LAMPIRAN 1

A. Tabel hasil pengukuran diameter serat nano

No.	PVA (nm)	1% CMV (nm)	2% CMV (nm)	3% CMV (nm)
1	144.579	181.125	180.379	190.991
2	145.181	182.442	187.504	199.68
3	148.059	184.966	190.835	203.025
4	150.314	186.386	195.244	208.911
5	155.116	186.613	197.63	214.311
6	156.109	187.892	198.174	223.322
7	160.02	192.661	198.717	226.722
8	161.509	193.776	200.485	229.063
9	161.546	194.174	201.525	235.997
10	162.017	194.626	201.544	240.805
11	163.003	196.485	201.544	241.28
12	166.115	197.009	201.931	246.512
13	167.785	197.118	201.944	250.79
14	169.054	197.47	203.618	253.244
15	169.564	197.93	206.149	255.484
16	169.581	198.556	206.208	257.019
17	169.778	198.861	207.029	258.174
18	169.885	199.394	209.384	260.744
19	170.309	199.47	210.513	261.348
20	170.593	199.664	210.743	262.31
21	170.792	199.664	212.419	264.484
22	172.399	199.789	212.49	266.311
23	172.417	200.337	213.784	267.899
24	172.891	202.238	215.323	269.444
25	173.048	203.009	215.87	272.367
26	173.451	203.009	216.393	273.945
27	174.388	204.348	217.535	274.437
28	174.743	204.792	217.535	275.76
29	174.808	206.142	221.863	276.846
30	174.86	206.149	226.074	278.722
31	177.146	207.789	226.109	278.935
32	177.287	207.938	226.299	279.938
33	177.594	208.662	226.302	281.88

34	177.867	208.765	226.703	282.009
35	178.36	209.314	227.344	284.15
36	178.411	209.384	227.888	286.487
37	178.5	210.308	228.007	288.059
38	178.585	211.389	228.343	288.553
39	179.225	212.119	228.885	288.619
40	180.774	212.59	229.163	289.015
41	181.175	212.632	229.374	290.114
42	182.028	213.36	230.112	290.688
43	182.791	213.77	230.147	292.015
44	184.286	213.77	230.481	293.198
45	184.549	216.741	231.321	293.799
46	184.704	217.857	232.745	293.983
47	184.811	217.939	233.054	294.276
48	184.819	218.228	233.875	296.338
49	184.901	219.767	233.914	296.683
50	184.905	220.255	235.733	297.286
51	186.662	220.263	236.542	297.734
52	187.194	220.263	236.929	298.638
53	187.246	221.973	237.631	299.49
54	187.779	222.142	239.002	299.503
55	188.186	222.536	242.776	301.155
56	188.52	223.31	243.101	301.314
57	189.626	223.713	243.834	305.452
58	189.817	225.231	246.406	305.487
59	189.945	225.536	246.492	305.928
60	190.136	225.967	246.836	306.759
61	190.343	226.37	246.883	306.86
62	191.201	230.357	246.885	308.375
63	191.398	230.474	247.123	308.576
64	191.574	230.521	248.268	308.855
65	191.597	231.426	248.405	309.239
66	191.597	231.809	250.006	309.239
67	192.043	233.057	250.77	309.378
68	194.109	233.262	251.023	310.374
69	194.501	234.535	252.84	311.08
70	194.548	234.873	254.178	311.184
71	195.905	234.961	256.611	311.427

72	197.147	239.559	257.777	312.709
73	197.224	239.619	257.897	313.719
74	197.773	239.642	258.398	313.788
75	197.998	240.964	259.957	316.915
76	198.861	242.99	261.301	318.441
77	200.257	243.025	261.816	318.746
78	200.337	243.566	265.148	318.847
79	200.379	244.603	265.148	319.489
80	200.955	246.184	267.097	323.981
81	201.196	246.774	267.233	323.981
82	201.944	248.883	269.181	325.255
83	202.411	249.242	270.937	327.368
84	203.754	251.06	273.056	328.141
85	203.843	252.941	284.818	329.272
86	204.274	254.279	298.706	329.321
87	205.917	256.185	299.855	329.91
88	209.271	258.54	302.125	330.628
89	211.231	262.206	305.744	330.831
90	211.504	262.678	327.753	331.234
91	211.776	267.968	336.624	332.257
92	212.076	268.961	341.202	334.902
93	212.626	271.155	372.251	336.203
94	213.587	272.622	372.91	339.457
95	216.667	282.367	381.037	341.971
96	218.949	311.989	388.219	370.061
97	221.62	321.496	394.171	393.927
98	223.432	321.697	403.889	408.076
99	226.323	357.29	446.185	473.993
100	226.852	367.781	464.943	541.968
Rata-rata	186.2074	227.0752	251.041	296.6741
SD	18.15179	34.26288	55.27028	48.71921

B. Tabel Hasil Uji Viskositas

NO	Variasi	Viskositas
1	CMV / PVA 0%	435.9
2	CMV / PVA 1%	451.9
3	CMV / PVA 2%	465.9
4	CMV / PVA 3%	481.9

C. Tabel Hasil Uji Konduktivitas

NO	Variasi	Konduktivitas
1	PVA / CMV 0%	451
2	PVA / CMV 1%	423
3	PVA / CMV 2%	393
4	PVA /CMV 3%	340

D. Hasil Uji Tarik

Tabel Nilai Kuat Tarik Membran Nanofiber CMV / PVA

Spesimen	Nilai Kuat Tarik Membran Nanofiber (MPa)			
	CMV-0/PVA	CMV-1/PVA	CMV-2/PVA	CMV-3/PVA
1	16.7196	24.7492	12.4004	10.8206
2	17.6355	25.0101	14.1957	11.5604
3	18.5137	25.1384	17.0783	13.2189
4	19.5598	26.0951	18.4547	13.5257
5	23.9978	23.5269	24.5631	14.2882
Rata-rata	18.1072	24.9659	15.5323	12.2814
Standar Deviasi	1.2143	0.1983	2.7402	1.3014

Tabel Regangan Membran Nanofiber CMV / PVA

Spesimen	Nilai Regangan Membran Nanofiber (MPa)			
	CMV-0/PVA	CMV-1/PVA	CMV-2/PVA	CMV-3/PVA
1	66.799	55.58475	19.29525	13.783
2	77.644	32.89675	32.022	12.09275
3	40.20675	44.11625	15.45375	47.44775
4	29.6365	16.224	34.09525	33.98425
5	152.1573	92.37684	129.1685	9.8604
Rata-rata	53.5716	44.1993	25.2166	26.8269375
Standar Deviasi	22.4050	11.3442	9.2289	16.9674

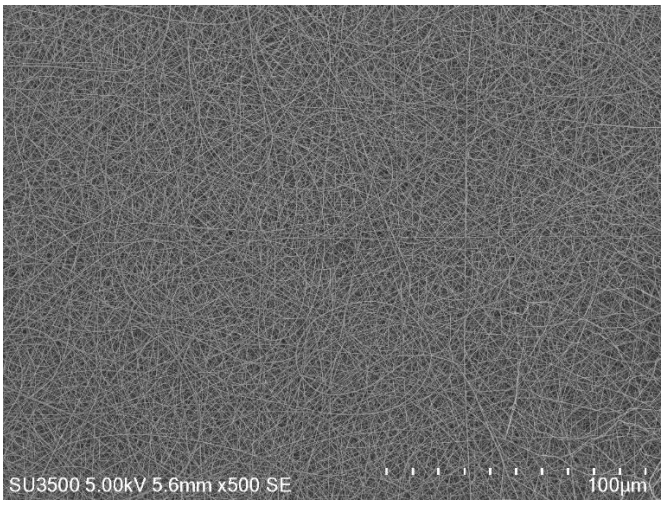
Tabel Modulus Elastisitas Membran Nanofiber CMV / PVA

Spesimen	Nilai Modulus Elastisitas Membran Nanofiber (MPa)			
	CMV-0/PVA	CMV-1/PVA	CMV-2/PVA	CMV-3/PVA
1	79.91935484	185.9240506	131.7491749	167.5
2	59.36651584	194.4827586	163.4854772	205.0761421
3	110.8732394	207.6923077	229.3023256	91.66666667
4	144.7272727	285.974026	154.5525292	142.9602888
5	18.11739051	54.6301689	65.41640178	54.31893688
Rata-rata	98.72159571	218.5182857	169.7723767	151.8007744
Standar Deviasi	37.26719441	45.85327839	41.87579871	47.53593584

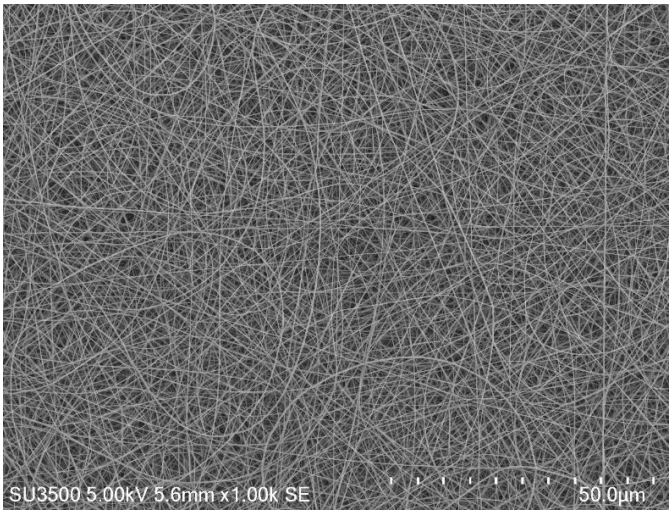
LAMPIRAN 2

HASIL *SCANNING ELECTRON MICROSCOPE* (SEM)

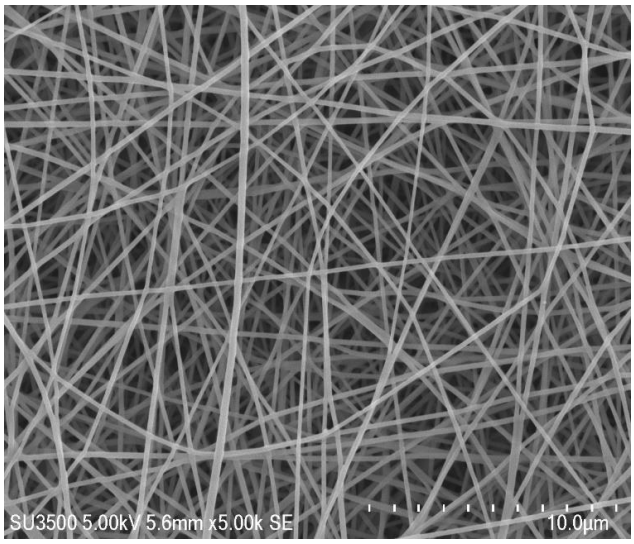
A. Mikrografi Membran Nanofiber CMV / PVA 0%



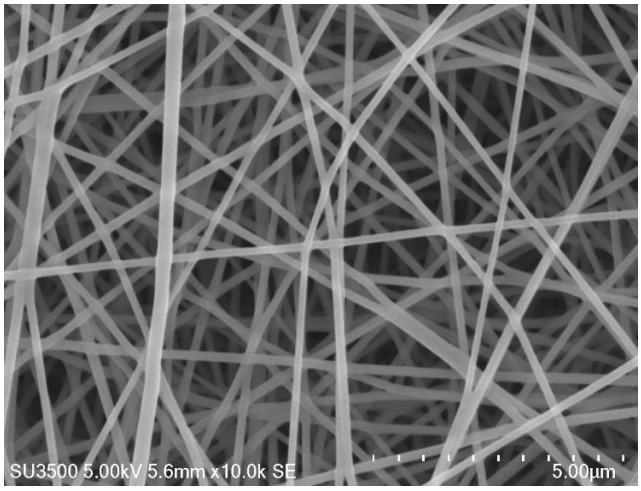
Perbesaran 500 kali



Perbesaran 1000 kali

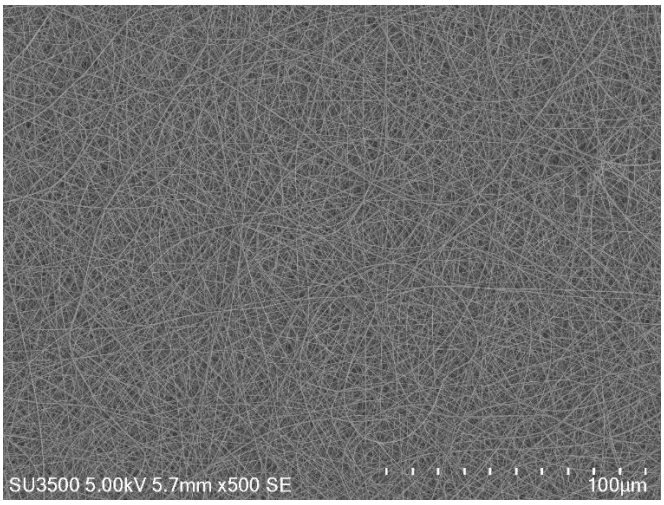


Perbesaran 5000 kali



Perbesaran 10000 kali

B. Mikrografi Membran Nanofiber CMV / PVA 1%



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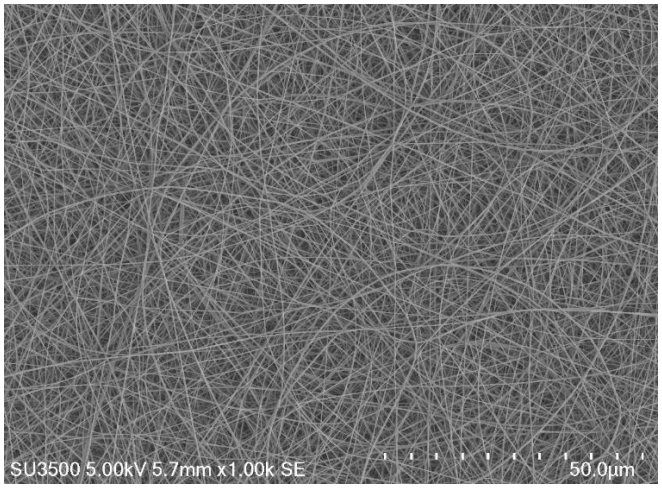

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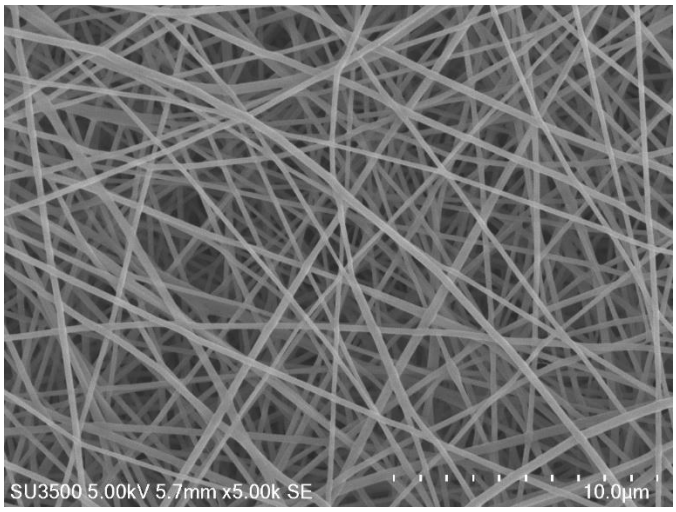

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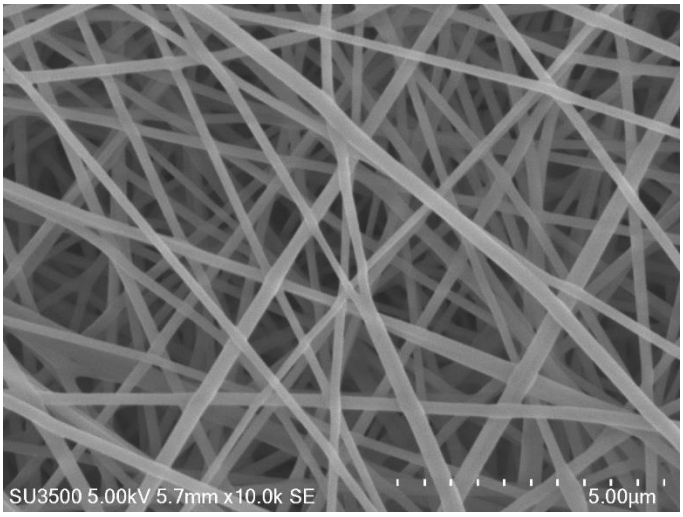
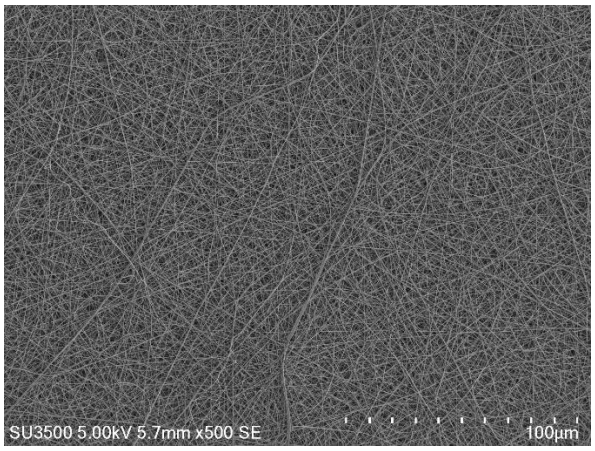


Perbesaran 10000 kali

C. Mikrografi Membran Nanofiber CMV / PVA 2 %



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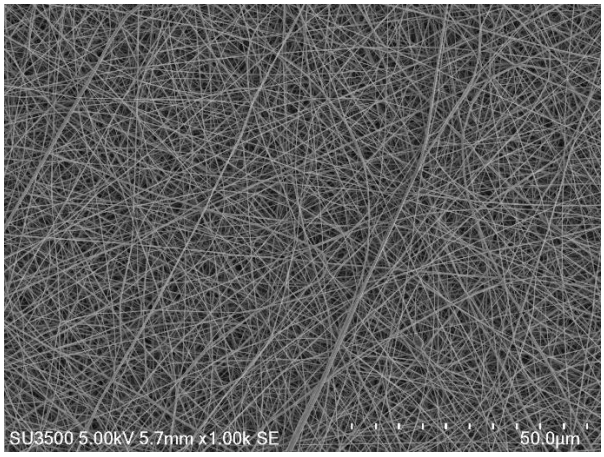

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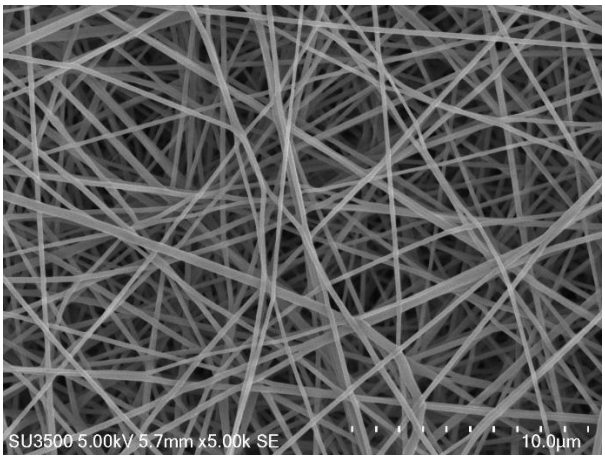
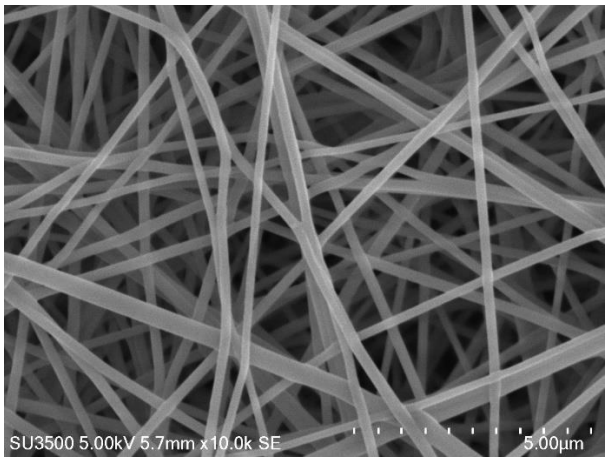
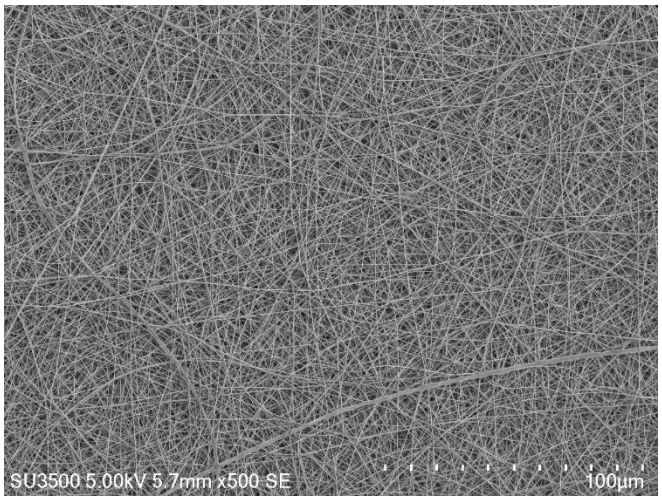


Perbesaran 5000 kali



Perbesaran 10000 kali

D. Mikrografi Membran Nanofiber CMV / PVA 3%



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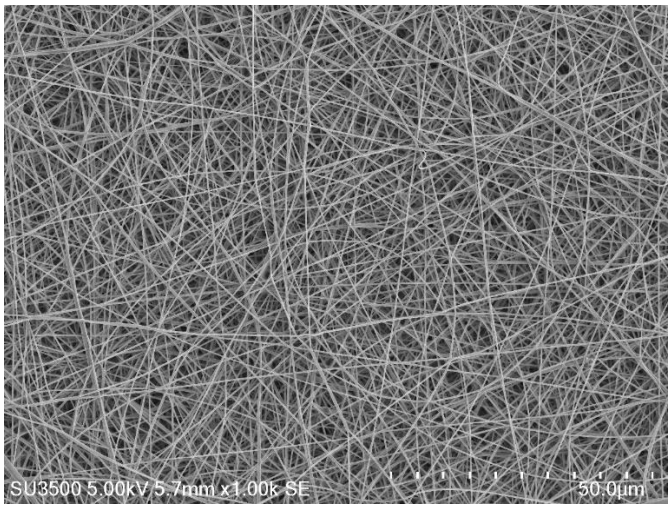
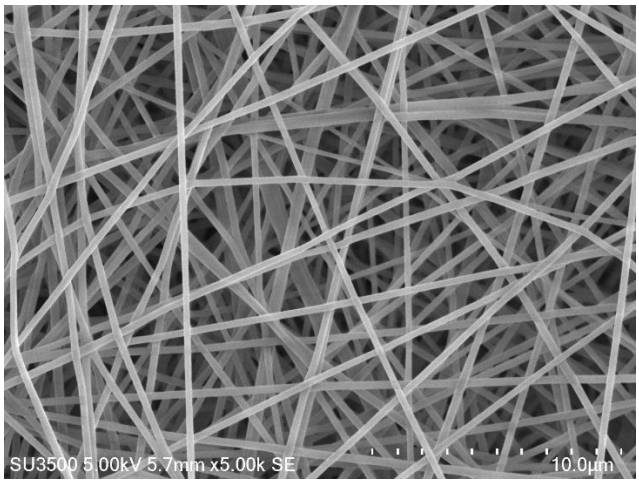
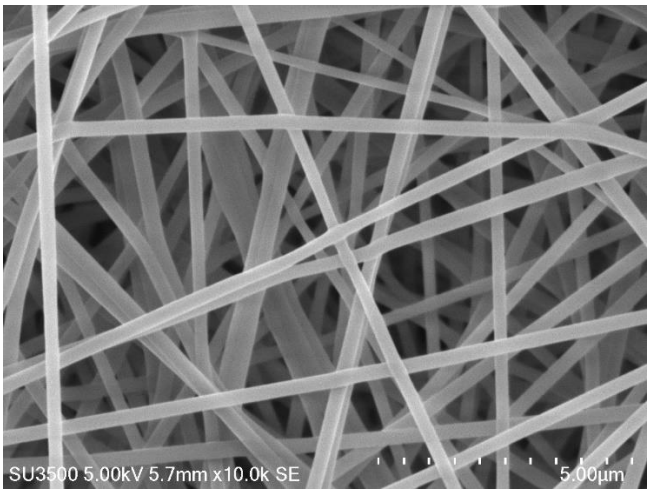


Perbesaran 1000 kali



Perbesaran 5000 kali



Perbesaran 10000 kali

LAMPIRAN 3

954/PS/08/19 20.08.2019

Fakultas Teknologi Pertanian
Universitas Gadjah Mada

Parameter table:

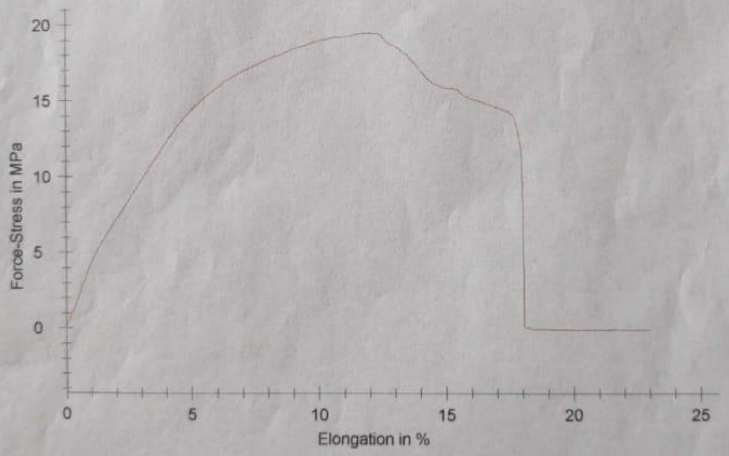
Company name : 954/PS/08/19
Customer : Dirga Rianto
Tester : Rachmat
Test speed : 10 mm/min

Test standard : Tensile strength
Material : PVA

Results:

Nr	a0 mm	b0 mm	Lc mm	FMax N	Tensile Strength MPa	Strain at Fmax. %
2	0.01257	10	50	2.4587	19.5598	11.8546

Series graphics:



Statistics:

Series n = 1	a0 mm	b0 mm	Lc mm	FMax N	Tensile Strength MPa	Strain at Fmax. %
x	0.01257	10	50	2.4587	19.5598	11.8546
s	-	-	-	-	-	-
v	-	-	-	-	-	-

Page 1/1

Fakultas Teknologi Pertanian
Universitas Gadjah Mada

Parameter table:

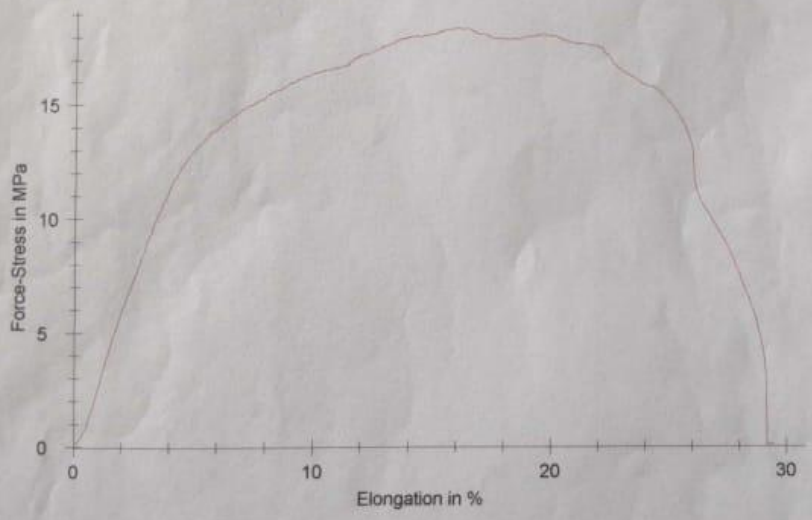
Company name: 954/PS/08/19
Customer : Dirga Rianto
Tester : Rachmat
Test speed: 10 mm/min

Test standard : Tensile strength
Material : PVA

Results:

Nr	a0 mm	b0 mm	Lc mm	FMax N	Tensile Strength MPa	Strain at Fmax. %
3	0.00984	10	50	1.8218	18.5137	16.0827

Series graphics:



Statistics:

Series n = 1	a0 mm	b0 mm	Lc mm	FMax N	Tensile Strength MPa	Strain at Fmax. %
$\bar{x}$	0.00984	10	50	1.8218	18.5137	16.0827
s	-	-	-	-	-	-
v	-	-	-	-	-	-

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Universitas Gadjah Mada

Parameter table:

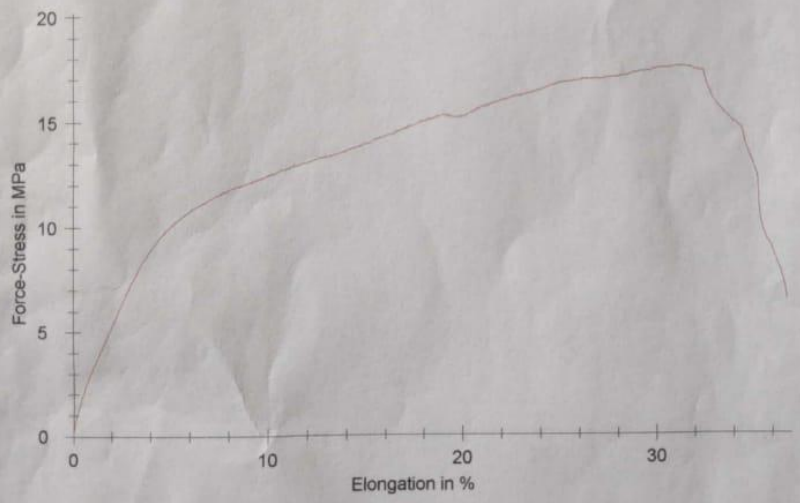
Company name: 954/PS/08/19
Customer : Dirga Rianto
Tester : Rachmat
Test speed: 10 mm/min

Test standard : Tensile strength
Material : PVA

Results:

Nr	a0 mm	b0 mm	Lc mm	FMax N	Tensile Strength MPa	Strain at Fmax. %
7	0.02077	10	50	3.6629	17.6355	31.0576

Series graphics:



Statistics:

Series n = 1	a0 mm	b0 mm	Lc mm	FMax N	Tensile Strength MPa	Strain at Fmax. %
x	0.02077	10	50	3.6629	17.6355	31.0576
s	-	-	-	-	-	-
v	-	-	-	-	-	-

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Parameter table:

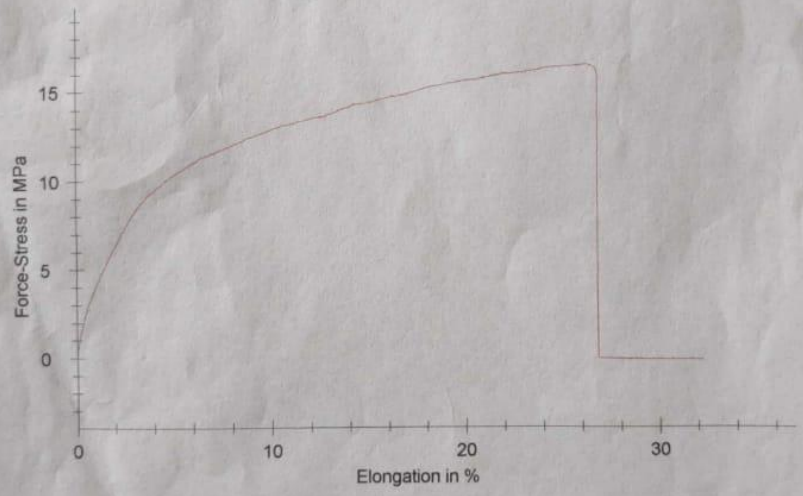
Company name: 954/PS/08/19
Customer : Dirga Rianto
Tester : Rachmat
Test speed: 10 mm/min

Test standard : Tensile strength
Material : PVA

Results:

Nr	a0 mm	b0 mm	Lc mm	FMax N	Tensile Strength MPa	Strain at Fmax. %
8	0.01421	10	50	2.3759	16.7196	26.1475

Series graphics:



Statistics:

Series n = 1	a0 mm	b0 mm	Lc mm	FMax N	Tensile Strength MPa	Strain at Fmax. %
x̄	0.01421	10	50	2.3759	16.7196	26.1475
s	-	-	-	-	-	-
v	-	-	-	-	-	-

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Parameter table:

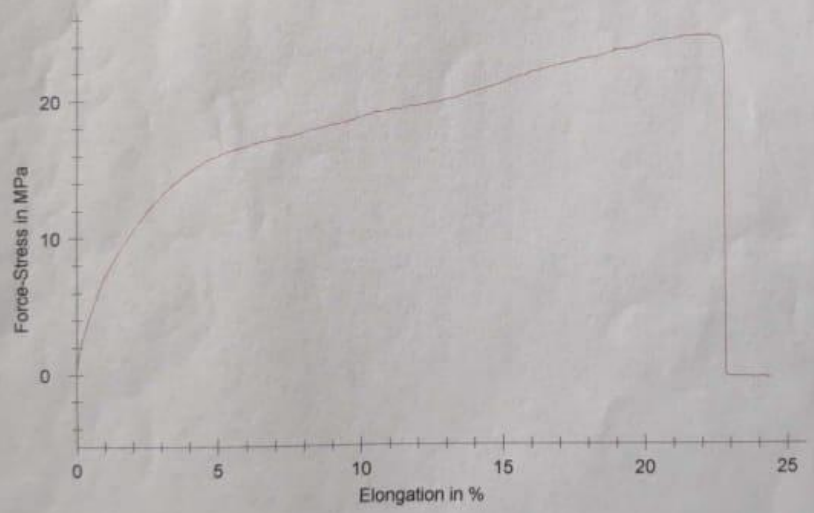
Company name: 954/PS/08/19
Customer : Dirga Rianto
Tester : Rachmat
Test speed: 10 mm/min

Test standard : Tensile strength
Material : CMV 1%

Results:

Nr	a0 mm	b0 mm	Lc mm	FMax N	Tensile Strength MPa	Strain at Fmax. %
14	0.00656	10	50	1.6235	24.7492	22.2339

Series graphics:



Statistics:

Series n = 1	a0 mm	b0 mm	Lc mm	FMax N	Tensile Strength MPa	Strain at Fmax. %
x	0.00656	10	50	1.6235	24.7492	22.2339
s	-	-	-	-	-	-
v	-	-	-	-	-	-

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Parameter table:

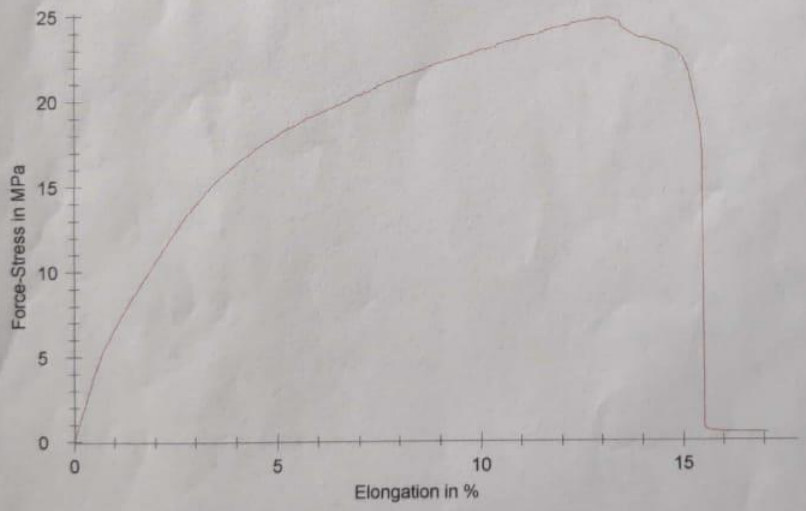
Company name: 954/PS/08/19
Customer : Dirga Rianto
Tester : Rachmat
Test speed: 10 mm/min

Test standard : Tensile strength
Material : CMV 1%

Results:

Nr	a0 mm	b0 mm	Lc mm	FMax N	Tensile Strength MPa	Strain at Fmax. %
15	0.00901	10	50	2.2534	25.0101	13.1587

Series graphics:



Statistics:

Series n = 1	a0 mm	b0 mm	Lc mm	FMax N	Tensile Strength MPa	Strain at Fmax. %
x̄	0.00901	10	50	2.2534	25.0101	13.1587
s	-	-	-	-	-	-
v	-	-	-	-	-	-

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Parameter table:

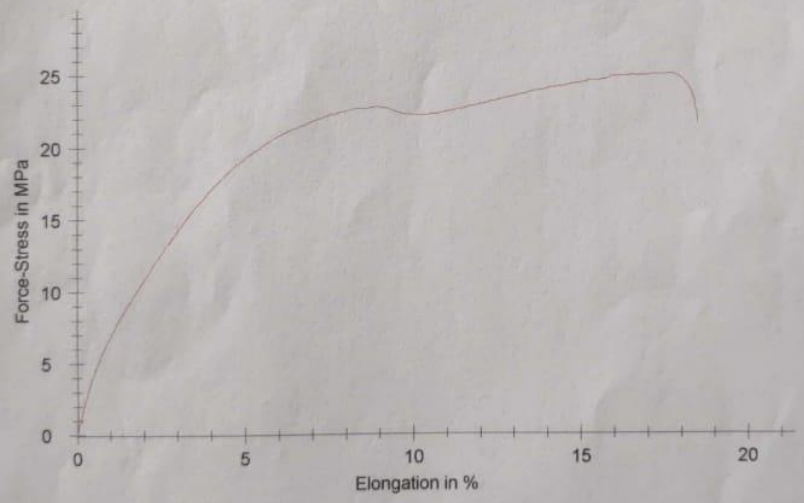
Company name: 954/PS/08/19
Customer : Dirga Rianto
Tester : Rachmat
Test speed: 10 mm/min

Test standard : Tensile strength
Material : CMV 1%

Results:

Nr	a0 mm	b0 mm	Lc mm	FMax N	Tensile Strength MPa	Strain at Fmax. %
11	0.01913	10	50	4.8090	25.1384	17.6465

Series graphics:



Statistics:

Series n = 1	a0 mm	b0 mm	Lc mm	FMax N	Tensile Strength MPa	Strain at Fmax. %
x	0.01913	10	50	4.8090	25.1384	17.6465
s	-	-	-	-	-	-
v	-	-	-	-	-	-

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Parameter table:

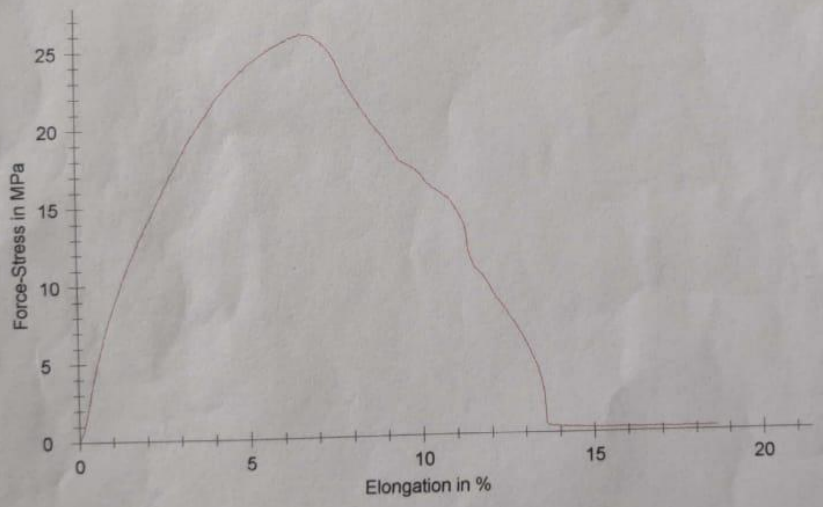
Company name: 954/PS/08/19
Customer : Dirga Rianto
Tester : Rachmat
Test speed: 10 mm/min

Test standard : Tensile strength
Material : CMV 1%

Results:

Nr	a0 mm	b0 mm	Lc mm	FMax N	Tensile Strength MPa	Strain at Fmax. %
13	0.00927	10	50	2.4190	26.0951	6.4896

Series graphics:



Statistics:

Series n = 1	a0 mm	b0 mm	Lc mm	FMax N	Tensile Strength MPa	Strain at Fmax. %
x̄	0.00927	10	50	2.4190	26.0951	6.4896
s	-	-	-	-	-	-
v	-	-	-	-	-	-

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Parameter table:

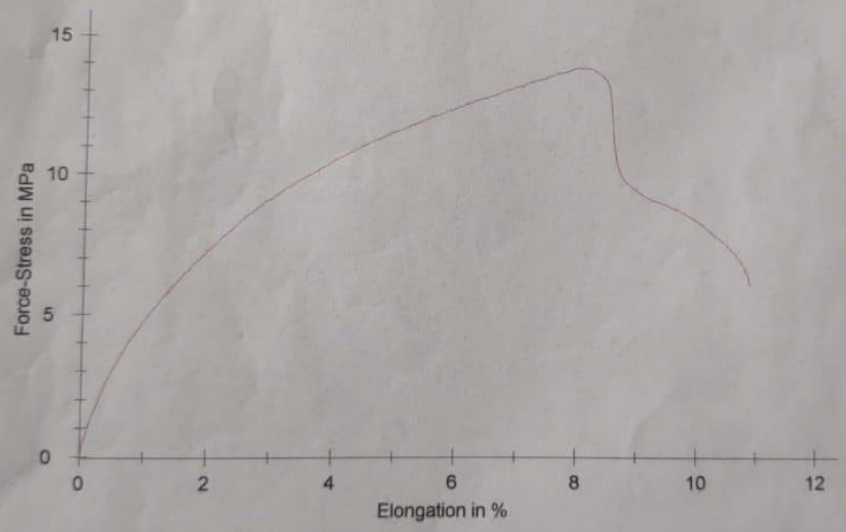
Company name: 954/PS/08/19
Customer : Dirga Rianto
Tester : Rachmat
Test speed: 10 mm/min

Test standard : Tensile strength
Material : CMV 2%

Results:

Nr	a0 mm	b0 mm	Lc mm	FMax N	Tensile Strength MPa	Strain at Fmax. %
19	0.02077	10	50	2.9485	14.1957	8.0855

Series graphics:



Statistics:

Series n = 1	a0 mm	b0 mm	Lc mm	FMax N	Tensile Strength MPa	Strain at Fmax. %
$\bar{x}$	0.02077	10	50	2.9485	14.1957	8.0855
s	-	-	-	-	-	-
v	-	-	-	-	-	-

954/PS/08/19 20.08.2019

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Parameter table:

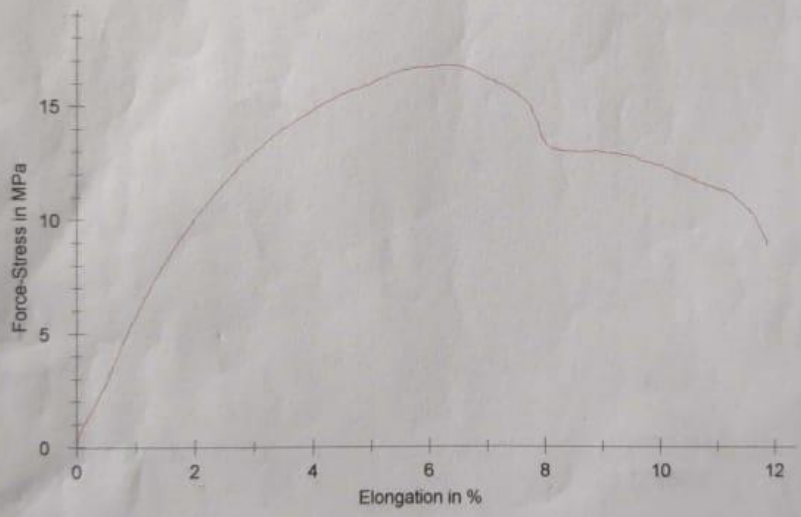
Company name: 954/PS/08/19
Customer : Dirga Rianto
Tester : Rachmat
Test speed: 10 mm/min

Test standard : Tensile strength
Material : CMV 2%

Results:

Nr	a0 mm	b0 mm	Lc mm	FMax N	Tensile Strength MPa	Strain at Fmax. %
23	0.01859	10	50	3.1749	17.0783	6.1815

Series graphics:



Statistics:

Series n = 1	a0 mm	b0 mm	Lc mm	FMax N	Tensile Strength MPa	Strain at Fmax. %
x	0.01859	10	50	3.1749	17.0783	6.1815
s	-	-	-	-	-	-
v	-	-	-	-	-	-

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Parameter table:

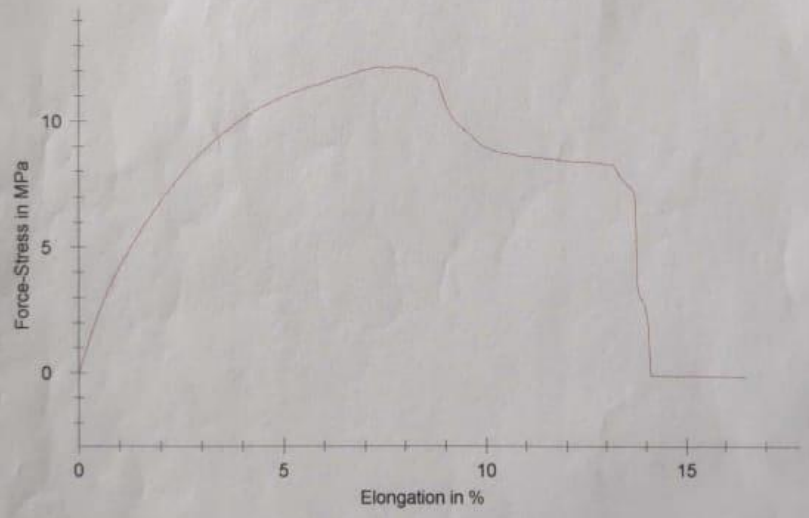
Company name: 954/PS/08/19
Customer : Dirga Rianto
Tester : Rachmat
Test speed: 10 mm/min

Test standard : Tensile strength
Material : CMV 2%

Results:

Nr	a0 mm	b0 mm	Lc mm	FMax N	Tensile Strength MPa	Strain at Fmax. %
22	0.01749	10	50	2.1688	12.4004	7.7181

Series graphics:



Statistics:

Series n = 1	a0 mm	b0 mm	Lc mm	FMax N	Tensile Strength MPa	Strain at Fmax. %
x	0.01749	10	50	2.1688	12.4004	7.7181
s	-	-	-	-	-	-
v	-	-	-	-	-	-

954/PS/08/19 20.08.2019

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Parameter table:

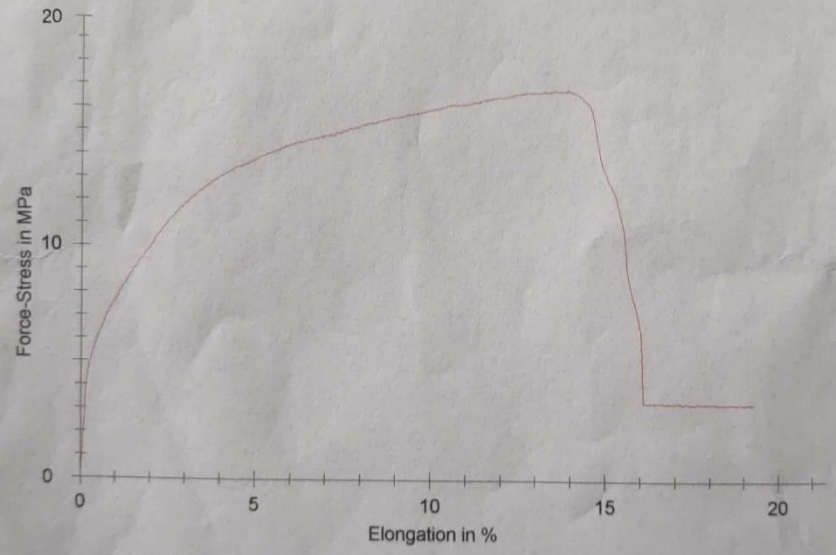
Company name: 954/PS/08/19
Customer : Dirga Rianto
Tester : Rachmat
Test speed: 10 mm/min

Test standard : Tensile strength
Material : CMV 2%

Results:

Nr	a0 mm	b0 mm	Lc mm	FMax N	Tensile Strength MPa	Strain at Fmax. %
17	0.0164	10	50	1.3866	18.4547	13.6381

Series graphics:



Statistics:

Series n = 1	a0 mm	b0 mm	Lc mm	FMax N	Tensile Strength MPa	Strain at Fmax. %
x̄	0.0164	10	50	1.3866	18.4547	13.6381
s	-	-	-	-	-	-
v	-	-	-	-	-	-

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Parameter table:

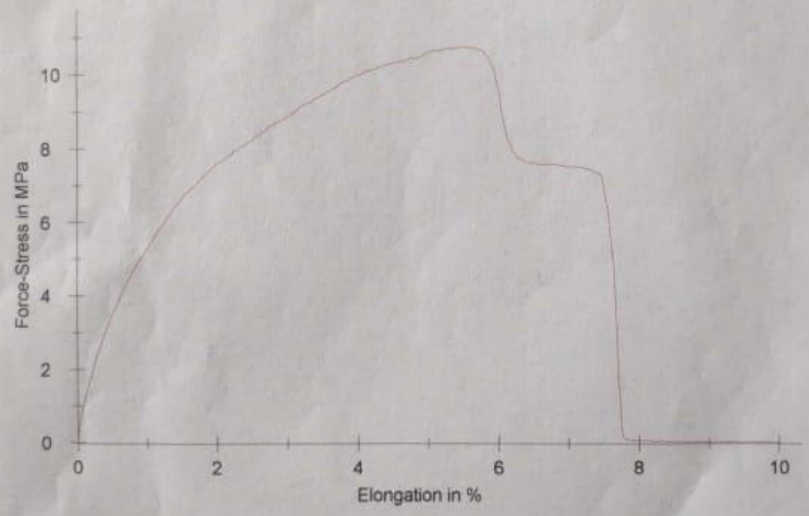
Company name: 954/PS/08/19
Customer : Dirga Rianto
Tester : Rachmat
Test speed: 10 mm/min

Test standard : Tensile strength
Material : CMV 3%

Results:

Nr	a0 mm	b0 mm	Lc mm	FMax N	Tensile Strength MPa	Strain at Fmax. %
32	0.01695	10	50	1.8341	10.8206	5.5132

Series graphics:



Statistics:

Series n = 1	a0 mm	b0 mm	Lc mm	FMax N	Tensile Strength MPa	Strain at Fmax. %
x	0.01695	10	50	1.8341	10.8206	5.5132
s	-	-	-	-	-	-
v	-	-	-	-	-	-

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Parameter table:

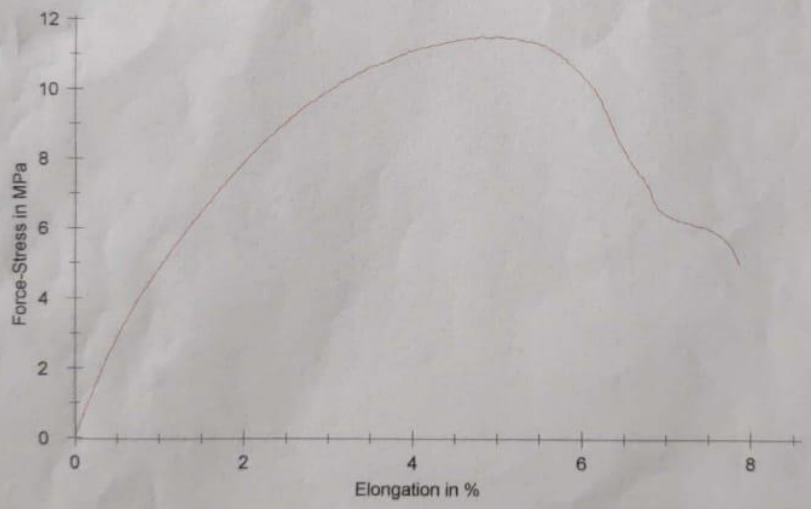
Company name: 954/PS/08/19
Customer : Dirga Rianto
Tester : Rachmat
Test speed: 10 mm/min

Test standard : Tensile strength
Material : CMV 3%

Results:

Nr	a0 mm	b0 mm	Lc mm	FMax N	Tensile Strength MPa	Strain at Fmax. %
30	0.02187	10	50	2.5283	11.5604	4.8371

Series graphics:



Statistics:

Series n = 1	a0 mm	b0 mm	Lc mm	FMax N	Tensile Strength MPa	Strain at Fmax. %
x̄	0.02187	10	50	2.5283	11.5604	4.8371
s	-	-	-	-	-	-
v	-	-	-	-	-	-

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Parameter table:

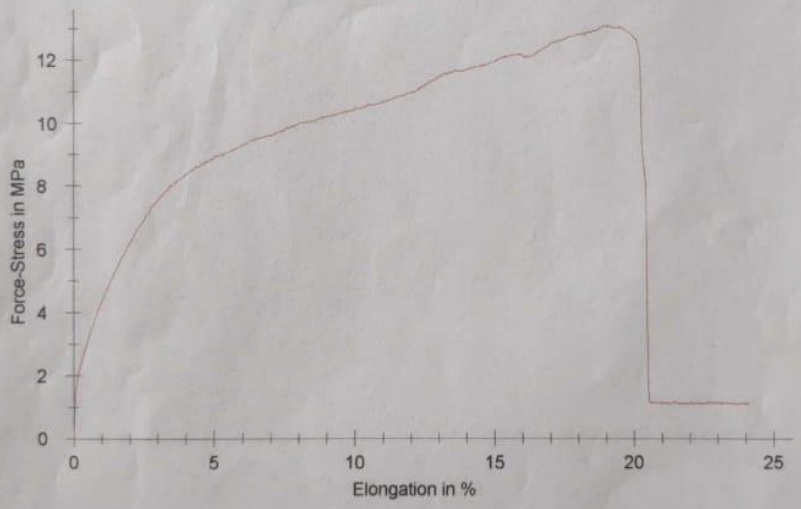
Company name: 954/PS/08/19
Customer : Dirga Rianto
Tester : Rachmat
Test speed: 10 mm/min

Test standard : Tensile strength
Material : CMV 3%

Results:

Nr	a0 mm	b0 mm	Lc mm	FMax N	Tensile Strength MPa	Strain at Fmax. %
25	0.00875	10	50	1.1567	13.2189	18.9791

Series graphics:



Statistics:

Series n = 1	a0 mm	b0 mm	Lc mm	FMax N	Tensile Strength MPa	Strain at Fmax. %
x	0.00875	10	50	1.1567	13.2189	18.9791
s	-	-	-	-	-	-
v	-	-	-	-	-	-

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Parameter table:

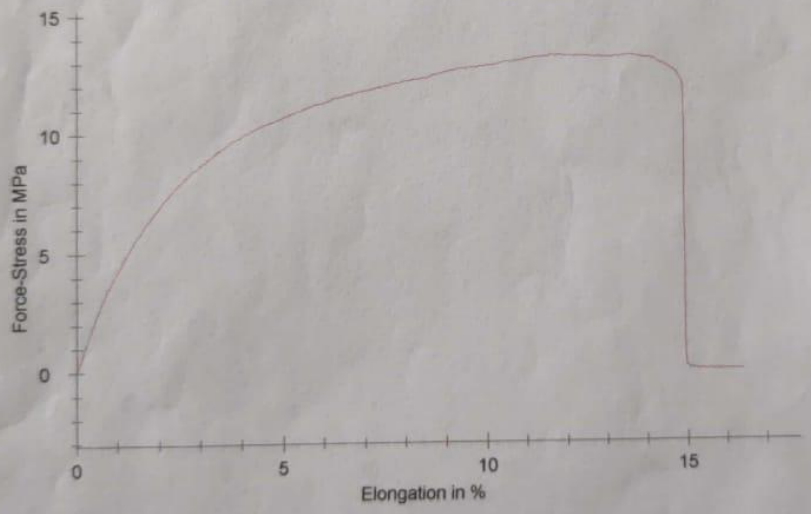
Company name: 954/PS/08/19
Customer : Dirga Rianto
Tester : Rachmat
Test speed: 10 mm/min

Test standard : Tensile strength
Material : CMV 3%

Results:

Nr	a0 mm	b0 mm	Lc mm	FMax N	Tensile Strength MPa	Strain at Fmax. %
26	0.01257	10	50	1.7002	13.5257	13.5937

Series graphics:



Statistics:

Series n = 1	a0 mm	b0 mm	Lc mm	FMax N	Tensile Strength MPa	Strain at Fmax. %
x	0.01257	10	50	1.7002	13.5257	13.5937
s	-	-	-	-	-	-
v	-	-	-	-	-	-

LAMPIRAN 4

Laboratorium Uji
TEKNOLOGI PANGAN DAN HASIL PERTANIAN
FAKULTAS TEKNOLOGI PERTANIAN
Universitas Gadjah Mada
Jl. Flora 1, Bulaksumur, Yogyakarta 55281
Telp.0274-524517, 901311; Fax. 0274-549650

HASIL ANALISA

NO:1048 / PS / 09 / 19

Lab. Penguji : Rekayasa Proses Pengolahan
Tanggal Pengujian : 12 September 2019
Sampel : PVA CMV
Jenis Analisa : Viskositas
Alat : Viskometer
Merk : Brookfield
Spindle : 64
Kecepatan : 60 rpm
Satuan : cP

No	Sampel/Kode	Hasil Analisa	
		UL 1	UL 2
1	PVA	435,9	435,9
2	PVA CMV 1%	451,9	451,9
3	PVA CMV 2%	465,9	465,9
4	PVA CMV 3%	481,9	481,9

Yogyakarta,13 September 2019

Penyelia

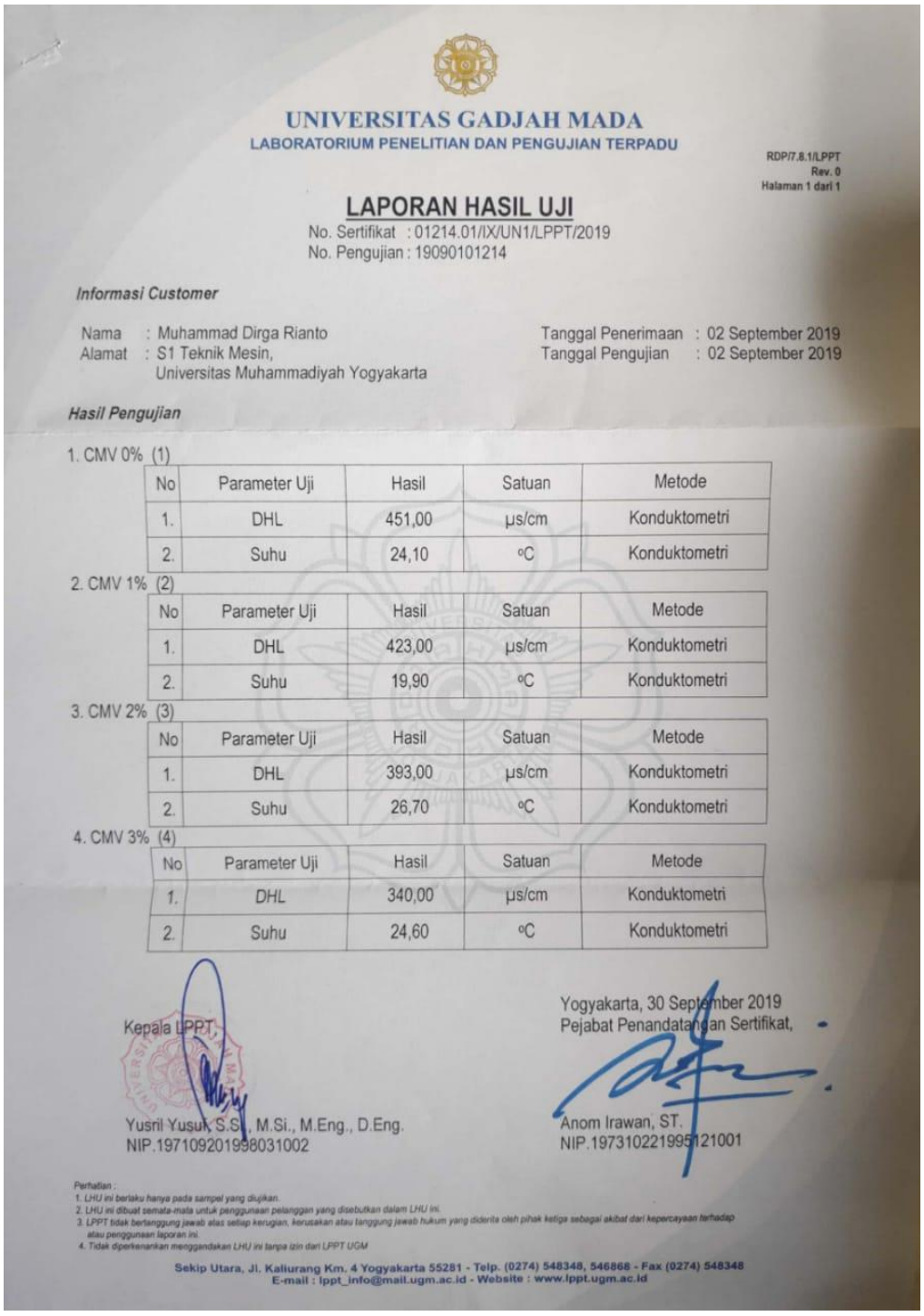
Aulia Ardhi, STP, M.Sc.

Analis

Rachmat Teguh Sutrisno

NB: Hasil Analisa hanya berlaku untuk sampel yang dianalisa

LAMPIRAN 5



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LABORATORIUM PENELITIAN DAN PENGUJIAN TERPADU

RDP/7.8.1/LPPT
Rev. 0
Halaman 1 dari 1

LAPORAN HASIL UJI

No. Sertifikat : 01214.01/IX/UN1/LPPT/2019
No. Pengujian : 19090101214

Informasi Customer

Nama : Muhammad Dirga Rianto
Alamat : S1 Teknik Mesin,
Universitas Muhammadiyah Yogyakarta

Tanggal Penerimaan : 02 September 2019
Tanggal Pengujian : 02 September 2019

Hasil Pengujian

1. CMV 0% (1)

No	Parameter Uji	Hasil	Satuan	Metode
1.	DHL	451,00	µs/cm	Konduktometri
2.	Suhu	24,10	°C	Konduktometri

2. CMV 1% (2)

No	Parameter Uji	Hasil	Satuan	Metode
1.	DHL	423,00	µs/cm	Konduktometri
2.	Suhu	19,90	°C	Konduktometri

3. CMV 2% (3)

No	Parameter Uji	Hasil	Satuan	Metode
1.	DHL	393,00	µs/cm	Konduktometri
2.	Suhu	26,70	°C	Konduktometri

4. CMV 3% (4)

No	Parameter Uji	Hasil	Satuan	Metode
1.	DHL	340,00	µs/cm	Konduktometri
2.	Suhu	24,60	°C	Konduktometri

Yogyakarta, 30 September 2019
Pejabat Penandatangan Sertifikat,

Kepala LPPT,

Yusril Yusuf, S.Si., M.Si., M.Eng., D.Eng.
NIP.197109201998031002

Anom Irawan, ST.
NIP.197310221995121001

Perhatian :
1. *LHU ini berlaku hanya pada sampel yang diujikan.*
2. *LHU ini dibuat semata-mata untuk penggunaan pelanggan yang disebutkan dalam LHU ini.*
3. *LPPT tidak bertanggung jawab atas setiap kerugian, kerusakan atau tanggung jawab hukum yang diderita oleh pihak ketiga sebagai akibat dari kepercayaan terhadap atau penggunaan laporan ini.*
4. *Tidak diperkenankan menggandakan LHU ini tanpa izin dari LPPT UGM*

Sekip Utara, Jl. Kaliurang Km. 4 Yogyakarta 55281 - Telp. (0274) 548348, 546868 - Fax (0274) 548348
E-mail : lppt_info@mail.ugm.ac.id - Website : www.lppt.ugm.ac.id