)]	
	cc/g		
0.0155331	-1.39483	-9.0508	
0.107179	-0.919699	-104.4364	
0.206621	-0.756332	-275.5063	
0.308393	-0.743224	-480.0376	



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Report date:	Thu Aug 7 2025	Operator:	Yusuf
Filename:	11600725_7 ulang.qcuPhysIso		
Analysis Information			
Sample	ID 1160_7 i	Weight	0.1063 g
Description	MJ 7		
Analysis			
Data ID	{ba245de3-ce10-4e09-9404-096dfb4a2829}	Date	2025.08.05
Operator	Yusuf	Duration	116.5 min
Instrument	St 3 on NOVA touch 4LX [s/n:170170510001]	Firmware	1.07 I
Comments			
Ambient Temp.	21.19 °C	Void Volume Mode	NOVA mode
Cell Type	9mm with rod	Thermal Delay	300sec
Cell ID		Cell ID	33
Adsorbate		Po Mode	Continuous
Name	Nitrogen	Molecular Weight	28.013 g/mol
Non-ideality	6.580000e-05 1.0 torr	Bath Temperature	77.35 K
Degas information		Cross Section Area	16.2 Å ² /mol
Time	4.0 hours	Temp	300.000000 °C
Data Reduction Parameters			
Thermal Transpiration	no		
Adsorbate Model			
Name	Nitrogen	Molecular Weight	28.0134 g
Bath Temperature	77.35 K	Cross Section Area	16.2 Å ² /molec
BET Multi-point BET results			
Isotherm Branch	Adsorption		
Slope	-379.448		
Intercept	-1.20487		
Correlation coeff., r	0.999671		
C constant	315.928		
Surface area	24.053 m ² /g		
Table - BET Multi-point BET			
Relative Pressure	Volume Adsorbed @STP	1 / [W ((P/Po) - 1)]	
	cc/g		
0.0167981	-1.76231	-7.7569	
0.108509	-2.26391	-43.0168	
0.209660	-2.68777	-78.9697	
0.311221	-3.00593	-120.2712	



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Report date:	Thu Aug 7 2025	Operator:	Yusuf
Filename:	11600725_8 ulang.qcuPhysIso		
Analysis Information			
Sample ID	1160_8 i	Weight	0.0840 g
Description	MJ 8		
Analysis Data ID	(e58b46b1-bcb9-4cbf-8405-ae8739db7ed8)		
Operator	Yusuf	Date	2025.08.05
Instrument	St 4 on NOVA touch 4LX [s/n:170170510001]	Duration	124.1 min
Comments		Firmware	1.07 I
Ambient Tjemp.	21.13℃	Void Volume Mode	NOVA mode
Cell Type	9mm with rod	Thermal Delay	300sec
		Cell ID	14
		Po Mode	Continuous
Adsorbate Name	Nitrogen	Molecular Weight	28.013 g/mol
Non-ideality	6.580000e-051/torr	Bath Temperature	77.35℃
Degas information		Cross Section Area	16.2Å ² /mol
Time	4.0 hours	Temp	300.000000℃
Data Reduction Parameters			
Thermal Transpiration	no		
Adsorbate Model			
Name	Nitrogen	Molecular Weight	28.0134 g
Bath Temperature	77.35℃	Cross Section Area	16.2Å ² /molec
BET Multi-point BET results			
Isotherm Branch		Adsorption	
Slope		-583.704	
Intercept		14.3665	
Correlation coeff., r		0.990089	
C constant		-39.6296	
Surface area		49.296 m ² /g	
Table - BET Multi-point BET			
Relative Pressure	Volume Adsorbed @STP	1 / [W((P/Po) - 1)]	
	cc/g		
0.0178804	-2.66883	-5.4581	
0.106295	-2.46523	-38.6021	
0.207604	-2.14104	-97.9082	
0.307864	-2.04619	-173.9283	



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Report date:	Mon Aug 4 2025	Operator:	Yusuf
Filename:	11600725_9.qcuPhysIso		
Analysis Information			
Sample ID	1160_9	Weight	0.0996 g
Description	MJ9		
Analysis			
Data ID	{56507579-4912-4e85-ab8e-4be6849d1a14}	Date	2025.07.31
Operator	Yusuf	Duration	184.9 min
Instrument	St 1 on NOVA touch 4LX [s/n:170170510001]	Firmware	1.07
Comments			
Ambient Temp.	22.32 °C	Void Volume	NOVA mode
Cell Type	9mm with rod	Thermal Delay	300 sec
Cell ID		Po Mode	Continuous
Adsorbate Name	Nitrogen	Molecular Weight	28.013 g/mol
Non-ideality	6.580000e-05 1/torr	Bath Temperature	77.35 K
Degas information		Cross Section Area	16.2 Å ² /mol
Time	4.0 hours	Temp	300.000000 °C
Data Reduction Parameters			
Thermal Transpiration	no		
Adsorbate Model			
Name	Nitrogen	Molecular Weight	28.0134 g
Bath Temperature	77.35 K	Cross Section Area	16.2 Å ² /molec
BET Multi-point BET results			
Isotherm Branch	Adsorption		
Slope	300.953		
Intercept	28.6077		
Correlation coeff., r	0.999639		
C constant	11.52		
Surface area	10.567 m ² /g		
Table - BET Multi-point BET			
Relative Pressure	Volume Adsorbed @STP cc/g	1 / [W((P/Po) - 1)]	
0.108668	1.57916	61.7714	
0.203859	2.30053	89.0556	
0.302334	2.88844	120.0405	



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Report date:	Mon Aug 4 2025	Operator:	Yusuf
Filename:	11600725_10.qcuPhysIso		
Analysis Information			
Sample ID	1160_10	Weight	0.1009 g
Description	MU10		
Analysis			
Data ID	(d97af920-57d6-408e-b25d-d88b8a57ae12)	Date	2025.07.31
Operator	Yusuf	Duration	240.4 min
Instrument	St 2 on NOVA touch 4LX [s/n:170170510001]	Firmware	1.07
Comments			
Ambient Temp.	22.49 °C	Void Volume Mode	NOVA mode
Cell Type	9mm with rod	Thermal Delay	300 sec
Cell ID		Cell ID	12
Cell Po Mode		Po Mode	Continuous I
Adsorbate Name	Nitrogen	Molecular Weight	28.013 g/mol
Non-ideality	6.580000e-05 1/torr	Bath Temperature	77.35 K
Degas information		Cross Section Area	16.2 Å ² /mol
Time	4.0 hours	Temp	300.000000 °C
Data Reduction Parameters			
Thermal Transpiration	no		
Adsorbate Model			
Name	Nitrogen	Molecular Weight	28.0134 g
Bath Temperature	77.35 K	Cross Section Area	16.2 Å ² /molec
BET Multi-point BET results			
Isotherm Branch	Adsorption		
Slope	169.091		
Intercept	34.39		
Correlation coeff., r	0.991753		
C constant	5.91687		
Surface area	17.115 m ² /g		
Table - BET Multi-point BET			
Relative Pressure	Volume Adsorbed @STP	1 / [W((P/Po) - 1)]	
	cc/g		
0.106791	1.78029		53.7328
0.204108	3.09069		66.3898
0.305998	4.03830		87.3594



LAPORAN HASIL PENELITIAN

“Pembuatan Adsorben Silika dari Daun Bambu dengan Metode Sol-Gel Menggunakan CH_3COOH ”

UNIVERSITAS ISLAM INDONESIA

Jl. Kaliurang Km 14.5, Sleman Yogyakarta
LABORATORIUM TERPADU
Quantachrome TouchWin v1.22



Report date:	Thu Aug 7 2025	Operator:	Yusuf
Filename:	11600725_11.qcuPhysIso		
Analysis Information			
Sample ID	1160_11	Weight	0.1300 g
Description	MJ11		
Analysis			
Data ID	{82b193e2-6c9b-4f21-910f-580b7e70ab1d}	Date	2025.07.31
Operator	Yusuf	Duration	196.3 min
Instrument	St 3 on NOVA touch 4LX [s/n:170170510001]	Firmware	1.07
Comments			
Ambient Temp.	22.32 °C	Void Volume Mode	NOVA mode
Cell Type	9mm with rod	Thermal Delay	300 sec
Cell ID		Cell ID	33
Po Mode		Po Mode	Continuous
Adsorbate			
Name	Nitrogen	Molecular Weight	28.013 g/mol
Non-ideality	6.580000e-05 1/torr	Bath Temperature	77.35 K
Cross Section Area			16.2 Å ² /mol
Degas information			
Time	4.0 hours	Temp	300.000000 °C
Data Reduction Parameters			
Thermal Transpiration	no		
Adsorbate Model			
Name	Nitrogen	Molecular Weight	28.0134 g
Bath Temperature	77.35 K	Cross Section Area	16.2 Å ² /molec
BET Multi-point BET results			
Isotherm Branch	Adsorption		
Slope	-238.055		
Intercept	-1.6839		
Correlation coeff., r	0.998981		
C constant	142.371		
Surface area	51.098 m ² /g		
Table - BET Multi-point BET			
Relative Pressure	Volume Adsorbed @STP cc/g	1 / [W ((P/Po) - 1)]	
0.0257255	-3.26075	-6.4791	
0.105987	-3.31691	-28.5974	
0.213594	-4.10757	-52.9062	
0.307629	-4.79192	-74.1871	



LAPORAN HASIL PENELITIAN

“Pembuatan Adsorben Silika dari Daun Bambu dengan Metode Sol-Gel Menggunakan CH_3COOH ”

UNIVERSITAS ISLAM INDONESIA

Jl. Kaliurang Km 14.5, Sleman Yogyakarta
LABORATORIUM TERPADU
Quantachrome TouchWin v1.22



Report date:	Mon Aug 4 2025	Operator:	Yusuf
Filename:	11600725_12.qcuPhysIso		
Analysis Information			
Sample ID	1160_12	Weight	0.1026 g
Description	MJ12		
Analysis			
Data ID	{555786fc-7f09-497c-8b04-f7553e3209c1}	Date	2025.07.31
Operator	Yusuf	Duration	229.1 min
Instrument	St 4 on NOVA touch 4LX [s/n:170170510001]	Firmware	1.07
Comments			
Ambient Temp.	22.38 °C	Void Volume Mode	NOVA mode
Cell Type	9mm with rod	Thermal Delay	300 sec
Cell ID		Cell ID	14
Po Mode		Po Mode	Continuous
Adsorbate			
Name	Nitrogen	Molecular Weight	28.013 g/mol
Non-ideality	6.580000e-05 1/torr	Bath Temperature	77.35 K
Cross Section Area			16.2 Å ² /mol
Degas information			
Time	4.0 hours	Temp	300.000000 °C
Data Reduction Parameters			
Thermal Transpiration	no		
Adsorbate Model			
Name	Nitrogen	Molecular Weight	28.0134 g
Bath Temperature	77.35 K	Cross Section Area	16.2 Å ² /molec
BET Multi-point BET results			
Isotherm Branch	Adsorption		
Slope	120.478		
Intercept	18.7885		
Correlation coeff., r	0.999292		
C constant	7.41229		
Surface area	25.006 m ² /g		
Table - BET Multi-point BET			
Relative Pressure	Volume Adsorbed @STP cc/g	1 / [W((P/Po) - 1)]	
0.108317	3.02697	32.1091	
0.204262	4.79025	42.8754	
0.307652	6.33701	56.1050	



LAPORAN HASIL PENELITIAN

“Pembuatan Adsorben Silika dari Daun Bambu dengan Metode Sol-Gel Menggunakan CH_3COOH ”

UNIVERSITAS ISLAM INDONESIA

Jl. Kaliurang Km 14.5, Sleman Yogyakarta
LABORATORIUM TERPADU
Quantachrome TouchWin v1.22



Report date:	Tue Aug 5 2025	Operator :	Yusuf
Filename:	11600725_13 ulang.qcuPhysIso		
Analysis Information			
Sample	ID 1160_13 i	Weight	0.1224 g
Description	MU13		
Analysis	Data ID {1c399932-d17f-44fc-80bd-61fc7d1b4700}	Date	2025.08.03
Operator	Yusuf	Duration	199.1 min
Instrument	St 1 on NOVA touch 4LX [s/n:170170510001]	Firmware	1.07
Comments			
Ambient Temp.	19.91 °C	Void Volume	NOVA mode
Cell Type	9mm with rod	Thermal Delay	300 sec
Cell ID		Cell ID	11
Cell Mode		Po Mode	Continuous
Adsorbate	Name Nitrogen	Molecular Weight	28.013 g/mol
Non-ideality	6.580000e-05 1/torr	Bath Temperature	77.35 K
Degas information		Cross Section Area	16.2 Å²/mol
Time	4.0 hours	Temp	300.000000 °C
Data Reduction Parameters			
Thermal Transpiration	no		
Adsorbate Model	Name Nitrogen	Molecular Weight	28.0134 g
Bath Temperature	77.35 K	Cross Section Area	16.2 Å²/molec
BET Multi-point BET results			
Isotherm Branch		Adsorption	
Slope		136.048	
Intercept		8.73741	
Correlation coeff., r		0.999699	
C constant		16.5707	
Surface area		24.053 m²/g	
Table - BET Multi-point BET			
Relative Pressure	Volume Adsorbed @STP cc/g	1 / [W ((P/Po) - 1)]	
0.0069883	0.573406	9.8198	
0.106783	4.09250	23.3727	
0.209009	5.78418	36.5513	
0.307416	6.97141	50.9428	

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(Report ID: QC20250805153417020-17430) Page 1 of 1



LAPORAN HASIL PENELITIAN

“Pembuatan Adsorben Silika dari Daun Bambu dengan Metode Sol-Gel Menggunakan CH_3COOH ”

UNIVERSITAS ISLAM INDONESIA

Jl. Kaliurang Km 14.5, Sleman Yogyakarta
LABORATORIUM TERPADU
Quantachrome TouchWin v1.22



Report date:	Tue Aug 5 2025	Operator:	Yusuf
Filename:	11600725_14 ulang.qcuPhysIso		
Analysis Information			
Sample	ID 1160_14 i	Weight	0.1184 g
Description	MU14		
Analysis	Data ID {3d6a752a-9bfa-45fe-8bcc-b25ba6a63d9b}	Date	2025.08.03
Operator	Yusuf	Duration	192.5 min
Instrument	St 2 on NOVA touch 4LX [s/n:170170510001]	Firmware	1.07
Comments			
Ambient Temp.	19.99 °C	Void Volume Mode	NOVA mode
Cell Type	9mm with rod	Thermal Delay	300 sec
Adsorbate	Name Nitrogen	Molecular Weight	28.013 g/mol
Non-ideality	6.580000e-05 1/torr	Bath Temperature	77.35 K
Degas information		Cross Section Area	16.2 Å ² /mol
Time	4.0 hours	Temp	300.000000 °C
Data Reduction Parameters			
Thermal Transpiration	no		
Adsorbate Model			
Name	Nitrogen	Molecular Weight	28.0134 g
Bath Temperature	77.35 K	Cross Section Area	16.2 Å ² /molec
BET Multi-point BET results			
Isotherm Branch	Adsorption		
Slope	528.268		
Intercept	-30.8123		
Correlation coeff., r	0.967298		
C constant	-16.1447		
Surface area	75.134 m ² /g		
Table - BET Multi-point BET			
Relative Pressure	Volume Adsorbed @STP cc/g	1 / [W ((P/Po) - 1)]	
0.00998679	-0.203092	-39.7414	
0.107810	1.87500	51.5642	
0.205035	2.97887	69.2752	
0.304838	2.75767	127.2306	



LAPORAN HASIL PENELITIAN

“Pembuatan Adsorben Silika dari Daun Bambu dengan Metode Sol-Gel Menggunakan CH_3COOH ”

UNIVERSITAS ISLAM INDONESIA

Jl. Kaliurang Km 14.5, Sleman Yogyakarta
LABORATORIUM TERPADU
Quantachrome TouchWin v1.22



Report date:	Wed Aug 6 2025	Operator:	Yusuf
Filename:	11600725_15 ulang.qcuPhysIso		
Analysis Information			
Sample	ID 1160_15 i	Weight	0.1362 g
Description	MU15		
Analysis	Data ID (ec3ba068-4212-4541-9a28-aea644ddfae1)	Date	2025.08.03
Operator	Yusuf	Duration	176.4 min
Instrument	St 3 on NOVA touch 4LX [s/n:170170510001]	Firmware	1.07
Comments			
Ambient Temp.	19.95 °C	Void Volume	NOVA mode
Cell Type	9mm with rod	Thermal Delay	300 sec
Cell ID		Cell ID	33
Po Mode		Po Mode	Continuous
Adsorbate	Name Nitrogen	Molecular Weight	28.013 g/mol
Non-ideality	6.580000e-05 1/torr	Bath Temperature	77.35 K
Degas information		Cross Section Area	16.2 Å ² /mol
Time	4.0 hours	Temp	300.000000 °C
Data Reduction Parameters			
Thermal Transpiration	no		
Adsorbate Model			
Name	Nitrogen	Molecular Weight	28.0134 g
Bath Temperature	77.35 K	Cross Section Area	16.2 Å ² /molec
BET Multi-point BET results			
Isotherm Branch	Adsorption		
Slope	-238.698		
Intercept	-2.79013		
Correlation coeff., r	0.999076		
C constant	86.5507		
Surface area	69,203 m ² /g		
Table - BET Multi-point BET			
Relative Pressure	Volume Adsorbed @STP cc/g	1 / [W((P/Po) - 1)]	
0.0236582	-2.69260	-7.2004	
0.110873	-3.25190	-30.6814	
0.208884	-3.96020	-53.3456	
0.309863	-4.73499	-75.8691	



LAPORAN HASIL PENELITIAN

“Pembuatan Adsorben Silika dari Daun Bambu dengan Metode Sol-Gel Menggunakan CH_3COOH ”

4. Hasil uji kandungan senyawa pada air sungai Pelayaran di Kecamatan Taman, Kabupaten Sidoarjo



INSTITUT TEKNOLOGI SEPULUH NOPEMBER
DIREKTORAT KERJASAMA DAN PENGELOLAAN USAHA (DKPU)
LABORATORIUM ENERGI DAN LINGKUNGAN
Gedung Research Center Lt. 5, Kampus ITS Sukolilo Surabaya 60111
Telp. (031) 5944792; Ext. 1113; Fax. (031) 5996670; Hp: 081331078833
Website: www.its.ac.id/dkpu, Email: lab.energi.lingkungan.its@gmail.com

LAPORAN HASIL PENGUJIAN No : 261/LHP/LEL-ITS/VIII/2025

Nama Pemilik : Raihan Zaky Farrasidi
Alamat Pemilik : Desa Gilang RT19 RW 05 No.30
Nama Contoh : **Sungai Pelayaran** Tanggal Terima : 19 Agustus 2025
Deskripsi Contoh : Bentuk : Padat/Cair/Gas Tanggal Pengujian : 19 Agustus 2025
Volume : - Tanggal Selesai :
Kemasan : Botol Pengujian : 19 Agustus 2025
Kode Contoh : **250819-001-005** Jumlah Contoh : 2

Menyatakan bahwa contoh tersebut di atas telah diuji di Laboratorium Energi dan Lingkungan DKPU ITS.

Hasil Pengujian:

No.	Nama Contoh	Jenis Uji	Hasil	Satuan	Metode Pengujian
1.	Sebelum Adsorben	Mangan (Mn)	0,0266	mg/L	AAS-Flame
2.	Sesudah Adsorben		0,0179		

Suhu : 22,2 °C
Humidity : 60 %
Analisis : DPS

Catatan:

- Hasil pengujian hanya berlaku untuk sampel yang diuji.
- Laboratorium tidak bertanggung jawab atas kerugian pada pihak ke tiga.
- Laporan hasil pengujian hanya boleh diperbanyak secara utuh.

Surabaya, 19 Agustus 2025
Kepala Laboratorium
Energi dan Lingkungan ITS

Fahmi Mubarak, S.T., M.Sc., Ph.D.
NIP. 197801152003121002

Koordinator Teknis

Vita Yuliana, S.Si.
NPP. 1990201822404

FR/LEL-ITS/7.8-01 Laporan Hasil Pengujian

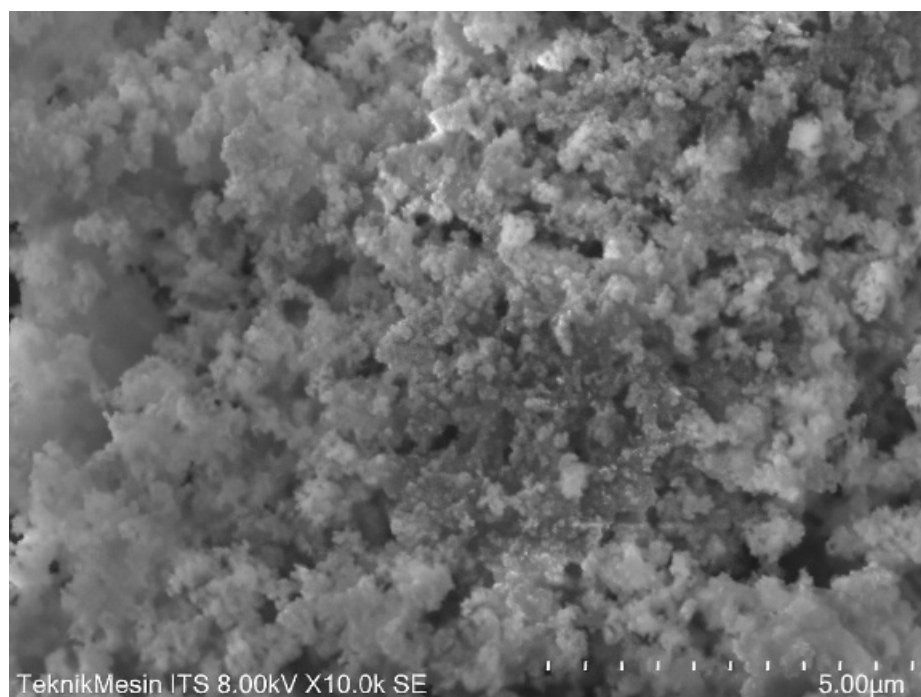
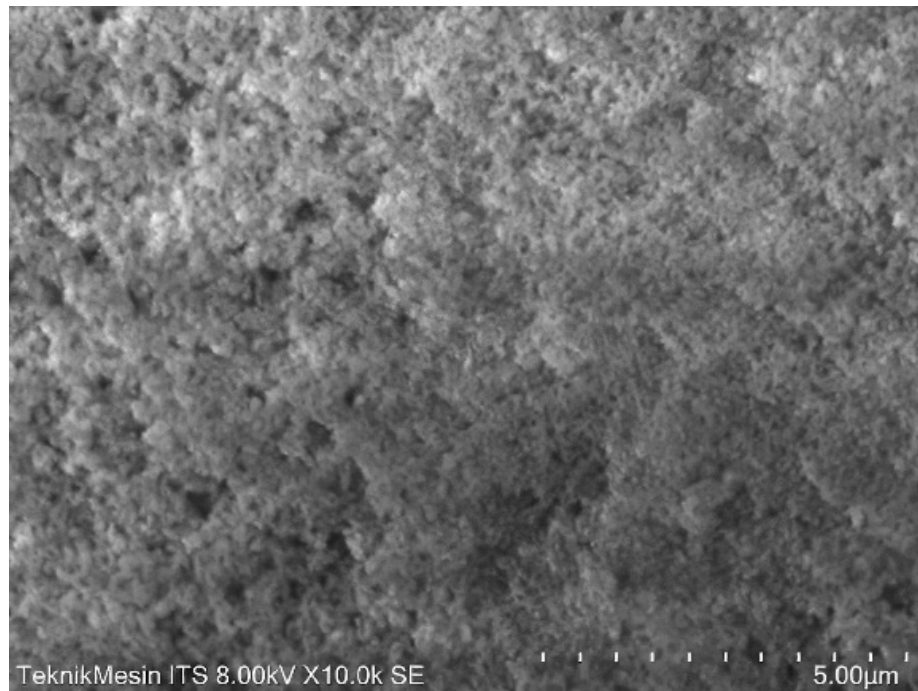
Ter./Rev./TP: 4/0/13032024



LAPORAN HASIL PENELITIAN

“Pembuatan Adsorben Silika dari Daun Bambu dengan Metode Sol-Gel Menggunakan CH_3COOH ”

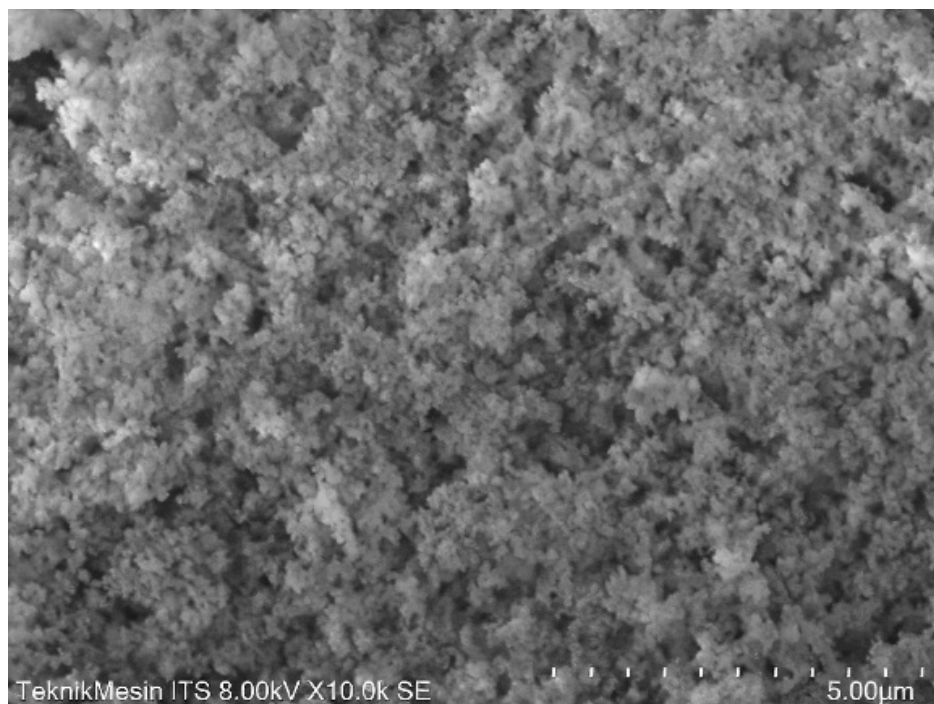
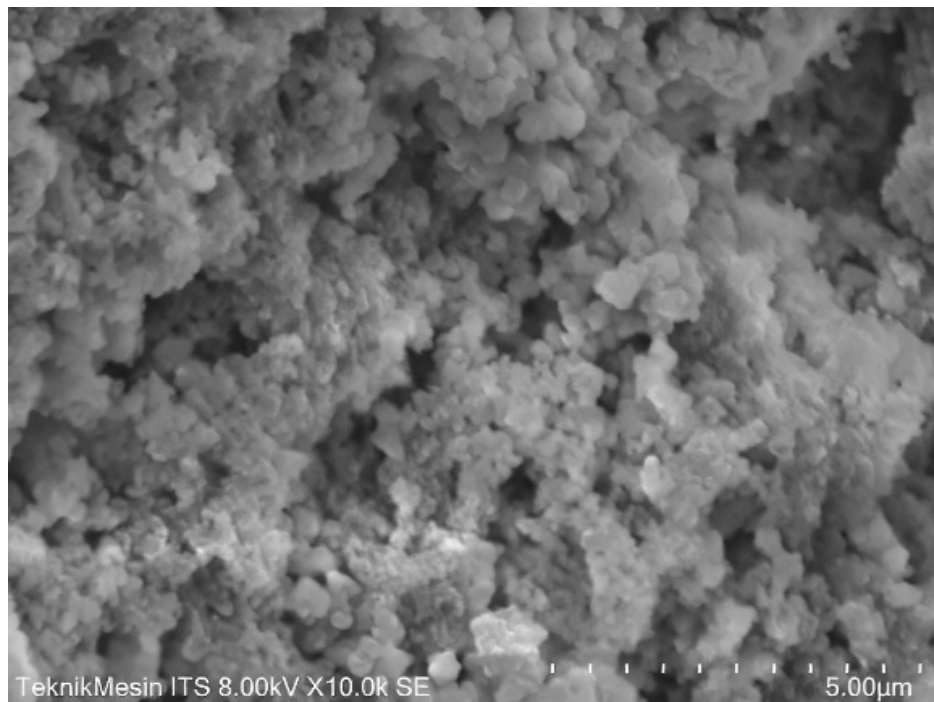
5. Hasil uji SEM pada sampel adsorben





LAPORAN HASIL PENELITIAN

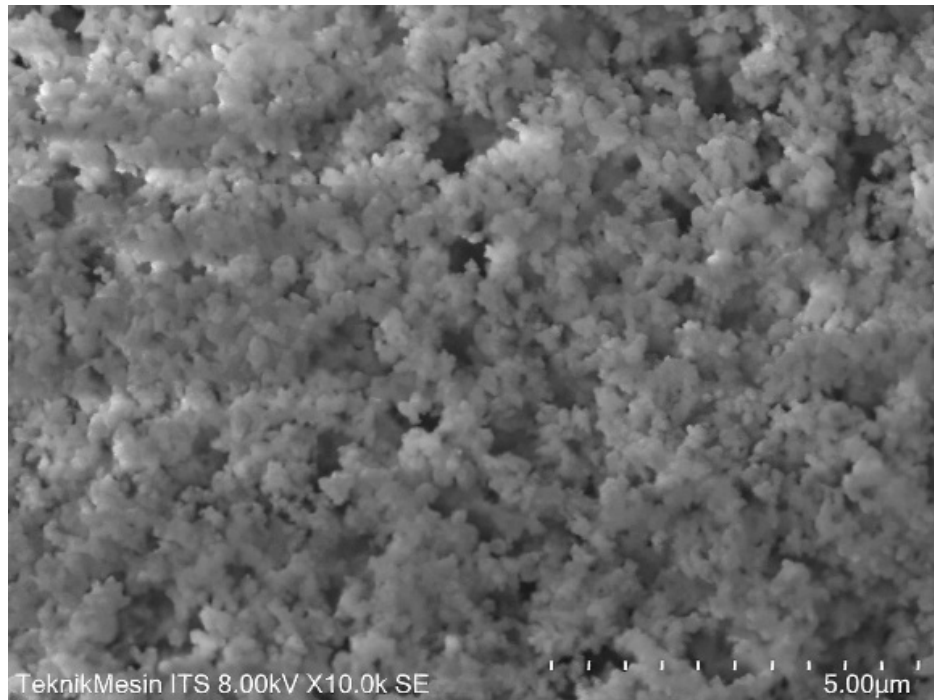
“Pembuatan Adsorben Silika dari Daun Bambu dengan Metode Sol-Gel Menggunakan CH_3COOH ”





LAPORAN HASIL PENELITIAN

“Pembuatan Adsorben Silika dari Daun Bambu dengan Metode Sol-Gel Menggunakan CH_3COOH ”





LAPORAN HASIL PENELITIAN

“Pembuatan Adsorben Silika dari Daun Bambu dengan Metode Sol-Gel Menggunakan CH_3COOH ”

6. Hasil uji Chesson pada sampel adsorben



LABORATORIUM GIZI
DEPARTEMEN GIZI KESEHATAN
FAKULTAS KESEHATAN MASYARAKAT
UNIVERSITAS AIRLANGGA
SURABAYA
Kampus C, Jl. Mulyorejo Surabaya, 60115
Telp. 0315964808

No. Sampel : 35/Lab. Gizi/2026
Nama Sampel : Daun Bambu Kuning Kering & Abu Daun Bambu Kuning
Nama Pengirim : Mochammad Hanif Amrulloh
Alamat : UPN Veteran Jawa Timur
Tanggal diterima : 5 Maret 2026
Tanggal selesai : 12 Maret 2026

HASIL

Kode Sampel	Lignin (%)
Daun Bambu Kuning	25,74
Abu Daun Bambu Kuning	19,81

Surabaya, 12 Maret 2026
Teknisi,

Evy Arfianti, S.KM, M.Kes.
NIP. 197303282000032005