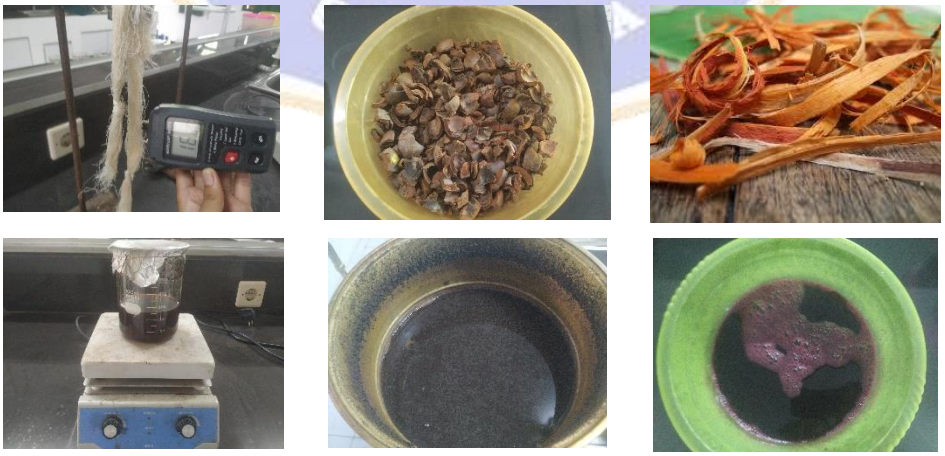
LAMPIRAN

Lampiran 1 Dokumentasi Kegiatan Penelitian

1. Pembuatan Nanopasta Fiksator

2. Pembuatan Zat Warna Alam



3. Proses Mordanting dan Fiksasi Benang Sutera

Lampiran 2 Hasil Uji Laboratorium Benang Sutera dengan Warna Alam Kulit Buah Manggis dan Kayu Secang

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Website: http://labtekstilftiuii@wordpress.com, Email : 911002136@uii.ac.id /CP : 081 328 77 6858

Nomor : 009/Kalab.ET/10/Lab.ET/II/2021
Lamp. : Rincian biaya dan Hasil pengujian
Hal : **Keterangan uji Lab.**

Kepada Yth :
Bapak Dekan/Sdr. : I Kadek Ariadi Saputra Dan I Kadek Parwantara Aryanika
Fakultas MIPA Universitas Pendidikan Ganesha
di- Singaraja Bali.

Assalamu'alaikum wr.wb.
Menunjuk Surat Dari Bapak tertanggal 20 Januari 2021 , Dengan Nomor Surat : 36/UN48.9.1/DT/2021 Tentang permohonan pengujian di Lab.Evaluasi Tekstil.
,Dengan ini Kepala Laboratorium Evaluasi Tekstil Jurusan Teknik Kimia Bidang Studi Teknik Tekstil Fakultas Teknologi Industri Universitas Islam Indonesia menerangkan :

Nama Mhs : I Kadek Ariadi Saputra dan I Kadek Parwantara Aryanika
NIM : 1713081011 dan 1713081013
Prodi/Fakultas : Kimia MIPA-Universitas Pendidikan Ganesha-Bali

Bahwa dari nama tersebut diatas **Betul-betul Telah Mengujikan** **Benang yang Sudah Diwarnai,** Untuk di analisa di Laboratorium Evaluasi Tekstil Jur. Teknik Kimia Bidang Studi Teknik Tekstil FTI-UII dengan jenis pengujian antara lain :

1. **Pengujian TLW Benang Terhadap Pencucian Sabun.**
2. **Pengujian TLW Benang Terhadap Sinar Matahari.**
3. **Pengujian Kekuatan Tarik dan Mulur Benang.**
4. **Pengujian Ketuaan Warna Benang (R%)**
5. **Pengujian Beda Warna Benang (L*a*b*dE*ab).**

(Dengan data hasil pengujian lab. terlampir)
Demikian surat keterangan dari kami, semoga dapat dipergunakan sebagaimana mestinya terima kasih.
Wassalamu'alaikum wr.wb.

Yogyakarta, 17 Pebruari 2021
Kalab.Evaluasi Tekstil

(Ir. H. Sukirman, MM .,CTexs.ATI.)

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DATA HASIL UJI LAB.EVALUASI TEKSTIL

Lampiran Nomor : 009/Kalab.ET/10/Lab.ET/II/2021

1. Pengujian TLW Benang Terhadap Pencucian Sabun.
2. Pengujian TLW Benang Terhadap Sinar Matahari.
3. Pengujian Kekuatan Tarik dan Mulur Benang.
4. Pengujian Ketuaan Warna Benang (R%)
5. Pengujian Beda Warna Benang (L*a*b*dE*ab).

Milik : I Kadek Ariadi Saputra dan I Kadek Parwantara Aryanika- Kimia MIPA GANESHA-BALI

Kode Kode Sampel/ Pewarna Manggis-Secang (2 : 1)	Uji ke	Nilai Uji TLW Benang Terhadap Pencucian Sabun (Grey Schale)	Nilai Uji TLW Benang Terhadap Sinar Matahari (Grey Schale)	Nilai Uji Ketuaan Warna Benang (R%)	Nilai Rata-rata Uji Kekuatan Tarik dan Mulur Benang		Nilai Uji Beda Warna Benang			
					Nilai Kekuatan Tarik (gr)	Nilai Kemuluran (%)	L*	a*	b*	dE*ab
STD-Benang Putih	0	-	-	124.75	-	-	111.21	0.13	-2.09	0.00
A0	1	4-5 (Baik)	4-5 (Baik)	49.48	220.000	7.955	34.39	16.24	3.67	78.81
	2	4 (Baik)	4-5 (Baik)	43.41			30.48	14.75	0.13	82.07
	3	4 (Baik)	4-5 (Baik)	43.83			30.87	13.92	2.06	81.63
AI	1	4-5 (Baik)	4-5 (Baik)	7.33	204.000	7.167	31.21	5.20	-12.71	80.87
	2	4 (Baik)	4-5 (Baik)	7.64			24.99	3.92	-10.57	86.72
	3	4-5 (Baik)	4-5 (Baik)	9.93			25.20	6.48	-11.50	86.76
AII	1	4-5 (Baik)	4-5 (Baik)	3.43	200.000	6.904	2.18	-0.23	-6.23	109.11
	2	4 (Baik)	4-5 (Baik)	4.00			4.44	1.07	-6.64	106.88
	3	4-5 (Baik)	4-5 (Baik)	4.35			3.26	2.57	-7.49	108.12
AIII	1	4 (Baik)	4-5 (Baik)	4.34	216.000	7.604	22.12	2.51	-14.83	90.04
	2	4 (Baik)	4-5 (Baik)	5.96			21.29	2.34	-15.75	90.98
	3	4 (Baik)	4-5 (Baik)	3.34			19.21	1.55	-12.03	92.55
AIV	1	4-5 (Baik)	4-5 (Baik)	5.28	208.000	7.384	11.13	0.77	-10.88	100.47
	2	4-5 (Baik)	4-5 (Baik)	5.92			9.09	4.72	-13.28	102.84
	3	4 (Baik)	4-5 (Baik)	6.43			9.51	-1.37	-6.95	101.84

Yogyakarta, 17 Pebruari 2021
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1. Pengujian TLW Benang Terhadap Pencucian Sabun.
2. Pengujian TLW Benang Terhadap Sinar Matahari.
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Milik : I Kadek Ariadi Saputra dan I Kadek Parwantara Aryanika -Kimia MIPA GANESHA-BALI

Kode Kode Sampel/ Pewarna Manggis-Secang (2: 1)	Uji ke	Nilai Uji TLW Benang Terhadap Pencuclan Sabun (Grey Schale)	Nilai Uji TLW Benang Terhadap Sinar Matahari (Grey Schale)	Nilai Uji Ketuaan Warna Benang (R%)	Nilai Rata-rata Uji Kekuatan Tarik dan Mulur Benang		Nilai Uji Beda Warna Benang			
					Nilai Kekuatan Tarik (gr)	Nilai Kemuluran (%)	L*	a*	b*	dE*ab
STD-Benang Putih	0	-	-	124.75	-	-	111.21	0.13	-2.09	0.00
B0	1	4-5 (Baik)	4-5 (Baik)	10.55	216.000	7.848	19.77	5.74	0.11	91.64
	2	4-5 (Baik)	5 (Baik Sekali)	13.94			19.17	5.27	-6.50	92.30
	3	4 (Baik)	5 (Baik Sekali)	13.37			19.20	6.58	-7.15	92.38
BI	1	4 (Baik)	4-5 (Baik)	12.49	208.000	7.724	2.65	0.84	-1.91	108.57
	2	4 (Baik)	4-5 (Baik)	12.57			2.02	2.92	-3.07	109.23
	3	4 (Baik)	4-5 (Baik)	12.36			8.65	6.18	-4.75	102.78
BII	1	4 (Baik)	4-5 (Baik)	6.65	212.000	7.368	19.62	5.09	-0.43	91.74
	2	4 (Baik)	4-5 (Baik)	7.19			21.81	8.12	-6.97	89.90
	3	3-4(Cukup Baik)	4-5 (Baik)	8.18			22.69	7.08	-1.11	88.80
BIII	1	4 (Baik)	4-5 (Baik)	7.98	218.000	7.140	21.34	11.95	-7.27	90.79
	2	3-4(Cukup Baik)	4-5 (Baik)	8.12			22.26	7.39	-2.20	89.26
	3	3-4(Cukup Baik)	4-5 (Baik)	8.39			20.68	10.33	-6.82	91.23
BIV	1	4 (Baik)	4-5 (Baik)	8.43	238.000	7.124	4.83	4.59	-5.06	106.52
	2	4 (Baik)	4-5 (Baik)	5.77			4.31	0.26	-0.83	106.92
	3	4 (Baik)	4-5 (Baik)	5.06			5.31	4.64	-4.79	106.04

Yogyakarta, 17 Pebruari 2021
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CARA KERJA PENGUJIAN
TAHAN LUNTUR WARNA BENANG TERHADAP SINAR MATAHARI

1. Pertama potong Kertas dg ukuran 5 x 10 cm untuk Media Tempelkan Benang Untaian Pada Kertas tersebut.
2. Kemudian Benang ditaruh pada suatu tempat papan dengan kondisi bahan Benang yang sebagian **kena sinar cahaya matahari** dan **yang sebagian lagi tertutup dengan kertas karton.**
3. Pengujian ini dilakukan selama 6 jam pada waktu sinar matahari efektif yaitu dari jam 09.00 - 15.00.
4. Kemudian Benang yang sudah selesai disinari matahari selama 6 jam, Dievaluasi perubahan warna Benangnya yang terkena sinar matahari **dibandingkan** dengan Benang yang tertutup tadi dengan menggunakan Grey Schale (Skala Abu-abu). Serta menunjukkan berapa nilainya ?

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PENGANTAR PENGUJIAN TAHAN LUNTUR WARNA

TUJUAN DAN STANDARD PENGUJIAN :

Dalam Evaluasi Tekstil Bagian Kimia,pengujian tahan luntur warna memang peranan penting,karena pengujian tahan luntur warna selain untuk menilai : Ketahanan luntur hasil dari pencelupan kain, dapat juga dipergunakan sebagai alat pengambil keputusan dalam pemilihan zat warna.

Sebagai standard penilaian hasil pengujian tahan luntur warna digunakan standard skala abu-abu (GREY SCHALE) dan Standard skala Penodaan (STAINING SCHALE).

STANDARD SKALA ABU-ABU (GREY SCHALE)

Standard grey schale digunakan untuk menilai perubahan warna pada uji tahan luntur warna.

Nilai grey schale menentukan tingkat perbedaan atau kekontrasan warna dari tingkat terendah sampai tingkat tertinggi, Tingkat nilai tersebut adalah :

5 ; 5-4
4 ; 4-3
3 ; 3-2
2 ; 2-1
1 ; 1-0

Standard grey schale terdiri dari 9 pasang lempeng standard abu-abu setiap pasang menunjukkan perbedaan atau kekontrasan warna yang sesuai dari deretan standard perubahan warna yang digambarkan oleh standard skala abu-abu, dan dinyatakan dengan rumus nilai Kekromatikan adam.

STANDARD SKALA PENODAAN (STAINING SCHALE)

Staining schale dipakai untuk menilai penodaan warna pada kain putih yang digunakan pada pengujian tahan luntur warna.

Untuk penilaian penodaan pada kain sama seperti penilaian grey schale.

Staining schale terdiri dari sepasang lempeng standard putih dan 8 lempeng standard putih abu-abu yang pada tiap pasang menunjukkan perbedaan atau kekontrasan warna yang sesuai dengan nilai penodaan warna.

Pada Staining schale penilaian penodaan pada kain putih pengujian pada tahan luntur warna, dilakukan dengan membandingkan dari kain putih yang dinodai dan yang tidak dinodai terhadap perbedaan yang digambarkan oleh Staining schale dan dinyatakan juga dengan nilai kekromatikan adam.

EVALUASI TAHAN LUNTUR WARNA

Nilai Tahan luntur Warna	Evaluasi Tahan Luntur Warna
5	Baik Sekali
4-5	Baik
4	Baik
3-4	Cukup Baik
3	Cukup
2-3	Kurang
2	Kurang
1-2	Jelek
1	Jelek

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PENGUJIAN TAHAN LUNTUR WARNA TERHADAP PENCUCIAN SABUN
(Percobaan P.1)

I. MAKSUD DAN TUJUAN :

Menentukan tahan luntur warna terhadap pencucian sabun.

II. PREAKSI-PREAKSI :

1. Larutan sabun yang mengandung 5 gr/liter air suling.
2. Sabun dan Syarat-syaratnya :
   a. Mengandung air tak lebih dari 5% berat kering.
   b. Alkali bebas sebagai Na_2CO_3 max 0,3 %.
   c. Alkali bebas sebagai Na_2OH max 0,1 %.
   d. Asam lemak sebagai garam Na max 85%.
   e. Titer asamnya max 30%.
   f. Angka jood max 50

ALAT-ALAT YANG DIPERGUNAKAN :

- Gelas piala
- Pemanas
- Benang
- Staining Schale
- Pengaduk
- Jarum jahit
- Grey Schale

BAHAN-BAHAN :

Dua helai kain putih yang masing-masing berukuran 10 x 4 cm. Dimana yang sehelai dari serat yang sejenis dengan bahan yang diuji, sedangkan yang sehelai lagi dari pasangan serat seperti sutera ataupun kapas.

III. CONTOH BAHAN PENGUJIAN :

Bahan uji berupa kain berwarna berukuran 10 x 4 cm, Kemudian ditaruh diantara kedua helai kain putih kemudian dijahit pada keempat sisinya.

IV. CARA KERJA :

Contoh uji diaduk-aduk selama 30 menit dalam larutan sabun pada suhu 40 $^{\circ}$C– 50 $^{\circ}$C dengan perbandingan Vlot 1 : 30.

Bila pengadukan dilakukan dengan tangan, maka contoh uji ditekan-tekan pada dinding gelas piala setiap dua menit sekali dengan tak dikeluarkan dari larutannya.

Contoh bahan uji dibilas dua kali dengan air suling yang dingin kemudian dibilas dengan air dingin yang mengalir selama 10 menit.

Contoh uji diperas,jahitannya dilepas pada ketiga sisinya sehingga contoh uji hanya tinggal satu jahitan (satu sisi saja).

Kemudian dinilai dengan grey schale terahadap perubahan warnanya dari contoh bahan uji tersebut. Sedangkan penodaan pada kain putih dinilai dengan alat Staining Schale.

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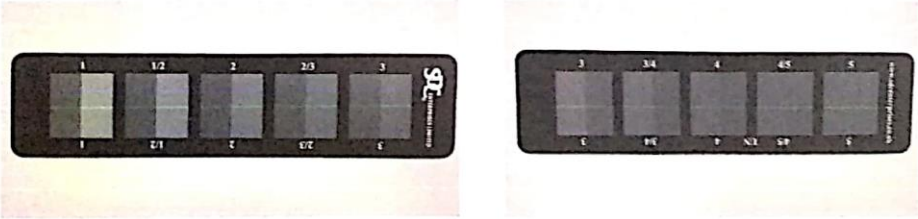
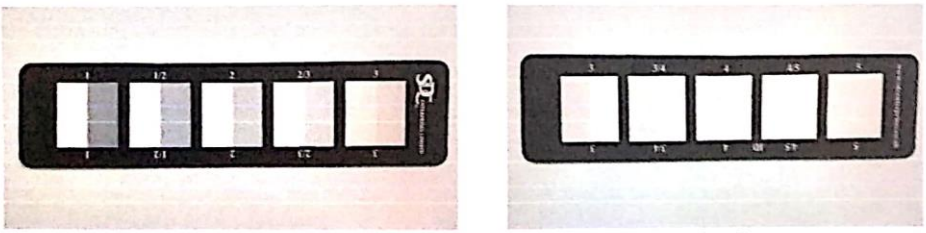
GAMBAR PERALATAN YG DIGUNAKAN
UNTUK MENGUJI TAHAN LUNTUR WARNA
Thd PENCUCIAN SABUN

Proses Mencuci dg Suhu 40-50°C



Gb. Grey Schale (utk Nilai Kelunturan)



Gb. Staining Schale (Utk Nilai Penodaan)

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CARA UJI KETUAAN WARNA BENANG (Reflektansi = R%)
(DENGAN MENGGUNAKAN PROGRAM UV-PC MODEL ISR-2200)

Langkah Kerja :

1. Pertama hubungkan Steker Komputer dan Spectropothometer ke sumber arus listrik
2. Hidupkan komputer yg sudah ada program UV-PC
3. Hidupkan pula Spectropothometer yang sudah terkoneksi dengan komputer tadi.
4. Kemudian klik 2x pada gambar program UV-PC yang sudah ada dilayar monitor.
5. Buka menu CONFIGURE pilih PC CONFIGURE keluar menu dan diisi kolom jenis printernya yang mau dipakai lalu diklik OK.
6. Buka Menu CONFIGURE pilih UTILITAS keluar menu UV-PC pilih ON (artinya : didalam UV-PC lampu sinar harus menyala/aktif semua) lalu tunggu sampai tanda warna hijau di monitor menyala semua ± 10 menit, kemudian baru klik OK
7. Buka Menu CONFIGURE pilih PARAMETER keluar menu dan diisi, umpama pilih (**R%,**T%) lalu ring grafiknya diisi untuk kolom star diisi 780nm dan untuk kolom finis diisi 380nm lalu di OK.
8. Sebelum menguji Benang yg sudah di Warnai ,untuk mengenolkan grafik/Blangko,Benang yg **ASLI/STANDAR (Putih) Yg Lilitkan Tebal pada media kertas Ukuran 4x4 cm (2 buah)** dijepit pada kotak ISR UV-PC didalam pada 2 sisi Jepit lalu klik BASELINE ditunggu sampai menunjukkan angka 380nm dari 780nm.
9. Awal uji masukkan sample **Benang yang sudah divariasi atau yg sudah Proses** ukuran 4x4 cm dijepit pada kotak ISR UV-PC yg satu sisi ***(Tempat Jepit benang yg digonta ganti sampel) dan benang putih di jepit satunya mendampingi proses uji benang yg berwarna (dg disebut doble beem)*** kemudian diklik **STAR** ,tunggu sampai terdeteksi sampai finis yaitu ke 380nm ,kemudian keluar menu file name,kolom 1 diberi nama kode sample dan kolom 2 diberi nama pemilik sampel uji. Lalu tekan **OK**
10. Kemudian pengujian selanjutnya dengan sample-sampel kain yang sudah divariasikan dan langkahnya seperti di no.9 begitu seterusnya.
11. Untuk mencari grafik yg belum kelihatan dalam layar monitor buka menu PRESENTASE pilih RADAR otomatis akan kelihatan gb grafik yg telah diuji tadi.
12. Untuk mencari File yang telah diuji buka MANIPULE pilih PEAK PICK di klik dan akan keluar menu gambar lalu di move ke atas biar kelihatan gb grafik dan nilai datanya hasil pengujian tsb.
13. Untuk mencari nilai ***yg diambil angka R % urutan kisaran yg terakir antara 1-6 paling bawah , makin nilai R % nya kecil warna Benang makin Tua/gelap,Sebaliknya Kalau nilai R% nya besar warna Benangnya makin Terang menuju warna ke putih.***
14. Cara mengeprint,buka OUTPUT di PEAK PICK pilih menu GRAFIC PLOT di klik langsung keluar data serta grafiknya.

Spesipikasi SPECTROPOTHOMETER (UV-PC) :
UV-2401 – (PC) S
Cat No : 206-82201-93 Tahun : 2001
Merek SHIMADZU CORPORATION JAPAN
INSTRUCTION MANUAL : ISR-2200

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CARA UJI BEDA WARNA BENANG(L* a* b* dE*ab)
(DENGAN MENGGUNAKAN PROGRAM UV-PC MODEL ISR-2200)

Langkah Kerja :

1.15 Hubungkan steker ke sumber arus listrik.
1.16 ON kan voltage Regulator/stabilisator
1.17 Hidupkan Komputer yg sudah di instal dengan program **Color Analysis** diklik 2x ,Kemudian hidupkan Mesin UV-PC supaya konek dengan komputer .
1.18 Buka menu **CONFIGURE** pada program pilih **PC CONFIGURE** keluar menu dan diisi Jenis Printernya yg dipakai lalu di klik OK.
1.19 Buka menu **CONFIGURE** pilih **UTILITAS** keluar menu UV-PC pilih **ON** (artinya : di dalam UV-PC lampu-lampu Energi UV harus nyala semua) lalu diklik OK ,Tunggu sampai lampu tanda warna hijau DI MONITOR menyala semua ± 10 menit ,kemudian baru di klik **OK**. Dan alat Spectrophotometer siap dipakai.
1.20 Buka Menu CONFIGURE pilih PC Configuration parameters dan mengisi untuk jenis Tex printer diisi jenis printernya , grafiK : diisi juga jenis printer dan serial pot diisi : 1 terus di OK.
1.21 Langkah 1: Buka CONFIGURE pilih SCAN PARAMETER keluar menu dan diisi ,umpama Pilih (**R %,T%**) Ring grafiknya diisi, untuk kolom Star diisi 780nm dan untuk kolom Finis diisi 380nm lalu di klik OK.
1.22 Langkah 2.: Buka Configure pilih illuminant/Obs.Parameter dengan pilihan sbb : D65 standar Observer diisi 10 degree kemudian klik **OK**.
1.23 Langkah 3 : Buka Configure pilih Color Scales diisi pilih yg CIE Lab dan diaktifkan yg diinginkan : **L* a* b* dE*ab** kemudian di OK.
Untuk mengenolkan grafik/Blanko ,**Benang yang Asli warna putih** , Benang diLilitkan dan ditempel pada media kertas dg ukuran 4x4 cm (2 bh) dijepit di dua sisi dan masukkan ke UV-PC kemudian klik BASELINE ditunggu sampai menunjukkan angka 380 nm.
1.24 Pertama Benang yang putih ASLI dicari nilai STANDARnya dg mengeklik **STD Read**
1.25 Selanjutnya masukkan sampel **Benang yg sudah dililitkan pada media Kertas yg sudah di warnai** ukuran 4x4 cm dicepitkan pada salah sisi yg digonta ganti benang warna dan benang putih satunya mendampingi proses uji benang yg berwarna (Doble beem) dan masukkan ke dalam UV-PC lalu di Klik **UNK Read** ,tunggu sampai proses penyinaran selesai ± 2 menit dan akan keluar menu file name , untuk kolom 1 diberi nama sampel yg diuji tadi , dan untuk kolom 2 diberi **nama yg mengujikan** ,lalu di klik **OK.**
1.26 Kemudian pengujian selanjutnya dengan sampel-sampel Benang warna yang sudah divariasi atau konsentarsi lainnya dan langkahnya seperti di No.1.12 , begitu seterusnya
1.27 Untuk mencari Print out **data nilai** saja yg sudah diuji tadi Buka menu **Presentation** pilih **Table data Print** di klik 1x. Untuk **Print out grafik** Buka menu **Presetation** pilih **Color Plot dan di klik** 1x.

Spesipikasi SPECTROPOTHOMETER (UV-PC) :

UV-2401 – PC
Cat No : 206-82201-93
Merek SHIMADZU CORPORATION JAPAN
INSTRUCTION MANUAL : ISR-2200

UNIVERSITAS ISLAM INDONESIA
FAKULTAS TEKNOLOGI INDUSTRI
JURUSAN TEKNIK KIMIA
LABORATORIUM EVALUASI TEKSTIL
Jl Kaliurang Km 14,5 Yogyakarta 55584 Telp. (0274)895287 ext. 130, Fax (0274) 895007
Website: http://labtekstilftiuii.wordpress.com /Email : 911002136@uii.ac.id/CP : 081 328 77 6858

UJI BEDA WARNA
Arti Hasil Nilai Analisa Warna
(L* a* b*)

L* : adalah tingkat **penerangan/Kecerahan** (lightness)

a* : Menempati warna dan saturasi sumbu **merah-hijau** yg diekpresikan dengan single number

a+ : sampel berada pada posisi **Kemerahan**

a- : sampel berada pada posisi **Kehijauan**

b* : Menempati warna pada sumbu **biru kuning** yg diekpresikan dg koordinat

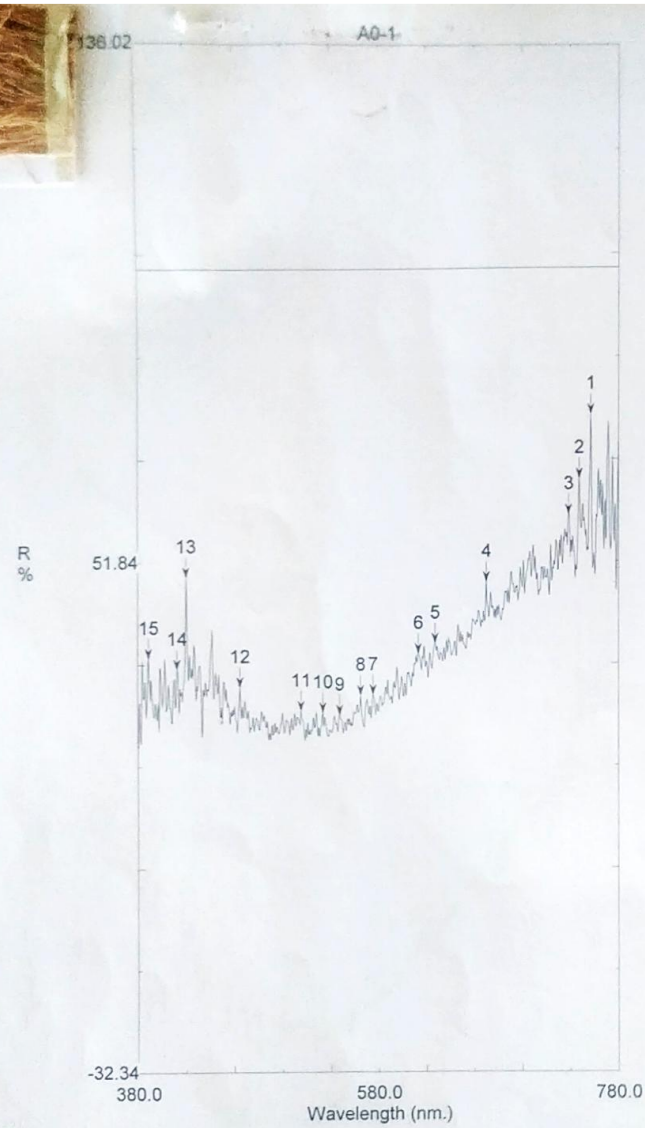
b+ : Sampel berada pada posisi **Kekuningan**

b- : Sampel berada pada posisi **Kebiruan**

Dari perhitungan parameter L* a* b* , nilainya dapat dihitung dan didapat nilai total refleksi cahaya pada benda yang dilakukan penyinaran sebagai dE*ab.

Persamaan untuk menghitung nilai dE*ab adalah :

$$dE^*ab = (L^*)^2 + (a^*)^2 + (b^*)^2)^{1/2}$$



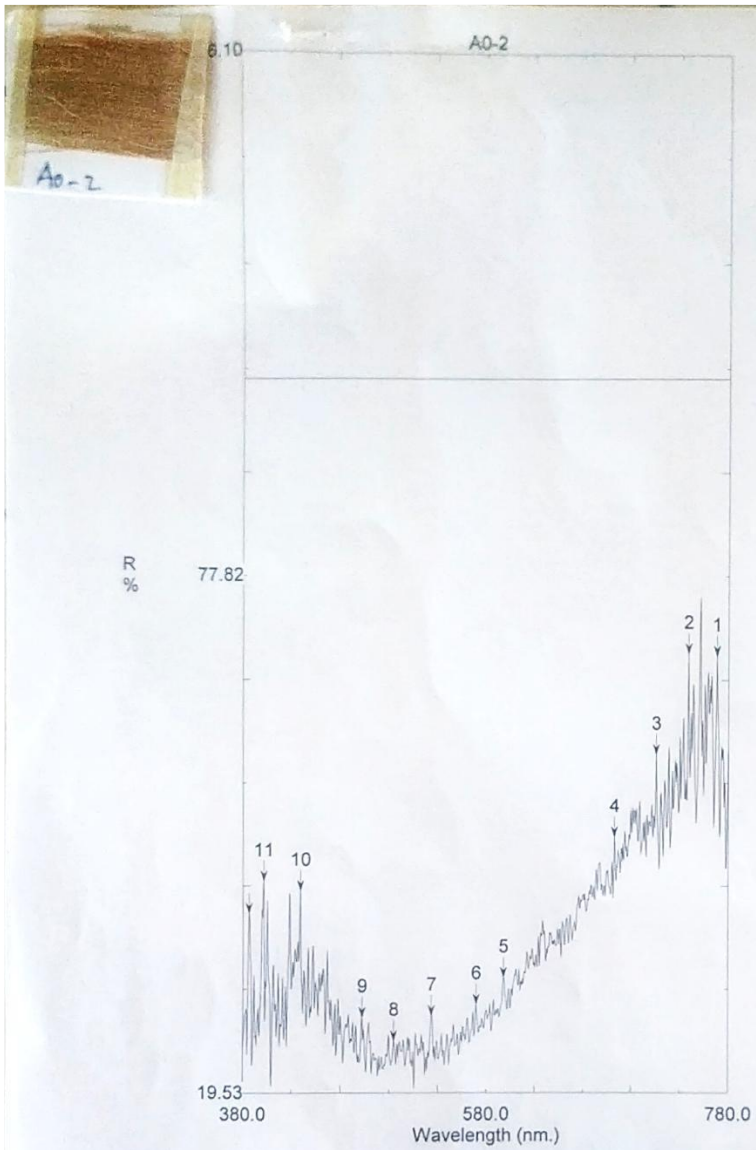
Peak Pick

No.	Wavelength (nm.)	R%
1	757.00	75.99
2	747.50	65.50
3	738.50	59.60
4	670.00	48.56
5	627.00	38.46
6	613.00	36.76
7	575.00	29.99
8	564.50	29.90
9	547.00	26.65
10	533.00	27.05
11	515.00	27.31
12	464.50	31.29
13	420.00	49.48
14	412.50	34.28
15	389.00	36.10

File Name: A0-1
Milik : I Kadek Ariadi-Kimi MIPA Ganesha BALI

Created: 10:30 16/02/21
Data: Original

Measuring Mode: R%
Scan Speed: Fast
Slit Width: 1.0
Sampling Interval: 0.5



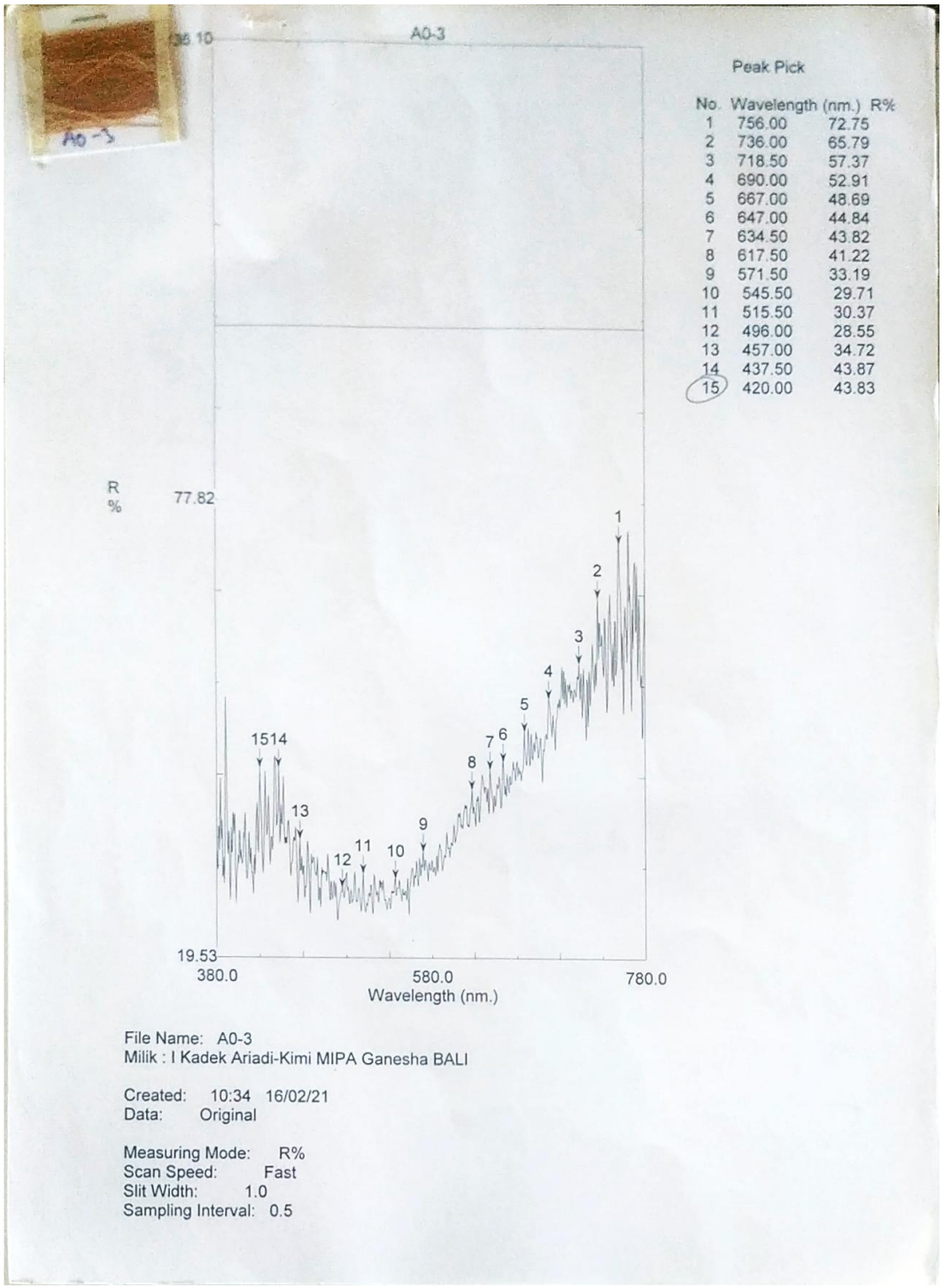
Peak Pick

No.	Wavelength (nm.)	R%
1	770.50	68.89
2	747.00	69.17
3	720.50	57.82
4	686.00	48.47
5	594.00	32.51
6	571.50	29.49
7	534.50	28.22
8	503.50	25.39
9	477.50	28.03
10	427.00	42.32
11	397.00	43.41
12	385.00	39.76

File Name: A0-2
Milik : I Kadek Ariadi-Kimi MIPA Ganesha BALI

Created: 10:32 16/02/21
Data: Original

Measuring Mode: R%
Scan Speed: Fast
Slit Width: 1.0
Sampling Interval: 0.5



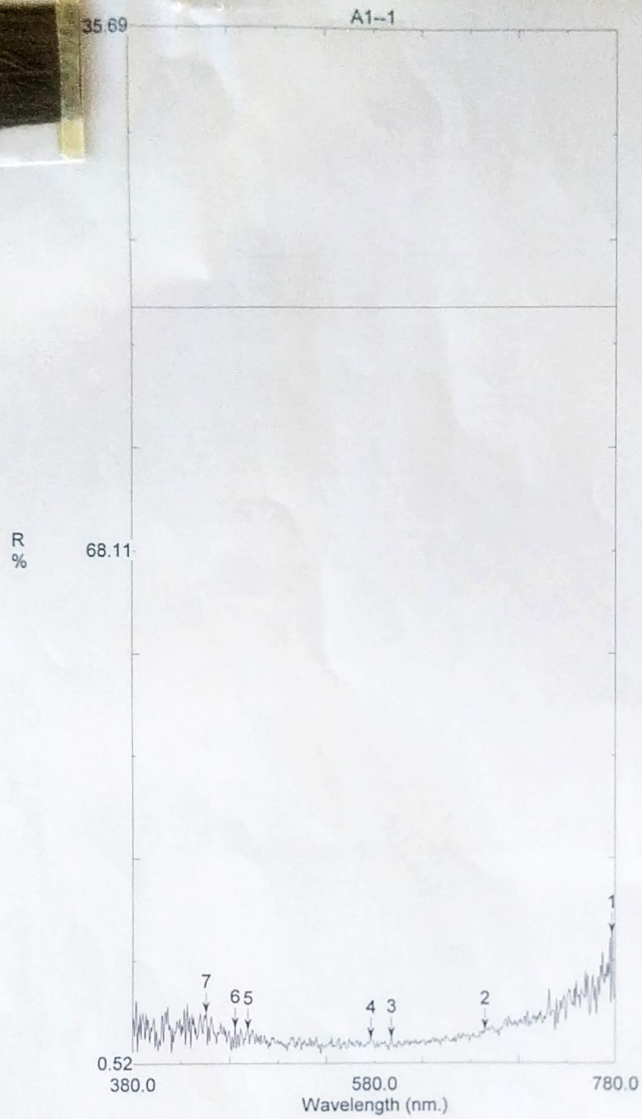
Peak Pick

No.	Wavelength (nm.)	R%
1	756.00	72.75
2	736.00	65.79
3	718.50	57.37
4	690.00	52.91
5	667.00	48.69
6	647.00	44.84
7	634.50	43.82
8	617.50	41.22
9	571.50	33.19
10	545.50	29.71
11	515.50	30.37
12	496.00	28.55
13	457.00	34.72
14	437.50	43.87
15	420.00	43.83

File Name: A0-3
Milik : I Kadek Ariadi-Kimi MIPA Ganesha BALI

Created: 10:34 16/02/21
Data: Original

Measuring Mode: R%
Scan Speed: Fast
Slit Width: 1.0
Sampling Interval: 0.5



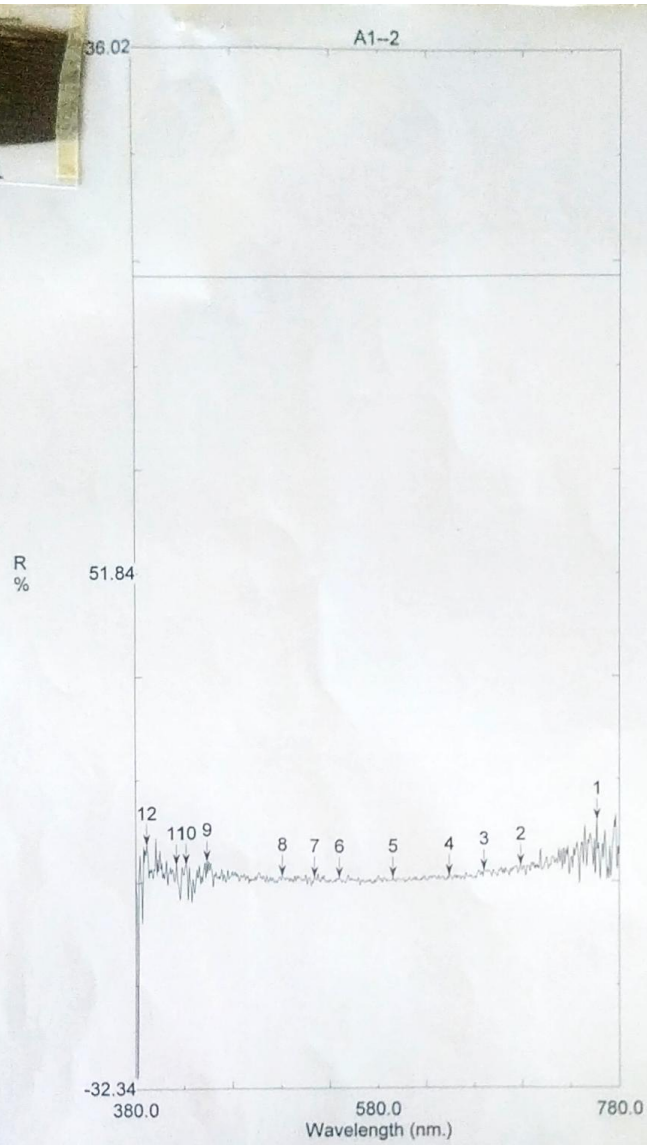
Peak Pick

No.	Wavelength (nm.)	R%
1	777.50	17.66
2	672.00	5.00
3	594.00	3.97
4	577.00	3.89
5	475.00	5.08
6	464.50	5.28
7	440.50	7.33

File Name: A1--1
Milik : I Kadek Ariadi-Kimi MIPA Ganesha BALI

Created: 10:25 16/02/21
Data: Original

Measuring Mode: R%
Scan Speed: Fast
Slit Width: 1.0
Sampling Interval: 0.5



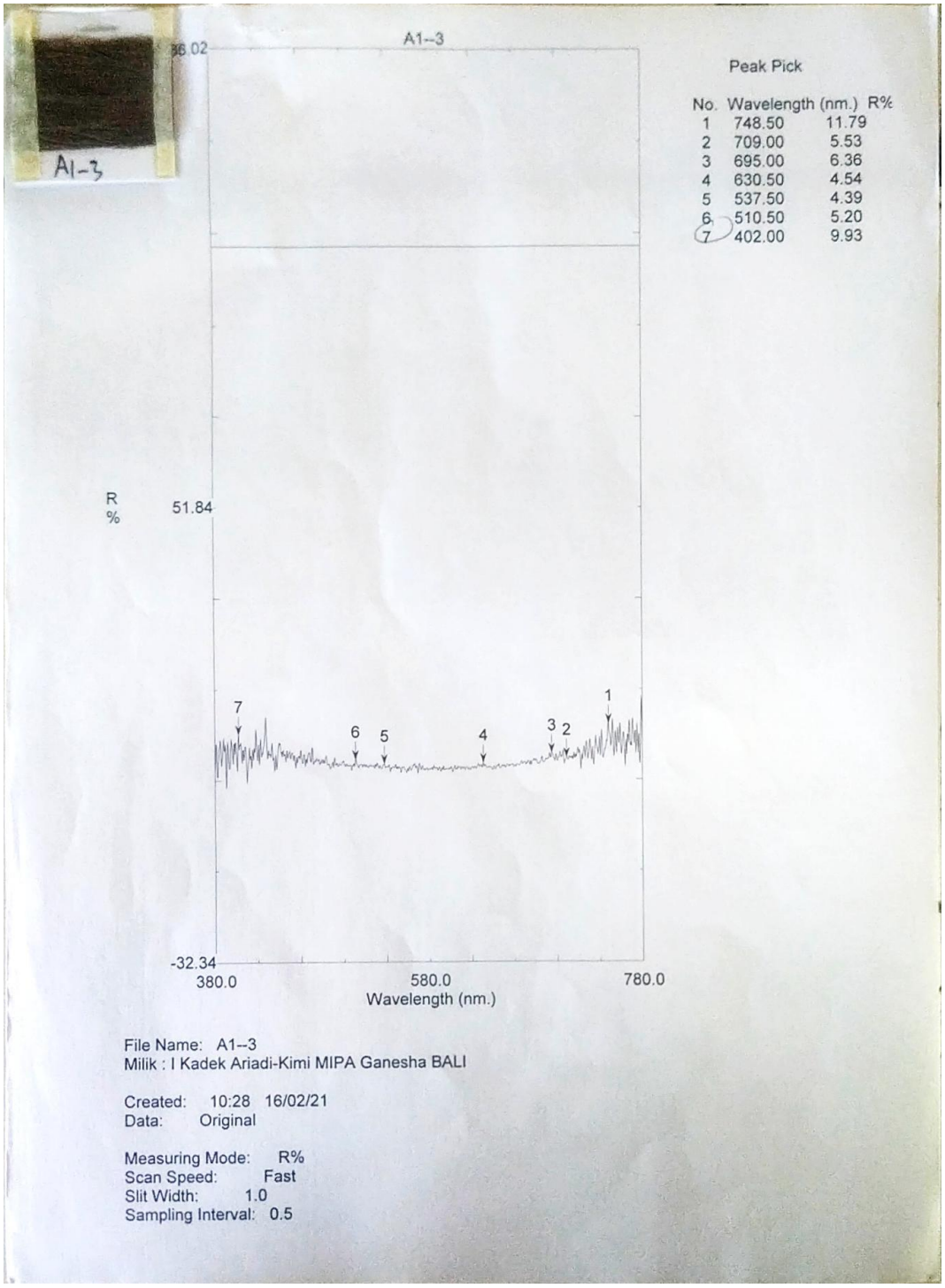
Peak Pick

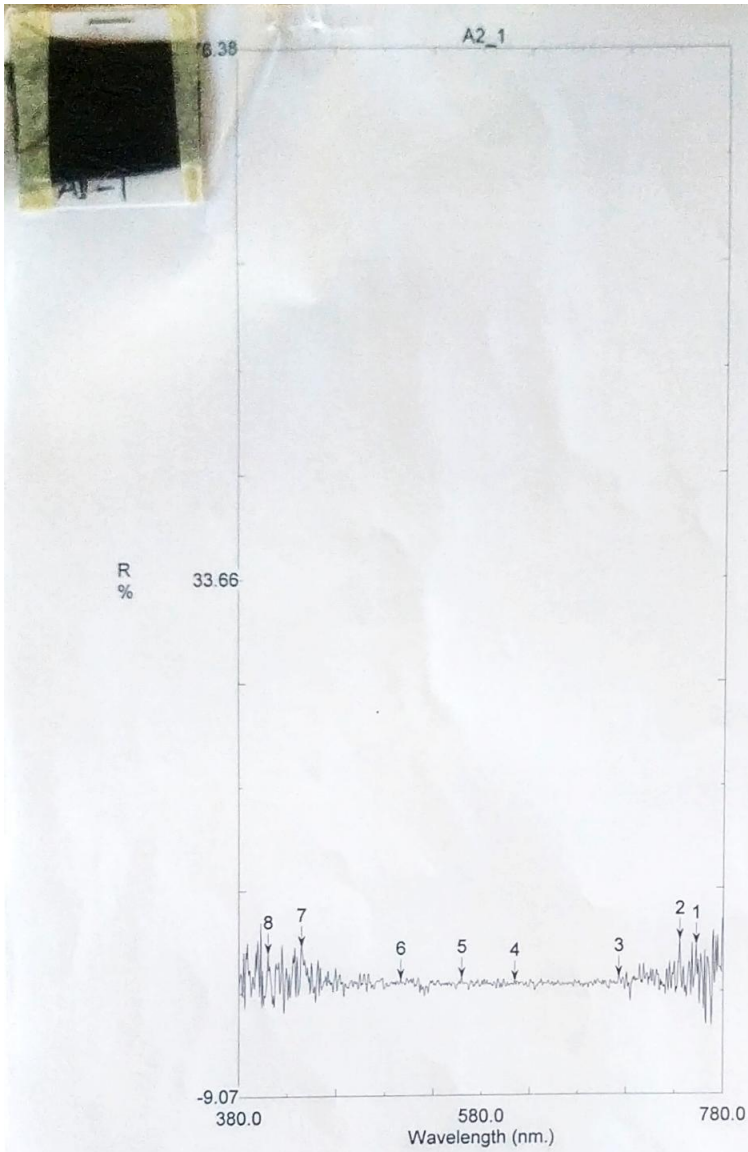
No.	Wavelength (nm.)	R%
1	761.50	11.51
2	698.50	4.07
3	668.00	3.28
4	639.00	2.45
5	592.00	2.10
6	547.50	2.07
7	527.00	2.19
8	500.50	2.44
9	438.50	4.94
10	421.50	4.40
11	413.50	4.38
12	389.00	7.64

File Name: A1--2
Milik : I Kadek Ariadi-Kimi MIPA Ganesha BALI

Created: 10:27 16/02/21
Data: Original

Measuring Mode: R%
Scan Speed: Fast
Slit Width: 1.0
Sampling Interval: 0.5


A1-3
A1-3
86.02
51.84
-32.34
R
%
380.0
580.0
780.0
Wavelength (nm.)
1
2
3
4
5
6
7
Peak Pick
No. Wavelength (nm.) R%
1 748.50 11.79
2 709.00 5.53
3 695.00 6.36
4 630.50 4.54
5 537.50 4.39
6 510.50 5.20
7 402.00 9.93
File Name: A1--3
Milik : I Kadek Ariadi-Kimi MIPA Ganesha BALI
Created: 10:28 16/02/21
Data: Original
Measuring Mode: R%
Scan Speed: Fast
Slit Width: 1.0
Sampling Interval: 0.5



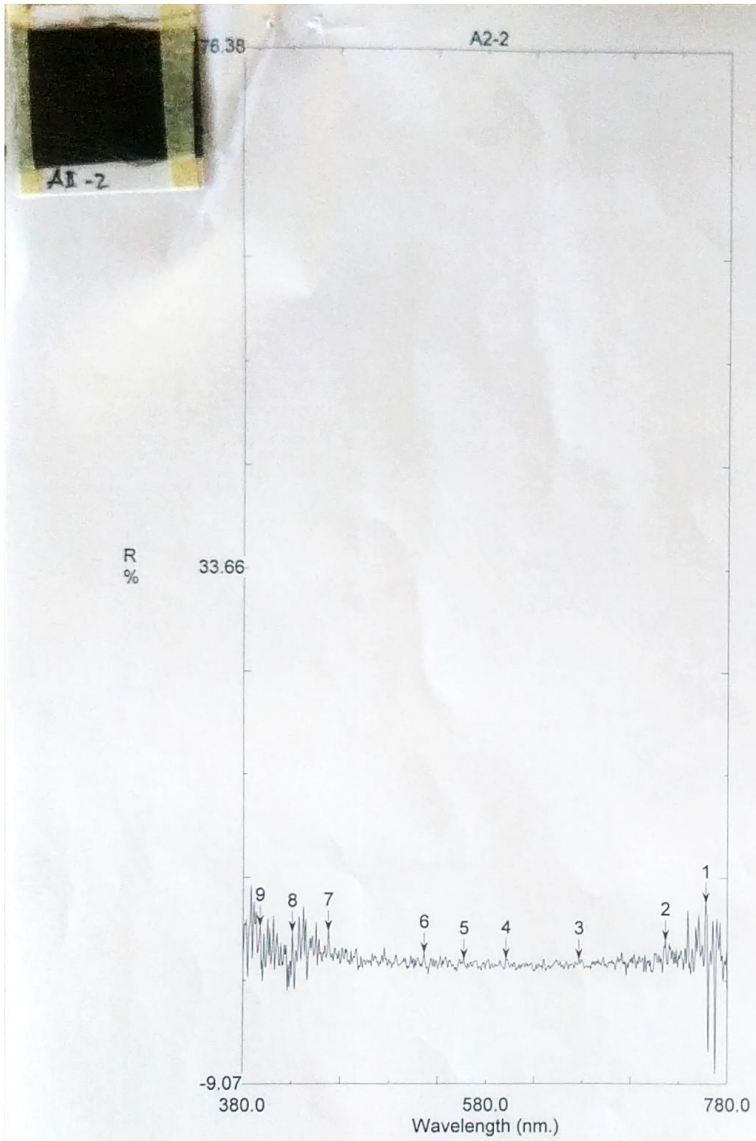
Peak Pick

No.	Wavelength (nm.)	R%
1	758.00	3.38
2	744.50	3.78
3	694.00	0.73
4	607.50	0.43
5	563.50	0.72
6	513.00	0.62
7	431.50	3.43
8	404.00	2.85

File Name: A2_1
Milik : I Kadek Ariadi-Kimi MIPA Ganesha BALI

Created: 10:41 16/02/21
Data: Original

Measuring Mode: R%
Scan Speed: Fast
Slit Width: 1.0
Sampling Interval: 0.5



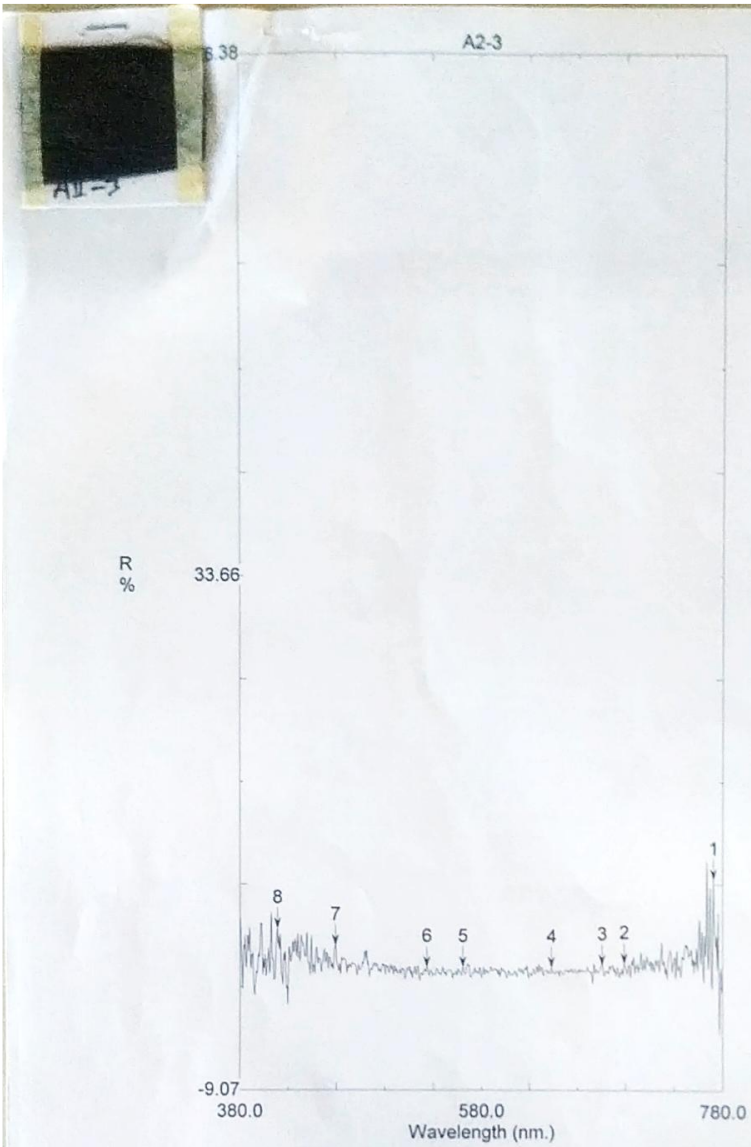
Peak Pick

No.	Wavelength (nm.)	R%
1	762.50	5.96
2	729.00	2.84
3	657.00	1.27
4	596.50	1.34
5	561.50	1.27
6	528.50	1.78
7	450.00	3.62
8	420.50	3.53
9	394.00	4.00

File Name: A2-2
Milik : I Kadek Ariadi-Kimi MIPA Ganesha BALI

Created: 10:38 16/02/21
Data: Original

Measuring Mode: R%
Scan Speed: Fast
Slit Width: 1.0
Sampling Interval: 0.5



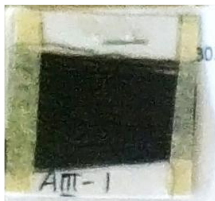
Peak Pick

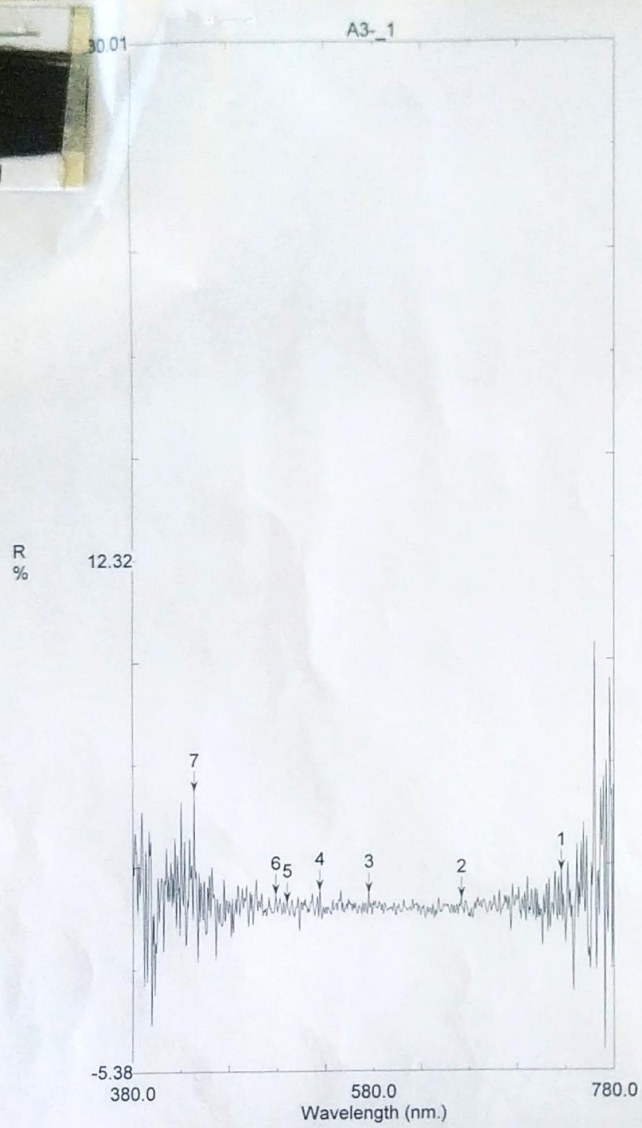
No.	Wavelength (nm.)	R%
1	772.50	8.48
2	699.00	1.46
3	680.50	1.34
4	638.50	1.14
5	564.50	1.14
6	534.50	1.16
7	459.00	2.96
8	411.00	4.35

File Name: A2-3
Milik : I Kadek Ariadi-Kimi MIPA Ganesha BALI

Created: 10:39 16/02/21
Data: Original

Measuring Mode: R%
Scan Speed: Fast
Slit Width: 1.0
Sampling Interval: 0.5





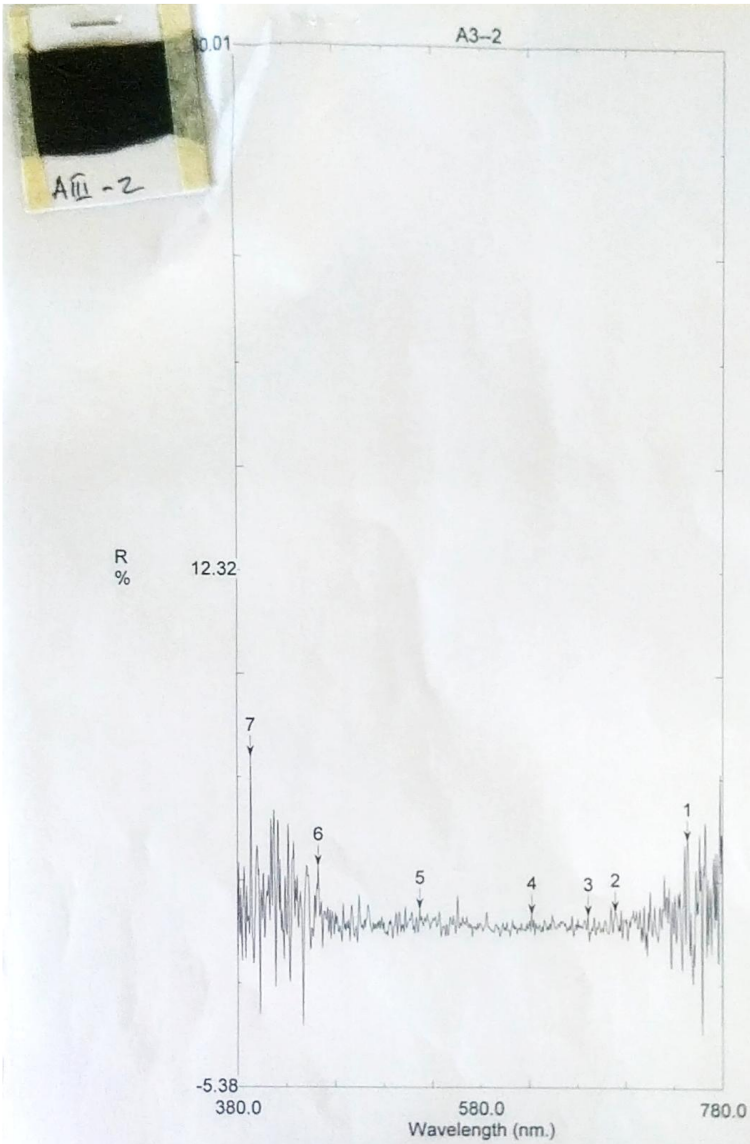
Peak Pick

No.	Wavelength (nm.)	R%
1	736.50	1.46
2	653.50	0.57
3	576.00	0.77
4	535.00	0.87
5	508.00	0.46
6	498.50	0.74
7	431.00	4.34

File Name: A3-_1
Milik : I Kadek Ariadi-Kimia MIPA-GANESHA BALI

Created: 12:33 17/02/21
Data: Original

Measuring Mode: R%
Scan Speed: Fast
Slit Width: 1.0
Sampling Interval: 0.5



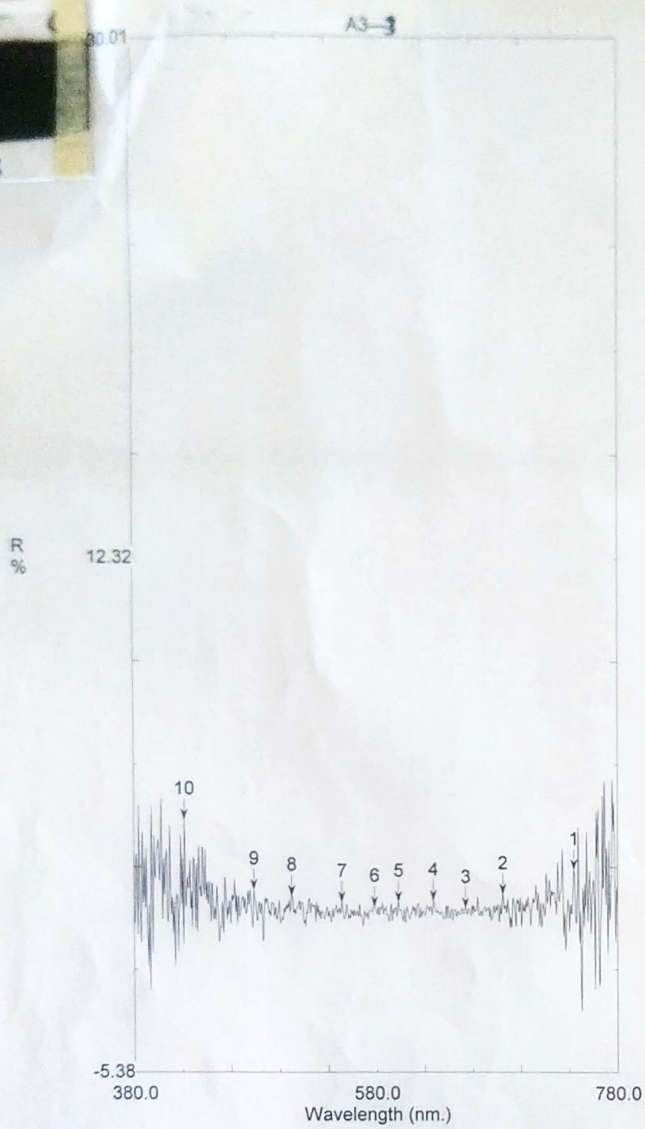
Peak Pick

No.	Wavelength (nm.)	R%
1	751.00	3.14
2	691.50	0.69
3	669.00	0.54
4	622.00	0.57
5	529.50	0.74
6	446.00	2.22
7	391.00	5.96

File Name: A3--2
Milik : I Kadek Ariadi-Kimia MIPA-GANESHA BALI

Created: 12:24 17/02/21
Data: Original

Measuring Mode: R%
Scan Speed: Fast
Slit Width: 1.0
Sampling Interval: 0.5



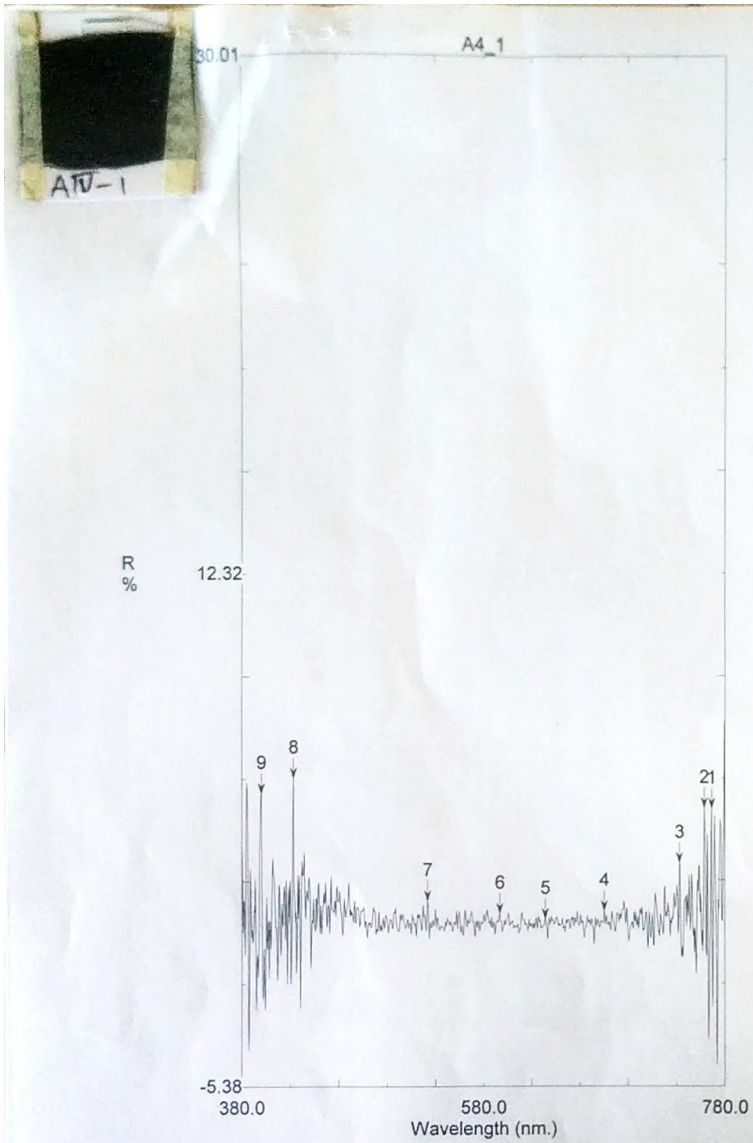
Peak Pick

No.	Wavelength (nm.)	R%
1	744.00	1.62
2	685.00	0.78
3	654.00	0.30
4	627.00	0.56
5	598.00	0.51
6	578.00	0.34
7	551.00	0.51
8	509.50	0.72
9	478.50	0.93
10	421.50	3.34

File Name: A3--3
Milik : I Kadek Ariadi-Kimia MIPA-GANESHA BALI

Created: 12:25 17/02/21
Data: Original

Measuring Mode: R%
Scan Speed: Fast
Slit Width: 1.0
Sampling Interval: 0.5



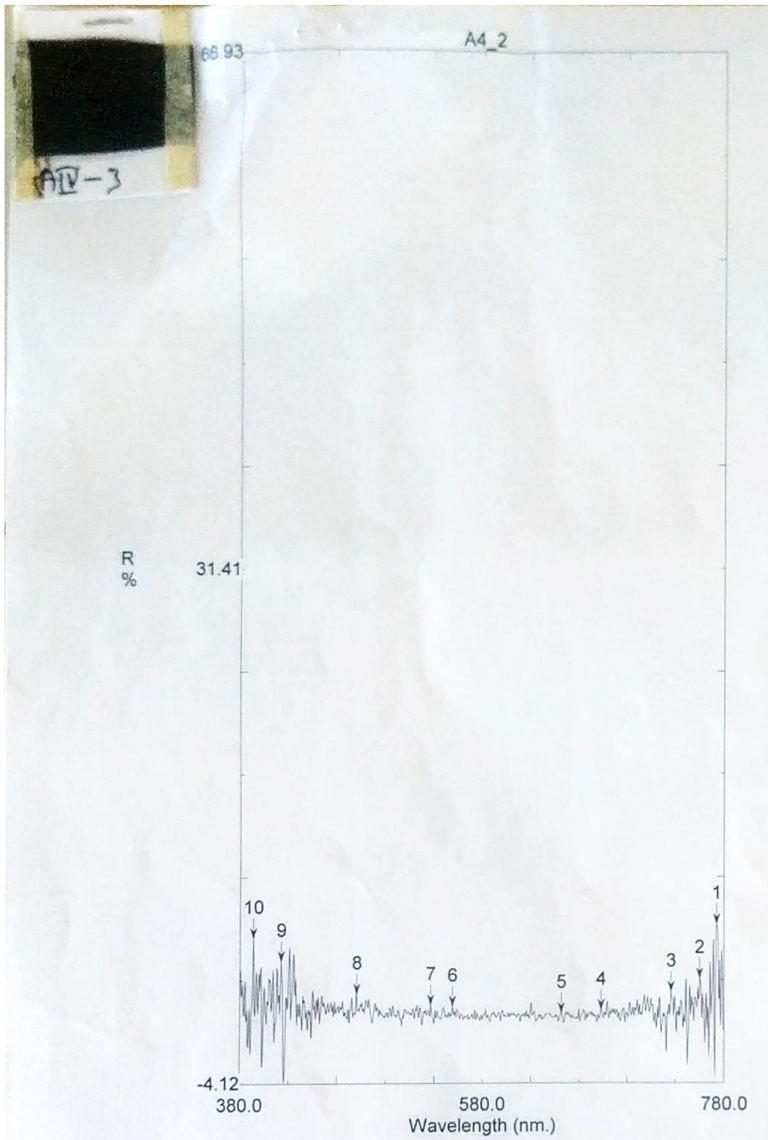
Peak Pick

No.	Wavelength (nm.)	R%
1	769.00	4.18
2	763.00	4.20
3	742.50	2.30
4	680.00	0.64
5	631.00	0.37
6	593.00	0.56
7	533.00	1.01
8	422.50	5.28
9	396.00	4.75

File Name: A4_1
Milik : I Kadek Ariadi-Kimia MIPA-GANESHA BALI

Created: 12:31 17/02/21
Data: Original

Measuring Mode: R%
Scan Speed: Fast
Slit Width: 1.0
Sampling Interval: 0.5



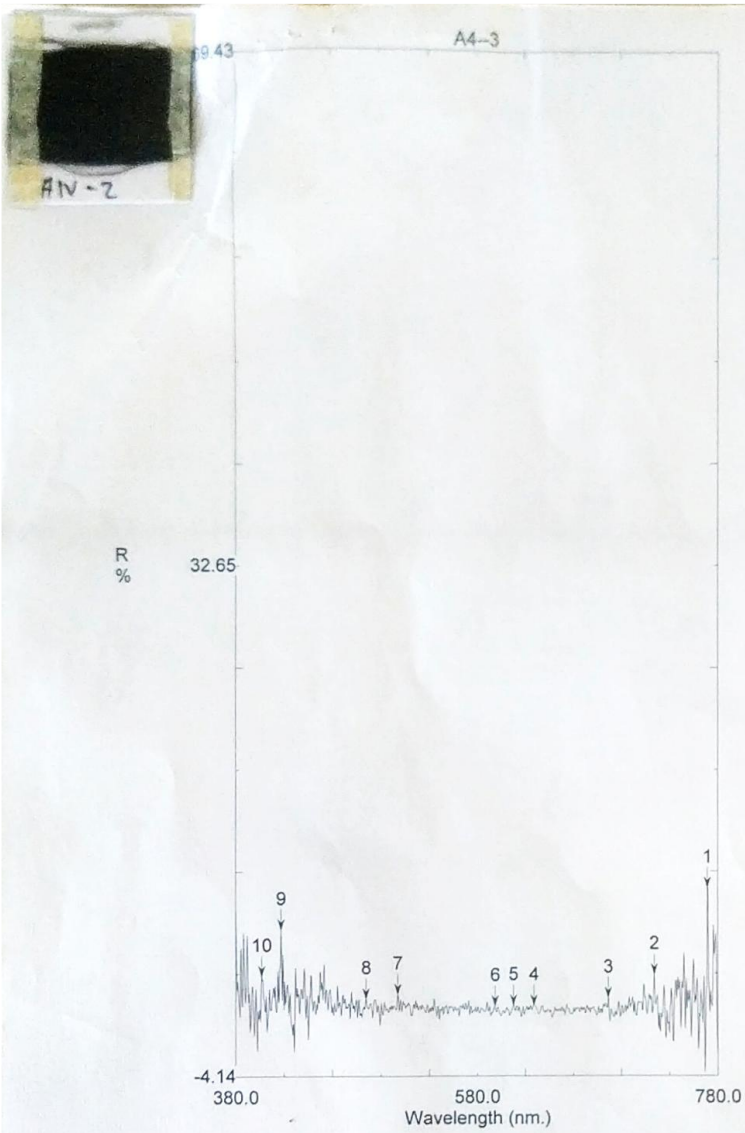
Peak Pick

No.	Wavelength (nm.)	R%
1	774.00	6.82
2	760.00	3.09
3	736.50	2.16
4	678.50	0.92
5	645.50	0.71
6	555.00	1.19
7	537.00	1.29
8	476.00	2.06
9	414.00	4.32
10	391.00	5.92

File Name: A4_2
Milik : I Kadek Ariadi-Kimi MIPA Ganesha BALI

Created: 10:53 16/02/21
Data: Original

Measuring Mode: R%
Scan Speed: Fast
Slit Width: 1.0
Sampling Interval: 0.5



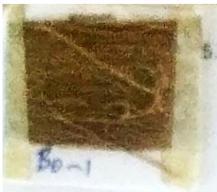
Peak Pick

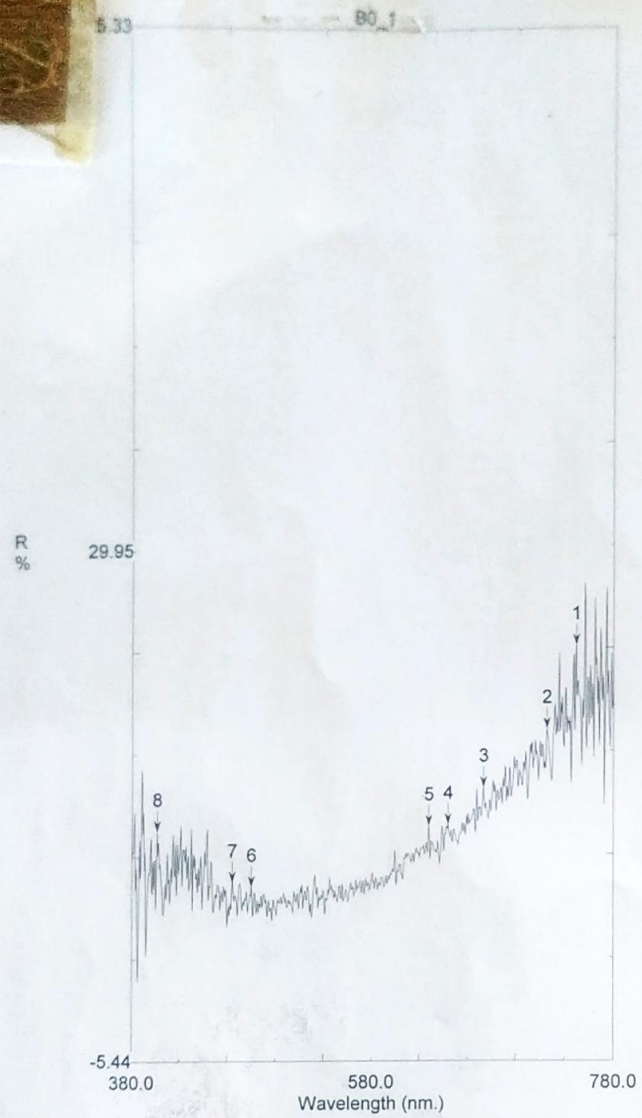
No.	Wavelength (nm.)	R%
1	771.50	9.39
2	727.50	3.16
3	689.00	1.48
4	627.00	0.95
5	610.00	0.97
6	594.50	0.90
7	513.50	1.76
8	487.50	1.45
9	417.50	6.43
10	401.50	3.09

File Name: A4--3
Milik : I Kadek Ariadi-Kimi MIPA Ganesha BALI

Created: 11:01 16/02/21
Data: Original

Measuring Mode: R%
Scan Speed: Fast
Slit Width: 1.0
Sampling Interval: 0.5





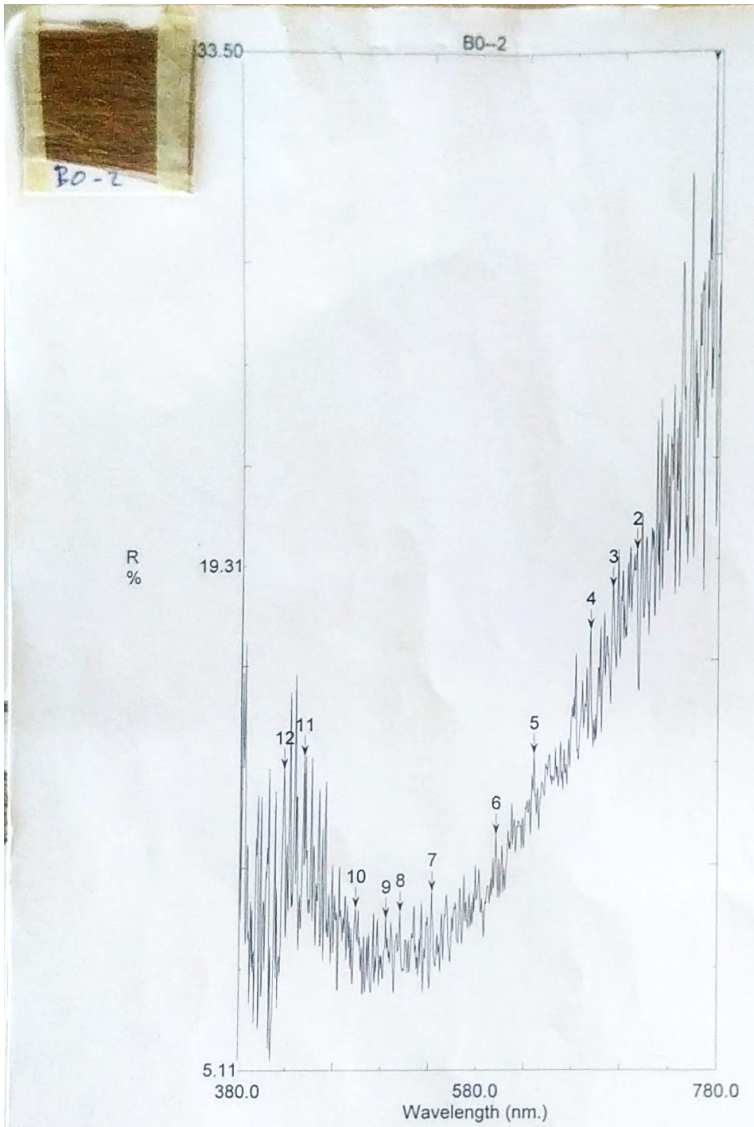
Peak Pick

No.	Wavelength (nm.)	R%
1	749.50	23.11
2	725.50	17.36
3	673.00	13.38
4	643.50	10.86
5	627.50	10.76
6	479.50	6.66
7	463.50	6.98
8	401.00	10.55

File Name: B0_1
Milik : I Kadek Ariadi-Kimi MIPA Ganesha BALI

Created: 11:10 16/02/21
Data: Original

Measuring Mode: R%
Scan Speed: Fast
Slit Width: 1.0
Sampling Interval: 0.5



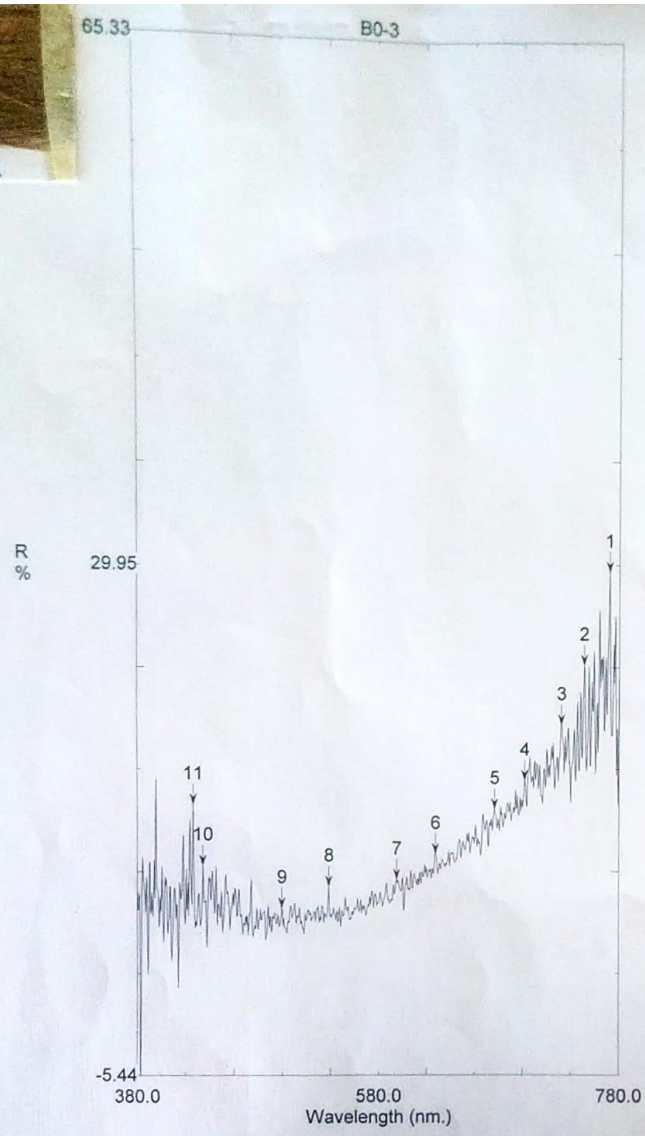
Peak Pick

No.	Wavelength (nm.)	R%
1	775.00	33.23
2	712.50	19.61
3	692.50	18.55
4	674.00	17.39
5	627.00	13.91
6	595.50	11.69
7	542.00	10.12
8	515.50	9.54
9	503.50	9.37
10	478.00	9.67
11	434.00	13.94
12	417.00	13.57

File Name: B0--2
Milik : I Kadek Ariadi-Kimi MIPA Ganesha BALI

Created: 11:14 16/02/21
Data: Original

Measuring Mode: R%
Scan Speed: Fast
Slit Width: 1.0
Sampling Interval: 0.5



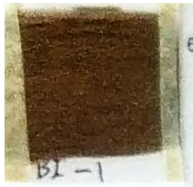
Peak Pick

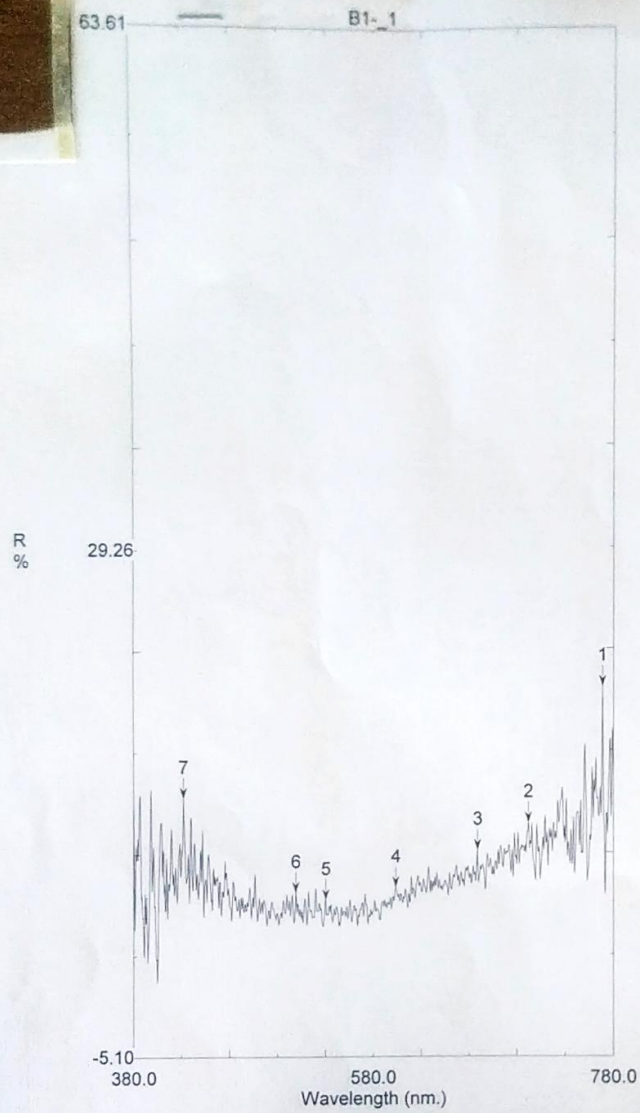
No.	Wavelength (nm.)	R%
1	772.00	29.49
2	751.00	23.06
3	732.00	18.92
4	701.50	15.05
5	676.50	13.08
6	627.00	9.96
7	594.50	8.19
8	538.00	7.70
9	499.00	6.21
10	434.00	9.17
11	426.00	13.37

File Name: B0-3
Milik : I Kadek Ariadi-Kimi MIPA Ganesha BALI

Created: 11:09 16/02/21
Data: Original

Measuring Mode: R%
Scan Speed: Fast
Slit Width: 1.0
Sampling Interval: 0.5





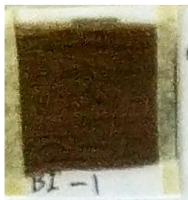
Peak Pick

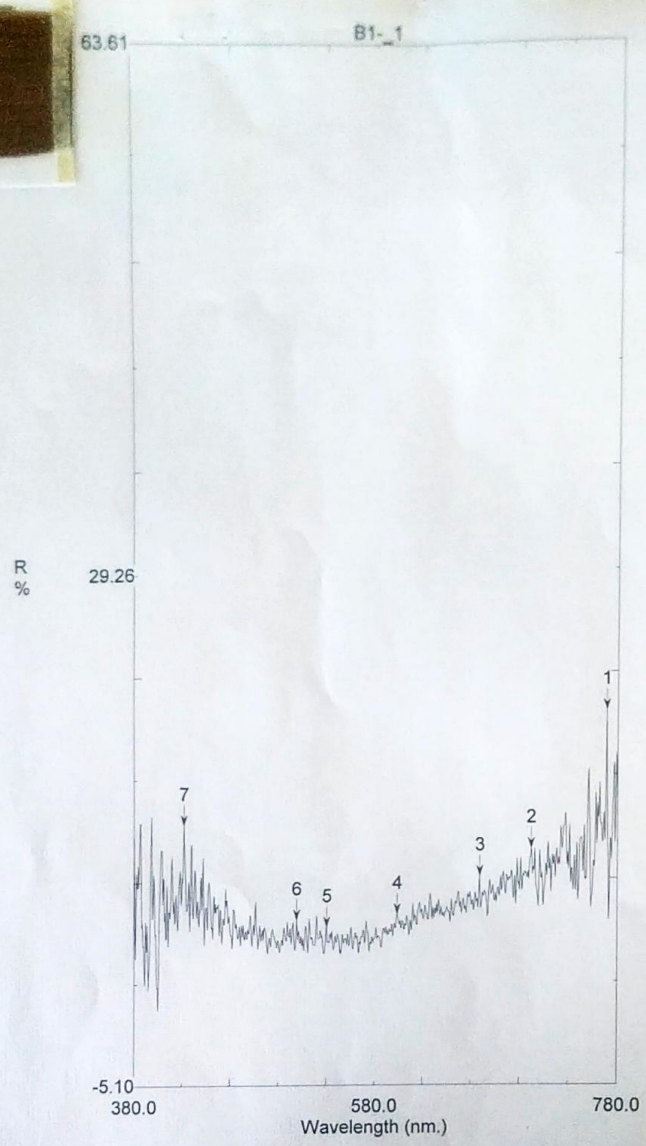
No.	Wavelength (nm.)	R%
1	771.00	19.83
2	709.50	10.69
3	667.00	8.88
4	598.50	6.38
5	540.00	5.55
6	515.00	6.06
7	421.50	12.49

File Name: B1-_1
Milik : I Kadek Ariadi-Kimi MIPA Ganesha BALI

Created: 11:21 16/02/21
Data: Original

Measuring Mode: R%
Scan Speed: Fast
Slit Width: 1.0
Sampling Interval: 0.5





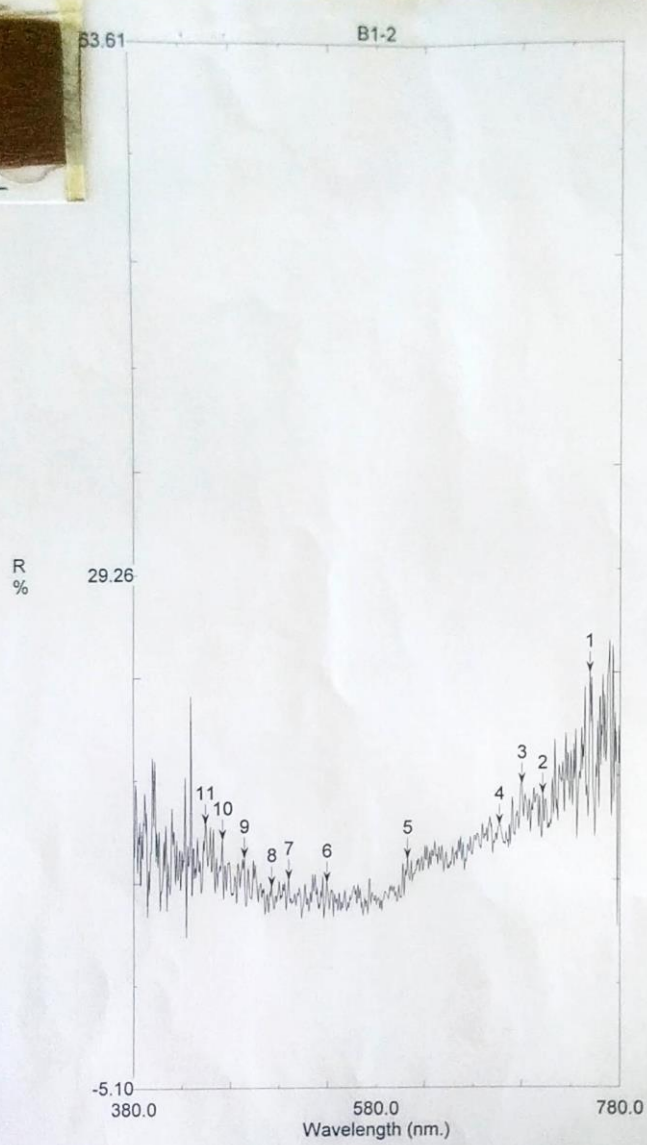
Peak Pick

No.	Wavelength (nm.)	R%
1	771.00	19.83
2	709.50	10.69
3	667.00	8.88
4	598.50	6.38
5	540.00	5.55
6	515.00	6.06
7	421.50	12.49

File Name: B1-_1
Milik : I Kadek Ariadi-Kimi MIPA Ganesha BALI

Created: 11:21 16/02/21
Data: Original

Measuring Mode: R%
Scan Speed: Fast
Slit Width: 1.0
Sampling Interval: 0.5



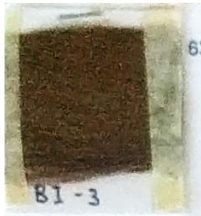
Peak Pick

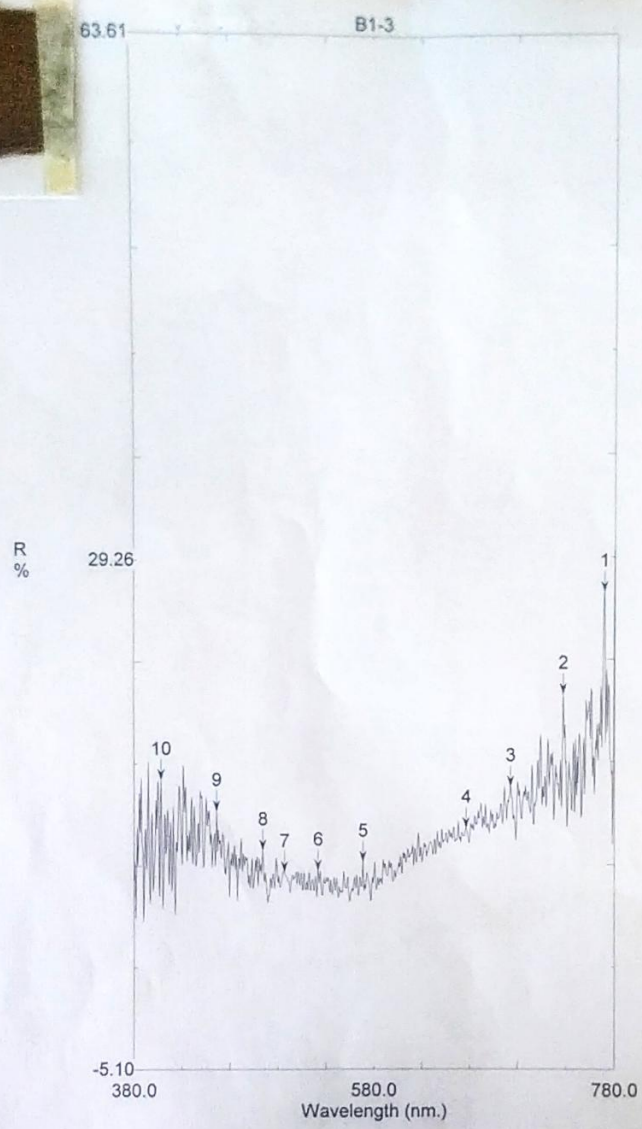
No.	Wavelength (nm.)	R%
1	755.50	22.43
2	717.00	14.36
3	700.00	15.06
4	681.50	12.33
5	605.50	10.13
6	539.00	8.63
7	507.50	8.82
8	493.50	8.37
9	471.00	10.31
10	453.00	11.52
11	439.00	12.57

File Name: B1-2
Milik : I Kadek Ariadi-Kimi MIPA Ganesha BALI

Created: 11:23 16/02/21
Data: Original

Measuring Mode: R%
Scan Speed: Fast
Slit Width: 1.0
Sampling Interval: 0.5





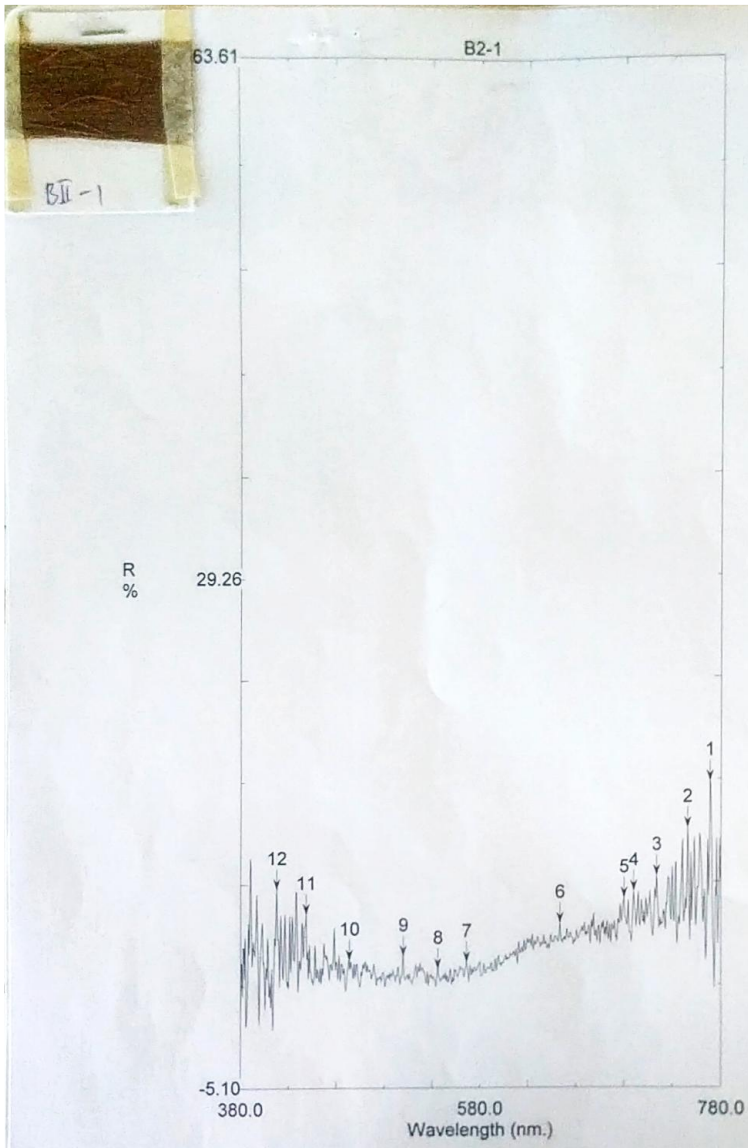
Peak Pick

No.	Wavelength (nm.)	R%
1	771.50	26.96
2	737.50	20.11
3	694.00	13.93
4	657.00	11.16
5	570.50	8.91
6	533.00	8.33
7	505.00	8.25
8	487.00	9.71
9	448.50	12.36
10	402.50	14.48

File Name: B1-3
Milik : I Kadek Ariadi-Kimi MIPA Ganesha BALI

Created: 11:25 16/02/21
Data: Original

Measuring Mode: R%
Scan Speed: Fast
Slit Width: 1.0
Sampling Interval: 0.5



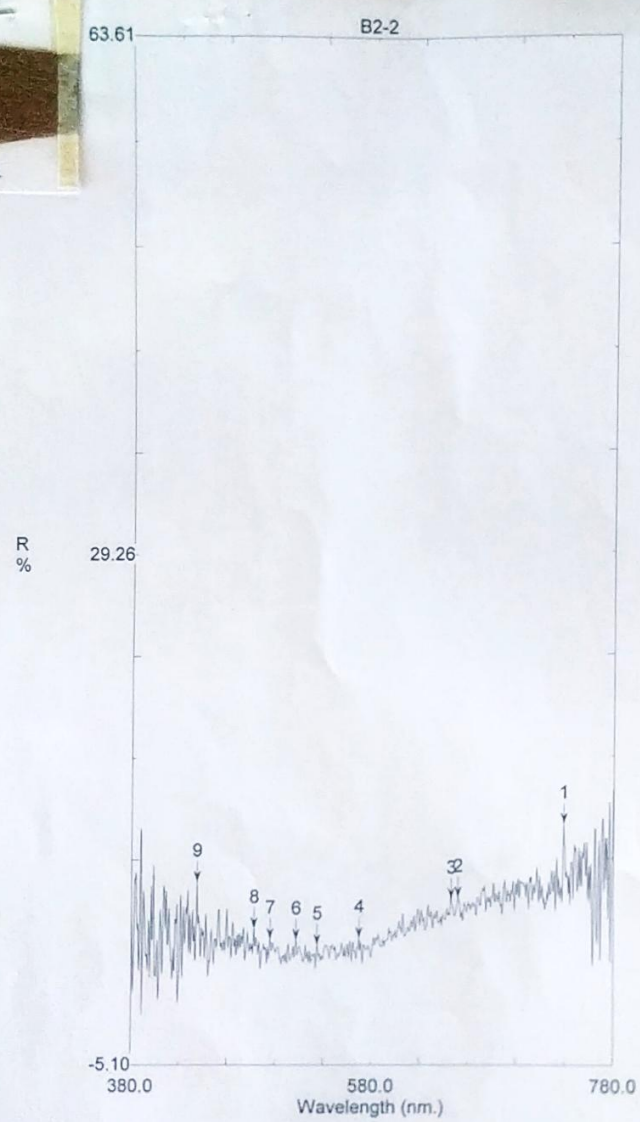
Peak Pick

No.	Wavelength (nm.)	R%
1	771.00	15.40
2	752.50	12.29
3	727.00	9.10
4	708.00	8.07
5	700.00	7.61
6	646.50	5.93
7	568.50	3.35
8	544.50	2.92
9	515.50	3.78
10	470.50	3.53
11	434.50	6.65
12	410.00	8.34

File Name: B2-1
Milik : I Kadek Ariadi-Kimi MIPA Ganesha BALI

Created: 11:26 16/02/21
Data: Original

Measuring Mode: R%
Scan Speed: Fast
Slit Width: 1.0
Sampling Interval: 0.5



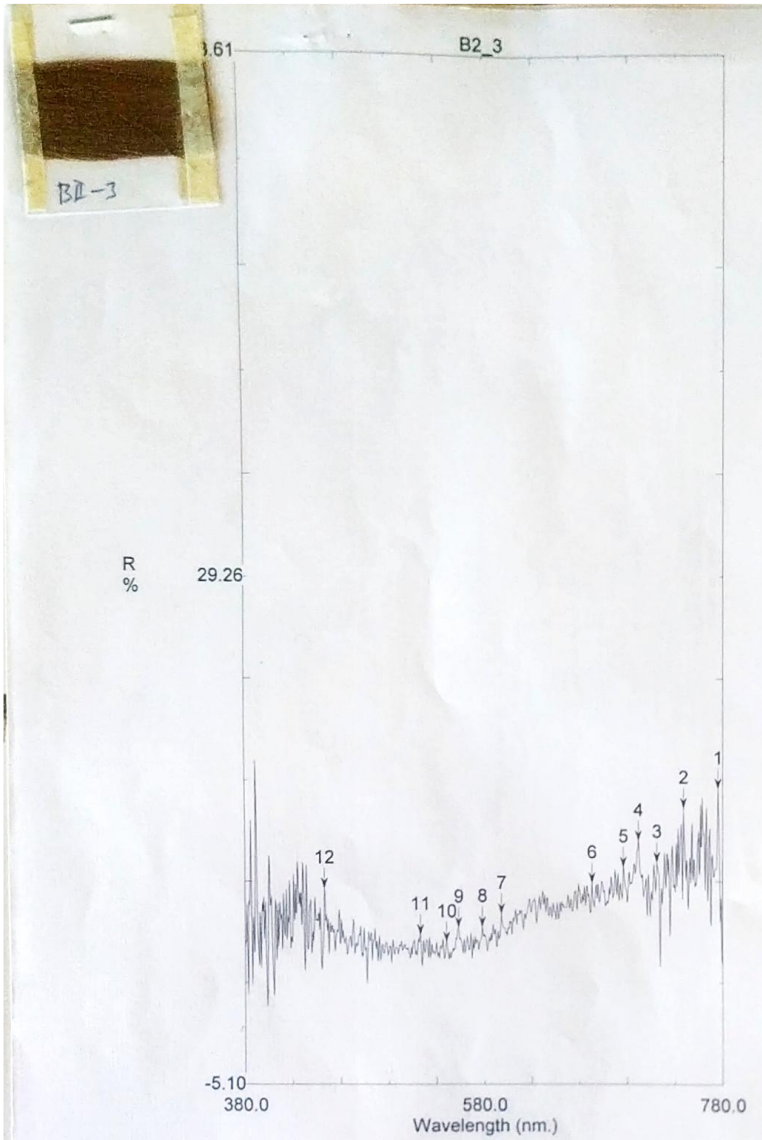
Peak Pick

No.	Wavelength (nm.)	R%
1	739.00	11.03
2	651.50	6.10
3	646.00	5.99
4	569.50	3.41
5	534.50	2.95
6	517.00	3.29
7	495.50	3.35
8	482.00	4.07
9	434.50	7.19

File Name: B2-2
Milik : I Kadek Ariadi-Kimi MIPA Ganesha BALI

Created: 11:29 16/02/21
Data: Original

Measuring Mode: R%
Scan Speed: Fast
Slit Width: 1.0
Sampling Interval: 0.5



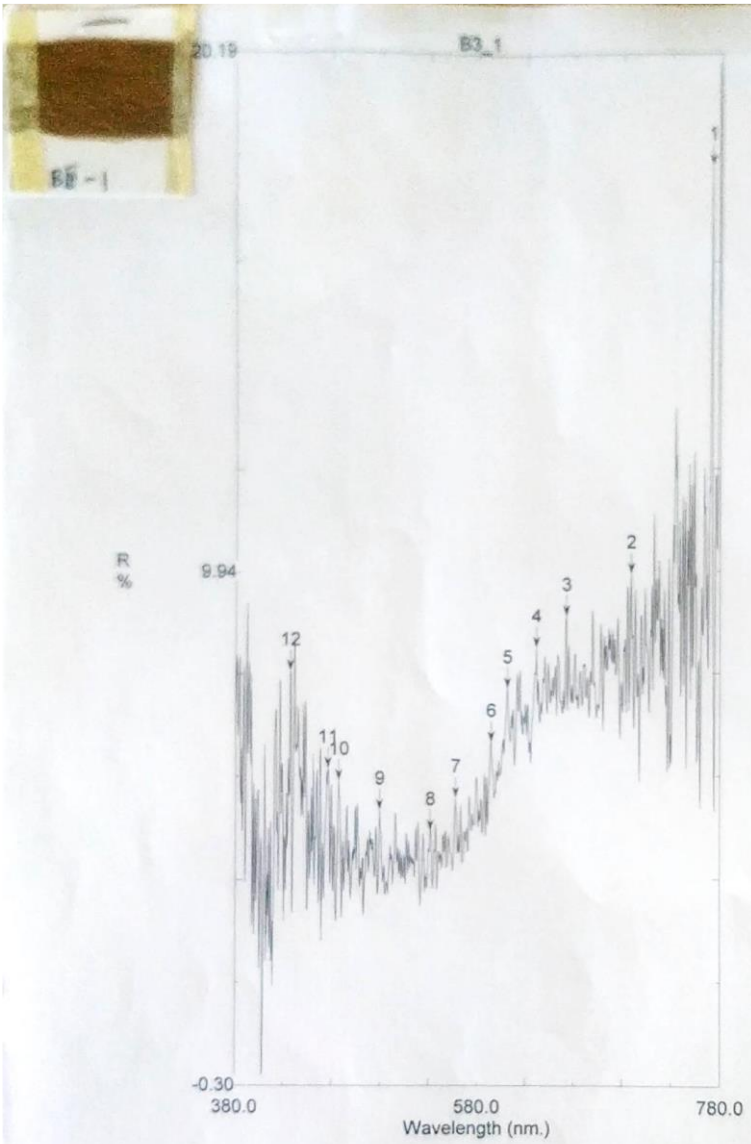
Peak Pick

No.	Wavelength (nm.)	R%
1	776.00	14.96
2	747.50	13.63
3	725.00	9.96
4	709.50	11.44
5	697.00	9.65
6	670.50	8.56
7	594.00	6.47
8	578.00	5.58
9	558.00	5.55
10	548.00	4.55
11	526.00	5.05
12	446.00	8.18

File Name: B2_3
Milik : I Kadek Ariadi-Kimi MIPA Ganesha BALI

Created: 11:34 16/02/21
Data: Original

Measuring Mode: R%
Scan Speed: Fast
Slit Width: 1.0
Sampling Interval: 0.5



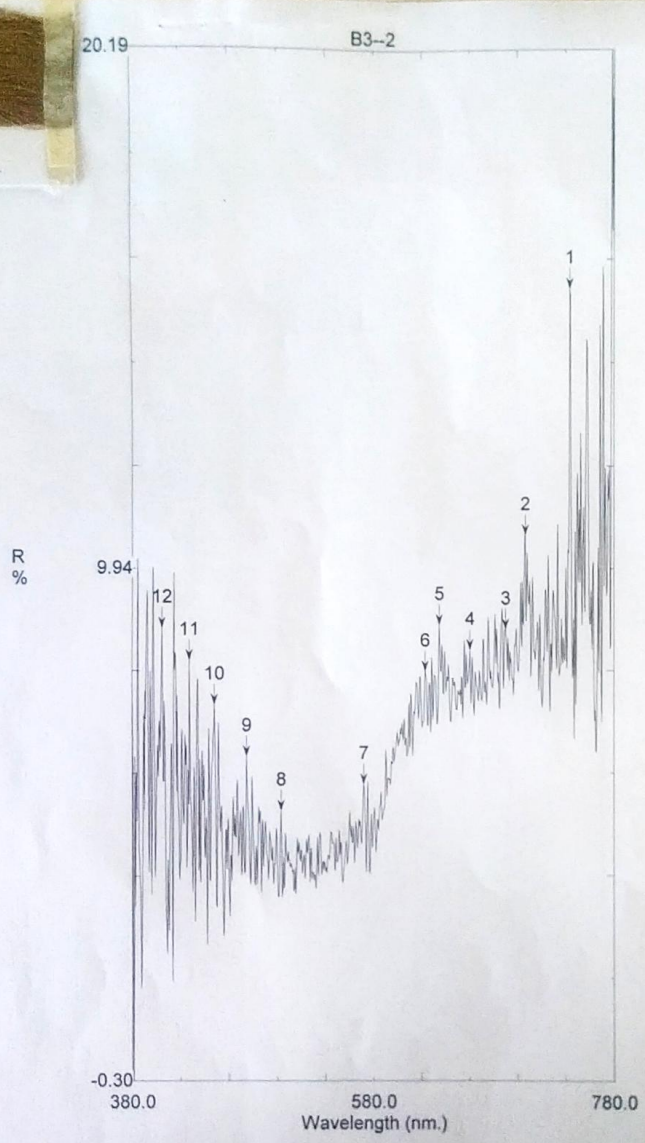
Peak Pick

No.	Wavelength (nm.)	R%
1	773.00	18.00
2	707.00	9.92
3	653.50	9.06
4	628.50	8.44
5	604.50	7.62
6	591.00	6.55
7	561.50	5.44
8	540.50	4.79
9	498.50	5.19
10	465.00	5.79
11	456.00	6.03
12	425.00	7.98

File Name: B3_1
Milik : I Kadek Ariadi-Kimia MIPA-GANESHA BALI

Created: 13:34 17/02/21
Data: Original

Measuring Mode: R%
Scan Speed: Fast
Slit Width: 1.0
Sampling Interval: 0.5



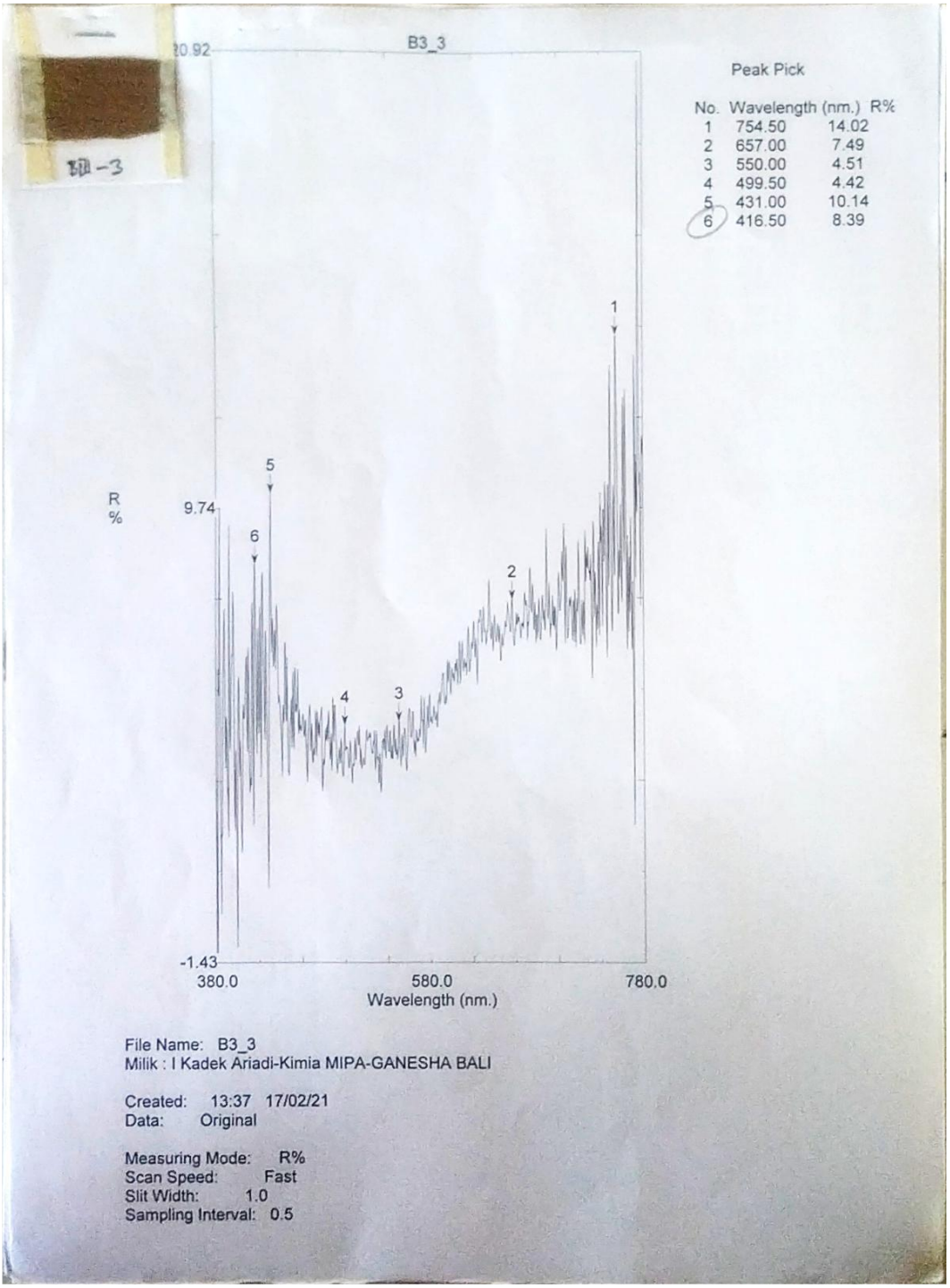
Peak Pick

No.	Wavelength (nm.)	R%
1	743.50	15.51
2	706.50	10.62
3	690.00	8.73
4	660.00	8.32
5	634.50	8.82
6	622.50	7.89
7	571.00	5.63
8	502.50	5.11
9	474.00	6.19
10	447.50	7.22
11	427.00	8.12
12	404.50	8.76

File Name: B3--2
Milik : I Kadek Ariadi-Kimia MIPA-GANESHA BALI

Created: 13:36 17/02/21
Data: Original

Measuring Mode: R%
Scan Speed: Fast
Slit Width: 1.0
Sampling Interval: 0.5



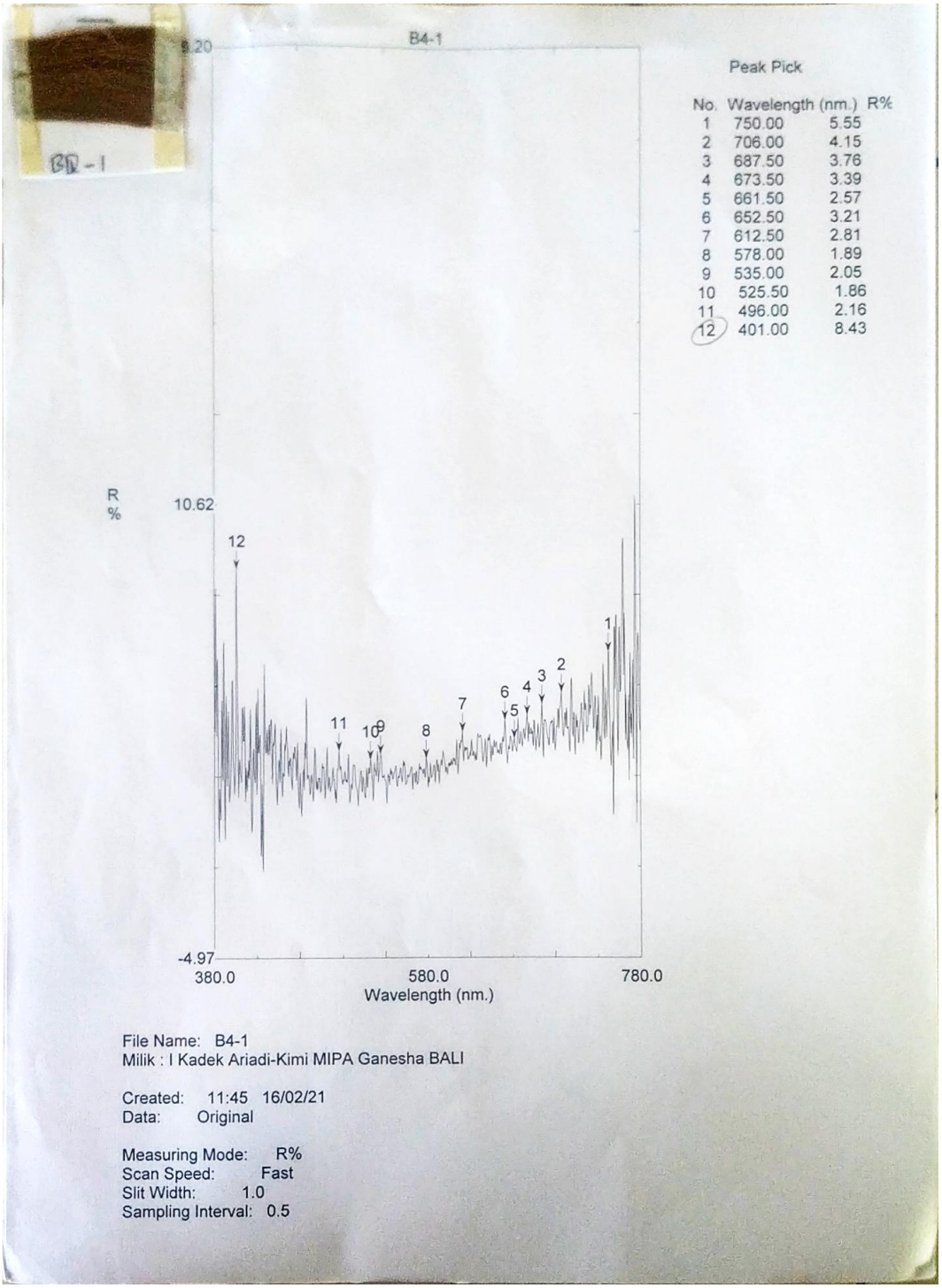
Peak Pick

No.	Wavelength (nm.)	R%
1	754.50	14.02
2	657.00	7.49
3	550.00	4.51
4	499.50	4.42
5	431.00	10.14
6	416.50	8.39

File Name: B3_3
Milik : I Kadek Ariadi-Kimia MIPA-GANESHA BALI

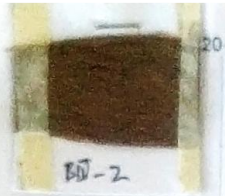
Created: 13:37 17/02/21
Data: Original

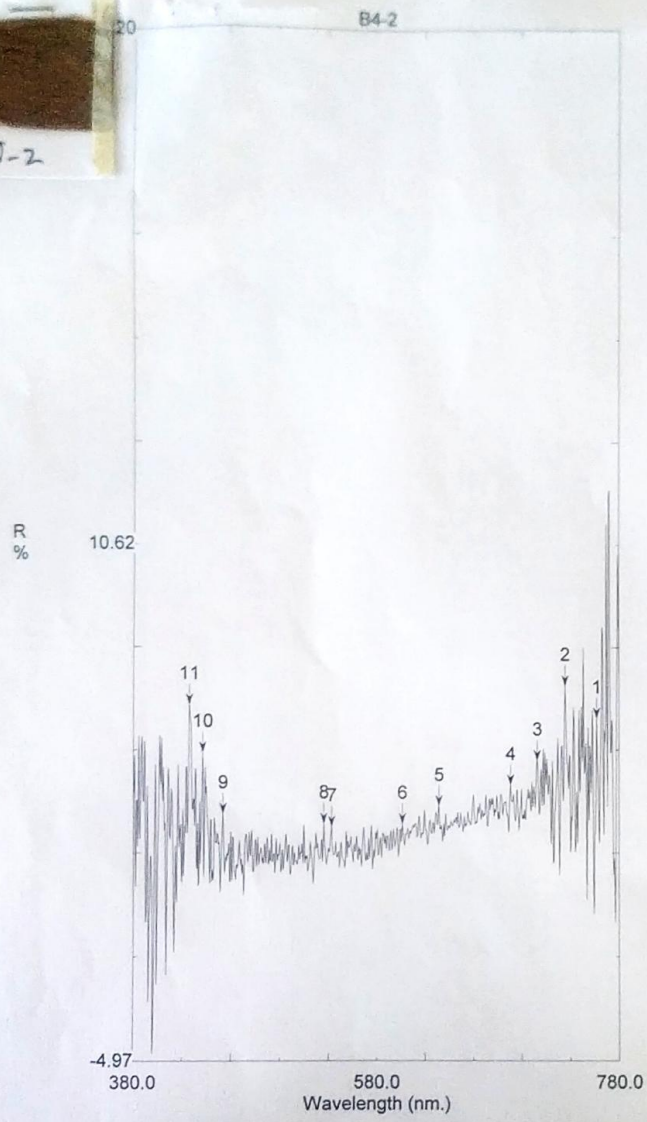
Measuring Mode: R%
Scan Speed: Fast
Slit Width: 1.0
Sampling Interval: 0.5



Peak Pick

No.	Wavelength (nm.)	R%
1	750.00	5.55
2	706.00	4.15
3	687.50	3.76
4	673.50	3.39
5	661.50	2.57
6	652.50	3.21
7	612.50	2.81
8	578.00	1.89
9	535.00	2.05
10	525.50	1.86
11	496.00	2.16
12	401.00	8.43





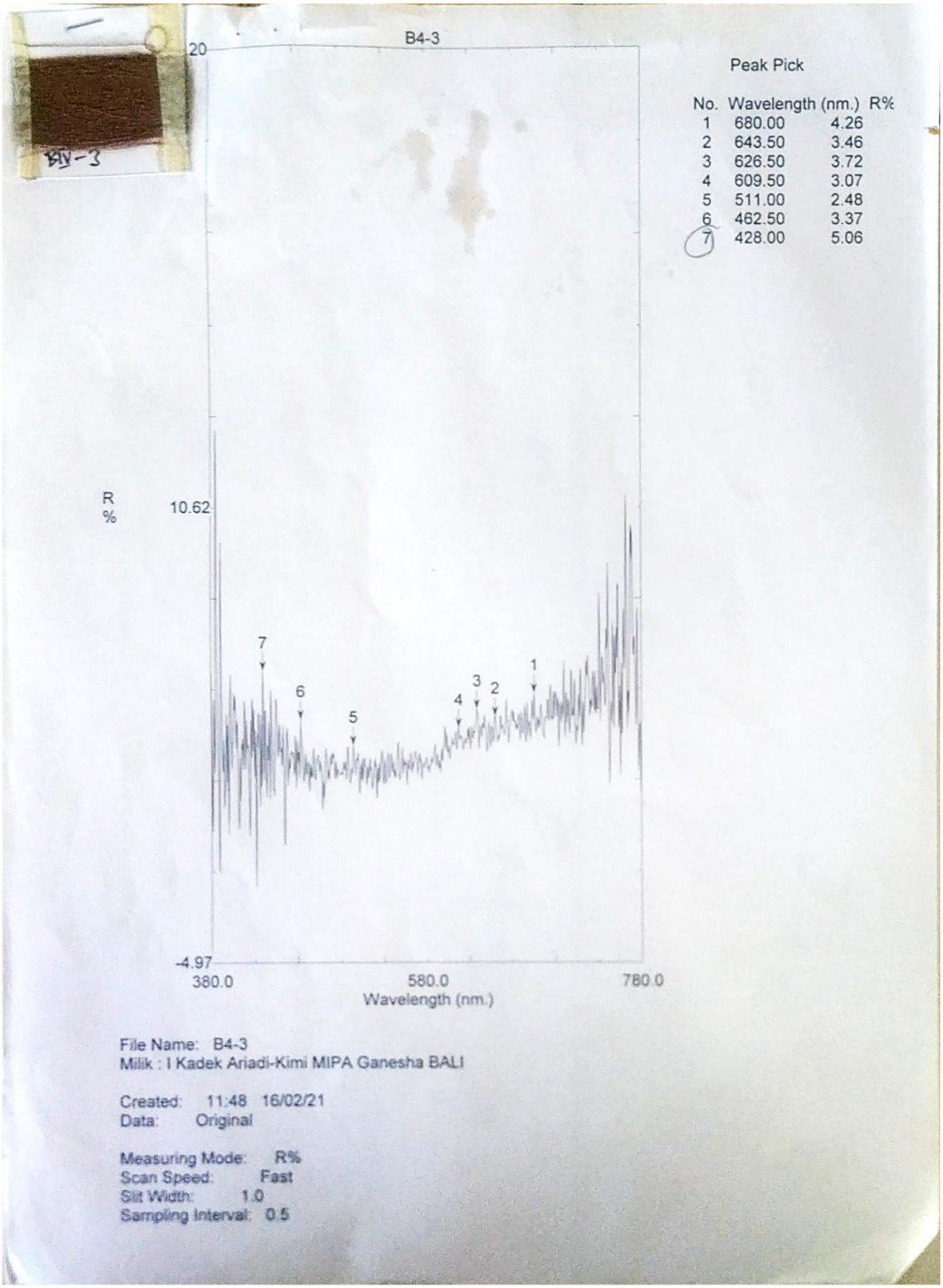
Peak Pick

No.	Wavelength (nm.)	R%
1	761.50	5.37
2	735.50	6.35
3	712.50	4.08
4	690.50	3.33
5	631.00	2.69
6	600.50	2.15
7	542.00	2.07
8	535.50	2.16
9	453.00	2.46
10	436.50	4.32
11	425.50	5.77

File Name: B4-2
Milik : I Kadek Ariadi-Kimi MIPA Ganesha BALI

Created: 11:47 16/02/21
Data: Original

Measuring Mode: R%
Scan Speed: Fast
Slit Width: 1.0
Sampling Interval: 0.5


B4-3
20
10.62
-4.97
R
%
380.0
580.0
780.0
Wavelength (nm.)
1
2
3
4
5
6
7
Peak Pick
No. Wavelength (nm.) R%
1 680.00 4.26
2 643.50 3.46
3 626.50 3.72
4 609.50 3.07
5 511.00 2.48
6 462.50 3.37
7 428.00 5.06
File Name: B4-3
Milik : I Kadek Ariadi-Kimi MIPA Ganesha BALI
Created: 11:48 16/02/21
Data: Original
Measuring Mode: R%
Scan Speed: Fast
Slit Width: 1.0
Sampling Interval: 0.5

MESDAN LAB

MESDAN-LAB strength tester

diujikan di Lab.Evateks-Rekateks-FTI-UII Jogja

Sample data

Customer	UPG-BALII
Date / Time	01-02-21 10:38
Art. code	Benang-A0
Count	0 (Nm)
Operator	supardi rs
Color	Coklat Muda
Lot number	1

Test parameters

Tension length	500 (mm)
Test speed	498,62 (mm/min)
Load cell	300 (g)
Pre-tensioning strength	0 (g)

Remarks
Uji Kekuatran Tarik dan Mulur BENANG,Kode(A0)Milik Mhs: I Kadek Ariadi S dan I Kadek Parwantara A-Kimia MIPA-UPG Bali

Tests data

Test	Strength(g)	Elongation(%)	Tenacity (RKM)
1	220.00	8.699	0.000
2	230.00	8.359	0.000
3	220.00	7.539	0.000
4	210.00	8.00	0.000
5	220.00	7.18	0.000

Statistical results

	Strength(g)	Elongation(%)	Tenacity (RKM)
Maximum	230.000 (2)	8.699 (1)	0.000
Minimum	210.000 (4)	7.180 (5)	0.000
Mean	220.000	7.955	0.000
Range (R%)	9.091	19.094	9.091
Variation coeff. (CV%)	3.214	7.678	3.214
Mean deviation (D)	7.071	0.611	0.000
IC (95%)	8.775	0.758	0.000
Upper limit (95%)	228.775	8.713	0.000
Lower limit (95%)	211.225	7.197	0.000
IC (99%)	14.559	1.258	0.000
Upper limit (99%)	234.559	9.213	0.000
Lower limit (99%)	205.441	6.698	0.000

MESDAN LAB

MESDAN-LAB strength tester

diujikan di Lab.Evateks-Rekateks-FTI-UII Jogja

Sample data

Customer	UPG-BALII
Date / Time	01-02-21 10:46
Art. code	Benang-B0
Count	0 (Nm)
Operator	supardi rs
Color	Coklat Tua
Lot number	2

Test parameters

Tension length	500 (mm)
Test speed	498,62 (mm/min)
Load cell	300 (g)
Pre-tensioning strength	0 (g)

Remarks
Uji Kekuatran Tarik dan Mulur BENANG,Kode(B0)Milik Mhs: I Kadek Ariadi S dan I Kadek Parwantara A-Kimia MIPA-UPG Bali

Tests data

Test	Strength(g)	Elongation(%)	Tenacity (RKM)
1	220.00	7.539	0.000
2	210.00	8.22	0.000
3	220.00	7.76	0.000
4	210.00	7.90	0.000
5	220.00	7.82	0.000

Statistical results

	Strength(g)	Elongation(%)	Tenacity (RKM)
Maximum	220.000 (1)	8.220 (2)	0.000
Minimum	210.000 (2)	7.539 (1)	0.000
Mean	216.000	7.848	0.000
Range (R%)	4.630	8.678	4.630
Variation coeff. (CV%)	2.536	3.154	2.536
Mean deviation (D)	5.477	0.248	0.000
IC (95%)	6.797	0.307	0.000
Upper limit (95%)	222.797	8.155	0.000
Lower limit (95%)	209.203	7.541	0.000
IC (99%)	11.278	0.510	0.000
Upper limit (99%)	227.278	8.358	0.000
Lower limit (99%)	204.722	7.338	0.000

MESDAN LAB

MESDAN-LAB strength tester

diujikan di Lab.Evateks-Rekateks-FTI-UII Jogja

Sample data

Customer	UPG-BALII
Date / Time	01-02-21 10:55
Art. code	Benang-AI
Count	0 (Nm)
Operator	supardi rs
Color	Coklat Abu2
Lot number	3

Test parameters

Tension length	500 (mm)
Test speed	498,62 (mm/min)
Load cell	300 (g)
Pre-tensioning strength	0 (g)

Remarks
Uji Kekuatran Tarik dan Mulur BENANG,Kode(AI)Milik Mhs: I Kadek Ariadi S dan I Kadek Parwantara A-Kimia MIPA-UPG Bali

Tests data

Test	Strength(g)	Elongation(%)	Tenacity (RKM)
1	200.00	7.079	0.000
2	200.00	7.20	0.000
3	200.00	6.559	0.000
4	220.00	7.539	0.000
5	200.00	7.46	0.000

Statistical results

	Strength(g)	Elongation(%)	Tenacity (RKM)
Maximum	220.000 (4)	7.539 (4)	0.000
Minimum	200.000 (1)	6.559 (3)	0.000
Mean	204.000	7.167	0.000
Range (R%)	9.804	13.673	9.804
Variation coeff. (CV%)	4.384	5.416	4.384
Mean deviation (D)	8.944	0.388	0.000
IC (95%)	11.100	0.482	0.000
Upper limit (95%)	215.100	7.649	0.000
Lower limit (95%)	192.900	6.686	0.000
IC (99%)	18.416	0.799	0.000
Upper limit (99%)	222.416	7.967	0.000
Lower limit (99%)	185.584	6.368	0.000

MESDAN LAB

MESDAN-LAB strength tester

diujikan di Lab.Evateks-Rekateks-FTI-UII Jogja

Sample data

Customer	UPG-BALII
Date / Time	01-02-21 11:02
Art. code	Benang-AII
Count	0 (Nm)
Operator	supardi rs
Color	Coklat Abu2
Lot number	4

Test parameters

Tension length	500 (mm)
Test speed	498,62 (mm/min)
Load cell	300 (g)
Pre-tensioning strength	0 (g)

Remarks
Uji Kekuatran Tarik dan Mulur BENANG,Kode(AII)Milik Mhs: I Kadek Ariadi S dan I Kadek Parwantara A-Kimia MIPA-UPG Bali

Tests data

Test	Strength(g)	Elongation(%)	Tenacity (RKM)
1	220.00	7.22	0.000
2	190.00	6.84	0.000
3	200.00	6.539	0.000
4	190.00	6.639	0.000
5	200.00	7.28	0.000

Statistical results

	Strength(g)	Elongation(%)	Tenacity (RKM)
Maximum	220.000 (1)	7.280 (5)	0.000
Minimum	190.000 (2)	6.539 (3)	0.000
Mean	200.000	6.904	0.000
Range (R%)	15.000	10.734	15.000
Variation coeff. (CV%)	6.124	4.852	6.124
Mean deviation (D)	12.247	0.335	0.000
IC (95%)	15.199	0.416	0.000
Upper limit (95%)	215.199	7.319	0.000
Lower limit (95%)	184.801	6.488	0.000
IC (99%)	25.218	0.690	0.000
Upper limit (99%)	225.217	7.593	0.000
Lower limit (99%)	174.783	6.214	0.000

MESDAN LAB

MESDAN-LAB strength tester

diujikan di Lab.Evateks-Rekateks-FTI-UII Jogja

Sample data

Customer	UPG-BALII
Date / Time	01-02-21 11:13
Art. code	Benang-AII
Count	0 (Nm)
Operator	supardi rs
Color	Coklat Abu2
Lot number	5

Test parameters

Tension length	500 (mm)
Test speed	498,62 (mm/min)
Load cell	300 (g)
Pre-tensioning strength	0 (g)

Remarks
Uji Kekuatran Tarik dan Mulur BENANG,Kode(AIII)Milik Mhs: I Kadek Ariadi S dan I Kadek Parwantara A-Kimia MIPA-UPG Bali

Tests data

Test	Strength(g)	Elongation(%)	Tenacity (RKM)
1	210.00	7.48	0.000
2	210.00	7.24	0.000
3	220.00	8.18	0.000
4	220.00	7.78	0.000
5	220.00	7.34	0.000

Statistical results

	Strength(g)	Elongation(%)	Tenacity (RKM)
Maximum	220.000 (3)	8.180 (3)	0.000
Minimum	210.000 (1)	7.240 (2)	0.000
Mean	216.000	7.604	0.000
Range (R%)	4.630	12.362	4.630
Variation coeff. (CV%)	2.536	5.009	2.536
Mean deviation (D)	5.477	0.381	0.000
IC (95%)	6.797	0.473	0.000
Upper limit (95%)	222.797	8.077	0.000
Lower limit (95%)	209.203	7.131	0.000
IC (99%)	11.278	0.784	0.000
Upper limit (99%)	227.278	8.388	0.000
Lower limit (99%)	204.722	6.820	0.000

MESDAN LAB

MESDAN-LAB strength tester

diujikan di Lab.Evateks-Rekateks-FTI-UII Jogja

Sample data

Customer	UPG-BALII
Date / Time	01-02-21 12:00
Art. code	Benang-BI
Count	0 (Nm)
Operator	supardi rs
Color	Coklat Abu2
Lot number	7

Test parameters

Tension length	500 (mm)
Test speed	498,62 (mm/min)
Load cell	300 (g)
Pre-tensioning strength	0 (g)

Remarks
Uji Kekuatran Tarik dan Mulur BENANG,Kode(BI)Milik Mhs: I Kadek Ariadi S dan I Kadek Parwantara A-Kimia MIPA-UPG Bali

Tests data

Test	Strength(g)	Elongation(%)	Tenacity (RKM)
1	220.00	7.66	0.000
2	200.00	7.82	0.000
3	200.00	7.26	0.000
4	220.00	8.02	0.000
5	200.00	7.86	0.000

Statistical results

	Strength(g)	Elongation(%)	Tenacity (RKM)
Maximum	220.000 (1)	8.020 (4)	0.000
Minimum	200.000 (2)	7.260 (3)	0.000
Mean	208.000	7.724	0.000
Range (R%)	9.615	9.840	9.615
Variation coeff. (CV%)	5.267	3.745	5.267
Mean deviation (D)	10.954	0.289	0.000
IC (95%)	13.595	0.359	0.000
Upper limit (95%)	221.594	8.083	0.000
Lower limit (95%)	194.406	7.365	0.000
IC (99%)	22.555	0.596	0.000
Upper limit (99%)	230.555	8.320	0.000
Lower limit (99%)	185.445	7.128	0.000

MESDAN LAB

MESDAN-LAB strength tester

diujikan di Lab.Evateks-Rekateks-FTI-UII Jogja

Sample data

Customer	UPG-BALII
Date / Time	01-02-21 14:03
Art. code	Benang-BII
Count	0 (Nm)
Operator	supardi rs
Color	Coklat Tua
Lot number	8

Test parameters

Tension length	500 (mm)
Test speed	498,62 (mm/min)
Load cell	300 (g)
Pre-tensioning strength	0 (g)

Remarks
Uji Kekuatran Tarik dan Mulur BENANG,Kode(BII)Milik Mhs: I Kadek Ariadi S dan I Kadek Parwantara A-Kimia MIPA-UPG Bali

Tests data

Test	Strength(g)	Elongation(%)	Tenacity (RKM)
1	210.00	8.06	0.000
2	210.00	7.50	0.000
3	220.00	7.019	0.000
4	200.00	7.42	0.000
5	220.00	6.84	0.000

Statistical results

	Strength(g)	Elongation(%)	Tenacity (RKM)
Maximum	220.000 (3)	8.060 (1)	0.000
Minimum	200.000 (4)	6.840 (5)	0.000
Mean	212.000	7.368	0.000
Range (R%)	9.434	16.559	9.434
Variation coeff. (CV%)	3.947	6.437	3.947
Mean deviation (D)	8.367	0.474	0.000
IC (95%)	10.383	0.589	0.000
Upper limit (95%)	222.383	7.956	0.000
Lower limit (95%)	201.617	6.779	0.000
IC (99%)	17.227	0.976	0.000
Upper limit (99%)	229.227	8.344	0.000
Lower limit (99%)	194.773	6.391	0.000

MESDAN LAB

MESDAN-LAB strength tester

diujikan di Lab.Evateks-Rekateks-FTI-UII Jogja

Sample data

Customer	UPG-BALII
Date / Time	01-02-21 14:12
Art. code	Benang-BIII
Count	0 (Nm)
Operator	supardi rs
Color	Coklat Tua
Lot number	9

Test parameters

Tension length	500 (mm)
Test speed	498,62 (mm/min)
Load cell	300 (g)
Pre-tensioning strength	0 (g)

Remarks
Uji Kekuatran Tarik dan Mulur BENANG,Kode(BIII)Milik Mhs: I Kadek Ariadi S dan I Kadek Parwantara A-Kimia MIPA-UPG Bali

Tests data

Test	Strength(g)	Elongation(%)	Tenacity (RKM)
1	210.00	6.98	0.000
2	210.00	8.34	0.000
3	230.00	7.34	0.000
4	220.00	5.68	0.000
5	220.00	7.36	0.000

Statistical results

	Strength(g)	Elongation(%)	Tenacity (RKM)
Maximum	230.000 (3)	8.340 (2)	0.000
Minimum	210.000 (1)	5.680 (4)	0.000
Mean	218.000	7.140	0.000
Range (R%)	9.174	37.255	9.174
Variation coeff. (CV%)	3.838	13.444	3.838
Mean deviation (D)	8.367	0.960	0.000
IC (95%)	10.383	1.191	0.000
Upper limit (95%)	228.383	8.331	0.000
Lower limit (95%)	207.617	5.949	0.000
IC (99%)	17.227	1.976	0.000
Upper limit (99%)	235.227	9.116	0.000
Lower limit (99%)	200.773	5.164	0.000

MESDAN LAB

MESDAN-LAB strength tester

diujikan di Lab.Evateks-Rekateks-FTI-UII Jogja

Sample data

Customer	UPG-BALII
Date / Time	01-02-21 14:30
Art. code	Benang-BIV
Count	0 (Nm)
Operator	supardi rs
Color	Coklat Tua
Lot number	10

Test parameters

Tension length	500 (mm)
Test speed	498,62 (mm/min)
Load cell	300 (g)
Pre-tensioning strength	0 (g)

Remarks
Uji Kekuatran Tarik dan Mulur BENANG,Kode(BIV)Milik Mhs: I Kadek Ariadi S dan I Kadek Parwantara A-Kimia MIPA-UPG Bali

Tests data

Test	Strength(g)	Elongation(%)	Tenacity (RKM)
1	240.00	7.44	0.000
2	240.00	6.72	0.000
3	240.00	6.96	0.000
4	240.00	7.32	0.000
5	230.00	7.18	0.000

Statistical results

	Strength(g)	Elongation(%)	Tenacity (RKM)
Maximum	240.000 (1)	7.440 (1)	0.000
Minimum	230.000 (5)	6.720 (2)	0.000
Mean	238.000	7.124	0.000
Range (R%)	4.202	10.107	4.202
Variation coeff. (CV%)	1.879	4.041	1.879
Mean deviation (D)	4.472	0.288	0.000
IC (95%)	5.550	0.357	0.000
Upper limit (95%)	243.550	7.481	0.000
Lower limit (95%)	232.450	6.767	0.000
IC (99%)	9.208	0.593	0.000
Upper limit (99%)	247.208	7.717	0.000
Lower limit (99%)	228.792	6.531	0.000

Table Data Print
Date: 02/10/21 Page: 1

Title : Uji Beda Warna Benang (L*a*b*dE*ab) Kode : A
Comment : Milik : I Kadek Ariadi-Kimia -GANESHA

File Name:

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Number of Lines: 16

Ill: D65 Obs: 10degree

Standard 111.21 0.13 -2.09

SampleID	L*	a*	b*	dE*ab	FileName
0	111.21	0.13	-2.09	0.00	ST-B_PTH
1	34.39	16.24	3.67	78.71	A0_1
2	30.48	14.75	0.13	82.07	A0-2
3	30.87	13.92	2.06	81.63	A0-3
4	31.21	5.20	-12.71	80.87	A1-1
5	24.99	3.92	-10.57	86.72	A1-2
6	25.20	6.48	-11.50	86.76	A1_3
7	2.18	-0.23	-6.23	109.11	A2-1
8	4.44	1.07	-6.64	106.88	A2-2
9	3.26	2.57	-7.49	108.12	A2-3
10	22.12	2.51	-14.83	90.04	A3-1
11	21.29	2.34	-15.75	90.98	A3-2
12	19.21	1.55	-12.03	92.55	A3-3
13	11.13	0.77	-10.88	100.47	A4_1
14	9.09	4.72	-13.28	102.84	A4_2
15	9.51	-1.37	-6.95	101.84	A4-3

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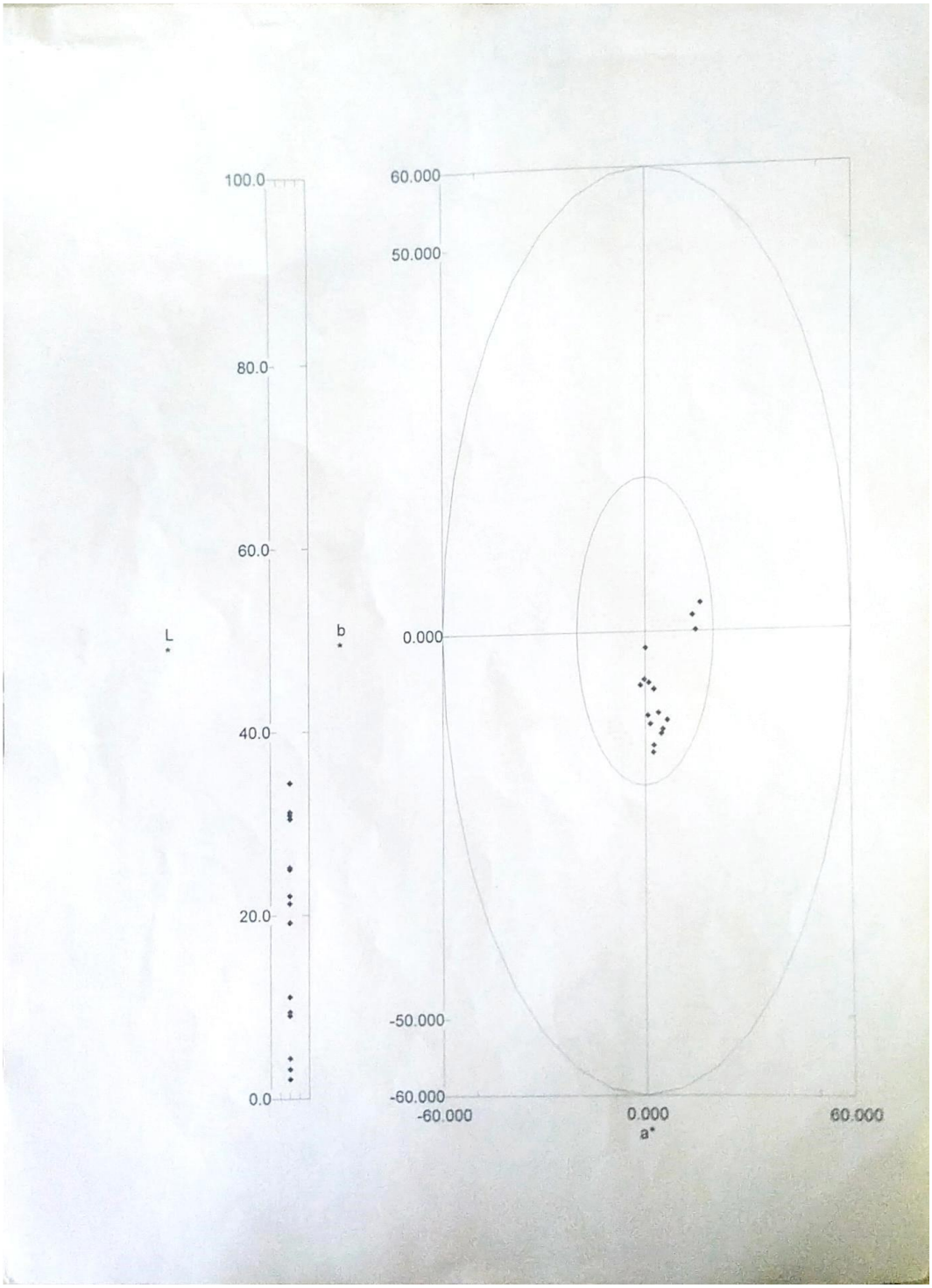
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a*

Table Data Print
Date: 02/10/21 Page: 1

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Comment : Milik : I Kadek Ariadi-Kimia -GANESHA

File Name:

Created:
Number of Lines: 16

Ill: D65 Obs: 10degree

Standard 111.21 0.13 -2.09

SampleID	L*	a*	b*	dE*ab	FileName
0	111.21	0.13	-2.09	0.00	ST-B_PTH
1	19.77	5.74	0.11	91.64	B0-1
2	19.17	5.27	-6.50	92.30	B0-2
3	19.20	6.58	-7.15	92.38	B0-3
4	2.65	0.84	-1.91	108.57	B1-1
5	2.02	2.92	-3.07	109.23	B1_2
6	8.65	6.18	-4.75	102.78	B1-3
7	19.62	5.09	-0.43	91.74	B2_1
8	21.81	8.12	-6.97	89.90	B2-2
9	22.69	7.08	-1.11	88.80	B2-3
10	21.34	11.95	-7.27	90.79	B3-1
11	22.26	7.39	-2.20	89.26	B3-2
12	20.68	10.33	-6.82	91.23	B3-3
13	4.83	4.59	-5.06	106.52	B4-1
14	4.31	0.26	-0.83	106.92	B4-2
15	5.31	4.64	-4.79	106.04	B4_3

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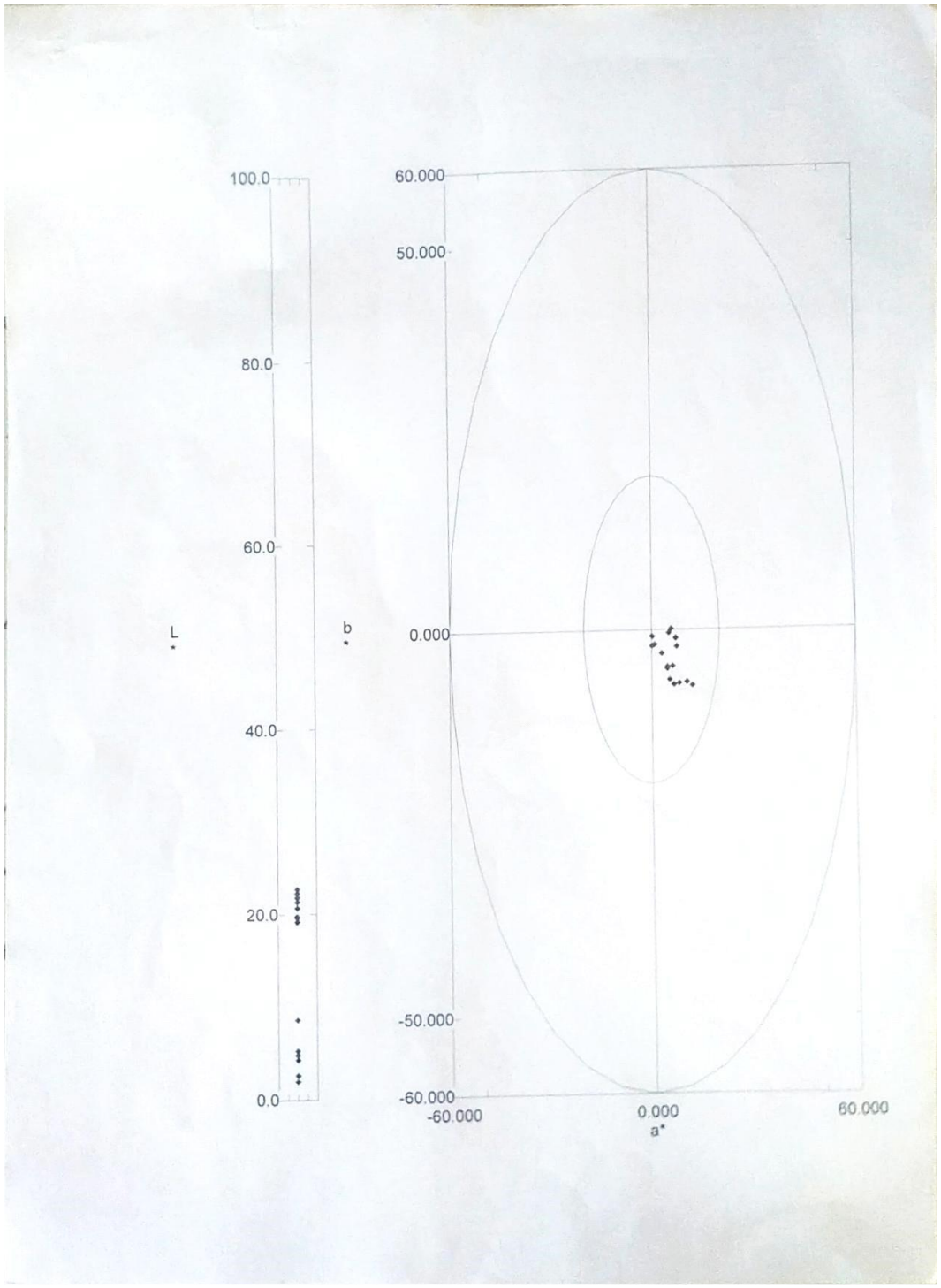
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Lampiran 3 Hasil Analisi Uji ANOVA dan Uji Tukey

1. Hasil Uji Beda Warna

Tests of Normality

		Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Komposisi	Statistic	df	Sig.	Statistic	df	Sig.
Hasil Uji	A0	.340	3	.	.849	3	.238
	B0	.350	3	.	.830	3	.188
	AI	.383	3	.	.755	3	.011
	AII	.196	3	.	.996	3	.877
	AIII	.232	3	.	.979	3	.725
	AIV	.208	3	.	.992	3	.828
	BI	.352	3	.	.826	3	.178
	BII	.233	3	.	.979	3	.724
	BIII	.304	3	.	.907	3	.409
	BIV	.191	3	.	.997	3	.900

a. Lilliefors Significance Correction

Descriptives

Hasil Uji

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
A0	3	80.8367	1.76888	1.02126	76.4425	85.2308	78.81	82.07
B0	3	92.1067	.40612	.23447	91.0978	93.1155	91.64	92.38
AI	3	84.7833	3.38911	1.95670	76.3643	93.2023	80.87	86.76
AII	3	108.0367	1.11733	.64509	105.2611	110.8123	106.88	109.11
AIII	3	91.1900	1.26811	.73214	88.0398	94.3402	90.04	92.55
AIV	3	101.7167	1.18980	.68693	98.7610	104.6723	100.47	102.84
BI	3	106.8600	3.54876	2.04888	98.0444	115.6756	102.78	109.23
BII	3	90.1467	1.48544	.85762	86.4566	93.8367	88.80	91.74
BIII	3	90.4267	1.03404	.59700	87.8580	92.9954	89.26	91.23

BIV	3	106.4933	.44061	.25438	105.3988	107.5879	106.04	106.92
Total	30	95.2597	9.55690	1.74484	91.6911	98.8283	78.81	109.23

Test of Homogeneity of Variances

Hasil Uji

Levene Statistic	df1	df2	Sig.
4.313	9	20	.003

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ANOVA

Hasil Uji

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	2578.465	9	286.496	81.586	.000
Within Groups	70.231	20	3.512		
Total	2648.696	29			

Multiple Comparisons

Dependent Variable: Hasil Uji

Tukey HSD

(I) Komposisi	(J) Komposisi	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval Lower Bound	95% Confidence Interval Upper Bound
A0	B0	-11.27000*	1.53005	.000	-16.6881	-5.8519
	AI	-3.94667	1.53005	.288	-9.3647	1.4714
	AII	-27.20000*	1.53005	.000	-32.6181	-21.7819
	AIII	-10.35333*	1.53005	.000	-15.7714	-4.9353
	AIV	-20.88000*	1.53005	.000	-26.2981	-15.4619
	BI	-26.02333*	1.53005	.000	-31.4414	-20.6053
	BII	-9.31000*	1.53005	.000	-14.7281	-3.8919
	BIII	-9.59000*	1.53005	.000	-15.0081	-4.1719
	BIV	-25.65667*	1.53005	.000	-31.0747	-20.2386
B0	A0	11.27000*	1.53005	.000	5.8519	16.6881
	AI	7.32333*	1.53005	.003	1.9053	12.7414
	AII	-15.93000*	1.53005	.000	-21.3481	-10.5119
	AIII	.91667	1.53005	1.000	-4.5014	6.3347
	AIV	-9.61000*	1.53005	.000	-15.0281	-4.1919
	BI	-14.75333*	1.53005	.000	-20.1714	-9.3353

	BII	1.96000	1.53005	.947	-3.4581	7.3781
	BIII	1.68000	1.53005	.979	-3.7381	7.0981
	BIV	-14.38667*	1.53005	.000	-19.8047	-8.9686
AI	A0	3.94667	1.53005	.288	-1.4714	9.3647
	B0	-7.32333*	1.53005	.003	-12.7414	-1.9053
	AII	-23.25333*	1.53005	.000	-28.6714	-17.8353
	AIII	-6.40667*	1.53005	.013	-11.8247	-.9886
	AIV	-16.93333*	1.53005	.000	-22.3514	-11.5153
	BI	-22.07667*	1.53005	.000	-27.4947	-16.6586
	BII	-5.36333	1.53005	.054	-10.7814	.0547
	BIII	-5.64333*	1.53005	.037	-11.0614	-.2253
	BIV	-21.71000*	1.53005	.000	-27.1281	-16.2919
AII	A0	27.20000*	1.53005	.000	21.7819	32.6181
	B0	15.93000*	1.53005	.000	10.5119	21.3481
	AI	23.25333*	1.53005	.000	17.8353	28.6714
	AIII	16.84667*	1.53005	.000	11.4286	22.2647
	AIV	6.32000*	1.53005	.015	.9019	11.7381
	BI	1.17667	1.53005	.998	-4.2414	6.5947
	BII	17.89000*	1.53005	.000	12.4719	23.3081
	BIII	17.61000*	1.53005	.000	12.1919	23.0281
	BIV	1.54333	1.53005	.988	-3.8747	6.9614
AIII	A0	10.35333*	1.53005	.000	4.9353	15.7714
	B0	-.91667	1.53005	1.000	-6.3347	4.5014
	AI	6.40667*	1.53005	.013	.9886	11.8247
	AII	-16.84667*	1.53005	.000	-22.2647	-11.4286
	AIV	-10.52667*	1.53005	.000	-15.9447	-5.1086
	BI	-15.67000*	1.53005	.000	-21.0881	-10.2519
	BII	1.04333	1.53005	.999	-4.3747	6.4614
	BIII	.76333	1.53005	1.000	-4.6547	6.1814
	BIV	-15.30333*	1.53005	.000	-20.7214	-9.8853

AIV	A0	20.88000*	1.53005	.000	15.4619	26.2981
	B0	9.61000*	1.53005	.000	4.1919	15.0281
	AI	16.93333*	1.53005	.000	11.5153	22.3514
	AII	-6.32000*	1.53005	.015	-11.7381	-.9019
	AIII	10.52667*	1.53005	.000	5.1086	15.9447
	BI	-5.14333	1.53005	.072	-10.5614	.2747
	BII	11.57000*	1.53005	.000	6.1519	16.9881
	BIII	11.29000*	1.53005	.000	5.8719	16.7081
	BIV	-4.77667	1.53005	.113	-10.1947	.6414
BI	A0	26.02333*	1.53005	.000	20.6053	31.4414
	B0	14.75333*	1.53005	.000	9.3353	20.1714
	AI	22.07667*	1.53005	.000	16.6586	27.4947
	AII	-1.17667	1.53005	.998	-6.5947	4.2414
	AIII	15.67000*	1.53005	.000	10.2519	21.0881
	AIV	5.14333	1.53005	.072	-.2747	10.5614
	BII	16.71333*	1.53005	.000	11.2953	22.1314
	BIII	16.43333*	1.53005	.000	11.0153	21.8514
	BIV	.36667	1.53005	1.000	-5.0514	5.7847
BII	A0	9.31000*	1.53005	.000	3.8919	14.7281
	B0	-1.96000	1.53005	.947	-7.3781	3.4581
	AI	5.36333	1.53005	.054	-.0547	10.7814
	AII	-17.89000*	1.53005	.000	-23.3081	-12.4719
	AIII	-1.04333	1.53005	.999	-6.4614	4.3747
	AIV	-11.57000*	1.53005	.000	-16.9881	-6.1519
	BI	-16.71333*	1.53005	.000	-22.1314	-11.2953
	BIII	-.28000	1.53005	1.000	-5.6981	5.1381
	BIV	-16.34667*	1.53005	.000	-21.7647	-10.9286
BIII	A0	9.59000*	1.53005	.000	4.1719	15.0081
	B0	-1.68000	1.53005	.979	-7.0981	3.7381
	AI	5.64333*	1.53005	.037	.2253	11.0614

	AII	-17.61000*	1.53005	.000	-23.0281	-12.1919
	AIII	-.76333	1.53005	1.000	-6.1814	4.6547
	AIV	-11.29000*	1.53005	.000	-16.7081	-5.8719
	BI	-16.43333*	1.53005	.000	-21.8514	-11.0153
	BII	.28000	1.53005	1.000	-5.1381	5.6981
	BIV	-16.06667*	1.53005	.000	-21.4847	-10.6486
BIV	A0	25.65667*	1.53005	.000	20.2386	31.0747
	B0	14.38667*	1.53005	.000	8.9686	19.8047
	AI	21.71000*	1.53005	.000	16.2919	27.1281
	AII	-1.54333	1.53005	.988	-6.9614	3.8747
	AIII	15.30333*	1.53005	.000	9.8853	20.7214
	AIV	4.77667	1.53005	.113	-.6414	10.1947
	BI	-.36667	1.53005	1.000	-5.7847	5.0514
	BII	16.34667*	1.53005	.000	10.9286	21.7647
	BIII	16.06667*	1.53005	.000	10.6486	21.4847

*. The mean difference is significant at the 0.05 level.

Hasil Uji

Tukey HSD[a]

		Subset for alpha = 0.05				
Komposisi	N	1	2	3	4	5
A0	3	80.8367				
AI	3	84.7833	84.7833			
BII	3		90.1467	90.1467		
BIII	3			90.4267		
AIII	3			91.1900		
B0	3			92.1067		
AIV	3				101.7167	
BIV	3				106.4933	106.4933
BI	3				106.8600	106.8600
AII	3					108.0367

Sig.		.288	.054	.947	.072	.988

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 3.000.

2. Hasil Uji Ketuaan Warna

Tests of Normality

		Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Komposisi	Statistic	df	Sig.	Statistic	df	Sig.
Hasil Uji	A0	.385	3	.	.750	3	.000
	B0	.327	3	.	.872	3	.301
	AI	.346	3	.	.838	3	.209
	AII	.229	3	.	.981	3	.738
	AIII	.229	3	.	.982	3	.741
	AIV	.197	3	.	.996	3	.876
	BI	.229	3	.	.981	3	.739
	BII	.243	3	.	.972	3	.679
	BIII	.249	3	.	.968	3	.654
	BIV	.309	3	.	.900	3	.384

a. Lilliefors Significance Correction

Descriptives

Hasil Uji

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
A0	3	45.4333	3.50452	2.02333	36.7276	54.1390	43.41	49.48
B0	3	12.6200	1.81519	1.04800	8.1108	17.1292	10.55	13.94
AI	3	8.3000	1.42011	.81990	4.7723	11.8277	7.33	9.93
AII	3	3.9267	.46436	.26810	2.7731	5.0802	3.43	4.35
AIII	3	4.5467	1.32217	.76336	1.2622	7.8311	3.34	5.96
AIV	3	5.8767	.57622	.33268	4.4452	7.3081	5.28	6.43

BI	3	12.4733	.10599	.06119	12.2100	12.7366	12.36	12.57
BII	3	7.3400	.77595	.44800	5.4124	9.2676	6.65	8.18
BIII	3	8.1633	.20841	.12032	7.6456	8.6810	7.98	8.39
BIV	3	6.4200	1.77654	1.02569	2.0068	10.8332	5.06	8.43
Total	30	11.5100	11.91037	2.17453	7.0626	15.9574	3.34	49.48

Test of Homogeneity of Variances

Hasil Uji

Levene Statistic	df1	df2	Sig.
5.828	9	20	.001

ANOVA

Hasil Uji

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	4066.450	9	451.828	190.629	.000
Within Groups	47.404	20	2.370		
Total	4113.854	29			

Multiple Comparisons

Dependent Variable: Hasil Uji

Tukey HSD

(I) Komposisi	(J) Komposisi	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval Lower Bound	95% Confidence Interval Upper Bound
A0	B0	32.81333*	1.25703	.000	28.3621	37.2646
	AI	37.13333*	1.25703	.000	32.6821	41.5846
	AII	41.50667*	1.25703	.000	37.0554	45.9579
	AIII	40.88667*	1.25703	.000	36.4354	45.3379

	AIV	39.55667*	1.25703	.000	35.1054	44.0079
	BI	32.96000*	1.25703	.000	28.5087	37.4113
	BII	38.09333*	1.25703	.000	33.6421	42.5446
	BIII	37.27000*	1.25703	.000	32.8187	41.7213
	BIV	39.01333*	1.25703	.000	34.5621	43.4646
B0	A0	-32.81333*	1.25703	.000	-37.2646	-28.3621
	AI	4.32000	1.25703	.062	-.1313	8.7713
	AII	8.69333*	1.25703	.000	4.2421	13.1446
	AIII	8.07333*	1.25703	.000	3.6221	12.5246
	AIV	6.74333*	1.25703	.001	2.2921	11.1946
	BI	.14667	1.25703	1.000	-4.3046	4.5979
	BII	5.28000*	1.25703	.013	.8287	9.7313
	BIII	4.45667*	1.25703	.050	.0054	8.9079
	BIV	6.20000*	1.25703	.003	1.7487	10.6513
AI	A0	-37.13333*	1.25703	.000	-41.5846	-32.6821
	B0	-4.32000	1.25703	.062	-8.7713	.1313
	AII	4.37333	1.25703	.057	-.0779	8.8246
	AIII	3.75333	1.25703	.146	-.6979	8.2046
	AIV	2.42333	1.25703	.652	-2.0279	6.8746
	BI	-4.17333	1.25703	.078	-8.6246	.2779
	BII	.96000	1.25703	.998	-3.4913	5.4113
	BIII	.13667	1.25703	1.000	-4.3146	4.5879
	BIV	1.88000	1.25703	.879	-2.5713	6.3313
AII	A0	-41.50667*	1.25703	.000	-45.9579	-37.0554
	B0	-8.69333*	1.25703	.000	-13.1446	-4.2421
	AI	-4.37333	1.25703	.057	-8.8246	.0779
	AIII	-.62000	1.25703	1.000	-5.0713	3.8313
	AIV	-1.95000	1.25703	.856	-6.4013	2.5013
	BI	-8.54667*	1.25703	.000	-12.9979	-4.0954
	BII	-3.41333	1.25703	.232	-7.8646	1.0379

	BIII	-4.23667	1.25703	.070	-8.6879	.2146
	BIV	-2.49333	1.25703	.619	-6.9446	1.9579
AIII	A0	-40.88667*	1.25703	.000	-45.3379	-36.4354
	B0	-8.07333*	1.25703	.000	-12.5246	-3.6221
	AI	-3.75333	1.25703	.146	-8.2046	.6979
	AII	.62000	1.25703	1.000	-3.8313	5.0713
	AIV	-1.33000	1.25703	.984	-5.7813	3.1213
	BI	-7.92667*	1.25703	.000	-12.3779	-3.4754
	BII	-2.79333	1.25703	.474	-7.2446	1.6579
	BIII	-3.61667	1.25703	.177	-8.0679	.8346
	BIV	-1.87333	1.25703	.881	-6.3246	2.5779
AIV	A0	-39.55667*	1.25703	.000	-44.0079	-35.1054
	B0	-6.74333*	1.25703	.001	-11.1946	-2.2921
	AI	-2.42333	1.25703	.652	-6.8746	2.0279
	AII	1.95000	1.25703	.856	-2.5013	6.4013
	AIII	1.33000	1.25703	.984	-3.1213	5.7813
	BI	-6.59667*	1.25703	.001	-11.0479	-2.1454
	BII	-1.46333	1.25703	.970	-5.9146	2.9879
	BIII	-2.28667	1.25703	.717	-6.7379	2.1646
	BIV	-.54333	1.25703	1.000	-4.9946	3.9079
BI	A0	-32.96000*	1.25703	.000	-37.4113	-28.5087
	B0	-.14667	1.25703	1.000	-4.5979	4.3046
	AI	4.17333	1.25703	.078	-.2779	8.6246
	AII	8.54667*	1.25703	.000	4.0954	12.9979
	AIII	7.92667*	1.25703	.000	3.4754	12.3779
	AIV	6.59667*	1.25703	.001	2.1454	11.0479
	BII	5.13333*	1.25703	.016	.6821	9.5846
	BIII	4.31000	1.25703	.063	-.1413	8.7613
	BIV	6.05333*	1.25703	.003	1.6021	10.5046
BII	A0	-38.09333*	1.25703	.000	-42.5446	-33.6421

	B0	-5.28000*	1.25703	.013	-9.7313	-.8287
	AI	-.96000	1.25703	.998	-5.4113	3.4913
	AII	3.41333	1.25703	.232	-1.0379	7.8646
	AIII	2.79333	1.25703	.474	-1.6579	7.2446
	AIV	1.46333	1.25703	.970	-2.9879	5.9146
	BI	-5.13333*	1.25703	.016	-9.5846	-.6821
	BIII	-.82333	1.25703	1.000	-5.2746	3.6279
	BIV	.92000	1.25703	.999	-3.5313	5.3713
BIII	A0	-37.27000*	1.25703	.000	-41.7213	-32.8187
	B0	-4.45667*	1.25703	.050	-8.9079	-.0054
	AI	-.13667	1.25703	1.000	-4.5879	4.3146
	AII	4.23667	1.25703	.070	-.2146	8.6879
	AIII	3.61667	1.25703	.177	-.8346	8.0679
	AIV	2.28667	1.25703	.717	-2.1646	6.7379
	BI	-4.31000	1.25703	.063	-8.7613	.1413
	BII	.82333	1.25703	1.000	-3.6279	5.2746
	BIV	1.74333	1.25703	.918	-2.7079	6.1946
BIV	A0	-39.01333*	1.25703	.000	-43.4646	-34.5621
	B0	-6.20000*	1.25703	.003	-10.6513	-1.7487
	AI	-1.88000	1.25703	.879	-6.3313	2.5713
	AII	2.49333	1.25703	.619	-1.9579	6.9446
	AIII	1.87333	1.25703	.881	-2.5779	6.3246
	AIV	.54333	1.25703	1.000	-3.9079	4.9946
	BI	-6.05333*	1.25703	.003	-10.5046	-1.6021
	BII	-.92000	1.25703	.999	-5.3713	3.5313
	BIII	-1.74333	1.25703	.918	-6.1946	2.7079

*. The mean difference is significant at the 0.05 level.

Hasil Uji

Tukey HSD[a]

Komposisi	N	Subset for alpha = 0.05			
		1	2	3	4
AII	3	3.9267			
AIII	3	4.5467			
AIV	3	5.8767			
BIV	3	6.4200			
BII	3	7.3400			
BIII	3	8.1633	8.1633		
AI	3	8.3000	8.3000	8.3000	
BI	3		12.4733	12.4733	
B0	3			12.6200	
A0	3				45.4333
Sig.		.057	.063	.062	1.000

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 3.000.

3. Hasil Uji Kekuatan Tarik

Tests of Normality

	Komposisi	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
		Statistic	df	Sig.	Statistic	df	Sig.
Hasil Uji	A0	.300	5	.161	.883	5	.325
	B0	.367	5	.026	.684	5	.006
	AI	.473	5	.001	.552	5	.000
	AII	.300	5	.161	.833	5	.146
	AIII	.367	5	.026	.684	5	.006
	AIV	.231	5	.200*	.881	5	.314
	BI	.367	5	.026	.684	5	.006
	BII	.231	5	.200*	.881	5	.314

BIII	.231	5	.200*	.881	5	.314
BIV	.473	5	.001	.552	5	.000

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

Descriptives

Hasil Uji

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
A0	5	220.0000	7.07107	3.16228	211.2201	228.7799	210.00	230.00
B0	5	216.0000	5.47723	2.44949	209.1991	222.8009	210.00	220.00
AI	5	204.0000	8.94427	4.00000	192.8942	215.1058	200.00	220.00
AII	5	200.0000	12.24745	5.47723	184.7928	215.2072	190.00	220.00
AIII	5	216.0000	5.47723	2.44949	209.1991	222.8009	210.00	220.00
AIV	5	208.0000	8.36660	3.74166	197.6115	218.3885	200.00	220.00
BI	5	208.0000	10.95445	4.89898	194.3983	221.6017	200.00	220.00
BII	5	212.0000	8.36660	3.74166	201.6115	222.3885	200.00	220.00
BIII	5	218.0000	8.36660	3.74166	207.6115	228.3885	210.00	230.00
BIV	5	238.0000	4.47214	2.00000	232.4471	243.5529	230.00	240.00
Total	50	214.0000	12.61680	1.78429	210.4143	217.5857	190.00	240.00

Test of Homogeneity of Variances

Hasil Uji

Levene Statistic	df1	df2	Sig.
.900	9	40	.535

ANOVA

Hasil Uji

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	5040.000	9	560.000	8.116	.000
Within Groups	2760.000	40	69.000		
Total	7800.000	49			

Multiple Comparisons

Dependent Variable: Hasil Uji

Tukey HSD

(I) Komposisi	(J) Komposisi	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval Lower Bound	95% Confidence Interval Upper Bound
A0	B0	4.00000	5.25357	.999	-13.5879	21.5879
	AI	16.00000	5.25357	.102	-1.5879	33.5879
	AII	20.00000*	5.25357	.015	2.4121	37.5879
	AIII	4.00000	5.25357	.999	-13.5879	21.5879
	AIV	12.00000	5.25357	.421	-5.5879	29.5879
	BI	12.00000	5.25357	.421	-5.5879	29.5879
	BII	8.00000	5.25357	.875	-9.5879	25.5879
	BIII	2.00000	5.25357	1.000	-15.5879	19.5879
	BIV	-18.00000*	5.25357	.041	-35.5879	-.4121
B0	A0	-4.00000	5.25357	.999	-21.5879	13.5879
	AI	12.00000	5.25357	.421	-5.5879	29.5879
	AII	16.00000	5.25357	.102	-1.5879	33.5879
	AIII	.00000	5.25357	1.000	-17.5879	17.5879
	AIV	8.00000	5.25357	.875	-9.5879	25.5879
	BI	8.00000	5.25357	.875	-9.5879	25.5879

	BII	4.00000	5.25357	.999	-13.5879	21.5879
	BIII	-2.00000	5.25357	1.000	-19.5879	15.5879
	BIV	-22.00000*	5.25357	.005	-39.5879	-4.4121
AI	A0	-16.00000	5.25357	.102	-33.5879	1.5879
	B0	-12.00000	5.25357	.421	-29.5879	5.5879
	AII	4.00000	5.25357	.999	-13.5879	21.5879
	AIII	-12.00000	5.25357	.421	-29.5879	5.5879
	AIV	-4.00000	5.25357	.999	-21.5879	13.5879
	BI	-4.00000	5.25357	.999	-21.5879	13.5879
	BII	-8.00000	5.25357	.875	-25.5879	9.5879
	BIII	-14.00000	5.25357	.223	-31.5879	3.5879
	BIV	-34.00000*	5.25357	.000	-51.5879	-16.4121
AII	A0	-20.00000*	5.25357	.015	-37.5879	-2.4121
	B0	-16.00000	5.25357	.102	-33.5879	1.5879
	AI	-4.00000	5.25357	.999	-21.5879	13.5879
	AIII	-16.00000	5.25357	.102	-33.5879	1.5879
	AIV	-8.00000	5.25357	.875	-25.5879	9.5879
	BI	-8.00000	5.25357	.875	-25.5879	9.5879
	BII	-12.00000	5.25357	.421	-29.5879	5.5879
	BIII	-18.00000*	5.25357	.041	-35.5879	-.4121
	BIV	-38.00000*	5.25357	.000	-55.5879	-20.4121
AIII	A0	-4.00000	5.25357	.999	-21.5879	13.5879
	B0	.00000	5.25357	1.000	-17.5879	17.5879
	AI	12.00000	5.25357	.421	-5.5879	29.5879
	AII	16.00000	5.25357	.102	-1.5879	33.5879
	AIV	8.00000	5.25357	.875	-9.5879	25.5879
	BI	8.00000	5.25357	.875	-9.5879	25.5879
	BII	4.00000	5.25357	.999	-13.5879	21.5879
	BIII	-2.00000	5.25357	1.000	-19.5879	15.5879
	BIV	-22.00000*	5.25357	.005	-39.5879	-4.4121

AIV	A0	-12.00000	5.25357	.421	-29.5879	5.5879
	B0	-8.00000	5.25357	.875	-25.5879	9.5879
	AI	4.00000	5.25357	.999	-13.5879	21.5879
	AII	8.00000	5.25357	.875	-9.5879	25.5879
	AIII	-8.00000	5.25357	.875	-25.5879	9.5879
	BI	.00000	5.25357	1.000	-17.5879	17.5879
	BII	-4.00000	5.25357	.999	-21.5879	13.5879
	BIII	-10.00000	5.25357	.667	-27.5879	7.5879
	BIV	-30.00000*	5.25357	.000	-47.5879	-12.4121
BI	A0	-12.00000	5.25357	.421	-29.5879	5.5879
	B0	-8.00000	5.25357	.875	-25.5879	9.5879
	AI	4.00000	5.25357	.999	-13.5879	21.5879
	AII	8.00000	5.25357	.875	-9.5879	25.5879
	AIII	-8.00000	5.25357	.875	-25.5879	9.5879
	AIV	.00000	5.25357	1.000	-17.5879	17.5879
	BII	-4.00000	5.25357	.999	-21.5879	13.5879
	BIII	-10.00000	5.25357	.667	-27.5879	7.5879
	BIV	-30.00000*	5.25357	.000	-47.5879	-12.4121
BII	A0	-8.00000	5.25357	.875	-25.5879	9.5879
	B0	-4.00000	5.25357	.999	-21.5879	13.5879
	AI	8.00000	5.25357	.875	-9.5879	25.5879
	AII	12.00000	5.25357	.421	-5.5879	29.5879
	AIII	-4.00000	5.25357	.999	-21.5879	13.5879
	AIV	4.00000	5.25357	.999	-13.5879	21.5879
	BI	4.00000	5.25357	.999	-13.5879	21.5879
	BIII	-6.00000	5.25357	.977	-23.5879	11.5879
	BIV	-26.00000*	5.25357	.001	-43.5879	-8.4121
BIII	A0	-2.00000	5.25357	1.000	-19.5879	15.5879
	B0	2.00000	5.25357	1.000	-15.5879	19.5879
	AI	14.00000	5.25357	.223	-3.5879	31.5879

	AII	18.00000*	5.25357	.041	.4121	35.5879
	AIII	2.00000	5.25357	1.000	-15.5879	19.5879
	AIV	10.00000	5.25357	.667	-7.5879	27.5879
	BI	10.00000	5.25357	.667	-7.5879	27.5879
	BII	6.00000	5.25357	.977	-11.5879	23.5879
	BIV	-20.00000*	5.25357	.015	-37.5879	-2.4121
BIV	A0	18.00000*	5.25357	.041	.4121	35.5879
	B0	22.00000*	5.25357	.005	4.4121	39.5879
	AI	34.00000*	5.25357	.000	16.4121	51.5879
	AII	38.00000*	5.25357	.000	20.4121	55.5879
	AIII	22.00000*	5.25357	.005	4.4121	39.5879
	AIV	30.00000*	5.25357	.000	12.4121	47.5879
	BI	30.00000*	5.25357	.000	12.4121	47.5879
	BII	26.00000*	5.25357	.001	8.4121	43.5879
	BIII	20.00000*	5.25357	.015	2.4121	37.5879

*. The mean difference is significant at the 0.05 level.

Hasil Uji

Tukey HSD[a]

		Subset for alpha = 0.05		
Komposisi	N	1	2	3
AII	5	200.0000		
AI	5	204.0000	204.0000	
AIV	5	208.0000	208.0000	
BI	5	208.0000	208.0000	
BII	5	212.0000	212.0000	
B0	5	216.0000	216.0000	
AIII	5	216.0000	216.0000	
BIII	5		218.0000	
A0	5		220.0000	
BIV	5			238.0000

Sig.		.102	.102	1.000

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 5.000.

4. Hasil Uji Kekuatan mulur

Tests of Normality

		Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Komposisi	Statistic	df	Sig.	Statistic	df	Sig.
Hasil Uji	A0	.152	5	.200*	.977	5	.918
	B0	.216	5	.200*	.965	5	.844
	AI	.210	5	.200*	.917	5	.509
	AII	.228	5	.200*	.892	5	.368
	AIII	.228	5	.200*	.921	5	.534
	AIV	.142	5	.200*	.988	5	.972
	BI	.230	5	.200*	.915	5	.498
	BII	.190	5	.200*	.955	5	.774
	BIII	.234	5	.200*	.938	5	.654
	BIV	.177	5	.200*	.964	5	.838

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

Descriptives

Hasil Uji

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
A0	5	7.9554	.61083	.27317	7.1970	8.7138	7.18	8.70
B0	5	7.8478	.24754	.11070	7.5404	8.1552	7.54	8.22
AI	5	7.1674	.38818	.17360	6.6854	7.6494	6.56	7.54
AII	5	6.9036	.33495	.14980	6.4877	7.3195	6.54	7.28

AIII	5	7.6040	.38089	.17034	7.1311	8.0769	7.24	8.18
AIV	5	7.3836	.89872	.40192	6.2677	8.4995	6.10	8.46
BI	5	7.7240	.28927	.12937	7.3648	8.0832	7.26	8.02
BII	5	7.3678	.47423	.21208	6.7790	7.9566	6.84	8.06
BIII	5	7.1400	.95990	.42928	5.9481	8.3319	5.68	8.34
BIV	5	7.1240	.28789	.12875	6.7665	7.4815	6.72	7.44
Total	50	7.4218	.59477	.08411	7.2527	7.5908	5.68	8.70

Test of Homogeneity of Variances

Hasil Uji

Levene Statistic	df1	df2	Sig.
1.562	9	40	.160

ANOVA

Hasil Uji

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	5.482	9	.609	2.056	.058
Within Groups	11.852	40	.296		
Total	17.334	49			

Multiple Comparisons

Dependent Variable: Hasil Uji

Tukey HSD

(I) Komposisi	(J) Komposisi	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval Lower Bound	Upper Bound
A0	B0	.10760	.34426	1.000	-1.0449	1.2601

	AI	.78800	.34426	.418	-.3645	1.9405
	AII	1.05180	.34426	.099	-.1007	2.2043
	AIII	.35140	.34426	.989	-.8011	1.5039
	AIV	.57180	.34426	.810	-.5807	1.7243
	BI	.23140	.34426	1.000	-.9211	1.3839
	BII	.58760	.34426	.785	-.5649	1.7401
	BIII	.81540	.34426	.371	-.3371	1.9679
	BIV	.83140	.34426	.344	-.3211	1.9839
B0	A0	-.10760	.34426	1.000	-1.2601	1.0449
	AI	.68040	.34426	.619	-.4721	1.8329
	AII	.94420	.34426	.192	-.2083	2.0967
	AIII	.24380	.34426	.999	-.9087	1.3963
	AIV	.46420	.34426	.935	-.6883	1.6167
	BI	.12380	.34426	1.000	-1.0287	1.2763
	BII	.48000	.34426	.922	-.6725	1.6325
	BIII	.70780	.34426	.567	-.4447	1.8603
	BIV	.72380	.34426	.537	-.4287	1.8763
AI	A0	-.78800	.34426	.418	-1.9405	.3645
	B0	-.68040	.34426	.619	-1.8329	.4721
	AII	.26380	.34426	.999	-.8887	1.4163
	AIII	-.43660	.34426	.955	-1.5891	.7159
	AIV	-.21620	.34426	1.000	-1.3687	.9363
	BI	-.55660	.34426	.832	-1.7091	.5959
	BII	-.20040	.34426	1.000	-1.3529	.9521
	BIII	.02740	.34426	1.000	-1.1251	1.1799
	BIV	.04340	.34426	1.000	-1.1091	1.1959
AII	A0	-1.05180	.34426	.099	-2.2043	.1007
	B0	-.94420	.34426	.192	-2.0967	.2083
	AI	-.26380	.34426	.999	-1.4163	.8887
	AIII	-.70040	.34426	.581	-1.8529	.4521

	AIV	-.48000	.34426	.922	-1.6325	.6725
	BI	-.82040	.34426	.362	-1.9729	.3321
	BII	-.46420	.34426	.935	-1.6167	.6883
	BIII	-.23640	.34426	.999	-1.3889	.9161
	BIV	-.22040	.34426	1.000	-1.3729	.9321
AIII	A0	-.35140	.34426	.989	-1.5039	.8011
	B0	-.24380	.34426	.999	-1.3963	.9087
	AI	.43660	.34426	.955	-.7159	1.5891
	AII	.70040	.34426	.581	-.4521	1.8529
	AIV	.22040	.34426	1.000	-.9321	1.3729
	BI	-.12000	.34426	1.000	-1.2725	1.0325
	BII	.23620	.34426	.999	-.9163	1.3887
	BIII	.46400	.34426	.936	-.6885	1.6165
	BIV	.48000	.34426	.922	-.6725	1.6325
AIV	A0	-.57180	.34426	.810	-1.7243	.5807
	B0	-.46420	.34426	.935	-1.6167	.6883
	AI	.21620	.34426	1.000	-.9363	1.3687
	AII	.48000	.34426	.922	-.6725	1.6325
	AIII	-.22040	.34426	1.000	-1.3729	.9321
	BI	-.34040	.34426	.991	-1.4929	.8121
	BII	.01580	.34426	1.000	-1.1367	1.1683
	BIII	.24360	.34426	.999	-.9089	1.3961
	BIV	.25960	.34426	.999	-.8929	1.4121
BI	A0	-.23140	.34426	1.000	-1.3839	.9211
	B0	-.12380	.34426	1.000	-1.2763	1.0287
	AI	.55660	.34426	.832	-.5959	1.7091
	AII	.82040	.34426	.362	-.3321	1.9729
	AIII	.12000	.34426	1.000	-1.0325	1.2725
	AIV	.34040	.34426	.991	-.8121	1.4929
	BII	.35620	.34426	.988	-.7963	1.5087

	BIII	.58400	.34426	.791	-.5685	1.7365
	BIV	.60000	.34426	.765	-.5525	1.7525
BII	A0	-.58760	.34426	.785	-1.7401	.5649
	B0	-.48000	.34426	.922	-1.6325	.6725
	AI	.20040	.34426	1.000	-.9521	1.3529
	AII	.46420	.34426	.935	-.6883	1.6167
	AIII	-.23620	.34426	.999	-1.3887	.9163
	AIV	-.01580	.34426	1.000	-1.1683	1.1367
	BI	-.35620	.34426	.988	-1.5087	.7963
	BIII	.22780	.34426	1.000	-.9247	1.3803
	BIV	.24380	.34426	.999	-.9087	1.3963
BIII	A0	-.81540	.34426	.371	-1.9679	.3371
	B0	-.70780	.34426	.567	-1.8603	.4447
	AI	-.02740	.34426	1.000	-1.1799	1.1251
	AII	.23640	.34426	.999	-.9161	1.3889
	AIII	-.46400	.34426	.936	-1.6165	.6885
	AIV	-.24360	.34426	.999	-1.3961	.9089
	BI	-.58400	.34426	.791	-1.7365	.5685
	BII	-.22780	.34426	1.000	-1.3803	.9247
	BIV	.01600	.34426	1.000	-1.1365	1.1685
BIV	A0	-.83140	.34426	.344	-1.9839	.3211
	B0	-.72380	.34426	.537	-1.8763	.4287
	AI	-.04340	.34426	1.000	-1.1959	1.1091
	AII	.22040	.34426	1.000	-.9321	1.3729
	AIII	-.48000	.34426	.922	-1.6325	.6725
	AIV	-.25960	.34426	.999	-1.4121	.8929
	BI	-.60000	.34426	.765	-1.7525	.5525
	BII	-.24380	.34426	.999	-1.3963	.9087
	BIII	-.01600	.34426	1.000	-1.1685	1.1365

Hasil Uji

Tukey HSD[a]

Komposisi	N	Subset for alpha = 0.05 1
AII	5	6.9036
BIV	5	7.1240
BIII	5	7.1400
AI	5	7.1674
BII	5	7.3678
AIV	5	7.3836
AIII	5	7.6040
BI	5	7.7240
B0	5	7.8478
A0	5	7.9554
Sig.		.099

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 5.000.