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APPENDICES

Appendix A The Thickness of Pure Bacterial Cellulose (pure BC) 1-8 days

Days	Thickness (cm)			Average (cm)	SD
	1	2	3		
1	0.508	0.533	0.512	0.518	0.013
2	2.188	2.370	2.234	2.264	0.09
3	3.306	3.416	3.330	3.350	0.06
4	3.867	4.167	3.783	3.939	0.202
5	4.182	4.308	4.130	4.207	0.09
6	4.652	4.429	4.475	4.520	0.11
7	4.750	4.689	4.705	4.715	0.03
8	4.812	4.752	4.769	4.778	0.03

Appendix B The Dry Weight of Pure Bacterial Cellulose (pure BC) 1-8 days

days	Dry weight (g)			Average (g)	SD
	1	2	3		
1	0.0257	0.0268	0.0206	0.0244	0.003
2	0.1311	0.1240	0.1120	0.1224	0.009
3	0.2291	0.1910	0.1990	0.2064	0.02
4	0.2834	0.2462	0.2662	0.2662	0.021
5	0.2968	0.2844	0.3013	0.2941	0.0087
6	0.3115	0.3045	0.2892	0.3017	0.008
7	0.3465	0.3215	0.2798	0.3129	0.03
8	0.3705	0.3335	0.2659	0.3233	0.05

Appendix C Mechanical Properties of Pure Bacterial Cellulose and Bacterial Cellulose Composites

Table C1 The tensile strength of pure bacterial cellulose and bacterial cellulose composites containing non DBD plasma treated fabrics in wet state

Composite types	Tensile strength (MPa)					Average (MPa)	SD
	1	2	3	4	5		
Pure BC	0.1332	0.1244	0.1283	0.1482	0.1308	0.1356	0.009
BC/Filter cloth	0.2831	0.3265	0.2931	0.3892	0.3165	0.3217	0.0416
BC/Polyester	1.3365	1.6484	1.4448	1.0621	1.6516	1.4286	0.2455
BC/Muslin	1.5887	1.2880	1.7916	1.7124	1.3796	1.5521	0.2144
BC/Nylon	1.5331	1.7324	1.5376	1.5745	1.3651	1.5505	0.1454
BC/Cotton	2.3964	2.2308	2.2285	2.1857	2.3544	2.2792	0.0908
BC/Lenin	3.0861	3.6251	3.3048	3.6657	3.7020	3.4767	0.2695

Table C2 The tensile strength of pure bacterial cellulose and bacterial cellulose composites containing non DBD plasma treated fabrics in dry state

Composite types	Tensile strength (MPa)					Average (MPa)	SD
	1	2	3	4	5		
Pure BC	0.6849	0.7581	0.6737	0.7551	0.7360	0.7107	0.04
BC/Filter cloth	0.7493	0.9889	0.8932	0.8974	0.8490	0.8756	0.0870
BC/polyester	1.2656	1.9806	2.1663	2.1353	2.2845	1.9664	0.4065
BC/Muslin	2.3388	2.5041	2.0587	1.9501	2.2188	2.2141	0.2199
BC/Nylon	2.0865	2.7464	2.2088	2.2037	2.1615	2.2814	0.2645
BC/Cotton	2.2134	2.7704	2.6649	2.6096	1.9871	2.4491	0.3334
BC/Lenin	3.6182	4.2310	4.7814	3.1432	4.4298	4.0407	0.6557

Table C3 The tensile strength of pure bacterial cellulose and bacterial cellulose composites containing DBD plasma treated fabrics in wet state

Composite types	Tensile strength (MPa)					Average (MPa)	SD
	1	2	3	4	5		
BC/Filter cloth	0.2923	0.3531	0.3614	0.3101	0.3114	0.3257	0.0299
BC/Polyester	2.1383	2.0416	2.0635	2.3147	2.1459	2.1408	0.1073
BC/Muslin	0.3078	0.3671	0.3192	0.3717	0.2441	0.3053	0.0372
BC/Nylon	1.9940	1.7368	1.9308	1.9626	1.8727	1.8994	0.1013
BC/Cotton	0.2789	0.3072	0.2554	0.2721	0.2639	0.2755	0.0198
BC/Lenin	0.2128	0.2313	0.2408	0.2321	0.2043	0.2243	0.0151

Table C4 The tensile strength of pure bacterial cellulose and bacterial cellulose composites containing DBD plasma treated fabrics in dry state

Composite types	Tensile strength (MPa)					Average (MPa)	SD
	1	2	3	4	5		
BC/Filter cloth	2.7634	2.6100	2.5660	2.4966	2.4170	2.5726	0.1273
BC/Polyester	3.1037	3.0791	2.9773	3.3322	3.5587	3.2102	0.2339
BC/Muslin	2.6819	2.7965	2.8793	2.8149	2.9104	2.8577	0.0492
BC/Nylon	3.3927	3.6253	3.6017	3.9441	3.1657	3.5459	0.2898
BC/Cotton	3.5824	3.4714	3.3399	3.6200	2.7494	3.3526	0.3544
BC/Lenin	3.1700	3.3937	3.0525	3.1417	3.3770	3.2269	0.151

Appendix D Mechanical Properties of Fabrics

Table D1 The tensile strength of non DBD plasma treated fabrics in wet state

Fabric types	Tensile strength (MPa)					Average (MPa)	SD
	1	2	3	4	5		
Filter cloth	19.375	19.008	16.617	24.728	28.904	21.7264	4.99
Polyester	30.983	42.382	39.022	28.963	35.760	35.422	5.54
Muslin	51.672	49.908	50.463	47.606	46.485	49.1268	2.13
Nylon	48.447	50.481	48.952	45.987	45.927	47.9588	1.97
Cotton	56.435	56.176	57.239	64.670	63.732	59.6504	4.19
Lenin	82.409	78.010	78.213	70.229	68.714	75.515	5.81

Table D2 The tensile strength of DBD plasma treated fabrics 2 min in wet state

Fabric types	Tensile strength (MPa)					Average (MPa)	SD
	1	2	3	4	5		
Filter cloth	5.5063	6.6139	8.3641	8.4148	4.3662	6.653	1.77
Polyester	25.406	24.957	31.098	32.521	32.378	29.272	3.68
Muslin	8.5905	7.4733	8.8828	7.9003	10.677	8.705	1.23
Nylon	37.157	36.170	37.598	30.389	30.081	34.277	3.73
Cotton	15.473	16.332	13.898	22.909	32.385	20.199	7.63
Lenin	15.471	14.845	14.006	13.995	12.547	14.173	1.09

Table D3 The tensile strength of non DBD plasma treated fabrics in dry state

Fabric types	Tensile strength (MPa)					Average (MPa)	SD
	1	2	3	4	5		
Filter cloth	30.508	28.752	28.725	28.881	31.383	29.649	1.22
Polyester	44.141	46.784	46.396	48.175	49.921	46.206	1.48
Muslin	56.160	54.491	54.744	52.533	55.944	54.774	1.45
Nylon	77.304	77.035	81.782	76.215	81.375	78.742	2.62
Cotton	102.67	107.37	107.21	104.76	96.773	103.760	4.36
Lenin	97.502	109.37	92.553	107.08	95.120	100.325	7.47

Table D4 The tensile strength of DBD plasma treated fabrics 2 min in dry state

Fabric types	Tensile strength (MPa)					Average (MPa)	SD
	1	2	3	4	5		
Filter cloth	7.7076	5.5449	4.9760	5.0068	5.8371	5.8145	1.12
Polyester	27.993	27.965	29.365	31.772	27.894	28.9978	1.67
Muslin	16.973	20.511	21.328	16.634	18.359	18.7610	2.09
Nylon	33.985	37.060	41.601	40.002	36.510	44.0014	3.00
Cotton	11.222	14.883	10.054	12.972	12.371	11.9004	1.83
Lenin	4.7236	7.8329	4.3550	6.6377	9.3581	6.5815	2.10

Appendix E The Production Yields of Pure Bacterial Cellulose and Bacterial Cellulose Composite

Table E1 The dry weight of pure bacterial cellulose and bacterial cellulose composites containing non DBD plasma treated fabrics

Composite types	Dry weight (g)			Average (g)	SD
	1	2	3		
Pure BC	0.0049	0.0052	0.0042	0.0048	0.00051
BC/Lenin	0.0062	0.0067	0.0059	0.0063	0.00040
BC/Cotton	0.0088	0.0086	0.0070	0.0081	0.00099
BC/Filter cloth	0.0088	0.0082	0.0090	0.0087	0.00042
BC/Muslin	0.0099	0.0102	0.0097	0.0099	0.00025
BC/Polyester	0.0091	0.0088	0.0100	0.0093	0.00062
BC/Nylon	0.0102	0.0102	0.0109	0.0104	0.00040

Table E2 The dry weight of pure bacterial cellulose and bacterial cellulose composites containing DBD plasma treated fabrics 2 min

Composites types	Dry weight (g)			Average (g)	SD
	1	2	3		
Pure BC	0.0049	0.0052	0.0042	0.0048	0.00051
BC/Lenin	0.0098	0.0083	0.0086	0.0089	0.00079
BC/Cotton	0.0095	0.0090	0.0088	0.0091	0.00036
BC/Filter cloth	0.0103	0.0101	0.0093	0.0099	0.00053
BC/Muslin	0.0133	0.0111	0.0110	0.0118	0.0013
BC/Polyester	0.0121	0.0115	0.0116	0.0117	0.00032
BC/Nylon	0.0137	0.0135	0.0136	0.0136	0.00010

Appendix F The Water Absorption Capacity of Pure Bacterial Cellulose and Bacterial Cellulose Composite

Table F1 The water absorption capacity of pure bacterial cellulose and bacterial cellulose composites containing non DBD plasma treated fabrics

Composites types	Water absorption capacity			Average	SD
	1	2	3		
Pure BC	126.98	151.44	133.55	134.69	9.72
BC/Lenin	99.79	100.49	118.32	106.2	10.5
BC/Cotton	95.78	82.47	78.11	85.45	9.20
BC/Filter cloth	67.75	69.24	67.48	68.16	0.95
BC/Muslin	52.38	64.19	70.13	62.23	9.03
BC/Polyester	56.40	57.25	48.89	54.18	4.60
BC/Nylon	44.32	47.04	43.16	44.84	1.99

Table F2 The water absorption capacity of pure bacterial cellulose and bacterial cellulose composites containing DBD plasma treated fabrics 2 min

Composites types	Water absorption capacity			Average	SD
	1	2	3		
Pure BC	126.98	151.44	133.55	134.69	9.72
BC/Lenin	97.21	86.37	92.47	92.02	5.43
BC/Cotton	77.16	81.56	78.40	79.04	2.27
BC/Filter cloth	51.05	56.43	61.74	56.41	5.34
BC/Muslin	42.74	33.04	43.81	39.86	5.93
BC/Polyester	43.09	37.82	45.67	42.19	4.00
BC/Nylon	31.20	30.95	27.32	29.82	2.17

**Appendix G The Water Vapor Transmission Rate of Pure Bacterial Cellulose,
Bacterial Cellulose Composites and Fabrics**

Table G1 The water vapor transmission rate of pure bacterial cellulose and bacterial cellulose composites containing non DBD plasma treated fabrics

Composites types	Water vapor transmission rate (g/m ² /day)			Average (g/m ² /day)	SD
	1	2	3		
Pure BC	893.14	1083.93	1004.39	993.82	95.83
BC/Lenin	914.08	898.66	1137.58	983.44	133.71
BC/Cotton	1077.99	997.87	1053.20	1043.02	41.02
BC/Filter cloth	1090.59	1258.74	1279.83	1209.72	103.71
BC/Muslin	1052.94	880.54	1093.13	1008.87	112.94
BC/Polyester	1460.44	1289.59	1174.95	1308.33	143.66
BC/Nylon	1158.95	1067.66	1093.42	1106.67	47.07

Table G2 The water vapor transmission rate of pure bacterial cellulose and bacterial cellulose composites containing DBD plasma treated fabrics 2 min

Composites types	Water vapor transmission rate (g/m ² /day)			Average (g/m ² /day)	SD
	1	2	3		
Pure BC	893.14	1083.93	1004.39	993.82	95.83
BC/Lenin	961.36	894.41	857.18	904.32	52.79
BC/Cotton	940.55	851.09	874.59	888.74	46.37
BC/Filter cloth	958.81	922.00	902.19	927.67	14.01
BC/Muslin	864.97	785.84	1054.35	901.72	137.97
BC/Polyester	853.36	1231.99	794.90	922.76	70.81
BC/Nylon	884.64	898.37	899.22	894.08	81.83

Table G3 The water vapor transmission rate porous supporting fabrics

Composites types	Water vapor transmission rate (g/m ² /day)			Average (g/m ² /day)	SD
	1	2	3		
Lenin	1594.62	1446.71	1476.57	1505.97	78.21
Cotton	1584.00	1531.92	1520.17	1545.36	33.97
Filter cloth	1600.14	1567.30	1535.88	1567.91	32.13
Muslin	1562.49	1444.87	1526.26	1511.21	60.24
Polyester	1738.15	1663.27	1598.16	1666.53	70.05
Nylon	1580.75	1543.67	1526.68	1559.37	27.65

Appendix H The Wicking Test

Table H1 The water absorption time of non DBD plasma treated fabrics

Composites types	Water absorption time (s)			Average (s)	SD
	1	2	3		
Lenin	76.8	74.4	79.8	77.0	2.71
Cotton	154.8	154.2	151.8	153.6	1.59
Filter cloth	126	123.6	125.4	125.0	1.25
Muslin	30.0	29.0	29.0	29.33	0.58
Polyester	0.00	0.00	0.00	0.00	0.00
Nylon	0.00	0.00	0.00	0.00	0.00

Table H2 The water absorption time of DBD plasma treated fabrics 2 min

Composites types	Water absorption time (s)			Average (s)	SD
	1	2	3		
Lenin	40.0	43.0	47.0	43.33	3.51
Cotton	46.0	49.0	40.0	45.0	4.58
Filter cloth	66.0	69.6	69	68.2	1.93
Muslin	20.0	22.0	21.0	21.0	1.00
Polyester	47.0	48.0	55.0	50.00	4.36
Nylon	0.00	0.00	0.00	0.00	0.00

Appendix I The In Vivo Experiment

Table II The percent of wound contraction of pure BC, BC/Cotton, BC/nylon and 3M tegraderm film 1624w at 5,7,14 and 21 days

Position	Composite types	The percent of wound contraction (%)			
		5 days	7 days	14 days	21 days
1	Pure BC	67.75	82.96	100.00	100.00
2	BC/Cotton	59.95	77.89	100.00	100.00
3	BC/Nylon	55.18	68.76	100.00	100.00
4	3M tegraderm film 1624w	61.11	77.13	100.00	100.00

Table 12 The body weight of rats, food consumption and water consumption at 5,7,14 and 21 days

Test	Weight (g)			
	5 days	7 days	14 days	21 days
Body weight of rats	332.46	340.72	364.50	393.33
Food consumption	21.42	24.94	27.00	26.17
Water consumption	23.42	33.28	32.83	34.00

Appendix J The In Vitro Experiment

Table J1 The percent survival of human dermal skin fibroblast cells cultured with the samples (compared with the control)

Composite types	% Survival			Average (%)	SD
	1	2	3		
Control	100.00	100.00	100.00	100.00	0.00
Pure BC	25.00	23.00	24.00	24.00	1.00
BC/Cotton	27.00	25.00	29.00	27.00	2.00
BC/Polyester	40.00	44.00	33.00	39.00	5.57
BC/Nylon	26.00	35.00	26.00	29.00	5.19

CURRICULUM VITAE

Name : Ms. Nichapat Boonyeun

Date of Birth : October 2, 1988

Nationality : Thai

University Education :

2007-2010 Bachelor Degree of Science in Chemistry, Faculty of Science, Chulalongkorn University, Bangkok, Thailand

Proceeding :

1. Boonyeun, N.; and Rujiravanit, R. (2014, April 22nd) Development of Porous Supporting Fabric-embedded Bacterial Cellulose Composites for Wound Dressing Applications. Proceeding of The 5th Research Symposium on Petrochemical and Materials Technology and 20th PPC Symposium on Petroleum, Petrochemical, and Polymers. Bangkok, Thailand.

Presentation :

1. Boonyeun, N.; and Rujiravanit, R. (2014, May 18th-23th) Preparation of Bacterial Cellulose Composites with the aid of Dielectric Barrier Discharge (DBD) Plasma Treatment. Paper presented at The 5th International Conference on Plasma Medicine 2014, Nara, Japan.

2. Boonyeun, N.; and Rujiravanit, R. (2014, April 22nd) Development of Porous Supporting Fabric-embedded Bacterial Cellulose Composites for Wound Dressing Applications. Paper presented at The 5th Research Symposium on Petrochemical and Materials Technology and 20th PPC Symposium on Petroleum, Petrochemical, and Polymers. Bangkok, Thailand.