

LAMPIRAN

Lampiran 1. Certificate of Analysis



Certificate of Analysis

8.20354.0000 Curcumin for synthesis
Batch S8350354

	Batch Values	
Assay (HPLC, area%)	77.1	% (a/a)
Bisdemethoxycurcumin (HPLC, Area%)	4.5	% (a/a)
Demethoxycurcumin (HPLC, Area%)	17.7	% (a/a)
Identity (IR)	passes test	

Date of examination (DD MM YYYY) 19 12 2022
Minimum shelf life (DD MM YYYY) 31 12 2027

Dr. Jörg Bauer
Responsible laboratory manager, quality control

This document has been produced electronically and is valid without a signature

Merck KGaA
Corporation with General Partners
Frankfurter Straße 250
64293 Darmstadt, Germany

The life science business of Merck KGaA, Darmstadt,
Germany operates as MilliporeSigma in the U.S. and
Canada

Page 1 of 1

SALSA Version 1260473990000993733// Date: 19.12.2022

Lampiran 2. Kurva Kalibrasi

Perhitungan Pembuatan Larutan Kurkumin

Larutan Induk

$$\begin{aligned}\text{Konsentrasi Larutan} &= \frac{\text{Bobot Kurkumin}}{\text{Volume}} \\ 50 \text{ ppm} &= \frac{50 \text{ mg}}{1000 \text{ ml}} \\ &= \frac{50 \text{ mg}}{100 \text{ ml}} \\ \text{Bobot Kurkumin} &= \frac{25 \text{ mg}}{50 \text{ ml}} = 0,5 \text{ mg/ml}\end{aligned}$$

Pengenceran Larutan

a. Konsentrasi 2 ppm

$$V_1 \times C_1 = V_2 \times C_2$$

$$V_1 \times 50 \text{ ppm} = 5 \text{ ml} \times 2 \text{ ppm}$$

$$V_1 = \frac{10 \text{ ml}}{50 \text{ ppm}}$$

$$V_1 = 0,2 \text{ ml} = 200 \mu\text{l}$$

b. Konsentrasi 2,5 ppm

$$V_1 \times C_1 = V_2 \times C_2$$

$$V_1 \times 50 \text{ ppm} = 5 \text{ ml} \times 2,5 \text{ ppm}$$

$$V_1 = \frac{12,5 \text{ ml}}{50 \text{ ppm}}$$

$$V_1 = 0,25 \text{ ml} = 250 \mu\text{l}$$

c. Konsentrasi 3 ppm

$$V_1 \times C_1 = V_2 \times C_2$$

$$V_1 \times 50 \text{ ppm} = 5 \text{ ml} \times 3 \text{ ppm}$$

$$V_1 = \frac{15 \text{ ml}}{50 \text{ ppm}}$$

$$V_1 = 0,3 \text{ ml} = 300 \mu\text{l}$$

d. Konsentrasi 3,5 ppm

$$V_1 \times C_1 = V_2 \times C_2$$

$$V_1 \times 50 \text{ ppm} = 5 \text{ ml} \times 3,5 \text{ ppm}$$

$$V_1 = \frac{17,5 \text{ ml}}{50 \text{ ppm}}$$

$$V1 = 0,35 \text{ ml} = 350 \mu\text{l}$$

e. Konsentrasi 4 ppm

$$V1 \times C1 = V2 \times C2$$

$$V1 \times 50 \text{ ppm} = 5 \text{ ml} \times 4 \text{ ppm}$$

$$V1 = \frac{20 \text{ ml}}{50 \text{ ppm}}$$

$$V1 = 0,4 \text{ ml} = 400 \mu\text{l}$$

f. Konsentrasi 5 ppm

$$V1 \times C1 = V2 \times C2$$

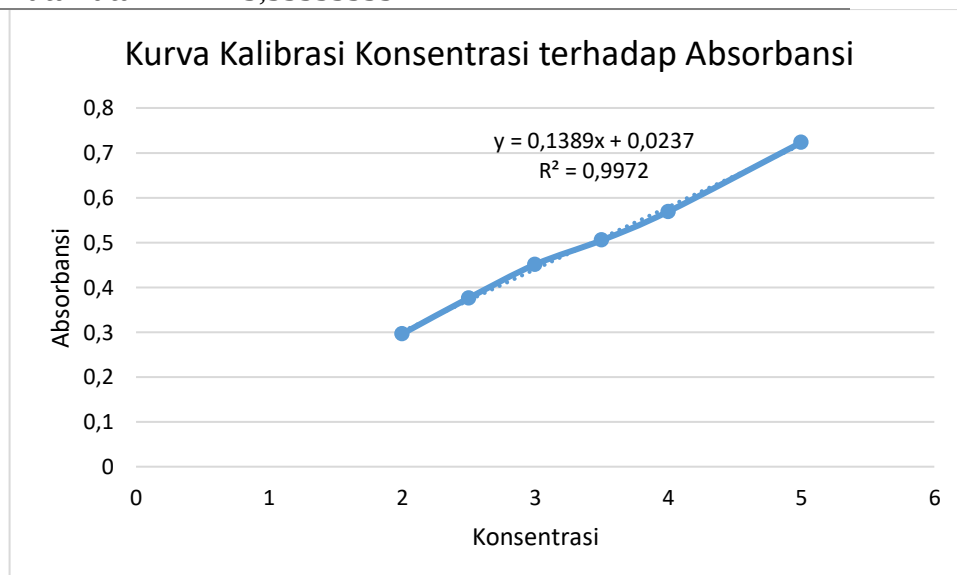
$$V1 \times 50 \text{ ppm} = 5 \text{ ml} \times 5 \text{ ppm}$$

$$V1 = \frac{25 \text{ ml}}{50 \text{ ppm}}$$

$$V1 = 0,5 \text{ ml} = 500 \mu\text{l}$$

Kurva Kalibrasi Kurkumin

No	kons (bpj)	Absorban
1	2 ppm	0,296
2	2,5 ppm	0,376
3	3 ppm	0,451
4	3,5 ppm	0,505
5	4 ppm	0,569
6	5 ppm	0,723
rata rata		3,33333333



Lampiran 3. Perhitungan %EE

a. Konsentrasi Larutan

$$\text{Konsentrasi} = \frac{y-a}{b}$$

b. Bobot Zat Aktif bebas

Bobot Zat aktif bebas = Konsentrasi x Volume x Faktor Pengenceran

c. Rumus %EE

$$\%EE = \frac{\text{Total Zat Aktif} - \text{Zat Aktif bebas}}{\text{total zat aktif}} \times 100\%$$

Data Pengukuran Efisiensi Penjerapan Hari Ke -1 dan Hari Ke – 30

Formula	Absorbansi		Efisiensi Penjerapan (%)	
	H-1	H - 30	H-1	H - 30
F1	0.054	0.052	99.96364	99.96604
F2	0.054	0.065	99.96364	99.95044
F3	0.053	0.056	99.96484	99.96124
F4	0.045	0.057	99.97444	99.96004
F5	0.049	0.055	99.96964	99.96244

Perhitungan

1. F1

1.1. H – 1

$$\begin{aligned} \text{Konsentrasi} &= \frac{0,054 - 0.0237}{0.1389} \\ &= 0.218143 \text{ ppm} \end{aligned}$$

$$\begin{aligned} \text{Bobot Zat Aktif Bebas} &= 0.218143 \text{ ppm} \times 5 \text{ ml} \times 5 \\ &= 5.453575 \text{ } \mu\text{g} = 0.005454 \text{ mg} \end{aligned}$$

$$\begin{aligned} \%EE &= \frac{15 \text{ mg} - 0.005454 \text{ mg}}{15 \text{ mg}} \times 100 \% \\ &= 99.96364 \% \end{aligned}$$

1.2. H – 30

$$\begin{aligned}\text{Konsentrasi} &= \frac{0,052 - 0,0237}{0,1389} \\ &= 0,203744 \text{ ppm}\end{aligned}$$

$$\begin{aligned}\text{Bobot Zat Aktif Bebas} &= 0,203744 \text{ ppm} \times 5 \text{ ml} \times 5 \\ &= 5,093593 \text{ } \mu\text{g} = 0,005094 \text{ mg}\end{aligned}$$

$$\begin{aligned}\%EE &= \frac{15 \text{ mg} - 0,005094 \text{ mg}}{15 \text{ mg}} \times 100 \% \\ &= 99,96604 \%\end{aligned}$$

2. F2

1.1. H – 1

$$\begin{aligned}\text{Konsentrasi} &= \frac{0,054 - 0,0237}{0,1389} \\ &= 0,218143 \text{ ppm}\end{aligned}$$

$$\begin{aligned}\text{Bobot Zat Aktif Bebas} &= 0,218143 \text{ ppm} \times 5 \text{ ml} \times 5 \\ &= 5,453575 \text{ } \mu\text{g} = 0,005454 \text{ mg}\end{aligned}$$

$$\begin{aligned}\%EE &= \frac{15 \text{ mg} - 0,005454 \text{ mg}}{15 \text{ mg}} \times 100 \% \\ &= 99,96364 \%\end{aligned}$$

1.2. H – 30

$$\begin{aligned}\text{Konsentrasi} &= \frac{0,065 - 0,0237}{0,1389} \\ &= 0,297336 \text{ ppm}\end{aligned}$$

$$\begin{aligned}\text{Bobot Zat Aktif Bebas} &= 0,297336 \text{ ppm} \times 5 \text{ ml} \times 5 \\ &= 7,433405 \text{ } \mu\text{g} = 0,007433 \text{ mg}\end{aligned}$$

$$\begin{aligned}\%EE &= \frac{15 \text{ mg} - 0,007433 \text{ mg}}{15 \text{ mg}} \times 100 \% \\ &= 99,95044 \%\end{aligned}$$

3. F3

1.1. H – 1

$$\begin{aligned}
 \text{Konsentrasi} &= \frac{0,053 - 0,0237}{0,1389} \\
 &= 0,210943 \text{ ppm} \\
 \text{Bobot Zat Aktif Bebas} &= 0,210943 \text{ ppm} \times 5 \text{ ml} \times 5 \\
 &= 5,273578 \text{ } \mu\text{g} = 0,005274 \text{ mg} \\
 \%EE &= \frac{15 \text{ mg} - 0,005274 \text{ mg}}{15 \text{ mg}} \times 100 \% \\
 &= 99,96484 \%
 \end{aligned}$$

1.2. H – 30

$$\begin{aligned}
 \text{Konsentrasi} &= \frac{0,056 - 0,0237}{0,1389} \\
 &= 0,232541 \text{ ppm} \\
 \text{Bobot Zat Aktif Bebas} &= 0,232541 \text{ ppm} \times 5 \text{ ml} \times 5 \\
 &= 5,813535 \text{ } \mu\text{g} = 0,005814 \text{ mg} \\
 \%EE &= \frac{15 \text{ mg} - 0,005814 \text{ mg}}{15 \text{ mg}} \times 100 \% \\
 &= 99,96124 \%
 \end{aligned}$$

4. F4

1.1. H – 1

$$\begin{aligned}
 \text{Konsentrasi} &= \frac{0,045 - 0,0237}{0,1389} \\
 &= 0,153348 \text{ ppm} \\
 \text{Bobot Zat Aktif Bebas} &= 0,153348 \text{ ppm} \times 5 \text{ ml} \times 5
 \end{aligned}$$

$$= 3.833693 \mu\text{g} = 0.003834 \text{ mg}$$

$$\%EE = \frac{15 \text{ mg} - 0.003834 \text{ mg}}{15 \text{ mg}} \times 100 \%$$

$$= 99.97444 \%$$

1.2. H – 30

$$\text{Konsentrasi} = \frac{0,057 - 0.0237}{0.1389}$$

$$= 0.239741 \text{ ppm}$$

$$\text{Bobot Zat Aktif Bebas} = 0.239741 \text{ ppm} \times 5 \text{ ml} \times 5$$

$$= 5.993521 \mu\text{g} = 0.005994 \text{ mg}$$

$$\%EE = \frac{15 \text{ mg} - 0.005994 \text{ mg}}{15 \text{ mg}} \times 100 \%$$

$$= 99.96004 \%$$

5. F5

1.1. H – 1

$$\text{Konsentrasi} = \frac{0,049 - 0.0237}{0.1389}$$

$$= 0.182145 \text{ ppm}$$

$$\text{Bobot Zat Aktif Bebas} = 0.182145 \text{ ppm} \times 5 \text{ ml} \times 5$$

$$= 4.553636 \mu\text{g} = 0.004554 \text{ mg}$$

$$\%EE = \frac{15 \text{ mg} - 0.004554 \text{ mg}}{15 \text{ mg}} \times 100 \%$$

$$= 99.96964 \%$$

1.2. H – 30

$$\text{Konsentrasi} = \frac{0,055 - 0.0237}{0.1389}$$

$$= 0.225342 \text{ ppm}$$

$$\begin{aligned}
 \text{Bobot Zat Aktif Bebas} &= 0.225342 \text{ ppm} \times 5 \text{ ml} \times 5 \\
 &= 5.633549 \text{ } \mu\text{g} = 0.005634 \text{ mg} \\
 \%EE &= \frac{15 \text{ mg} - 0.005634 \text{ mg}}{15 \text{ mg}} \times 100 \% \\
 &= 99.96244 \%
 \end{aligned}$$

Lampiran 4. Hasil Karakterisasi NLC Kurkumin

Data Karakterisasi NLC kurkumin Hari Ke – 1

Formula	Ukuran Partikel (nm)	PdI	Zeta Potensial (mV)
F1	121,33±7,15	0,32±0,08	-47,40±1,15
F2	99,26±0,76	0,28±0,04	-51,30±0,61
F3	153,33±5,10	0,28±0,01	-48,00±0,46
F4	141,07±0,64	0,25±0,04	-53,97±1,90
F5	216,27±3,36	0,45±0,06	-60,00±0,56

Data Karakterisasi NLC kurkumin Hari Ke – 30

Formula	Ukuran Partikel (nm)	PdI	Zeta Potensial (mV)
F1	120,57±0,99	0,26±0,04	-42,50±0,10
F2	90,25±0,54	0,24±0,01	-39,27±1,19
F3	125,93±1,56	0,24±0,02	-39,87±0,46
F4	206,97±6,33	0,36±0,06	-40,97±0,38
F5	304,0±3,40	0,27±0,11	-45,93±0,15

Lampiran 5. Hasil Uji T-Test Karakterisasi NLC kurkumin

	Tests of Normality					
	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
CMP_F1_PSA_H 1	.305	3	.	.906	3	.404
CMP_F1_PSA_H 30	.349	3	.	.832	3	.194
CMP_F2_PSA_H 1	.249	3	.	.968	3	.656
CMP_F2_PSA_H 30	.276	3	.	.942	3	.537
CMP_F3_PSA_H 1	.232	3	.	.980	3	.729
CMP_F3_PSA_H 30	.226	3	.	.983	3	.752
CMP_F4_PSA_H 1	.328	3	.	.871	3	.298
CMP_F4_PSA_H 30	.310	3	.	.898	3	.380
CMP_F5_PSA_H 1	.280	3	.	.938	3	.519
CMP_F5_PSA_H 30	.248	3	.	.968	3	.658
CMP_F1_PdI_H1	.224	3	.	.984	3	.761
CMP_F1_PdI_H3 0	.188	3	.	.998	3	.913
CMP_F2_PdI_H1	.270	3	.	.949	3	.564
CMP_F2_PdI_H3 0	.240	3	.	.975	3	.694
CMP_F3_PdI_H1	.371	3	.	.784	3	.077
CMP_F3_PdI_H3 0	.342	3	.	.845	3	.227
CMP_F4_PdI_H1	.212	3	.	.990	3	.812
CMP_F4_PdI_H3 0	.345	3	.	.840	3	.214
CMP_F5_PdI_H1	.373	3	.	.778	3	.064

CMP_F5_PdI_H3 0	.332	3	.	.864	3	.277
CMP_F1_Zeta_H 1	.201	3	.	.994	3	.856
CMP_F1_Zeta_H 30	.175	3	.	1.000	3	1.000
CMP_F2_Zeta_H 1	.356	3	.	.818	3	.157
CMP_F2_Zeta_H 30	.287	3	.	.929	3	.485
CMP_F3_Zeta_H 1	.253	3	.	.964	3	.637
CMP_F3_Zeta_H 30	.385	3	.	.750	3	.000
CMP_F4_Zeta_H 1	.195	3	.	.996	3	.884
CMP_F4_Zeta_H 30	.337	3	.	.855	3	.253
CMP_F5_Zeta_H 1	.238	3	.	.976	3	.702
CMP_F5_Zeta_H 30	.253	3	.	.964	3	.637

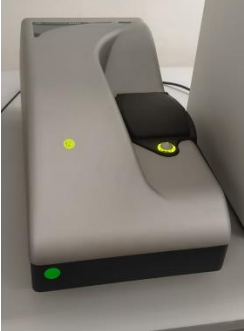
a. Lilliefors Significance Correction

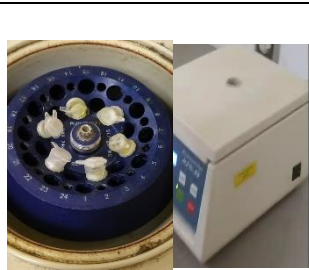
Paired Samples Test

		Paired Differences							
			Std.	Std.	95% Confidence				Sig.
		Mean	Deviation	Error	Interval of the		t	df	(2-
			on	Mean	Lower	Upper			tailed)
Pair 1	CMP_F1_PSA_H1 - CMP_F1_PSA_H30	.767	6.165	3.560	-14.549	16.083	.215	2	.849
Pair 2	CMP_F2_PSA_H1 - CMP_F2_PSA_H30	9.013	1.109	.640	6.258	11.769	14.074	2	.005
Pair 3	CMP_F3_PSA_H1 - CMP_F3_PSA_H30	27.400	6.022	3.477	12.439	42.361	7.880	2	.016
Pair 4	CMP_F4_PSA_H1 - CMP_F4_PSA_H30	-65.900	6.255	3.612	-81.439	-50.361	-18.247	2	.003
Pair 5	CMP_F5_PSA_H1 - CMP_F5_PSA_H30	-87.733	6.756	3.901	-104.516	-70.951	-22.492	2	.002
Pair 6	CMP_F1_PdI_H1 - CMP_F1_PdI_H30	.056667	.041633	.024037	-.046756	.160090	2.357	2	.142
Pair 7	CMP_F2_PdI_H1 - CMP_F2_PdI_H30	.038667	.052166	.030118	-.090922	.168255	1.284	2	.328
Pair 8	CMP_F3_PdI_H1 - CMP_F3_PdI_H30	.035667	.029195	.016856	-.036857	.108190	2.116	2	.169

Pair 9	CMP_F4_ PdI_H1 - CMP_F4_ PdI_H30	- .10333 3	.042360	.024456	-.208560	.001894	- 4.225	2	.052
Pair 10	CMP_F5_ PdI_H1 - CMP_F5_ PdI_H30	.18466 7	.103549	.059784	-.072563	.441896	3.089	2	.091
Pair 11	CMP_F1_ Zeta_H1 - CMP_F1_ Zeta_H30	- 4.9000 0	1.05357	.60828	-7.51720	-2.28280	- 8.056	2	.015
Pair 12	CMP_F2_ Zeta_H1 - CMP_F2_ Zeta_H30	- 12.033 33	1.43643	.82932	- 15.6016 3	-8.46504	- 14.51 0	2	.005
Pair 13	CMP_F3_ Zeta_H1 - CMP_F3_ Zeta_H30	- 8.1333 3	.70946	.40961	-9.89573	-6.37094	- 19.85 6	2	.003
Pair 14	CMP_F4_ Zeta_H1 - CMP_F4_ Zeta_H30	- 13.000 00	1.63707	.94516	- 17.0667 1	-8.93329	- 13.75 4	2	.005
Pair 15	CMP_F5_ Zeta_H1 - CMP_F5_ Zeta_H30	- 14.066 67	.55076	.31798	- 15.4348 2	- 12.69851	- 44.23 8	2	.001

Lampiran 6. Dokumentasi Penelitian

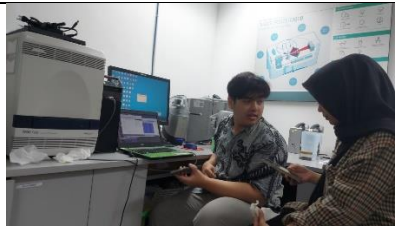
		
Proses pembuatan NLC dengan alat sonikator	Proses Homogenisasi Panas dengan menggunakan <i>magnetic stirrer</i>	Hasil Pengujian Kelarutan kurkumin dalam surfaktan plantacare
		
Tabung eppendorf untuk penyimpanan sampel yang akan diuji karakterisasi	Alat Particle Size Analyzer	Hasil pengujian solidifikasi kembali lipid padat compritol
		
Laptop untuk mengolah data	Alat gelas yang dipakai selama penelitian	Seri pengenceran



Alat sentifuga



Hasil Pengujian
efisiensi penjerapan



Dokumentasi di PT. DKSH,
Jakarta



Dokumentasi di Lab
FMIPA, UGM,
Yogyakarta

Lampiran 7. Hasil Cek Turnitin

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KARAKTERISASI NANOSTRUCTURED LIPID CARRIERS (N.

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Lampiran 8. Kartu Bimbingan Pembimbing 1

No. Dok. 02.64.004-PM.03/AKD-SPMB


Fakultas Farmasi
Universitas
Bhakti Kencana

KARTU BIMBINGAN TUGAS AKHIR I/TUGAS AKHIR II

Pembimbing Utama	Dr. Apt. Gamadi Jafar, M. Si				
Nama Mahasiswa	Fitna Cantika				
NPM	201FF03029				
Bidang Ilmu	Farmasetika dan Teknologi Farmasi (FTF)				

No	Hari/Tanggal	Waktu	Tempat	Materi	Paraf
1	Jumat, 2 Feb 2024	08.00	UBK	Optimasi Formula NLC	✓
2	Senin, 12 Feb 2024	14.00	UBK	Laporan Pembuatan blanko NLC	✓
3	Jumat, 16 Feb 2024	09.00	UBK	Laporan Kemajuan Pembuatan NLC	✓
4	Selasa, 27 Feb 2024	13.30	UBK	Laporan pemakaian alat Vivaspin 4/centrifuge	✓
5	Rabu, 6 Maret 2024	14.00	UBK	Laporan kemajuan farmakokinetik NLC	✓
6	Senin, 18 Maret 2024	09.00	UBK	Perubahan konsentrasi Formula NLC	✓
7	Rabu, 27 Maret 2024	13.00	UBK	Kemajuan Formula NLC menggunakan formula baru	✓
8	Rabu, 3 April 2024	08.00	UBK + DSH	Pengujian mengenai PDI, ukuran Partikel, Zeta	✓
9	Senin, 29 April 2024	10.00	UBK	Laporan Pengujian kelentaran surfaktan	✓
10	Rabu, 29 Mei 2024	16.00	Jogyakarta	berdiskusi mengenai Pengujian TGM	✓
11	Rabu, 26 Juni 2024	12.00	UBK	berdiskusi mengenai Pengujian blanko NLC	✓
12	Senin, 1 Juli 2024	09.00	UBK	Laporan Pengujian Efisiensi Penyerapan	✓
13	Jumat 5 Juli 2024	08.00	UBK	berdiskusi untuk Persiapan sidang	✓
14	Rabu 10 Juli 2024	09.00	UBK	Laporan Draft skripsi terbaru	✓

Catatan : Kartu ini harus dibawa setiap kali melakukan bimbingan dan harus diisi oleh dosen pembimbing.



Dr. Gamadi Jafar, M. Si
 Dosen Pembimbing Utama
 No. HP: 081-222-7030778
 Email: gamadi.jafar@ubk.ac.id

Lampiran 9. Kartu Bimbingan Pembimbing 2

No. Dok. 02.64.00/FRM-03/AKD-SPMI



Fakultas Farmasi
Universitas
Bhakti Kencana



KARTU BIMBINGAN TUGAS AKHIR I/TUGAS AKHIR II

Pembimbing Serta	Dr. Fenti Fatmawati M. Si				
Nama Mahasiswa	Fitria Cantika				
NPM	201FF03029				
Bidang Ilmu	Farmasetika dan Teknologi Farmasi (FTF)				

No	Hari/Tanggal	Waktu	Tempat	Materi	Paraf
1.	Senin, 19 Feb 2024	09.00	UBK	Berdiskusi tentang langkah penelitian	<i>[Signature]</i>
2.	Rabu, 28 Feb 2024	11.00	UBK	Berdiskusi mengenai prosedur sentipone, dll	<i>[Signature]</i>
3.	Jumat, 22 Maret 24	11.00	UBK	Berdiskusi mengenai uji karakterisasi ALG.	<i>[Signature]</i>
4.	Senin, 22 April 24	13.00	UBK	Berdiskusi mengenai alat untuk penelitian	<i>[Signature]</i>
5.	Jumat, 26 April 24	10.30	UBK	Berdiskusi mengenai laporan kemajuan IAA.	<i>[Signature]</i>
6.	Senin, 29 April 24	20.00	Online	Berdiskusi mengenai kpat pemilihan durfaktan yg	<i>[Signature]</i>
7.	Kamis, 30 Mei 2024	12.00	Online	laporan sedang melakukan uji TEM di Joggja	<i>[Signature]</i>
8.	Senin, 10 Juni 2024	08.00	UBK	laporan terkait kelanjutan pengujian/EE	<i>[Signature]</i>
9.	Selasa, 9 Juli 2024	09.00	UBK	laporan terkait draft skripsi	<i>[Signature]</i>

Catatan : Kartu ini harus dibawa setiap kali melakukan bimbingan dan harus diisi oleh dosen pembimbing.

📍 Jl. Sustarno Hatta No 254 Bandung

☎ 022 7830 765 022 7830 766

📧 info@bhaktikencana.ac.id