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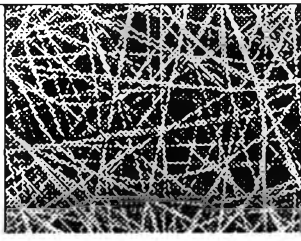
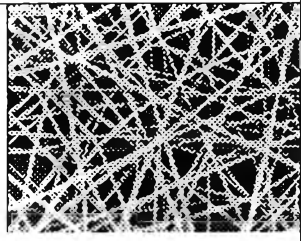
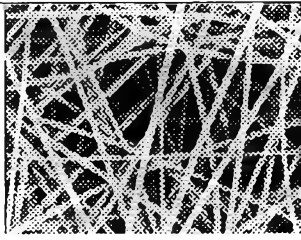
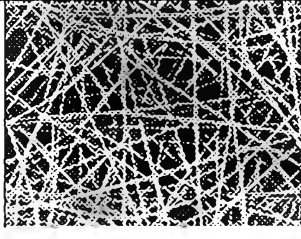
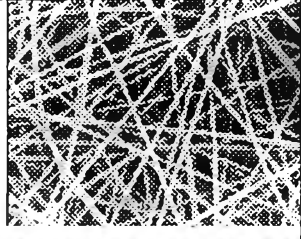
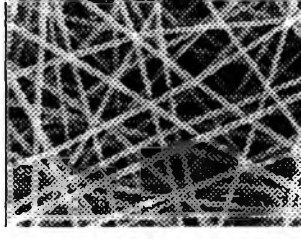
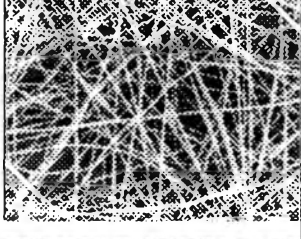
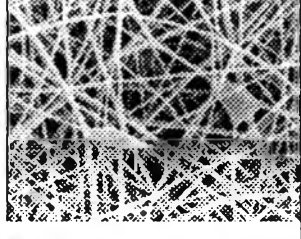
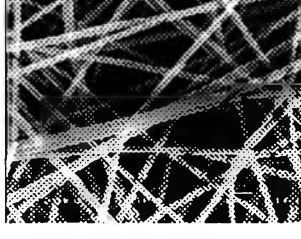
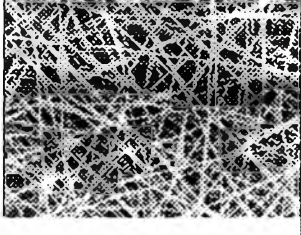
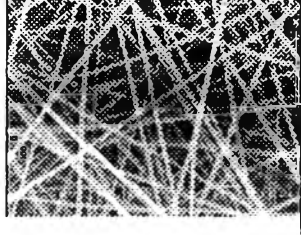
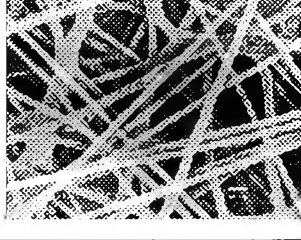
APPENDICES

Appendix A Morphological appearance and fiber diameters of electrospun fibers

In order to study the effects of solution concentration and applied voltage on the morphological appearance and fiber diameter, the electrospinning experiment with the grounded collector (a sheet of aluminum foil) was set-up. A JEOL JSM-5200 scanning electron microscope (SEM) was used to investigate the morphological appearance of the electrospun fibers. The SEM images were obtained by using an acceleration voltage of 15 kV with a magnification of 2000-10000x. The average fiber diameter of the electrospun fibers was measured by Semafore 4.0 software.

For all of the experiments, the collecting distance and flow rate were set at 15 cm. and 1 ml/h, respectively.

Table A1 SEM images of electrospun PVA fibers at different concentration and applied voltage

Applied Voltage (kV)	8 %w/v	10 %w/v	12 %w/v
15			
17.5			
20			
22.5			

SEM images show that the larger diameter of electrospun fibers was obtained when concentration of PVA was increased. The optimum conditions for electrospinning of PVA which were easy to prepare the PVA solution and obtained higher output of fibers were 10 % v/w and 15 kV for PVA concentration and applied voltage, respectively.



Table A2 Diameter of electrospun PVA fibers and drug-loaded electrospun PVA fibers (10 % w/v, 15 kV and 15 cm)

No.	Fiber Diameter (nm)								
	Neat PVA Fiber	PVA with 10% SS	PVA with 20% SS	PVA with 10% DS	PVA with 20% DS	PVA with 10% Nap	PVA with 20% Nap	PVA with 10% Ind	PVA with 20% Ind
1	91	69	143	73	73	107	116	98	141
2	117	118	143	142	142	148	128	162	172
3	142	93	154	90	90	107	121	243	100
4	99	128	126	92	92	148	138	162	164
5	113	82	103	110	110	129	203	164	132
6	119	86	10	90	90	186	121	98	211
7	152	115	142	178	178	123	132	127	145
8	137	110	100	178	178	169	118	118	146
9	165	100	126	146	146	83	146	145	171
10	162	91	77	121	121	92	121	81	196
11	153	127	162	116	116	140	179	253	189
12	172	86	57	129	129	123	132	139	136
13	137	69	82	116	116	156	192	103	169
14	113	82	103	103	103	147	115	126	228
15	99	82	139	91	91	92	139	274	200
16	127	118	118	139	139	151	116	139	179
17	130	91	91	77	77	120	143	110	154
18	143	109	193	82	82	112	100	182	118
19	91	91	150	78	78	112	132	132	178
20	165	145	121	91	91	118	180	116	118
21	115	118	145	78	78	82	109	115	136
22	127	185	81	78	78	120	92	179	164
23	129	92	92	86	86	116	118	154	129
24	113	81	82	129	129	78	174	164	235
25	130	118	132	90	90	120	191	174	245
26	100	100	91	78	78	134	109	118	112
27	129	91	78	90	90	94	167	155	198
28	128	115	146	81	81	117	129	128	151
29	143	132	110	103	103	120	154	154	193
30	86	128	54	141	141	130	150	115	185

No.	Fiber Diameter (nm)								
	Neat PVA Fiber	PVA with 10% SS	PVA with 20% SS	PVA with 10% DS	PVA with 20% DS	PVA with 10% Nap	PVA with 20% Nap	PVA with 10% Ind	PVA with 20% Ind
31	128	103	98	86	86	120	132	143	130
32	146	102	77	109	109	193	86	174	169
33	146	78	105	98	98	95	103	146	166
34	154	152	130	82	82	65	78	143	138
35	92	104	82	91	91	161	112	128	148
36	132	149	123	118	118	118	78	174	169
37	146	144	99	125	125	91	70	167	211
38	98	104	58	85	85	167	92	134	123
39	167	173	131	127	127	156	95	182	214
40	150	179	84	125	125	103	209	184	177
41	134	152	92	155	155	86	128	143	148
42	150	104	136	108	108	82	110	141	120
43	92	171	87	92	92	167	123	127	105
44	110	115	66	108	108	103	132	192	123
45	156	102	84	117	85	150	87	100	288
46	126	137	92	85	91	118	105	174	172
47	110	107	120	91	78	227	101	200	201
48	129	78	105	108	76	110	105	172	180
49	110	72	87	101	99	110	123	209	129
50	154	96	184	99	101	121	138	193	179
Avg	129.1	111.5	107.8	106.1	104.7	124.3	127.4	153.1	165.7
SD	23.0	29.2	34.8	25.5	26.1	32.4	32.6	39.8	39.0

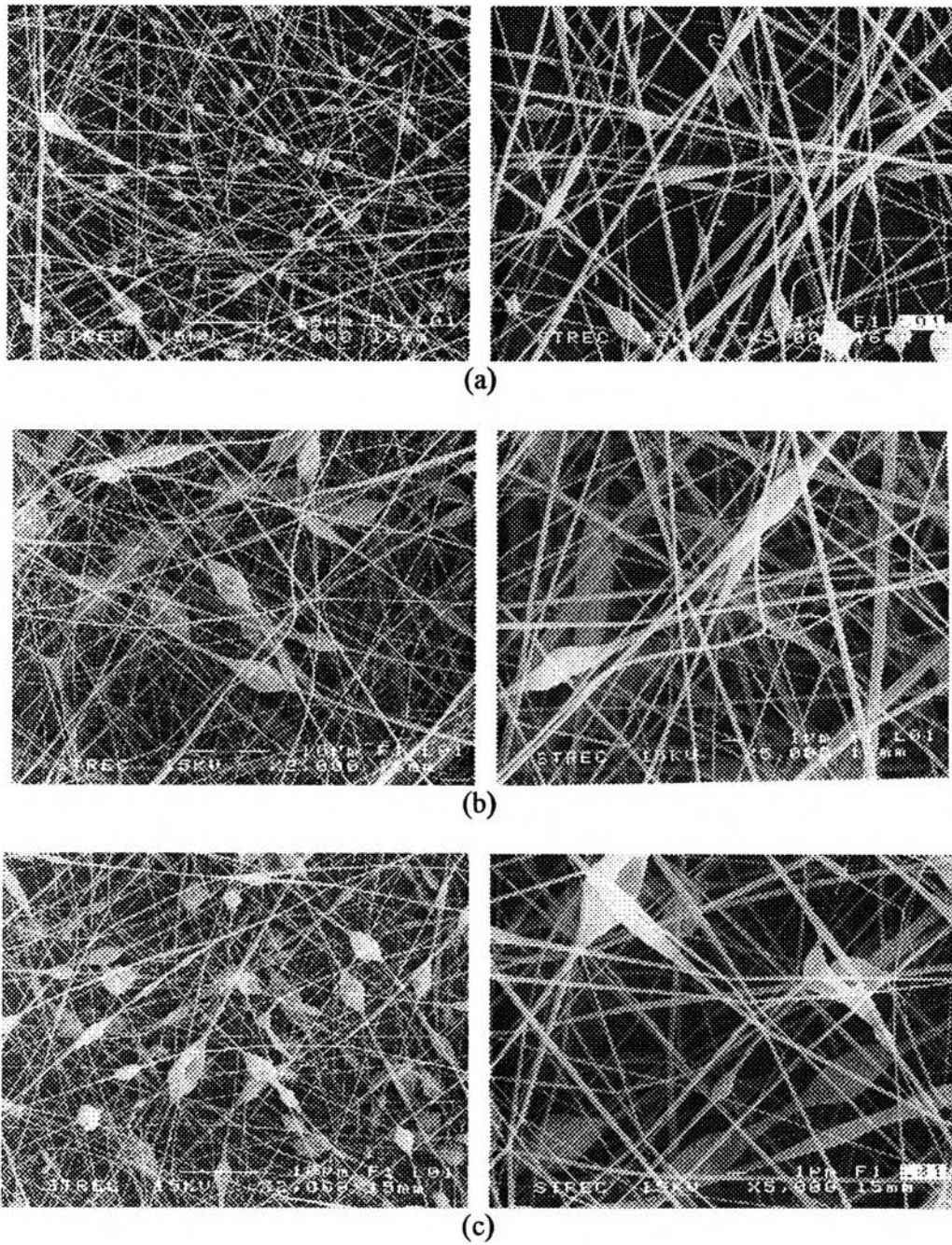


Figure A1 SEM images of electrospun CA fibers from 14 %w/v of CA solution at different applied voltage; (a) 15 kV, (b) 17.5 kV and (c) 20 kV.

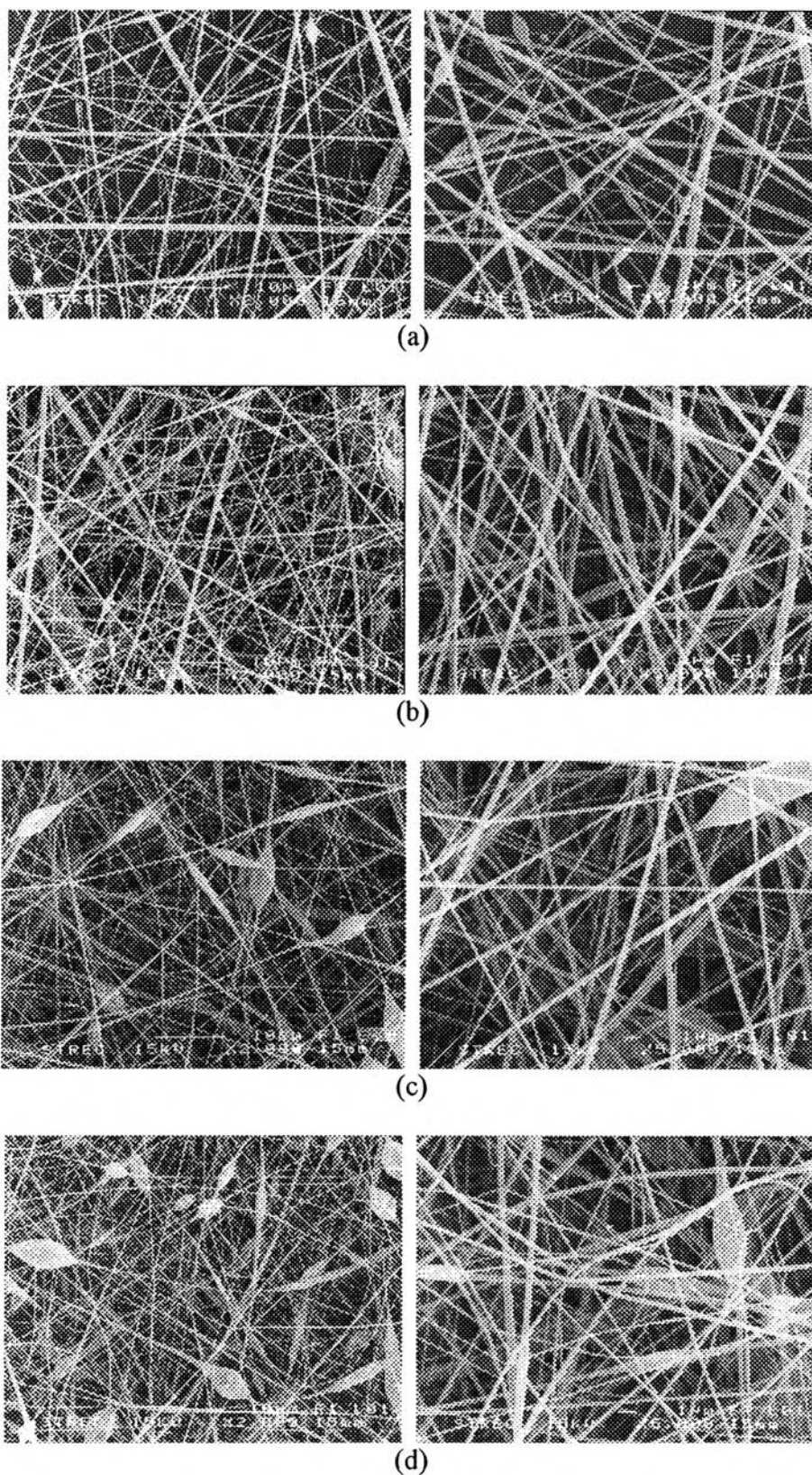


Figure A2 SEM images of electrospun CA fibers from 15 %w/v of CA solution at different applied voltage; (a) 12.5 kV, (b) 15 kV, (c) 17.5 kV and (d) 20 kV.

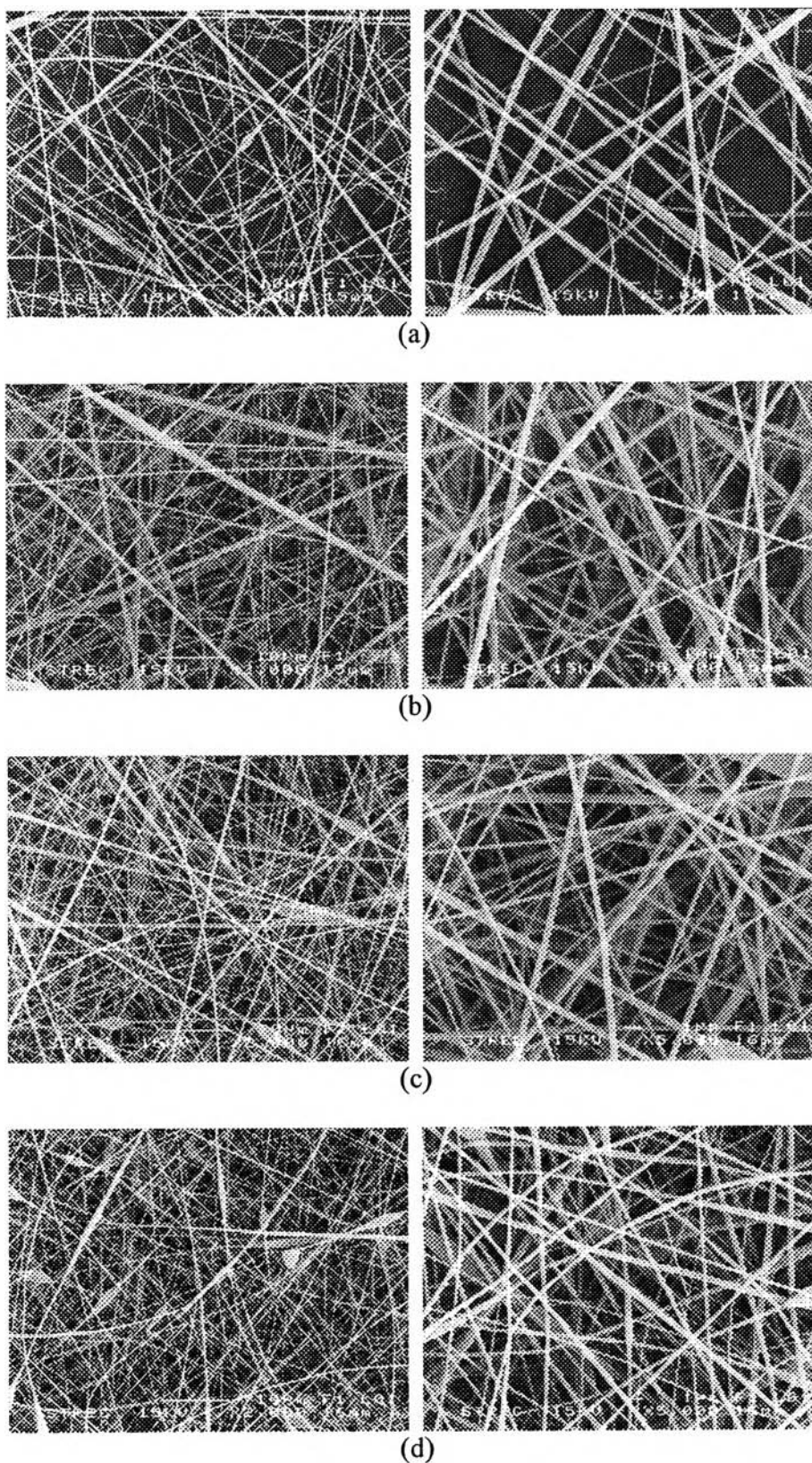


Figure A3 SEM images of electrospun CA fibers from 16 %w/v of CA solution at different applied voltage; (a) 12.5 kV, (b) 15 kV, (c) 17.5 kV and (d) 20 kV.

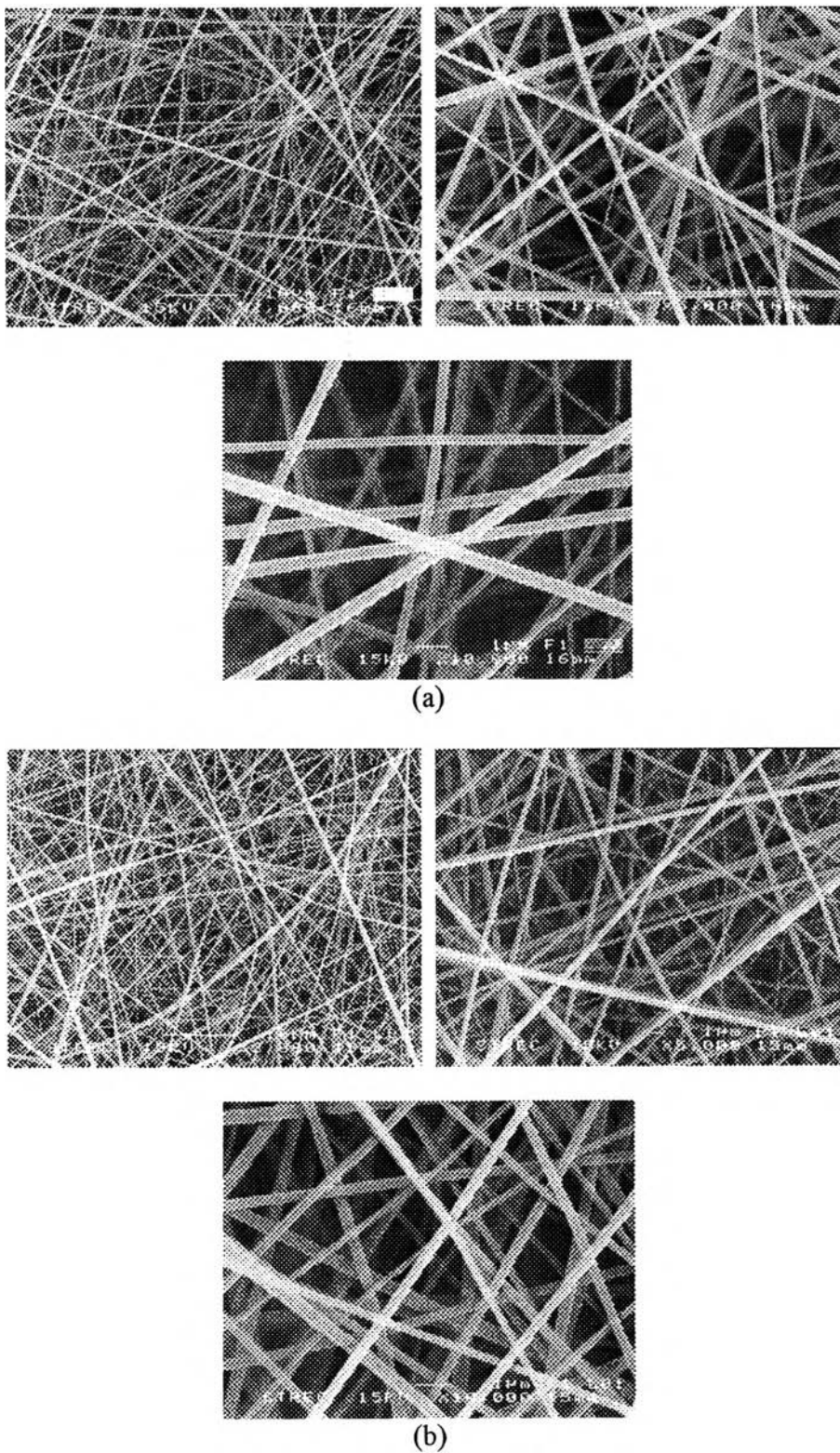


Figure A4 SEM images of electrospun CA fibers from 17 %w/v of CA solution at different applied voltage; (a) 15 kV and (b) 17.5 kV.

Table A3 Diameter of electrospun CA fibers (17 %w/v, 17.5 kV and 15 cm)

No	Neat CA fibers	CA with 5 wt.% of Vit-E	CA with 0.5 wt.% of Retin-A
1	282	323	216
2	264	198	235
3	248	254	267
4	180	255	286
5	306	227	346
6	267	288	242
7	274	243	216
8	252	309	239
9	221	276	255
10	195	223	283
11	325	212	297
12	263	260	273
13	281	224	289
14	221	237	266
15	213	211	272
16	265	237	255
17	240	284	261
18	253	223	276
19	264	271	256
20	236	235	235
21	274	236	260
22	212	228	240
23	253	324	215
24	286	284	226
25	275	371	252
26	309	201	221
27	221	230	217
28	239	272	206
29	274	194	246
30	263	250	260

No	Neat CA fibers	CA with 5 wt.% of Vit-E	CA with 0.5 wt.% of Retin-A
31	241	271	236
32	353	293	313
33	202	299	275
34	340	220	243
35	274	255	225
36	236	272	239
37	307	334	205
38	256	233	241
39	258	320	229
40	321	192	230
41	320	275	263
42	223	313	274
43	263	224	255
44	249	207	205
45	315	234	203
46	341	198	225
47	268	213	189
48	258	246	223
49	309	219	246
50	273	274	200
Avg	265.26	253.44	246.54
SD	38.90	41.43	31.05

Appendix B Mechanical properties of neat and the vitamin-loaded as-spun fiber mats and as-cast CA films

The mechanical integrity in terms of the tensile strength and the strain at maximum of both the neat and the vitamin-loaded as-spun CA fiber mats and as-cast CA films was investigated using a Lloyd LRX universal testing machine at room temperature. Each specimen was cut into a rectangular shape (10 mm × 100 mm). The crosshead speed and the gauge length used were 20 mm min⁻¹ and 50 mm, respectively. The results were reported as average values from at least 7 measurements.

Table B1 The tensile strength and the strain at maximum of neat and the Vit-E-loaded as-spun CA fiber mats

Type of as-spun CA fiber mats	No.	Tensile strength (MPa)	% Strain at maximum (%)
Neat	1	15.28	21.63
	2	16.36	20.08
	3	15.61	18.83
	4	14.54	21.79
	5	16.79	21.01
	6	15.61	18.83
	7	14.80	19.22
	<i>Avg</i>	<i>15.57</i>	<i>20.20</i>
	<i>SD</i>	<i>0.80</i>	<i>1.29</i>
with 5 wt.% of Vit-E	1	14.30	16.39
	2	13.50	16.15
	3	16.88	17.91
	4	15.68	20.08
	5	16.88	17.38
	6	15.28	21.63
	7	16.36	20.08
	<i>Avg</i>	<i>15.55</i>	<i>18.52</i>
	<i>SD</i>	<i>1.29</i>	<i>2.09</i>
With 0.5 wt.% of Retin-A	1	15.13	19.32
	2	17.18	21.05
	3	16.79	21.01
	4	15.28	21.63
	5	15.61	18.83
	6	14.80	19.22
	7	13.25	19.27
	<i>Avg</i>	<i>15.44</i>	<i>20.05</i>
	<i>SD</i>	<i>1.30</i>	<i>1.14</i>

Table B2 The tensile strength and the strain at maximum of neat and the Retin-A-loaded as-cast CA films

Type of as-cast CA films	No.	Tensile strength (MPa)	% Strain at maximum (%)
Neat	1	18.61	1.54
	2	18.16	1.95
	3	21.87	1.25
	4	20.37	1.88
	5	20.93	1.70
	6	22.16	1.68
	7	19.21	1.41
	<i>Avg</i>	<i>20.19</i>	<i>1.63</i>
	<i>SD</i>	<i>1.57</i>	<i>0.25</i>
With 5 wt.% of Vit-E	1	19.21	2.63
	2	19.05	2.23
	3	22.78	1.96
	4	21.80	2.16
	5	23.17	1.83
	6	25.22	2.62
	7	16.89	1.89
	<i>Avg</i>	<i>21.16</i>	<i>2.19</i>
	<i>SD</i>	<i>2.89</i>	<i>0.33</i>
with 0.5 wt.% of Retin-A	1	20.91	1.50
	2	20.11	1.99
	3	21.23	2.31
	4	18.19	2.74
	5	19.36	1.69
	6	21.90	2.41
	7	20.34	1.85
	<i>Avg</i>	<i>20.29</i>	<i>2.07</i>
	<i>SD</i>	<i>1.24</i>	<i>0.44</i>

Appendix C Stability of vitamins

Stability of Retin-A and Vit-E in the B/T/M medium was evaluated at 37°C by varying the aging period of each vitamin in the medium. The test solution was prepared by dissolving an amount of either Retin-A or Vit-E in a measured quantity of the B/T/M medium. At a specified period ranging between 0 and 24 h (1440 min), 0.5 ml of the test solution was withdrawn (i.e., sample solution) and the amount of the vitamin that remained detectable in the sample solution was determined using HPLC against the predetermined calibration curve for each vitamin. The experiments were carried out in duplicate.

Table C1 Stability of Vit-E in the B/T/M medium

Collecting Time (min)	Detectable amount of Vit-E (%)			
	Test 1	Test 2	Avg	SD
0	100.00	100.00	100.00	0.00
30	98.93	97.29	98.11	1.16
60	99.12	96.16	97.64	2.10
120	97.69	95.36	96.53	1.65
180	99.38	96.71	98.05	1.89
240	99.90	96.99	98.45	2.06
360	100.27	96.55	98.41	2.63
480	97.68	99.37	98.53	1.20
720	98.09	97.19	97.64	0.63
960	99.63	95.86	97.75	2.67
1200	98.68	99.46	99.07	0.55
1440	97.13	96.70	96.92	0.30

Table C2 Stability of Retin-A in the B/T/M medium

Collecting Time (min)	Detectable amount of Retin-A (%)			
	Test 1	Test 2	Avg	SD
0	100.00	100.00	100.00	0.00
5	98.76	100.51	99.63	1.24
10	102.40	99.41	100.90	2.12
20	98.91	100.05	99.48	0.80
30	103.14	100.52	101.83	1.85
60	101.77	99.63	100.70	1.51
120	102.42	99.70	101.06	1.92
180	100.79	98.44	99.61	1.66
240	98.46	99.38	98.92	0.65
360	101.56	97.62	99.59	2.78
480	96.18	92.72	94.45	2.45
720	94.54	91.46	93.00	2.18
960	89.08	86.37	87.73	1.92
1200	82.26	79.08	80.67	2.26
1440	71.73	70.35	71.04	0.97

Appendix D Cumulative Release of NSAIDs (%) from as-spun PVA mats and as-cast PVA films

To study the release characteristics of drugs from drug-loaded electrospun PVA mats and as-cast PVA films, two types of release, i.e. total immersion and transdermal diffusion through a pig skin, were carried out. The study of the release characteristics of the drugs through a pig skin was carried out with an aim at resembling the actual release through a human skin. At a specified diffusion period ranging between 0 and 24 h (1440 min), the buffer solution was taken out. The amount of drugs in the withdrawn solutions was determined using the UVspectrophotometer at 296 for SS, DS, NAP and IND, respectively.

Table D1 Cumulative release of SS (%) from SS-loaded electrospun PVA fiber mats and SS-loaded PVA films by the total immersion technique

Immersion Time (min)	Cumulative release of SS (%)									
	As-spun PVA fiber mats					As-cast PVA films				
	Test1	Test2	Test3	Avg	SD	Test1	Test2	Test3	Avg	SD
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	91.54	89.95	90.32	90.60	0.83	90.57	92.25	87.52	90.11	2.40
4	92.65	93.60	91.05	92.43	1.29	91.78	92.64	87.65	90.69	2.67
6	93.01	95.39	92.85	93.75	1.42	92.18	93.03	89.31	91.51	1.95
8	93.37	95.39	93.20	93.99	1.22	93.74	93.16	89.69	92.20	2.19
11	93.73	95.75	93.55	94.34	1.22	93.74	93.29	89.81	92.28	2.15
15	95.13	95.75	93.90	94.92	0.94	93.87	93.29	89.81	92.32	2.20
20	95.13	96.08	93.56	94.92	1.27	93.99	93.41	90.17	92.53	2.06
25	95.13	96.08	93.90	95.03	1.10	93.99	93.65	90.41	92.69	1.98
30	95.46	96.08	94.22	95.25	0.95	94.12	93.65	90.65	92.81	1.88
40	95.46	96.08	94.87	95.47	0.61	94.12	93.77	91.11	93.00	1.64
50	95.46	96.08	94.87	95.47	0.61	94.24	93.77	91.11	93.04	1.68
60	95.46	96.08	94.87	95.47	0.61	94.24	93.77	91.11	93.04	1.68
90	95.77	96.08	94.87	95.57	0.63	94.35	94.11	91.56	93.34	1.55
120	95.77	96.08	94.87	95.57	0.63	95.83	94.45	92.11	94.13	1.88
240	96.08	96.38	96.07	96.18	0.18	95.94	94.45	92.11	94.16	1.93
480	96.08	96.38	96.36	96.27	0.17	96.27	95.10	92.32	94.56	2.03
720	96.37	96.96	96.36	96.57	0.34	96.38	95.20	92.85	94.81	1.80
960	96.95	96.96	96.94	96.95	0.01	96.49	95.31	93.36	95.05	1.58
1200	96.95	97.53	97.22	97.23	0.29	96.59	95.41	93.56	95.19	1.52
1440	97.51	97.80	97.22	97.51	0.29	96.80	95.41	94.16	95.46	1.32

Table D2 Cumulative release of DS (%) from DS-loaded electrospun PVA fiber mats and DS-loaded PVA films by the total immersion technique

Immersion Time (min)	Cumulative release of DS (%)									
	As-spun PVA fiber mats					As-cast PVA films				
	Test1	Test2	Test3	Avg	SD	Test1	Test2	Test3	Avg	SD
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	13.86	13.36	10.52	12.58	1.80	15.19	15.91	13.50	14.87	1.24
4	14.87	14.12	11.67	13.55	1.67	17.89	18.88	14.48	17.08	2.31
6	16.05	14.70	13.46	14.74	1.29	19.30	19.60	15.70	18.20	2.17
8	16.21	15.44	13.78	15.14	1.24	21.06	20.17	16.44	19.22	2.45
11	16.37	16.50	14.97	15.95	0.85	21.61	22.05	18.20	20.62	2.11
15	18.84	18.25	17.07	18.05	0.90	22.70	23.30	20.17	22.06	1.66
20	19.08	19.89	18.13	19.03	0.88	23.96	24.58	21.40	23.31	1.68
25	19.77	21.35	19.25	20.13	1.09	25.25	25.09	23.37	24.57	1.04
30	20.46	23.02	21.47	21.65	1.29	26.40	25.94	24.37	25.57	1.06
40	22.56	25.04	23.00	23.53	1.32	28.24	27.35	25.94	27.17	1.16
50	24.79	27.69	24.66	25.71	1.71	28.86	28.59	27.82	28.42	0.54
60	27.42	33.72	28.13	29.75	3.45	29.36	29.55	28.67	29.19	0.46
90	32.60	34.65	31.97	33.07	1.40	30.66	32.00	31.70	31.45	0.70
120	38.62	40.22	37.26	38.70	1.48	31.04	33.66	33.25	32.65	1.41
240	50.21	54.73	49.31	51.42	2.91	32.48	35.08	33.64	33.73	1.30
480	61.69	62.87	61.17	61.91	0.87	33.55	36.02	34.06	34.54	1.30
720	67.51	68.59	67.08	67.73	0.78	34.32	36.88	34.44	35.21	1.45
960	71.23	71.04	70.63	70.97	0.31	34.74	38.20	35.11	36.02	1.90
1200	72.87	72.87	72.28	72.67	0.34	35.22	38.53	36.78	36.85	1.66
1440	76.48	75.94	74.41	75.61	1.08	35.92	40.17	37.53	37.87	2.15

Table D3 Cumulative release of NAP (%) from NAP-loaded electrospun PVA fiber mats and NAP-loaded PVA films by the total immersion technique

Immersion Time (min)	Cumulative release of NAP (%)									
	As-spun PVA fiber mats					As-cast PVA films				
	Test1	Test2	Test3	Avg	SD	Test1	Test2	Test3	Avg	SD
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	7.42	8.36	9.11	8.30	0.84	10.23	9.37	7.58	9.06	1.35
5	15.42	14.24	12.54	14.06	1.45	22.00	18.21	13.62	17.94	4.19
7	19.32	20.98	17.43	19.24	1.77	32.20	26.93	18.16	25.76	7.09
10	24.67	23.38	23.10	23.71	0.84	40.45	34.95	24.82	33.41	7.93
12	30.23	28.03	28.32	28.86	1.19	47.45	39.25	29.20	38.63	9.14
15	35.62	33.07	34.20	34.30	1.28	55.31	48.12	34.22	45.88	10.72
20	42.12	39.64	40.72	40.83	1.24	62.71	56.16	42.47	53.78	10.33
25	47.91	46.39	50.14	48.14	1.89	68.06	63.39	48.41	59.96	10.26
30	54.84	51.31	56.48	54.21	2.64	69.31	67.51	52.79	63.20	9.06
40	62.20	62.98	70.96	65.38	4.85	71.99	70.13	57.28	66.47	8.01
50	73.47	70.37	78.98	74.27	4.36	74.86	72.17	60.74	69.26	7.50
60	76.50	76.58	85.06	79.38	4.92	77.14	72.61	63.38	71.04	7.02
90	90.93	89.39	93.83	91.38	2.25	79.13	74.17	68.62	73.97	5.26
120	96.81	95.42	96.74	96.32	0.78	79.29	75.15	70.92	75.12	4.18
240	97.77	97.96	98.65	98.13	0.46	79.60	75.36	75.14	76.70	2.51
480	98.25	99.60	99.04	98.96	0.68	80.11	75.85	76.93	77.63	2.21
720	98.33	99.75	99.12	99.07	0.71	80.26	75.89	76.93	77.69	2.28
960	98.33	99.83	99.12	99.09	0.75	80.26	77.09	76.93	78.10	1.88
1200	98.71	99.83	99.12	99.22	0.57	80.26	77.25	77.36	78.29	1.71
1440	99.15	99.83	99.20	99.39	0.38	80.26	77.25	77.36	78.29	1.71

Table D4 Cumulative release of IND (%) from IND-loaded electrospun PVA fiber mats and IND-loaded PVA films by the total immersion technique

Immersion Time (min)	Cumulative release of IND (%)									
	As-spun PVA fiber mats					As-cast PVA films				
	Test1	Test2	Test3	Avg	SD	Test1	Test2	Test3	Avg	SD
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	3.03	3.19	2.44	2.88	0.39	1.90	1.96	1.82	1.90	0.07
4	6.26	6.27	3.32	5.28	1.70	2.80	2.68	2.48	2.65	0.17
6	7.47	6.70	4.47	6.21	1.56	3.43	3.40	3.55	3.46	0.08
8	8.67	7.99	5.61	7.42	1.60	4.57	4.17	4.40	4.38	0.20
10	9.70	8.13	6.32	8.05	1.69	5.87	4.86	5.30	5.35	0.50
12	10.58	9.24	7.29	9.04	1.65	6.47	5.21	6.06	5.91	0.64
15	11.30	9.93	8.68	9.97	1.31	7.23	7.03	7.08	7.11	0.10
20	11.87	10.47	9.36	10.57	1.25	8.48	8.30	8.75	8.51	0.23
25	12.85	10.87	10.18	11.30	1.39	9.22	8.69	9.15	9.02	0.28
30	13.67	11.53	10.71	11.97	1.53	10.51	9.54	10.25	10.10	0.51
40	15.58	12.83	12.81	13.74	1.59	12.35	10.88	13.53	12.25	1.33
50	17.59	13.09	13.85	14.84	2.41	15.73	12.33	14.29	14.12	1.71
60	18.39	13.97	14.49	15.62	2.41	17.52	14.50	15.22	15.75	1.57
90	21.91	16.33	17.26	18.50	2.99	20.88	19.21	19.22	19.77	0.96
120	24.47	17.56	19.49	20.51	3.57	22.83	21.14	21.28	21.75	0.94
240	31.81	22.51	25.48	26.60	4.75	28.10	24.94	25.57	26.20	1.67
480	37.04	28.80	32.59	32.81	4.12	31.24	26.58	26.63	28.15	2.68
720	41.57	32.54	36.38	36.83	4.53	32.03	27.21	27.38	28.87	2.73
960	42.17	35.65	38.95	38.92	3.26	32.31	27.44	27.83	29.19	2.71
1200	43.48	37.92	40.32	40.57	2.79	32.45	27.66	28.05	29.39	2.66
1440	44.41	38.59	42.24	41.75	2.95	32.65	27.93	28.22	29.60	2.65

Table D5 Cumulative release of SS (%) from SS-loaded electrospun PVA fiber mats and SS-loaded PVA films by the transdermal diffusion through a pig skin technique

Time (min)	Cumulative release of SS (%)									
	As-spun PVA fiber mats					As-cast PVA films				
	Test1	Test2	Test3	Avg	SD	Test1	Test2	Test3	Avg	SD
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	8.72	8.91	9.24	8.96	0.26	2.55	1.91	2.84	2.43	0.48
20	9.69	13.76	10.82	11.43	2.10	2.96	2.71	3.30	2.99	0.29
30	12.23	15.88	11.37	13.16	2.39	3.58	3.45	4.02	3.68	0.29
45	13.89	18.63	12.69	15.07	3.14	4.14	5.48	4.66	4.76	0.67
60	15.12	20.09	15.86	17.02	2.68	4.72	6.20	5.33	5.41	0.74
90	17.61	22.32	18.94	19.62	2.43	6.28	10.57	7.12	7.99	2.28
120	20.14	28.49	22.09	23.57	4.36	8.22	14.11	9.35	10.56	3.13
180	35.54	37.93	34.90	36.13	1.60	12.00	18.07	13.71	14.59	3.13
240	39.71	47.73	44.95	44.13	4.07	14.97	20.92	17.12	17.67	3.01
360	49.98	56.84	53.69	53.50	3.44	18.41	24.85	21.08	21.45	3.23
480	55.52	63.14	63.98	60.88	4.66	21.58	27.50	24.73	24.60	2.96
720	68.88	73.15	70.06	70.70	2.21	29.19	32.83	33.49	31.83	2.32
960	76.05	83.07	84.63	81.25	4.57	32.38	36.40	37.16	35.31	2.57
1200	84.57	89.73	91.58	88.63	3.63	33.96	38.00	38.98	36.98	2.66
1440	87.24	92.76	94.54	91.51	3.80	36.33	40.81	41.71	39.62	2.88

Table D6 Cumulative release of DS (%) from DS-loaded electrospun PVA fiber mats and DS-loaded PVA films by the transdermal diffusion through a pig skin technique

Time (min)	Cumulative release of DS (%)									
	As-spun PVA fiber mats					As-cast PVA films				
	Test1	Test2	Test3	Avg	SD	Test1	Test2	Test3	Avg	SD
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	3.22	1.67	1.94	2.28	0.83	2.03	1.62	2.04	1.89	0.24
20	3.39	1.88	2.62	2.63	0.76	2.14	1.75	2.21	2.03	0.25
30	4.20	3.08	2.95	3.41	0.69	2.22	1.85	2.32	2.13	0.25
45	4.49	3.26	4.08	3.94	0.63	2.99	2.14	2.53	2.56	0.43
60	4.87	3.44	4.28	4.20	0.72	2.90	2.22	2.86	2.66	0.38
90	5.22	3.57	5.07	4.62	0.91	3.06	2.65	2.99	2.90	0.22
120	6.11	3.64	5.01	4.92	1.24	3.12	2.77	3.11	3.00	0.20
180	7.55	4.88	6.24	6.22	1.34	3.78	3.17	3.45	3.47	0.30
240	8.44	6.58	7.38	7.47	0.93	4.02	3.36	3.65	3.68	0.33
360	9.54	8.16	9.09	8.93	0.70	4.13	3.55	4.38	4.02	0.42
480	10.41	9.82	10.82	10.35	0.51	4.22	3.97	4.87	4.35	0.46
720	11.84	10.63	12.38	11.62	0.90	4.46	4.27	5.56	4.76	0.69
960	13.39	12.18	14.03	13.20	0.94	4.68	4.51	7.06	5.42	1.43
1200	15.36	15.19	17.19	15.92	1.11	5.17	5.54	7.74	6.15	1.39
1440	16.11	18.15	21.44	18.57	2.69	5.26	5.68	8.70	6.55	1.88

Table D7 Cumulative release of NAP (%) from NAP-loaded electrospun PVA fiber mats and NAP-loaded PVA films by the transdermal diffusion through a pig skin technique

Time (min)	Cumulative release of NAP (%)									
	As-spun PVA fiber mats					As-cast PVA films				
	Test1	Test2	Test3	Avg	SD	Test1	Test2	Test3	Avg	SD
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	3.25	3.11	4.20	3.52	0.59	3.40	2.33	2.16	2.63	0.67
20	3.65	3.25	4.61	3.84	0.70	3.56	2.35	2.39	2.77	0.69
30	4.05	3.39	4.96	4.14	0.79	3.73	2.80	2.45	2.99	0.66
45	4.34	3.87	5.26	4.49	0.71	3.93	2.79	3.62	3.45	0.59
60	4.75	4.09	6.30	5.05	1.14	4.02	2.81	3.63	3.48	0.62
90	5.50	5.11	6.75	5.78	0.86	4.47	3.19	3.89	3.85	0.64
120	6.51	5.62	7.45	6.53	0.92	4.90	3.42	4.24	4.18	0.74
180	7.48	7.07	10.21	8.26	1.71	5.24	3.93	5.41	4.86	0.81
240	9.44	7.82	11.05	9.44	1.61	5.56	4.14	6.01	5.24	0.98
360	11.50	10.19	14.26	11.98	2.08	7.23	5.03	6.89	6.38	1.19
480	14.57	17.34	16.73	16.21	1.46	8.58	5.58	7.93	7.36	1.58
720	18.41	20.12	21.86	20.13	1.73	10.60	7.23	10.07	9.30	1.82
960	22.84	25.23	26.23	24.77	1.74	12.43	8.91	12.94	11.43	2.19
1200	26.73	29.57	28.96	28.42	1.50	14.78	10.84	14.33	13.32	2.16
1440	31.85	33.06	32.72	32.55	0.63	17.10	13.01	15.26	15.12	2.05

Table D8 Cumulative release of IND (%) from IND-loaded electrospun PVA fiber mats and IND-loaded PVA films by the transdermal diffusion through a pig skin technique

Time (min)	Cumulative release of IND (%)									
	As-spun PVA fiber mats					As-cast PVA films				
	Test1	Test2	Test3	Avg	SD	Test1	Test2	Test3	Avg	SD
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.55	0.12	0.12	0.26	0.24	0.10	0.10	0.08	0.09	0.01
20	0.64	0.38	0.21	0.41	0.22	0.21	0.20	0.08	0.16	0.07
30	0.74	0.39	0.30	0.47	0.24	0.32	0.25	0.08	0.22	0.12
45	0.84	0.48	0.30	0.54	0.28	0.48	0.26	0.13	0.29	0.18
60	0.94	0.49	0.39	0.61	0.29	0.60	0.47	0.13	0.40	0.24
90	0.97	0.58	0.57	0.71	0.22	0.77	0.53	0.13	0.48	0.32
120	1.15	0.76	0.58	0.83	0.29	0.84	0.59	0.18	0.54	0.34
180	1.35	1.20	0.76	1.10	0.31	0.84	0.66	0.40	0.64	0.22
240	1.63	1.39	0.86	1.29	0.39	1.07	0.67	0.41	0.72	0.33
360	1.83	1.59	1.29	1.57	0.27	1.25	0.84	0.51	0.87	0.37
480	2.21	1.88	2.16	2.08	0.18	1.54	1.01	0.66	1.07	0.45
720	2.67	3.09	3.04	2.93	0.23	1.89	1.34	0.94	1.39	0.48
960	3.15	3.58	3.60	3.44	0.25	2.20	1.78	1.22	1.73	0.49
1200	3.64	4.74	4.43	4.27	0.57	2.72	2.07	1.70	2.16	0.52
1440	4.39	5.77	5.45	5.20	0.72	2.93	2.83	1.95	2.57	0.54

Appendix E Cumulative Release of SS from cross-linked as-spun PVA mats containing SS

The transdermal diffusion through a pig skin was carried out in order to study the release characteristic of the drug from SS-loaded e-spun PVA fiber mats both before and after cross-linking. At a specified diffusion period ranging between 0 and 72 h (3 d or 4,320 min), 0.3 ml of the buffer solution was withdrawn and an equal amount of fresh buffer solution was added into the cell to assure a good contact between the buffer solution and the skin at all times. The amount of the drug in the withdrawn solution samples was determined using the UV-spectrophotometer at 296 nm. The experiments were carried out in triplicate.

Table E1 Cumulative release of SS (%) from SS-loaded electrospun PVA fiber mats

Dissolution time (min)	Cumulative release of SS(%) from SS-loaded electrospun PVA fiber mats				
	Test1	Test2	Test3	Avg	SD
0	0.00	0.00	0.00	0.00	0.00
10	5.08	5.12	4.99	5.06	0.07
20	6.38	6.62	5.86	6.29	0.39
30	7.44	7.99	6.79	7.41	0.60
45	9.85	12.01	8.29	10.05	1.87
60	11.82	14.89	9.61	12.11	2.65
90	17.42	19.38	13.95	16.91	2.75
120	21.87	24.00	17.69	21.19	3.21
180	28.98	31.42	23.12	27.84	4.27
240	34.41	38.79	28.62	33.94	5.10
360	40.91	43.75	35.38	40.01	4.26
480	47.41	48.58	39.82	45.27	4.76
720	51.96	55.67	45.37	51.00	5.21
960	56.22	60.14	50.28	55.54	4.96
1200	58.80	62.11	52.45	57.79	4.91
1440	60.51	65.03	56.95	60.83	4.05
1800	63.15	66.36	60.45	63.32	2.96
2160	66.36	69.75	62.90	66.34	3.43
2880	70.07	72.95	68.97	70.66	2.05
4320	73.82	79.96	71.48	75.08	4.38



Table E2 Cumulative release of SS (%) from SS-loaded electrospun PVA fiber mats after cross-linking with glutaraldehyde vapor for 0.5 and 1 hr

Dissolution time (min)	Cumulative release of SS (%)									
	Exposure time (hr)									
	0.5					1				
	Test1	Test2	Test3	Avg	SD	Test1	Test2	Test3	Avg	SD
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.35	0.44	0.75	0.51	0.21	0.76	0.54	0.62	0.64	0.11
20	0.53	0.78	0.89	0.73	0.19	1.29	0.81	0.70	0.93	0.31
30	1.38	0.97	1.05	1.13	0.22	1.84	1.39	1.06	1.43	0.39
45	2.21	1.26	1.82	1.76	0.48	3.02	1.67	1.98	2.22	0.71
60	2.60	2.16	2.37	2.38	0.22	4.93	2.41	2.67	3.33	1.39
90	5.14	4.48	5.06	4.89	0.36	8.86	4.72	4.70	6.09	2.40
120	7.79	7.00	7.74	7.51	0.44	11.99	7.26	7.30	8.85	2.72
180	13.40	12.81	12.19	12.80	0.61	17.58	11.35	11.01	13.31	3.70
240	18.81	18.08	16.40	17.76	1.24	21.09	14.36	14.62	16.69	3.81
360	26.89	26.97	22.56	25.48	2.52	27.38	21.13	20.62	23.04	3.76
480	33.42	34.09	26.98	31.49	3.93	31.25	24.70	25.72	27.22	3.53
720	40.79	40.40	33.36	38.18	4.18	35.84	31.93	34.30	34.02	1.97
960	46.14	46.06	40.21	44.14	3.40	41.30	34.73	37.14	37.72	3.32
1200	51.65	49.70	42.60	47.99	4.76	43.08	36.15	38.74	39.32	3.50
1440	54.62	53.19	48.59	52.13	3.15	44.73	40.45	42.54	42.57	2.14
1800	60.35	57.14	53.20	56.89	3.58	50.10	41.72	45.99	45.94	4.19
2160	65.05	61.30	62.65	63.00	1.90	54.36	45.83	53.77	51.32	4.76
2880	69.43	63.88	68.75	67.35	3.03	62.55	53.90	59.93	58.79	4.44
4320	76.55	67.02	75.24	72.94	5.16	69.04	62.16	69.92	67.04	4.25

Table E3 Cumulative release of SS (%) from SS-loaded electrospun PVA fiber mats after cross-linking with glutaraldehyde for 3 and 5 hr

Dissolution time (min)	Cumulative release of SS(%)									
	Exposure time (hr)									
	3					5				
	Test1	Test2	Test3	Avg	SD	Test1	Test2	Test3	Avg	SD
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.43	0.46	0.42	0.44	0.02	0.29	0.25	0.25	0.26	0.02
20	0.29	0.38	0.96	0.54	0.36	0.50	0.51	0.30	0.43	0.12
30	0.47	0.54	1.21	0.74	0.41	0.57	0.58	0.40	0.51	0.10
45	0.65	0.86	2.22	1.24	0.86	0.62	0.93	0.45	0.66	0.24
60	1.00	1.21	4.21	2.14	1.80	0.81	1.23	0.82	0.96	0.24
90	2.50	2.71	6.69	3.96	2.36	1.18	2.24	1.67	1.69	0.53
120	4.53	5.21	9.91	6.55	2.93	1.95	3.34	3.01	2.77	0.72
180	7.50	8.59	14.36	10.15	3.69	3.51	6.33	5.40	5.08	1.44
240	11.07	12.49	19.33	14.30	4.42	5.07	8.90	7.62	7.20	1.95
360	16.17	17.77	25.22	19.72	4.83	8.75	13.66	11.29	11.24	2.46
480	20.26	22.04	29.41	23.90	4.85	10.60	17.35	14.43	14.13	3.38
720	25.43	27.52	33.50	28.82	4.19	14.59	23.64	20.06	19.43	4.56
960	28.98	31.17	37.29	32.48	4.30	17.58	28.70	24.90	23.73	5.65
1200	31.27	34.03	39.54	34.95	4.21	21.27	32.91	27.54	27.24	5.83
1440	33.08	36.28	41.07	36.81	4.02	24.64	35.38	30.01	30.01	5.37
1800	37.74	40.52	43.33	40.53	2.80	28.40	37.80	32.71	32.97	4.70
2160	42.69	45.73	46.26	44.89	1.93	35.09	44.20	39.08	39.46	4.57
2880	47.18	49.72	53.43	50.11	3.14	42.04	46.74	43.36	44.05	2.43
4320	53.01	55.08	57.16	55.08	2.08	44.97	48.63	45.40	46.33	2.00

Table E4 Cumulative release of SS (%) from SS-loaded electrospun PVA fiber mats after cross-linking with glyoxal for 1 and 3 hr

Dissolution time (min)	Cumulative release of SS(%)									
	Exposure time (hr)									
	1					3				
	Test1	Test2	Test3	Avg	SD	Test1	Test2	Test3	Avg	SD
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	4.35	1.49	1.10	2.31	1.78	1.40	1.66	1.13	1.40	0.26
20	7.09	2.88	3.81	4.59	2.21	1.53	1.79	1.51	1.61	0.16
30	11.36	4.09	5.75	7.07	3.81	1.79	2.00	1.82	1.87	0.11
45	13.23	7.11	10.17	10.17	3.06	2.00	2.23	1.99	2.07	0.13
60	16.74	9.89	14.35	13.66	3.48	2.22	2.52	2.35	2.37	0.15
90	20.27	14.61	20.25	18.38	3.26	3.99	6.07	6.14	5.40	1.22
120	24.94	18.66	25.33	22.98	3.74	6.35	8.72	9.14	8.07	1.50
180	27.74	24.72	32.07	28.18	3.69	12.91	13.83	17.19	14.64	2.25
240	31.48	27.42	34.50	31.13	3.55	15.53	18.15	20.13	17.93	2.31
360	35.13	33.60	38.69	35.81	2.61	23.91	23.64	27.53	25.03	2.17
480	38.91	35.30	41.46	38.55	3.10	26.26	29.01	30.44	28.57	2.13
720	42.75	40.29	45.38	42.81	2.54	30.68	33.01	39.02	34.24	4.30
960	45.41	43.15	47.47	45.34	2.16	34.55	36.33	41.74	37.54	3.75
1200	48.18	44.42	49.98	47.53	2.84	35.79	37.59	44.51	39.29	4.60
1440	50.30	47.28	51.17	49.58	2.04	37.39	39.85	46.33	41.19	4.62
1800	52.93	49.59	53.93	52.15	2.27	41.49	42.83	47.42	43.91	3.11
2160	56.65	51.79	57.97	55.47	3.25	45.59	47.14	50.02	47.58	2.25
2880	60.70	54.13	61.99	58.94	4.22	53.31	50.23	52.70	52.08	1.63
4320	67.56	65.62	70.48	67.89	2.45	64.14	64.59	66.78	65.17	1.41

Table E5 Cumulative release of SS (%) from SS-loaded electrospun PVA fiber mats after cross-linking with glyoxal for 5 and 8 hr

Dissolution time (min)	Cumulative release of SS(%)									
	Exposure time (hr)									
	5					8				
	Test1	Test2	Test3	Avg	SD	Test1	Test2	Test3	Avg	SD
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	1.12	2.67	0.74	1.51	1.02	2.10	0.15	0.08	0.78	1.15
20	1.54	4.37	0.87	2.26	1.86	2.37	0.33	0.34	1.01	1.17
30	2.03	4.79	3.21	3.34	1.38	2.65	0.67	0.42	1.25	1.22
45	2.68	6.43	4.77	4.63	1.88	4.53	1.12	1.14	2.26	1.97
60	3.00	8.56	6.77	6.11	2.84	5.05	2.05	1.90	3.00	1.78
90	4.34	11.46	10.93	8.91	3.97	7.75	3.57	4.13	5.15	2.27
120	5.15	14.07	14.69	11.30	5.34	9.00	4.42	6.85	6.76	2.29
180	10.00	17.53	18.94	15.49	4.81	12.77	5.35	12.79	10.31	4.29
240	13.86	19.24	23.39	18.83	4.78	15.51	8.58	15.84	13.31	4.10
360	20.60	21.97	27.12	23.23	3.44	19.30	11.82	22.21	17.78	5.36
480	24.18	22.88	28.60	25.22	3.00	22.70	13.74	28.20	21.55	7.30
720	26.64	25.77	30.32	27.58	2.41	26.93	18.15	32.79	25.95	7.37
960	33.56	28.80	34.88	32.42	3.20	30.52	25.02	37.63	31.06	6.32
1200	37.15	30.29	37.96	35.13	4.22	33.73	25.73	39.40	32.96	6.87
1440	41.13	35.96	40.14	39.08	2.74	35.56	29.46	42.73	35.92	6.64
1800	45.04	37.01	41.65	41.24	4.03	40.09	33.22	43.89	39.06	5.41
2160	47.19	42.96	46.89	45.68	2.36	43.91	38.05	47.38	43.11	4.71
2880	53.84	50.91	56.25	53.67	2.68	48.58	44.06	50.13	47.59	3.15
4320	64.15	63.24	71.32	66.24	4.43	50.91	56.24	51.82	52.99	2.85

Appendix F Cumulative Release of vitamins (%) from as-spun CA mats and as-cast CA films

A Perkin Elmer Series 2000 HPLC was used to quantify the amount of vitamin in a sample solution. Chromatographic separation of each vitamin was achieved using a water symmetry[®] C₈ column (particle size = 5 μm; column dimension = 3.9 × 150 mm) operating at 1 ml min⁻¹. The mobile phases for Vit-E and Retin-A separations were 25:25:1 and 45:45:10 v/v/v acetonitrile/methanol/distilled water, respectively. The injection volume was 100 μl. A UV detector for Vit-E and Retin-A was set at (λ_{\max}) 295 and 325 nm, respectively. All of the sample solutions were filtered through a polytetrafluoroethylene (PTFE) filter (average pore size = 0.45 μm) prior to injection. After injection, Vit-E and Retin-A were separated out at elution periods of 4.8-5.3 and 1.6-1.8 min, respectively. The calibration curve was conducted separately for each vitamin-releasing medium. The calibration curve for Vit-E and Retin-A was in the range of 5-20 and 0.3-1.4 μg ml⁻¹, respectively.

Table F1 Cumulative Release of Vit-E (%) from as-spun CA fiber mats and as-cast CA film in B/T medium

Immersion Time (min)	Cumulative release of Vit-E (%) in B/T medium									
	As-spun CA fiber mats					As-cast CA films				
	Test1	Test2	Test3	Avg	SD	Test1	Test2	Test3	Avg	SD
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2.00	0.80	0.58	1.03	0.80	0.23	10.69	6.40	9.44	8.84	2.20
5.00	1.06	1.22	1.60	1.29	0.28	17.04	19.20	14.21	16.82	2.51
10.00	1.68	2.33	3.08	2.36	0.70	18.21	23.35	15.50	19.02	3.99
20.00	4.50	3.69	5.04	4.41	0.68	18.94	24.50	15.89	19.78	4.36
30.00	9.77	5.07	6.44	7.09	2.42	19.50	25.90	16.20	20.53	4.93
60.00	14.03	9.88	11.30	11.74	2.11	19.30	25.82	16.45	20.53	4.80
120.00	18.41	18.76	19.76	18.98	0.70	19.39	25.55	16.33	20.42	4.70
180.00	21.97	23.97	22.48	22.81	1.04	19.23	25.72	16.44	20.46	4.76
240.00	26.38	25.81	25.04	25.74	0.67	19.38	25.52	16.27	20.39	4.71
360.00	30.40	28.47	30.68	29.85	1.20	18.69	25.82	16.17	20.23	5.01
720.00	39.59	36.24	42.69	39.51	3.23	19.08	25.34	16.32	20.24	4.62
960.00	43.72	42.25	47.29	44.42	2.59	19.06	25.59	16.54	20.39	4.67
1200.00	49.69	47.23	52.16	49.69	2.46	18.80	25.48	16.67	20.32	4.60
1440.00	52.55	49.51	54.94	52.33	2.72	19.01	25.51	17.00	20.50	4.45

Table F2 Cumulative Release of Vit-E (%) from as-spun CA fiber mats and as-cast CA film in B/T/M medium

Immersion Time (min)	Cumulative release of Vit-E (%) in B/T/M medium									
	As-spun CA fiber mats					As-cast CA films				
	Test1	Test2	Test3	Avg	SD	Test1	Test2	Test3	Avg	SD
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2.00	0.00	3.22	1.79	1.67	1.61	24.03	24.90	31.16	26.70	3.89
5.00	5.69	5.33	2.59	4.54	1.70	36.19	35.36	36.59	36.05	0.63
10.00	9.89	8.52	4.51	7.64	2.80	41.34	43.30	40.33	41.65	1.51
20.00	15.04	17.78	9.09	13.97	4.44	42.09	47.21	41.25	43.52	3.23
30.00	31.48	35.17	11.71	26.12	12.62	42.86	48.23	41.07	44.05	3.73
60.00	34.78	38.83	21.78	31.80	8.91	43.10	48.94	42.29	44.78	3.63
120.00	44.62	48.50	32.82	41.98	8.17	42.95	48.96	42.33	44.75	3.67
180.00	49.64	55.66	42.02	49.11	6.84	42.51	49.43	42.37	44.77	4.04
240.00	56.80	59.14	48.68	54.88	5.49	43.74	49.44	42.38	45.19	3.74
360.00	63.12	67.88	58.85	63.28	4.52	43.72	49.75	42.34	45.27	3.94
480.00	73.57	69.45	65.23	69.41	4.17	43.96	50.32	42.77	45.68	4.06
720.00	84.15	76.56	79.98	80.23	3.80	43.35	50.05	42.72	45.37	4.06
960.00	88.71	82.92	88.06	86.56	3.17	43.90	50.23	42.54	45.56	4.10
1200.00	91.08	84.89	96.70	90.89	5.91	43.29	49.72	41.99	45.00	4.14
1440.00	94.24	89.15	101.13	94.84	6.01	43.68	50.23	42.40	45.44	4.20

Table F3 Cumulative Release of Retin-A (%) from as-spun CA fiber mats and as-cast CA film in B/T medium

Immersion Time (min)	Cumulative release of Retin-A (%) in B/T medium									
	As-spun CA fiber mats					As-cast CA films				
	Test1	Test2	Test3	Avg	SD	Test1	Test2	Test3	Avg	SD
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	3.22	3.08	3.87	3.39	0.42	18.77	15.33	10.62	14.91	4.09
5	5.22	8.60	11.48	8.44	3.14	40.53	49.57	39.83	43.31	5.43
10	10.35	13.81	14.38	12.85	2.18	45.72	52.91	43.60	47.41	4.88
20	14.06	16.58	17.19	15.94	1.66	50.97	52.19	39.28	47.48	7.13
30	15.88	19.23	18.89	18.00	1.84	54.11	54.24	41.47	49.94	7.33
60	16.57	22.08	22.45	20.37	3.29	57.57	57.84	45.55	53.65	7.02
120	18.56	27.59	23.94	23.36	4.54	54.97	59.14	47.02	53.71	6.16
180	26.98	31.55	26.56	28.36	2.77	60.82	59.13	50.08	56.67	5.78
240	29.48	33.25	30.92	31.22	1.90	60.52	63.70	48.49	57.57	8.03
360	33.38	36.44	33.39	34.41	1.76	59.35	63.54	47.85	56.91	8.12

Table F4 Cumulative Release of Retin-A (%) from as-spun CA fiber mats and as-cast CA film in B/T/M medium

Immersion Time (min)	Cumulative release of Retin-A (%) in B/T/M medium									
	As-spun CA fiber mats					As-cast CA films				
	Test1	Test2	Test3	Avg	SD	Test1	Test2	Test3	Avg	SD
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	-0.51	5.41	8.95	4.62	4.78	6.10	9.49	7.50	7.69	1.70
5	2.99	7.13	11.63	7.25	4.32	41.56	38.86	57.90	46.11	10.30
10	4.96	10.82	13.08	9.62	4.19	44.27	39.06	60.32	47.88	11.08
20	7.41	11.37	20.03	12.94	6.45	49.12	47.97	62.21	53.10	7.91
30	19.70	25.70	27.51	24.30	4.09	49.41	48.67	62.64	53.57	7.86
60	34.56	42.87	33.62	37.02	5.09	50.23	52.12	62.51	54.95	6.61
120	60.40	45.93	58.97	55.10	7.97	69.72	62.81	71.61	68.05	4.63
180	84.81	87.04	94.83	88.89	5.26	70.90	67.97	79.87	72.91	6.20
240	93.00	93.06	97.94	94.67	2.84	71.87	70.07	85.60	75.85	8.49
360	97.36	91.43	100.55	96.45	4.63	78.01	75.37	87.75	80.38	6.52

Appendix G Rheological properties of the SS-loaded as-spun PVA fiber mats both before and after cross-linking with either glutaraldehyde or glyoxal vapor

A Rheometric Scientific ARES melt rheometer with a thin film/fiber fixture was used to study rheological properties of the SS-loaded e-spun PVA fiber mats both before and after cross-linking. In these experiments, the dynamic tension strain was applied and the storage moduli (E') were measured as a function of both strain (i.e., 0.01-10%) and frequency (i.e., 0.1-100 rad s⁻¹). The fiber mat samples were cut into a rectangular shape (6 mm x 70 mm; thickness = 20-30 μ m) and placed on a thin film/fiber fixture sample holder (distance between two probes = 3 cm). Strain sweep tests were first carried out to determine the suitable strain(s) that allowed the E' measurements to be done in the linear viscoelastic regime (found to be 0.3% for all the fiber mat samples). Frequency sweep tests were then carried out to determine E' of each sample as a function of frequency. Each measurement was carried out at room temperature ($\sim 26 \pm 1^\circ\text{C}$) and repeated at least two times.

Table G1 Strain sweep test results illustrating the storage moduli (E') as a function of strain (0.01-10%) at a fixed frequency of $1 \text{ rad}\cdot\text{s}^{-1}$ of neat sodium salicylate-loaded electrospun PVA fiber mat (denotes as “neat”) and the mats that were cross-linked with the vapor from the aqueous solution of glutaraldehyde at various exposure time intervals.

Strain (%)	E' (Pa)				
	Neat	Exposure Time (hr)			
		0.5	1	3	5
9.89E-03	3.74E+07	1.54E+08	1.64E+08	2.02E+08	2.42E+08
1.57E-02	3.97E+07	1.32E+08	1.64E+08	1.99E+08	2.47E+08
2.50E-02	3.89E+07	1.28E+08	1.65E+08	1.97E+08	2.47E+08
3.97E-02	4.11E+07	1.30E+08	1.64E+08	1.99E+08	2.41E+08
6.28E-02	3.90E+07	1.30E+08	1.64E+08	1.98E+08	2.44E+08
9.97E-02	3.95E+07	1.30E+08	1.63E+08	2.00E+08	2.42E+08
1.58E-01	3.89E+07	1.28E+08	1.63E+08	2.00E+08	2.40E+08
2.51E-01	3.92E+07	1.28E+08	1.63E+08	2.00E+08	2.38E+08
3.97E-01	3.84E+07	1.25E+08	1.62E+08	1.99E+08	2.32E+08
6.30E-01	3.68E+07	1.21E+08	1.59E+08	1.97E+08	2.22E+08
9.99E-01	3.41E+07	1.12E+08	1.52E+08	1.88E+08	2.05E+08
1.58E+00	3.06E+07	1.00E+08	1.41E+08	1.69E+08	1.82E+08
2.50E+00	2.60E+07	8.62E+07	1.27E+08	1.45E+08	1.53E+08
3.97E+00	2.13E+07	6.85E+07	1.12E+08	1.13E+08	1.15E+08
6.30E+00	1.89E+07	5.26E+07	8.63E+07	8.42E+07	8.05E+07
9.98E+00	1.86E+07	3.66E+07	6.21E+07	6.27E+07	5.56E+07

Table G2 Strain sweep test results illustrating the storage moduli (E') as a function of strain (0.01-10%) at a fixed frequency of $1 \text{ rad}\cdot\text{s}^{-1}$ of neat sodium salicylate-loaded electrospun PVA fiber mat (denotes as “neat”) and the mats that were cross-linked with the vapor from the aqueous solution of glyoxal at various exposure time intervals.

Strain (%)	E' (Pa)				
	Neat	Exposure Time (hr)			
		1	3	5	8
9.89E-03	3.74E+07	1.89E+08	2.22E+08	3.72E+08	6.63E+08
1.57E-02	3.97E+07	1.86E+08	2.09E+08	3.68E+08	6.52E+08
2.50E-02	3.89E+07	1.83E+08	2.21E+08	3.65E+08	6.36E+08
3.97E-02	4.11E+07	1.88E+08	2.20E+08	3.71E+08	6.47E+08
6.28E-02	3.90E+07	1.86E+08	2.13E+08	3.71E+08	6.50E+08
9.97E-02	3.95E+07	1.83E+08	2.12E+08	3.70E+08	6.45E+08
1.58E-01	3.89E+07	1.81E+08	2.13E+08	3.68E+08	6.49E+08
2.51E-01	3.92E+07	1.81E+08	2.10E+08	3.66E+08	6.52E+08
3.97E-01	3.84E+07	1.77E+08	2.04E+08	3.61E+08	6.60E+08
6.30E-01	3.68E+07	1.70E+08	1.95E+08	3.56E+08	6.43E+08
9.99E-01	3.41E+07	1.61E+08	1.86E+08	3.38E+08	5.94E+08
1.58E+00	3.06E+07	1.47E+08	1.77E+08	2.88E+08	5.14E+08
2.50E+00	2.60E+07	1.30E+08	1.62E+08	2.33E+08	4.28E+08
3.97E+00	2.13E+07	1.07E+08	1.43E+08	1.73E+08	3.22E+08
6.30E+00	1.89E+07	7.48E+07	1.09E+08	1.21E+08	2.13E+08
9.98E+00	1.86E+07	4.76E+07	7.12E+07	8.11E+07	1.43E+08

Table G3 Frequency sweep test results illustrating the storage moduli (E') as a function of frequency ($0.1-100 \text{ rad}\cdot\text{s}^{-1}$) at a fixed strain of 0.5% of neat sodium salicylate-loaded electrospun PVA fiber mat (denotes as “neat”) and the mats that were cross-linked with the vapor from the aqueous solution of glutaraldehyde at various exposure time intervals.

Frequency ($\text{rad}\cdot\text{s}^{-1}$)	E' (MPa)									
	Neat		Exposure Time (hr)							
			0.5		1		3		5	
	Test1	Test2	Test1	Test2	Test1	Test2	Test1	Test2	Test1	Test2
0.10	38.3	38.4	41.7	42.3	67.5	66.7	77.0	78.0	85.7	83.7
0.16	38.8	39.1	42.9	42.9	69.0	68.1	78.0	79.0	86.2	85.4
0.25	39.0	39.5	43.8	43.8	69.8	69.2	79.0	80.2	87.8	87.1
0.40	39.5	40.3	44.5	44.6	70.5	69.9	80.0	80.9	89.2	88.7
0.63	40.0	40.7	45.9	45.8	71.2	70.6	81.3	82.4	90.9	89.8
1.00	40.4	41.2	47.0	47.2	72.1	71.3	82.6	83.3	92.4	91.2
1.58	40.7	41.6	48.0	48.1	73.0	72.3	83.7	84.9	93.7	93.0
2.51	41.2	42.0	49.4	49.4	74.0	73.0	84.6	85.4	95.6	94.4
3.98	41.7	42.5	50.6	50.6	74.9	74.2	86.2	86.7	97.4	96.2
6.31	42.2	43.0	51.9	52.2	75.7	75.1	87.7	88.3	99.1	98.1
10.00	42.6	43.4	53.4	53.3	76.6	76.0	89.1	90.0	100.9	100.0
15.85	43.1	44.0	55.0	54.4	77.3	77.0	91.2	91.6	103.2	102.6
25.12	43.6	44.5	57.2	56.2	78.5	78.0	93.0	93.7	105.5	104.5
39.81	44.1	45.1	59.2	58.0	79.5	78.9	95.1	95.7	108.2	107.7
63.10	44.6	45.6	61.7	60.3	80.5	80.0	97.8	97.8	111.7	110.4
100.00	45.2	46.3	63.7	62.4	81.7	81.1	100.3	100.6	115.4	113.9

Table G4 Frequency sweep test results illustrating the storage moduli (E') as a function of frequency (0.1-100 $\text{rad}\cdot\text{s}^{-1}$) at a fixed strain of 0.5% of neat sodium salicylate-loaded electrospun PVA fiber mat (denotes as “neat”) and the mats that were cross-linked with the vapor from the aqueous solution of glyoxal at various exposure time intervals.

Frequency ($\text{rad}\cdot\text{s}^{-1}$)	E' (MPa)									
	Neat		Exposure Time (hr)							
			1		3		5		8	
	Test1	Test2	Test1	Test2	Test1	Test2	Test1	Test2	Test1	Test2
0.10	38.3	38.4	75.9	76.8	95.4	99.8	112.5	123.3	200.8	205.3
0.16	38.8	39.1	77.9	77.4	100.9	102.8	117.9	129.9	209.6	212.3
0.25	39.0	39.5	79.9	79.6	103.6	105.2	126.1	135.4	218.8	218.7
0.40	39.5	40.3	81.5	81.3	105.7	109.1	132.0	139.5	224.8	226.6
0.63	40.0	40.7	84.3	84.0	109.3	112.5	137.9	147.1	233.3	235.6
1.00	40.4	41.2	85.8	86.0	112.8	116.1	144.2	153.9	243.1	244.6
1.58	40.7	41.6	88.5	88.4	118.8	120.5	152.6	162.1	254.8	255.8
2.51	41.2	42.0	90.7	91.3	125.4	125.2	160.6	169.2	265.2	268.3
3.98	41.7	42.5	93.9	94.4	130.2	131.1	168.5	180.2	277.1	279.9
6.31	42.2	43.0	97.5	98.7	135.1	136.3	176.7	187.9	291.2	292.4
10.00	42.6	43.4	100.3	102.5	140.7	142.3	186.8	201.3	303.4	308.4
15.85	43.1	44.0	105.3	107.5	146.9	148.8	199.2	215.7	322.8	323.0
25.12	43.6	44.5	109.5	113.0	155.0	157.0	209.5	230.6	344.0	337.1
39.81	44.1	45.1	116.1	118.2	162.9	165.4	225.4	246.8	364.2	358.4
63.10	44.6	45.6	122.5	125.0	177.3	175.6	238.1	263.3	388.2	381.2
100.00	45.2	46.3	129.1	132.6	191.7	186.8	252.2	278.3	413.4	404.3

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