

## LAMPIRAN 1

### A. Hasil Analisa Morfologi Membran *Nanofiber* PVA/NeCS

NO,	KONSENTRASI NeCS			
	0%	20%	25%	30%
1	92,045	74,383	31,442	37,118
2	111,575	78,895	69,597	52,493
3	111,796	78,895	69,597	52,701
4	118,343	83,681	69,872	54,649
5	118,343	86,655	69,872	55,678
6	118,577	86,655	74,53	59,055
7	118,577	86,655	78,74	62,637
8	118,577	88,757	79,051	63,976
9	125,165	92,045	79,189	64,957
10	130,171	98,039	83,517	65,617
11	130,171	98,619	83,847	65,876
12	130,428	98,619	88,583	65,876
13	131,492	98,619	88,583	69,597
14	131,492	102,277	88,583	69,597
15	131,752	103,986	88,583	69,872
16	131,752	103,986	88,583	69,872
17	139,778	103,986	88,933	70,975
18	144,642	105,194	88,933	73,819
19	144,642	105,194	88,933	74,237
20	144,642	108,481	88,933	74,237
21	144,642	110,294	93,163	74,53
22	144,642	111,575	93,504	74,53
23	144,642	111,575	97,436	74,53
24	144,642	111,575	97,821	79,051
25	144,642	111,575	97,821	79,051
26	144,642	114,379	97,821	83,517
27	144,642	115,54	98,814	83,517
28	144,928	117,61	98,814	83,517
29	144,928	118,343	102,479	83,517
30	147,013	118,343	104,396	83,517
31	148,767	118,343	104,808	83,847
32	148,767	118,343	105,402	83,847
33	149,061	118,343	105,402	83,847
34	157,791	118,343	105,402	83,847
35	157,791	118,343	108,268	83,847

36	157,791	121,317	108,268	83,847
NO	KONSENTRASI NeCS	KONSENTRASI NeCS	KONSENTRASI NeCS	KONSENTRASI NeCS
	0%	20%	25%	30%
37	157,791	121,317	108,268	85,302
38	157,791	122,549	108,696	85,302
39	158,103	122,549	108,696	88,583
40	158,103	128,205	108,696	88,583
41	158,103	128,205	111,355	91,864
42	158,338	128,205	111,355	92,227
43	158,883	128,205	111,355	92,227
44	167,363	128,205	111,355	92,227
45	167,693	128,205	111,355	92,227
46	170,94	128,205	111,355	92,227
47	171,278	130,171	111,355	93,163
48	171,278	130,719	111,355	93,163
49	171,278	131,492	111,355	93,874
50	171,278	134,804	111,796	97,436
51	177,515	134,804	113,636	97,436
52	184,089	134,804	118,11	97,821
53	184,089	134,804	118,11	97,821
54	184,089	134,804	118,11	97,821
55	184,453	134,804	118,11	97,821
56	184,453	134,804	118,11	97,821
57	184,453	138,067	118,577	98,425
58	184,453	138,067	118,577	98,425
59	184,453	138,648	118,577	98,425
60	184,453	138,648	118,577	98,814
61	184,558	138,648	118,577	102,076
62	186,326	138,648	118,783	105,402
63	186,326	138,648	121,112	105,402
64	186,326	139,469	125,275	105,402
65	186,326	139,469	125,275	105,402
66	186,326	139,469	125,275	108,268
67	197,239	144,642	125,275	108,268
68	197,239	147,059	125,77	108,268
69	197,239	147,059	130,428	108,696
70	197,239	147,059	131,234	111,355
71	197,239	147,059	131,234	111,355
72	197,239	147,059	131,234	111,355

73	197,239	147,059	131,234	111,355
74	197,628	147,929	131,752	111,549
NO	KONSENTRASI NeCS	KONSENTRASI NeCS	KONSENTRASI NeCS	KONSENTRASI NeCS
	0%	20%	25%	30%
75	197,628	147,929	131,752	111,796
76	197,628	148,767	132,874	111,796
77	197,628	148,767	137,795	111,796
78	197,628	155,979	137,795	111,796
79	197,628	159,314	138,34	111,796
80	197,628	159,314	138,34	111,796
81	197,628	159,314	138,34	111,796
82	197,628	159,314	138,34	111,796
83	197,628	159,314	139,194	114,595
84	201,111	161,756	139,194	118,11
85	204,958	163,399	144,357	118,11
86	207,101	163,399	144,357	118,11
87	210,388	167,363	144,357	118,315
88	210,388	167,653	146,574	118,577
89	210,804	167,653	148,221	118,577
90	210,804	170,94	148,221	118,577
91	210,804	171,569	148,474	120,635
92	210,804	173,31	153,114	120,635
93	210,804	173,31	153,719	123,031
94	212,025	184,089	157,48	125,275
95	223,15	184,865	158,103	125,275
96	223,591	187,377	162,327	125,77
97	223,979	190,642	163,035	125,77
98	236,686	196,078	167,033	128,458
99	289,283	196,078	167,693	128,755
100	335,387	212,418	167,693	131,752
<b>RATA- RATA</b>	<b>173,33</b>	<b>133,29</b>	<b>115,53</b>	<b>94,41</b>
<b>STDEV</b>	<b>37,25859693</b>	<b>28,86436726</b>	<b>25,84627835</b>	<b>20,91936958</b>

**Tabel Hasil analisa Diameter Membran Nanofiber CsNE**

No	Konsentrasi NeCS	Diameter	Standar deviasi
1	0%	173,33	37,25
2	20%	133,29	28,86

3	25%	115,53	25,84
4	30%	94,41	20,91

### B. Tabel Hasil Uji Viskositas

No	Konsentrasi NeCs	Viskositas
1	0%	285,9
2	20%	135,5
3	25%	94,5
4	30%	66,6

### C. Hasil Uji Tarik

**Tabel Nilai Kuat Tarik Membran *Nanofiber* PVA/NeCS**

Spesimen	Nilai Kuat Tarik Membran <i>Nanofiber</i> (MPa)			
	PVA/NeCs 0%	PVA/NeCs 20%	PVA/NeCs 25%	PVA/NeCs 30%
1	8,3411	<b>13,5234</b>	3,1056	2,8591
2	8,2959	<b>15,9524</b>	<b>3,4961</b>	3,7237
3	8,3262	12,2355	3,2483	<b>4,0127</b>
4	<b>8,9930</b>	12,0548	3,8163	<b>4,2974</b>
5	<b>7,7302</b>	11,5032	<b>4,0038</b>	2,5858
<b>Rata-rata</b>	<b>8,3373</b>	<b>13,0539</b>	<b>3,5340</b>	<b>3,49574</b>
<b>Standar Deviasi</b>	<b>0,4473</b>	<b>1,7815</b>	<b>0,3765</b>	<b>0,6625</b>

**Tabel Nilai Regangan Membran *Nanofiber* PVA/NeCS**

Spesimen	Nilai Regangan Membran <i>Nanofiber</i> (%)			
	PVA/NeCs 0%	PVA/NeCs 20%	PVA/NeCs 25%	PVA/NeCs 30%
1	124,7122	<b>68,2858</b>	40,8831	24,7938
2	96,6955	<b>89,8284</b>	<b>35,1692</b>	32,8866
3	88,3977	110,7639	46,2452	<b>31,8716</b>
4	<b>97,3378</b>	99,5389	26,4545	<b>34,0047</b>
5	<b>121,1268</b>	109,1814	<b>53,1435</b>	48,0765
<b>Rata-rata</b>	<b>105,6540</b>	<b>95,5197</b>	<b>40,3791</b>	<b>34,32664</b>
<b>Standar</b>	<b>16,2004</b>	<b>17,3872</b>	<b>10,2303</b>	<b>8,4871</b>

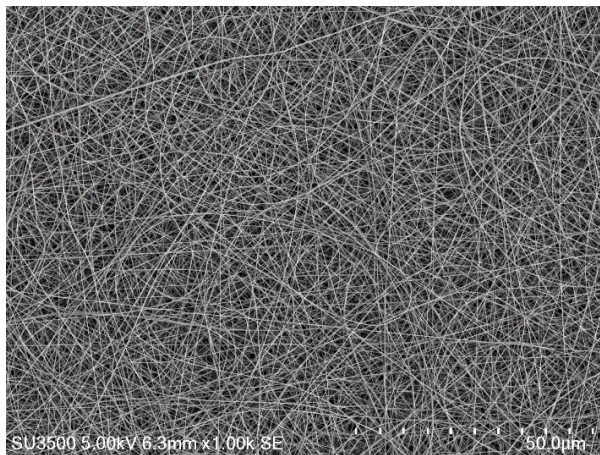
Deviasi				
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**Tabel Nilai Modulus Elastisitas Membran *Nanofiber* PVA/NeCS**

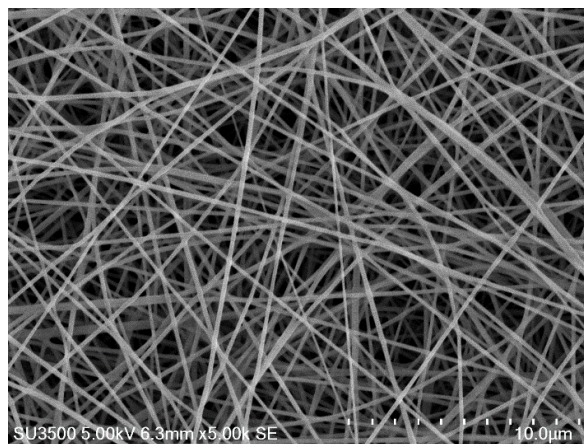
Spesimen	Nilai Modulus Elastisitas Membran Nanofiber (MPa)			
	PVA/NeCs 0%	PVA/NeCs 20%	PVA/NeCs 25%	PVA/NeCs 30%
1	29,54545455	<b>35,15731874</b>	17,57117438	13,70967742
2	41,26245847	<b>36,35724332</b>	<b>18,30214514</b>	15,80779944
3	64,81213873	50	21,70408751	<b>16,57754011</b>
4	<b>54,16666667</b>	47,799511	36,71811535	<b>33,08957952</b>
5	<b>66,51234568</b>	43,88919066	<b>56,70962851</b>	45,4738331
Rata-rata	51,2598	42,6407	30,2010	24,93168592
Standar Deviasi	15,7814	6,6673	16,7218	13,8519

**LAMPIRAN 2**  
**HASIL SCANNING ELECTRON MICROSCOPE (SEM)**

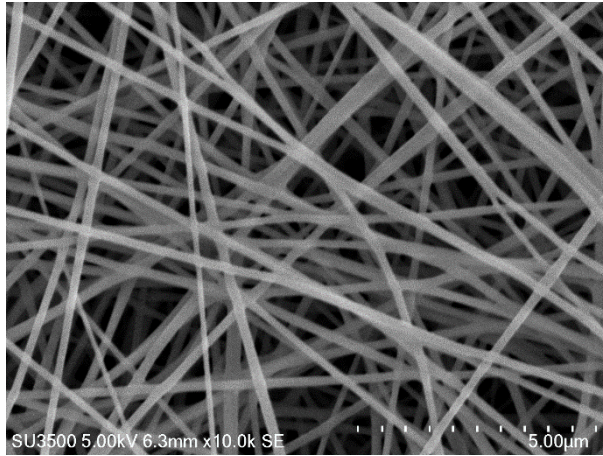
**A. Mikrografi Membran Nanofiber PVA/CsNE 0%.**



Perbesaran 1.000 kali

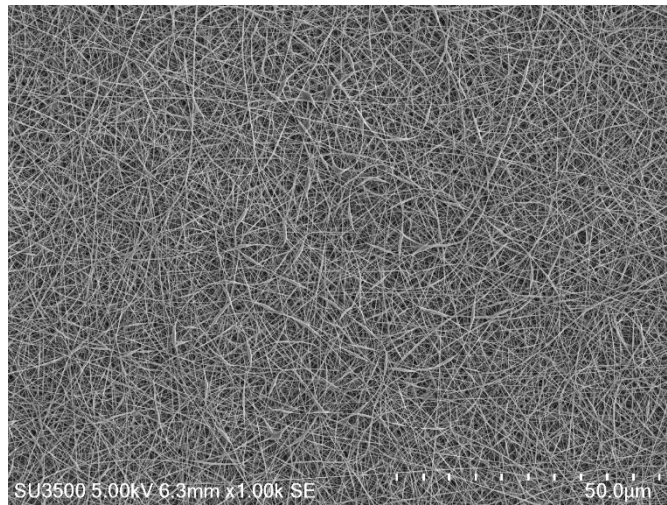


Perbesaran 5.000 kali

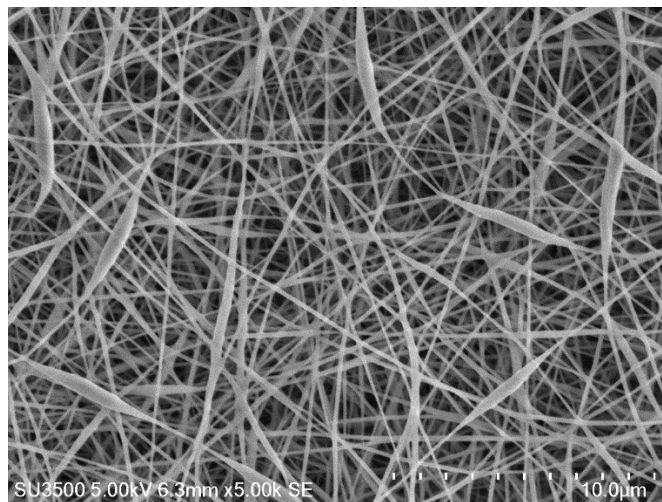


Perbesaran 10.000 kali

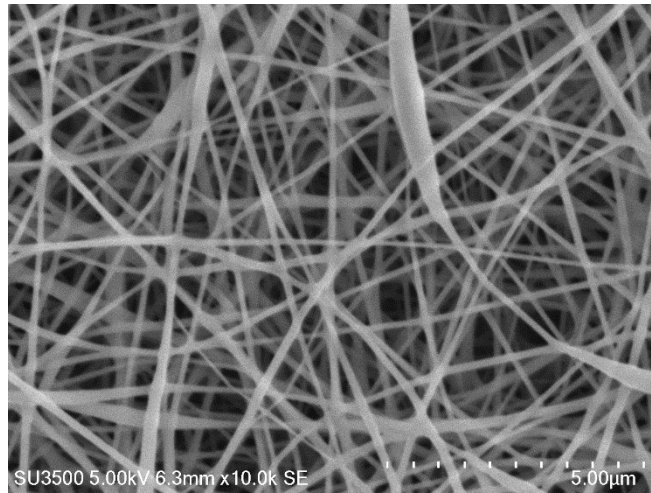
**B. Mikrografi Membran *Nanofiber* PVA/NeCS 20%.**



Perbesaran 1.000 kali

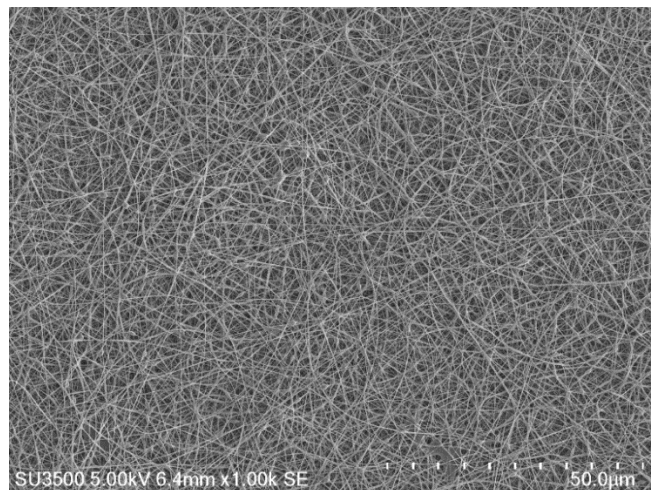


Perbesaran 5.000 kali



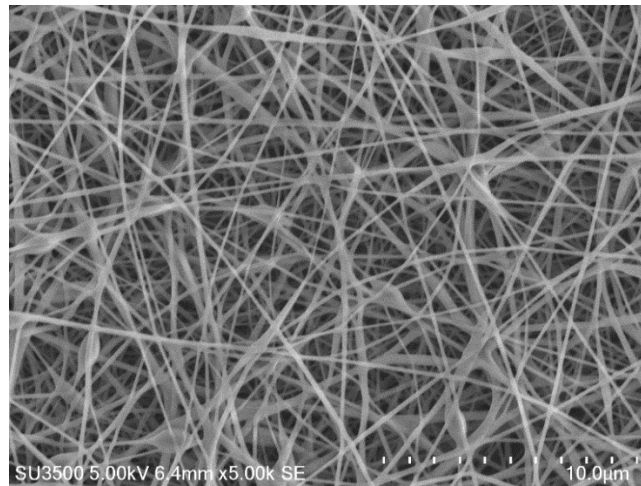
Perbesaran 10.000 kali

**C. Mikrografi Membran *Nanofiber* PVA/NeCS 25%.**

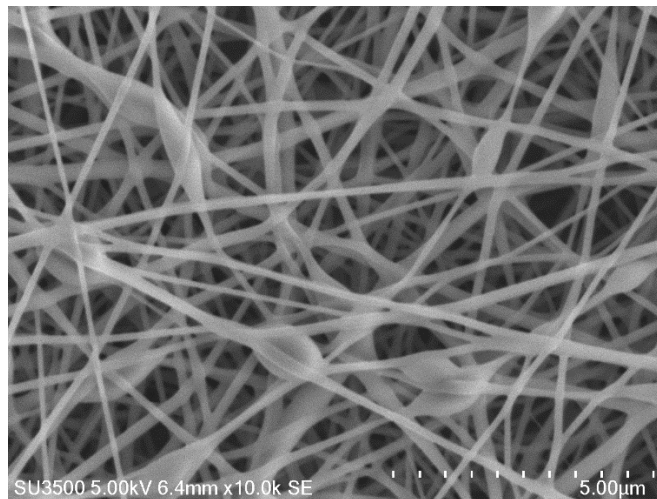


Perbesaran 1.000 kali



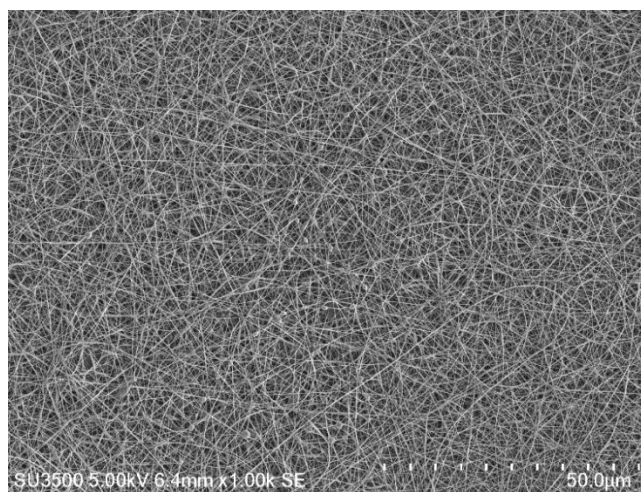


Perbesaran 5.000 kali

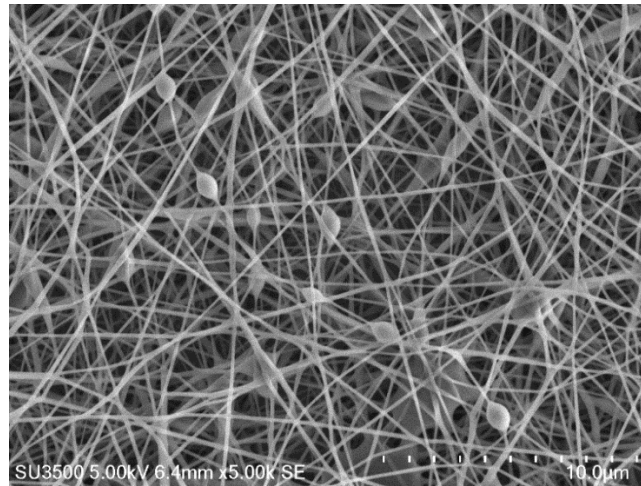


Perbesaran 10.000 kali

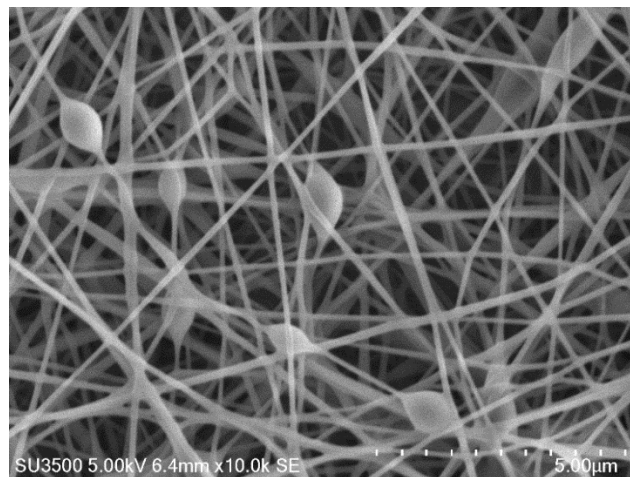
**D. Mikrografi Membran *Nanofiber* PVA/CsNE 30%.**



Perbesaran 1.000 kali



Perbesaran 5.000 kali

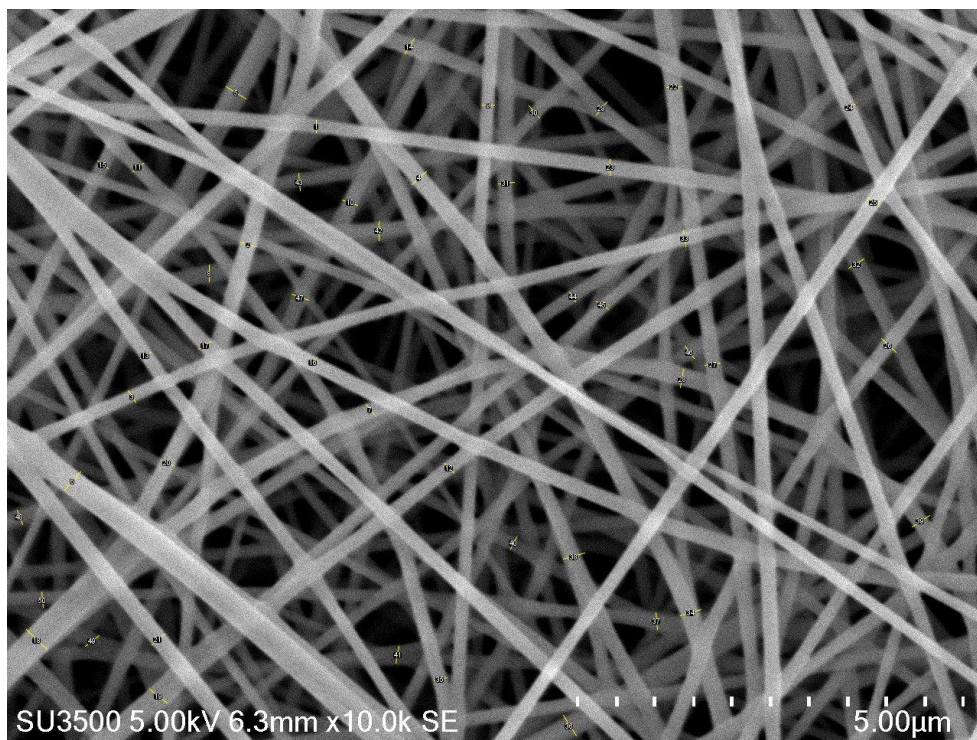
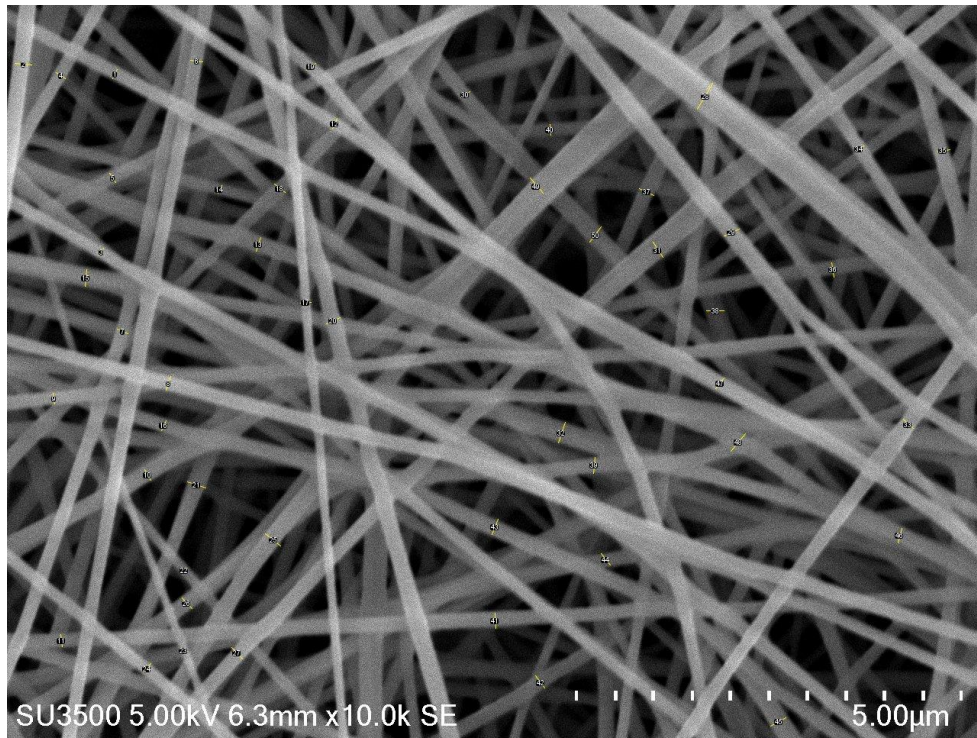


Perbesaran 10.000 kali

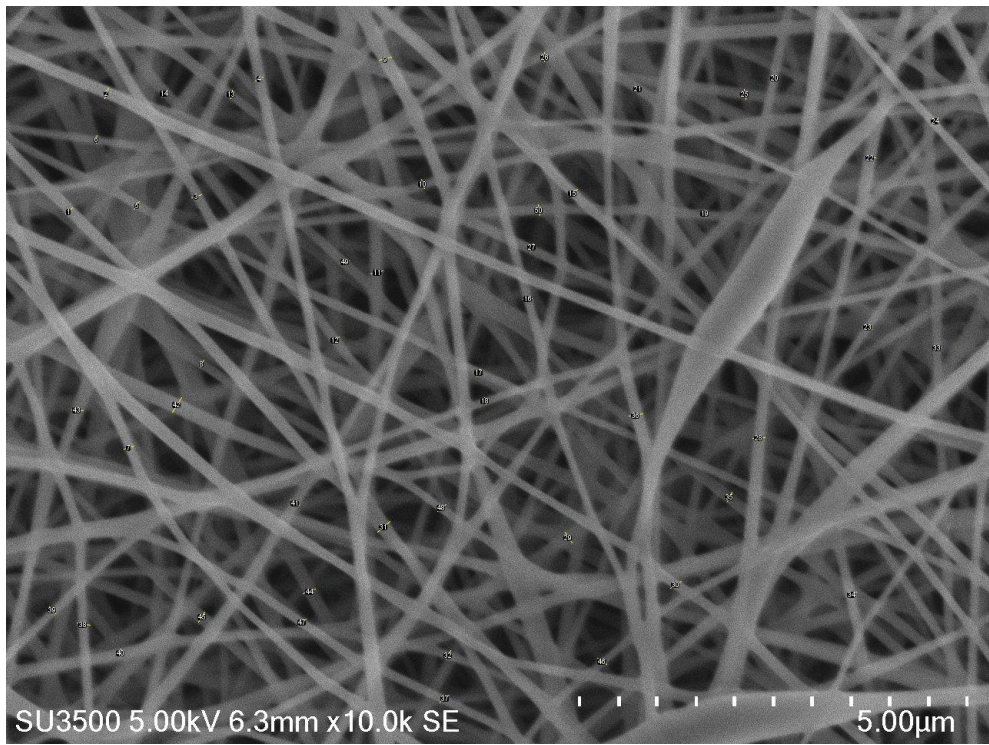
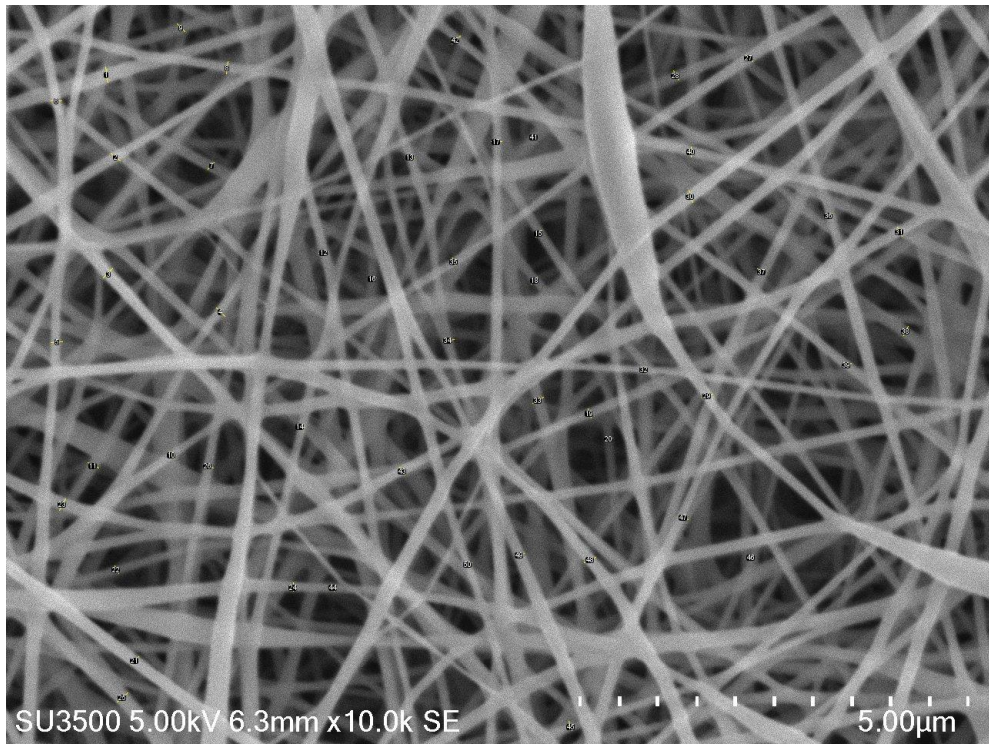
### LAMPIRAN 3

**Hasil Pengukuran Diameter Serat *Nanofiber* Pada 100 titik Berbeda**

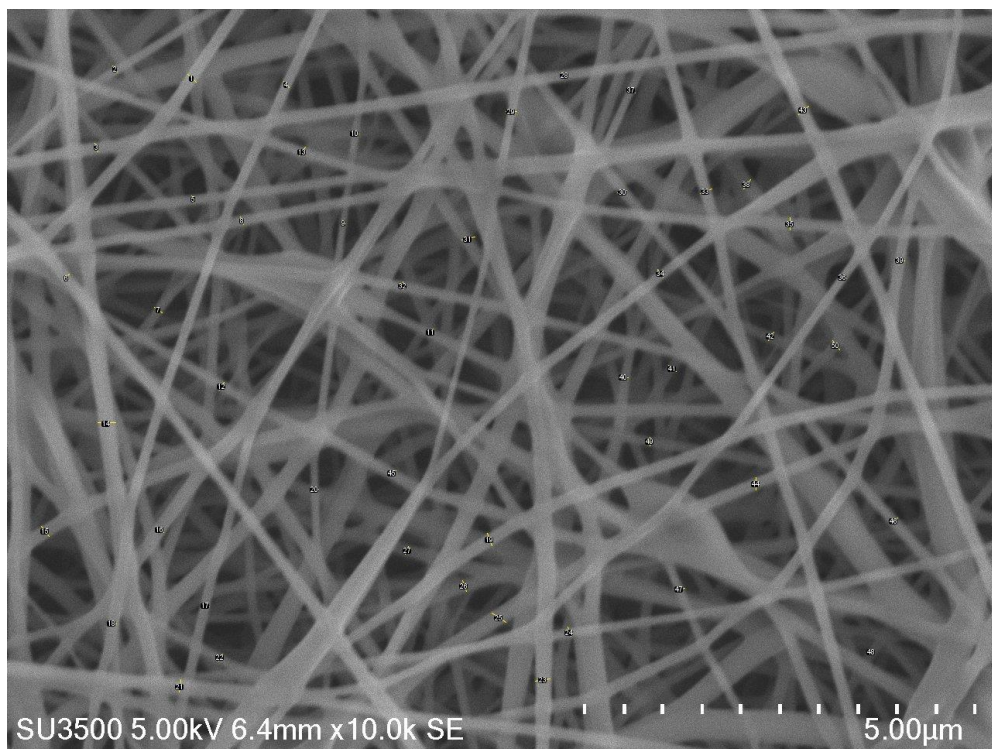
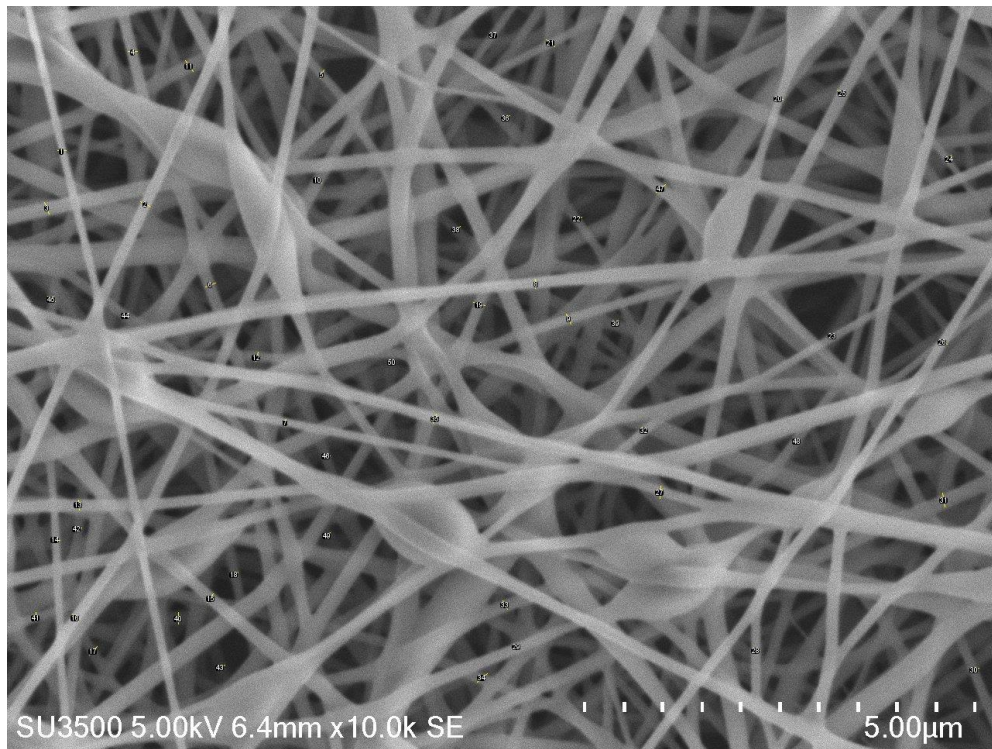
**A. Mikrografi Membran *Nanofiber* PVA/NeCS 0%.**



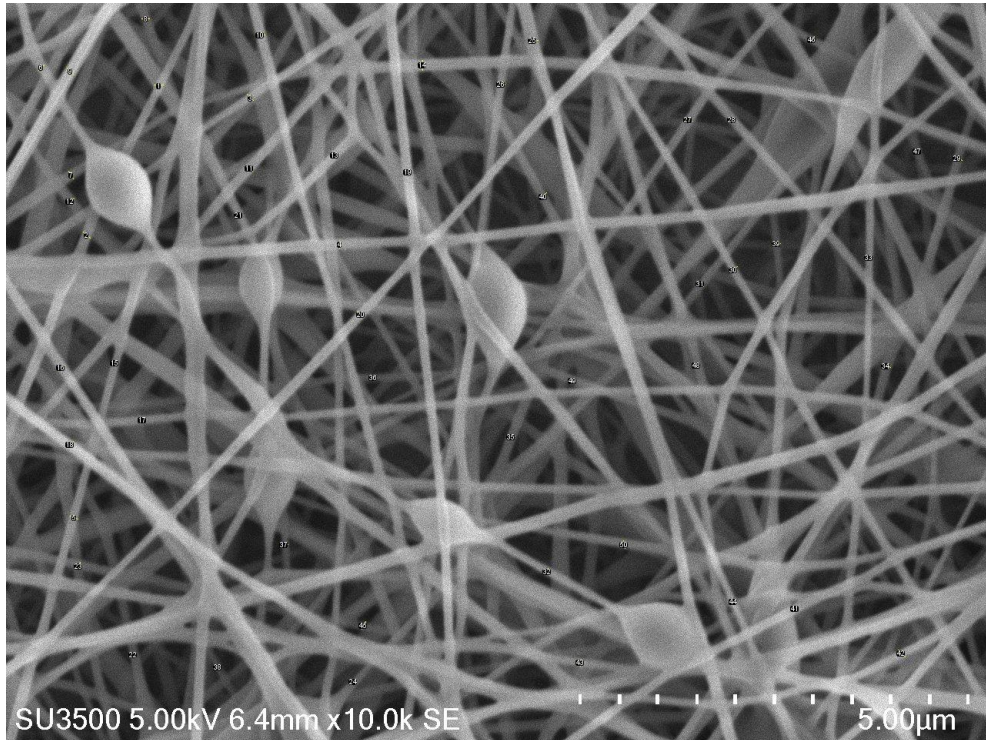
**B. Mikrografi Membran *Nanofiber* PVA/NeCS 20%.**

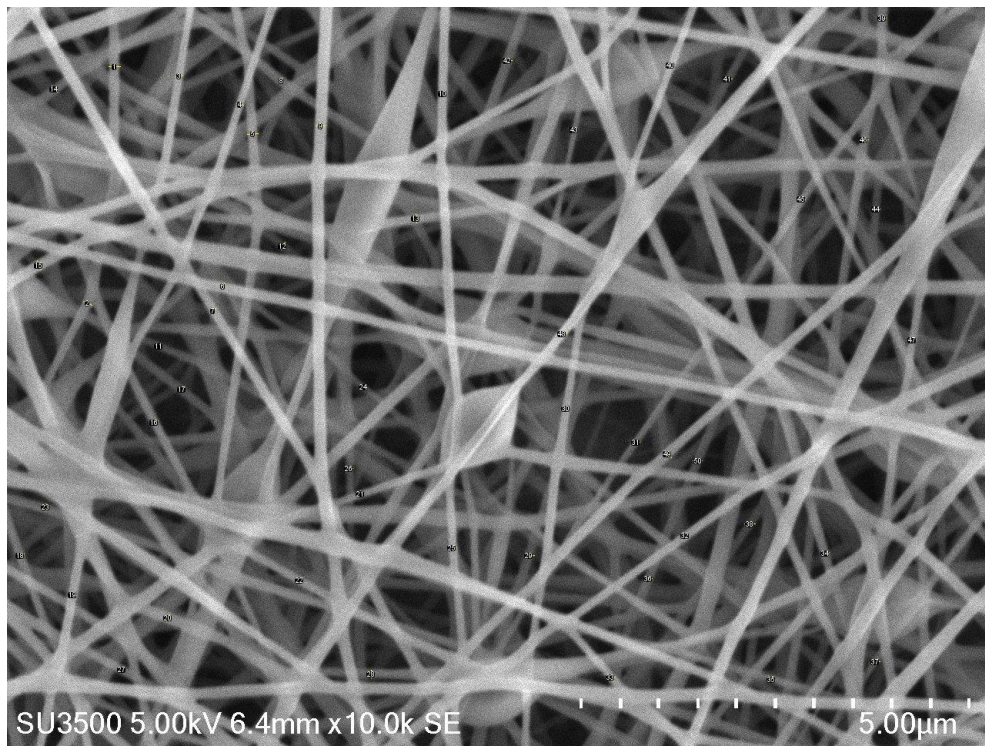


**C. Mikrografi Membran *Nanofiber* PVA/NeCS 25%.**



**D. Mikrografi Membran Nanofiber PVA/NeCS 30%.**





#### 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:442/ PS / 04 / 19

Lab. Penguji : Rekayasa Proses Pengolahan  
Tanggal Pengujian : 11 April 2019  
Sampel : PVA/NeCs  
Jenis Analisa : Viskositas  
Alat : Viskometer  
Merk : Brookfield  
Spindle : 62  
Kecepatan : 60 rpm  
Satuan : cP

No	Sampel/Kode	Hasil Analisa	
		UL 1	UL 2
1	PVA/NeCs 0%	285,9	285,9
2	PVA/NeCs 20%	135,5	135,5
3	PVA/NeCs 25%	94,5	94,5
4	PVA/NeCs 30%	66,6	66,6

Penyelia



Aulia Ardh, STP., M.Sc.

Yogyakarta, 29 April 2019

Analisis

Rahmat Teguh S

NB: Hasil Analisa hanya berlaku untuk sampel yang dianalisa



## LAMPIRAN 5

**180/PS/02/19**

**29.04.2019**

**Fakultas Teknologi Pertanian  
Universitas Gadjah Mada**

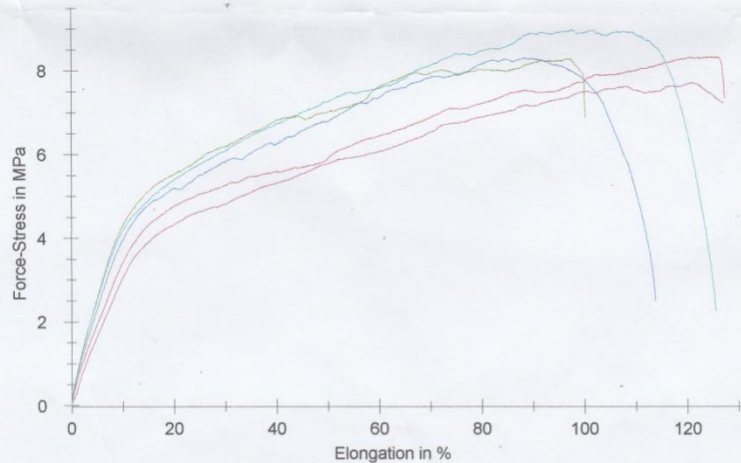
**Parameter table:**

Company name: 180/PS/02/19	Test standard : Tensile strength
Customer : Agung Sukoco	Material : PVA/NeCs 0%
Tester : Rachmat	
Test speed: 10 mm/min	

**Results:**

Nr	a0 mm	b0 mm	Lc mm	FMax N	Tensile Strength MPa	Strain at Fmax. %
1	0.04756	10	20	3.9670	8.3411	124.7122
2	0.03772	10	20	3.1292	8.2959	96.6955
3	0.03116	10	20	2.5945	8.3262	88.3977
4	0.02788	10	20	2.5072	8.9930	97.3378
5	0.05574	10	20	4.3088	7.7302	121.1268

**Series graphics:**



**Statistics:**

Series n = 5	a0 mm	b0 mm	Lc mm	FMax N	Tensile Strength MPa	Strain at Fmax. %
x	0.04001	10	20	3.3013	8.3373	105.6540
s	0.01157	0.000	0.000	0.8090	0.4473	16.2004
v	28.91	0.00	0.00	24.51	5.37	15.33

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Universitas Gadjah Mada**

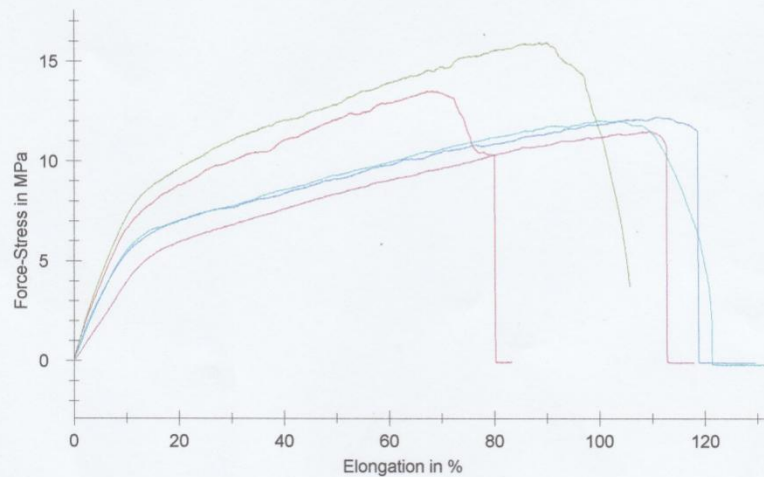
**Parameter table:**

Company name: 376/PS/04/19      Test standard : Tensile strength  
 Customer : Agung Sukoco      Material : 20% nanoemulsi 2jam  
 Tester : Rachmat  
 Test speed: 10 mm/min

**Results:**

Nr	a0 mm	b0 mm	Lc mm	FMax N	Tensile Strength MPa	Strain at Fmax. %
1	0.01476	10	20	1.9961	13.5234	68.2858
2	0.0164	10	20	2.6162	15.9524	89.8284
3	0.0164	10	20	2.0066	12.2355	110.7639
4	0.01886	10	20	2.2735	12.0548	99.5389
5	0.01968	10	20	2.2638	11.5032	109.1814

**Series graphics:**



**Statistics:**

Series n = 5	a0 mm	b0 mm	Lc mm	FMax N	Tensile Strength MPa	Strain at Fmax. %
$\bar{x}$	0.01722	10	20	2.2312	13.0539	95.5197
s	0.002009	0.000	0.000	0.2534	1.7814	17.3872
v	11.66	0.00	0.00	11.36	13.65	18.20

**Fakultas Teknologi Pertanian  
Universitas Gadjah Mada**

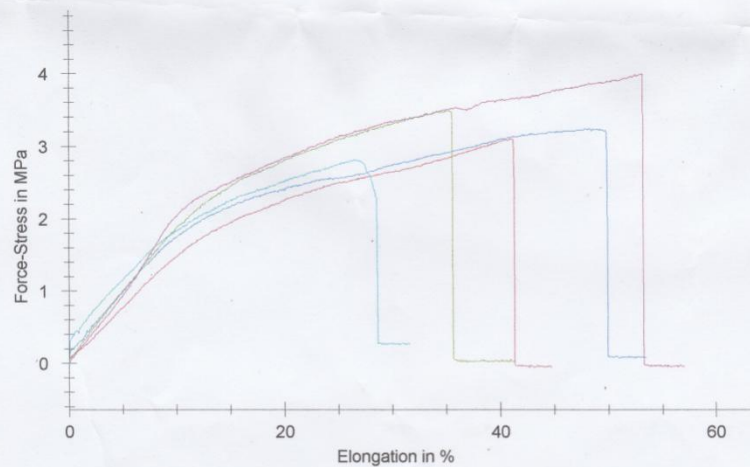
**Parameter table:**

Company name: 180/PS/02/19      Test standard : Tensile strength  
 Customer : Agung Sukoco      Material : PVA/NeCs 25%  
 Tester : Rachmat  
 Test speed: 10 mm/min

**Results:**

Nr	a0 mm	b0 mm	Lc mm	FMax N	Tensile Strength MPa	Strain at Fmax. %
1	0.02624	10	20	0.8149	3.1056	40.8831
2	0.01968	10	20	0.6880	3.4961	35.1692
3	0.02788	10	20	0.9056	3.2483	48.2452
4	0.01476	10	20	0.6466	2.8163	26.4545
5	0.0246	10	20	0.9849	4.0038	53.1435

**Series graphics:**



**Statistics:**

Series n = 5	a0 mm	b0 mm	Lc mm	FMax N	Tensile Strength MPa	Strain at Fmax. %
x	0.02263	10	20	0.8080	3.3340	40.7791
s	0.005365	0.000	0.000	0.1426	0.4479	10.5510
v	23.70	0.00	0.00	17.65	13.43	25.87

**Fakultas Teknologi Pertanian  
Universitas Gadjah Mada**

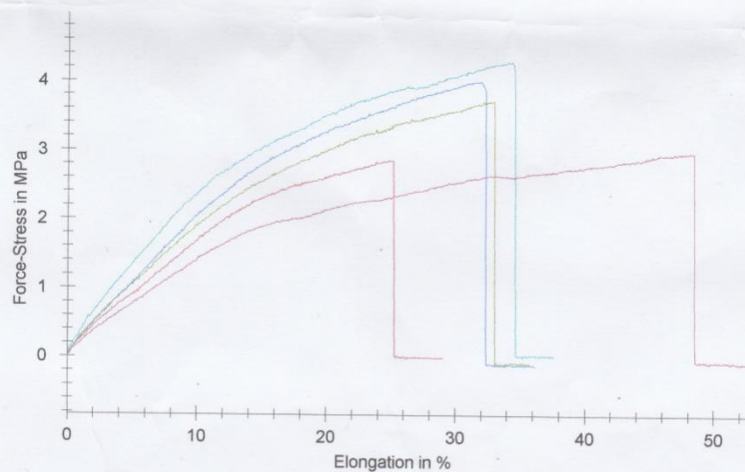
**Parameter table:**

Company name: 180/PS/02/19      Test standard : Tensile strength  
 Customer : Agung Sukoco      Material : PVA/NeCs 30%  
 Tester : Rachmat  
 Test speed: 10 mm/min

**Results:**

Nr	a0 mm	b0 mm	Lc mm	FMax N	Tensile Strength MPa	Strain at Fmax. %
1	0.0163	10	20	0.4660	2.8591	24.7938
2	0.01481	10	20	0.5515	3.7237	32.8866
3	0.0164	10	20	0.6581	4.0127	31.8716
4	0.0164	10	20	0.7048	4.2974	34.0047
5	0.01968	10	20	0.5876	2.9858	48.0765

**Series graphics:**



**Statistics:**

Series n = 5	a0 mm	b0 mm	Lc mm	FMax N	Tensile Strength MPa	Strain at Fmax. %
x	0.01672	10	20	0.5936	3.5758	34.3266
s	0.001788	0.000	0.000	0.0930	0.6315	8.4873
v	10.70	0.00	0.00	15.67	17.66	24.73