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APPENDIX

A Moisture Content of Starch-Based Composite Foams

Table A1 Moisture content of starch foams as a function of relative humidity.

Relative humidity (%)	Moisture content of starch foams (%)						
	X_1	X_2	X_3	X_4	X_5	Mean	SD
11	12.48	12.61	11.92	13.39	12.45	12.57	0.52
32	17.25	18.34	18.95	18.88	17.96	18.27	0.70
42	21.62	20.26	21.91	21.98	20.05	21.17	0.93
52	24.99	24.66	24.06	24.02	25.12	24.57	0.51
67	27.52	26.90	29.29	26.83	27.22	27.55	1.01
75	33.81	35.93	33.57	32.40	32.79	33.70	1.37

Table A2 Moisture content of starch-10% PVA composite foams as a function of relative humidity.

Relative humidity (%)	Moisture content of starch-10% PVA composite foams (%)						
	X_1	X_2	X_3	X_4	X_5	mean	SD
11	8.57	8.66	8.74	9.37	9.39	8.95	0.40
32	11.87	12.38	12.93	11.60	13.38	12.43	0.73
42	18.10	17.46	17.90	16.47	17.59	17.51	0.63
52	20.41	20.16	20.02	19.14	19.43	19.84	0.53
67	22.80	22.16	22.82	22.54	23.72	22.81	0.57
75	28.48	29.71	28.45	28.07	30.02	28.95	0.86

Table A3 Moisture content of starch-30% PVA composite foams as a function of relative humidity.

Relative humidity (%)	Moisture content of starch-30% PVA composite foams (%)						
	X_1	X_2	X_3	X_4	X_5	mean	SD
11	6.34	6.11	6.85	6.35	6.48	6.42	0.27
32	11.65	10.71	11.04	9.38	11.11	10.78	0.86
42	15.21	14.75	15.67	15.01	14.75	15.08	0.38
52	17.27	16.53	17.64	17.27	17.67	17.27	0.45
67	20.03	20.93	18.57	19.52	19.71	19.75	0.85
75	23.19	22.94	22.33	23.29	23.07	22.96	0.38

Table A4 Moisture content of starch-10% PLA composite foams as a function of relative humidity.

Relative humidity (%)	Moisture content of starch-10% PLA composite foams (%)						
	X_1	X_2	X_3	X_4	X_5	mean	SD
11	8.68	8.22	7.99	7.05	8.57	8.11	0.65
32	12.95	13.55	12.72	12.36	13.28	12.97	0.47
42	16.35	17.17	17.54	18.31	17.21	17.31	0.71
52	20.53	19.55	20.90	21.35	22.36	20.94	1.03
67	22.45	22.21	23.08	20.92	22.08	22.15	0.79
75	25.77	27.65	25.02	26.15	26.99	26.31	4.02

Table A5 Moisture content of starch-30% PLA composite foams as a function of relative humidity.

Relative humidity (%)	Moisture content of starch-30% PLA composite foams (%)						
	X_1	X_2	X_3	X_4	X_5	mean	SD
11	6.81	6.28	6.39	5.53	6.82	6.37	0.53
32	10.05	11.82	9.99	10.00	11.42	10.65	0.89
42	14.39	15.93	15.27	14.19	13.99	14.75	0.81
52	16.27	17.91	17.93	17.20	16.91	17.25	0.71
67	19.58	19.90	19.51	20.35	19.47	19.40	0.36
75	21.05	21.66	21.74	21.88	22.60	21.79	0.55

Table A6 Moisture content of starch-10% PCL composite foams as a function of relative humidity.

Relative humidity (%)	Moisture content of starch-10% PCL composite foams (%)						
	X_1	X_2	X_3	X_4	X_5	mean	SD
11	8.86	8.58	7.31	8.81	8.99	8.51	0.69
32	13.61	13.78	12.34	13.00	12.80	13.11	0.59
42	18.95	18.14	18.36	18.68	17.31	18.29	0.62
52	21.35	20.77	20.62	20.71	19.15	20.52	0.82
67	20.10	19.09	19.40	20.13	21.33	20.01	0.87
75	23.28	23.52	23.45	22.01	22.84	23.02	0.62

Table A7 Moisture content of starch-30% PCL composite foams as a function of relative humidity.

Relative humidity (%)	Moisture content of starch-30% PCL composite foams (%)						
	X_1	X_2	X_3	X_4	X_5	mean	SD
11	7.61	6.98	6.59	7.06	7.15	7.08	0.37
32	11.19	10.41	10.12	11.97	10.20	10.77	0.79
42	15.68	15.74	15.26	15.15	15.60	15.49	0.26
52	16.81	17.40	16.32	15.59	16.91	16.60	0.68
67	20.10	19.09	19.40	20.12	21.33	20.01	0.87
75	23.28	23.51	23.45	22.01	22.84	23.02	0.62

Table A8 Moisture content of starch foams as a function of storage time.

Storage time (days)	Moisture content of starch foams (%)						
	X_1	X_2	X_3	X_4	X_5	mean	SD
1	9.20	8.21	9.07	8.88	9.01	8.84	0.39
2	9.54	9.44	9.10	9.74	9.18	9.40	0.26
3	11.00	11.14	10.77	10.63	11.33	10.97	0.27
4	12.29	12.47	11.63	13.18	12.20	12.35	0.55
5	18.60	17.85	17.80	17.85	17.18	17.86	0.50
7	21.62	20.26	21.91	21.98	20.05	21.17	0.93

Table A9 Moisture content of starch-10% PVA composite foams as a function of storage time.

Storage time (days)	Moisture content of starch-10% PVA composite foams (%)						
	X_1	X_2	X_3	X_4	X_5	mean	SD
1	7.56	6.62	7.31	7.82	6.60	7.18	0.54
2	8.36	8.53	8.47	8.12	8.12	8.32	0.19
3	8.80	8.97	9.34	9.67	9.25	9.20	0.33
4	9.67	10.55	10.12	10.13	11.32	10.36	0.60
5	13.93	14.98	13.93	13.51	13.03	13.88	0.72
7	18.10	17.46	17.91	16.46	17.58	17.50	0.63

Table A10 Moisture content of starch-30% PVA composite foams as a function of storage time.

Storage time (days)	Moisture content of starch-30% PVA composite foams (%)						
	X_1	X_2	X_3	X_4	X_5	mean	SD
1	5.99	5.04	5.12	5.81	5.22	5.44	0.43
2	7.14	7.30	7.45	7.25	7.43	7.31	0.13
3	7.85	7.43	7.18	7.76	7.57	7.56	0.26
4	8.78	8.06	8.60	8.35	8.13	8.38	0.30
5	10.52	11.04	11.46	10.80	9.88	10.74	0.59
7	15.21	14.75	15.67	15.01	14.75	15.08	0.38

Table A11 Moisture content of starch-10% PLA composite foams as a function of storage time.

Storage time (days)	Moisture content of starch-10% PLA composite foams (%)						
	X_1	X_2	X_3	X_4	X_5	mean	SD
1	7.25	8.61	8.79	7.60	8.09	7.60	1.44
2	8.86	8.00	8.12	8.10	8.97	8.41	0.46
3	10.45	10.85	9.49	9.34	9.25	9.88	0.72
4	10.38	11.44	10.47	10.61	11.04	10.79	0.44
5	12.06	12.76	12.67	13.95	14.38	13.17	0.96
7	16.35	17.17	17.54	18.31	17.20	17.31	0.71

Table A12 Moisture content of starch-30% PLA composite foams as a function of storage time.

Storage time (days)	Moisture content of starch-30% PLA composite foams (%)						
	X_1	X_2	X_3	X_4	X_5	mean	SD
1	5.39	5.23	5.58	5.75	5.98	5.59	0.29
2	7.49	6.50	7.33	7.21	7.27	7.16	0.38
3	7.86	7.98	8.58	8.79	8.49	8.34	0.38
4	9.01	9.30	9.21	9.42	9.29	9.24	0.16
5	10.89	10.95	11.39	12.87	11.84	11.59	0.82
7	14.38	15.93	15.27	14.19	13.99	14.75	0.81

Table A13 Moisture content of starch-10% PCL composite foams as a function of storage time.

Storage time (days)	Moisture content of starch-10% PCL composite foams (%)						
	X_1	X_2	X_3	X_4	X_5	mean	SD
1	7.02	7.04	7.70	7.33	7.41	7.30	0.28
2	8.14	7.99	8.60	8.33	8.45	8.31	0.24
3	9.76	9.16	9.65	10.00	9.72	9.66	0.31
4	10.71	11.26	11.84	11.55	11.71	11.41	0.45
5	14.87	15.03	14.71	14.46	13.48	14.51	0.61
7	18.95	18.14	18.36	18.68	17.31	18.29	0.62

Table A14 Moisture content of starch-30% PCL composite foams as a function of storage time.

Storage time (days)	Moisture content of starch-30% PCL composite foams (%)						
	X_1	X_2	X_3	X_4	X_5	mean	SD
1	5.31	5.85	5.17	5.41	5.53	5.45	0.26
2	7.49	7.65	7.41	6.79	6.78	7.22	0.41
3	7.56	7.07	7.06	7.44	7.36	7.30	0.22
4	8.45	8.59	8.56	8.30	8.09	8.40	0.21
5	10.47	11.66	9.81	11.08	11.78	10.96	0.83
7	15.68	15.73	15.26	15.15	15.60	15.49	0.26

B Tensile Strength of Starch-Based Composite Foams

Table B1 Tensile strength of starch foams as a function of relative humidity.

Relative humidity (%)	Tensile strength of starch foams (MPa)						
	X_1	X_2	X_3	X_4	X_5	mean	SD
11	0.2386	0.2390	0.2254	0.2277	0.2109	0.2283	0.0115
32	0.2861	0.2795	0.2660	0.2725	0.2514	0.2711	0.0133
42	0.3220	0.3265	0.3135	0.3174	0.3311	0.3221	0.0070
52	0.2319	0.2665	0.3037	0.2536	0.3242	0.2760	0.0375
67	0.2012	0.2213	0.2145	0.2215	0.2203	0.2212	0.0170
75	0.2015	0.2103	0.2014	0.1997	0.2043	0.2034	0.0041

Table B2 Tensile strength of starch-10% PVA composite foams as a function of relative humidity.

Relative humidity (%)	Tensile strength of starch-10% PVA composite foams (MPa)						
	X_1	X_2	X_3	X_4	X_5	mean	SD
11	0.2970	0.2714	0.3156	0.2698	0.2674	0.2842	0.0212
32	0.3461	0.3618	0.3488	0.4039	0.3950	0.3711	0.0267
42	0.4432	0.4064	0.4254	0.4126	0.4325	0.4241	0.0148
52	0.3429	0.3488	0.3771	0.3424	0.3562	0.3535	0.0143
67	0.3462	0.3217	0.3989	0.2805	0.2914	0.3077	0.0262
75	0.2987	0.2706	0.2854	0.2845	0.2806	0.2839	0.0101

Table B3 Tensile strength of starch-30% PVA composite foams as a function of relative humidity.

Relative humidity (%)	Tensile strength of starch-30% PVA composite foams (MPa)						
	X_1	X_2	X_3	X_4	X_5	mean	SD
11	0.3756	0.3872	0.3954	0.3842	0.3756	0.3877	0.0152
32	0.4258	0.4369	0.4371	0.4362	0.4289	0.4352	0.0275
42	0.5313	0.4990	0.5243	0.5136	0.5302	0.5197	0.0185
52	0.4689	0.4596	0.4523	0.4512	0.4602	0.4578	0.0266
67	0.4125	0.4187	0.4105	0.4200	0.4185	0.4156	0.0091
75	0.3845	0.3759	0.3805	0.3841	0.3776	0.3805	0.0038

Table B4 Tensile strength of starch-10% PLA composite foams as a function of relative humidity.

Relative humidity (%)	Tensile strength of starch-10% PLA composite foams (MPa)						
	X_1	X_2	X_3	X_4	X_5	mean	SD
11	0.2575	0.2616	0.2502	0.2649	0.2503	0.2569	0.0066
32	0.3149	0.2816	0.3009	0.3037	0.2770	0.2956	0.0158
42	0.3340	0.3352	0.3351	0.3433	0.3401	0.3375	0.0235
52	0.2846	0.377	0.2974	0.3143	0.3292	0.3086	0.0176
67	0.2659	0.2932	0.2731	0.2849	0.2631	0.2761	0.0127
75	0.2426	0.2418	0.2411	0.2409	0.2421	0.2417	0.0007

Table B5 Tensile strength of starch-30% PLA composite foams as a function of relative humidity.

Relative humidity (%)	Tensile strength of starch-30% PLA composite foams (MPa)						
	X_1	X_2	X_3	X_4	X_5	mean	SD
11	0.3881	0.3673	0.3812	0.3902	0.3851	0.3824	0.0091
32	0.3985	0.4522	0.4019	0.4155	0.4153	0.4167	0.0212
42	0.4790	0.4742	0.4494	0.4521	0.4587	0.4607	0.0314
52	0.4066	0.3302	0.3373	0.3538	0.3421	0.3540	0.0301
67	0.3267	0.3066	0.3058	0.3017	0.2959	0.3073	0.0116
75	0.2698	0.2700	0.2678	0.2658	0.2699	0.2688	0.0018

Table B6 Tensile strength of starch-10% PCL composite foams as a function of relative humidity.

Relative humidity (%)	Tensile strength of starch-10% PCL composite foams (MPa)						
	X_1	X_2	X_3	X_4	X_5	mean	SD
11	0.2458	0.2495	0.2754	0.2451	0.2558	0.2543	0.0125
32	0.3297	0.3039	0.3047	0.3017	0.3281	0.3136	0.0139
42	0.3984	0.3977	0.4155	0.3116	0.3871	0.3821	0.0407
52	0.2962	0.2510	0.2711	0.2654	0.2726	0.2713	0.0163
67	0.2311	0.2507	0.2335	0.2520	0.2103	0.2355	0.0170
75	0.2117	0.2085	0.2215	0.2103	0.2124	0.2129	0.0050

Table B7 Tensile strength of starch-30% PCL composite foams as a function of relative humidity.

Relative humidity (%)	Tensile strength of starch-30% PCL composite foams (MPa)						
	X_1	X_2	X_3	X_4	X_5	mean	SD
11	0.3585	0.3182	0.3724	0.3841	0.3924	0.3651	0.0292
32	0.3969	0.3944	0.4334	0.4256	0.4053	0.4111	0.0174
42	0.4283	0.3874	0.4158	0.4241	0.3961	0.4104	0.0178
52	0.5087	0.5157	0.5152	0.5295	0.5313	0.5201	0.0098
67	0.3301	0.3239	0.3541	0.3058	0.3287	0.3285	0.0172
75	0.3012	0.3025	0.3102	0.3025	0.3100	0.3053	0.0044

Table B8 Tensile strength of starch foams as a function of storage time.

Storage time (day)	Tensile strength of starch foams (MPa)						
	X_1	X_2	X_3	X_4	X_5	mean	SD
1	0.5632	0.5840	0.6069	0.5411	0.5491	0.5689	0.0267
2	0.7525	0.7876	0.8185	0.7500	0.8235	0.7864	0.0349
3	0.6585	0.6487	0.6570	0.6493	0.6603	0.6547	0.0053
4	0.4612	0.4138	0.4390	0.4140	0.4508	0.4358	0.0214
5	0.3305	0.3694	0.3564	0.3519	0.3635	0.3544	0.0148
7	0.3220	0.3265	0.3135	0.3174	0.3311	0.3221	0.0070

Table B9 Tensile strength of starch-10% PVA composite foams as a function of storage time.

Storage time (day)	Tensile strength of starch-10% PVA composite foams (MPa)						
	X_1	X_2	X_3	X_4	X_5	mean	SD
1	0.9292	0.8605	0.8986	0.8741	0.9209	0.8967	0.0294
2	1.4659	1.3332	1.3702	1.2419	1.0981	1.3019	0.1393
3	0.8120	0.8359	0.7883	0.8047	0.8591	0.8200	0.0277
4	0.5104	0.6560	0.5375	0.5334	0.5692	0.5613	0.0569
5	0.4515	0.4487	0.4413	0.4782	0.4617	0.4568	0.0140
7	0.4432	0.4064	0.4254	0.4125	0.4325	0.4240	0.1486

Table B10 Tensile strength of starch-30% PVA composite foams as a function of storage time.

Storage time (day)	Tensile strength of starch-30% PVA composite foams (MPa)						
	X_1	X_2	X_3	X_4	X_5	mean	SD
1	1.1309	1.1303	1.0061	1.0576	1.1205	1.0891	0.0554
2	1.3818	1.6718	1.6482	1.5035	1.5461	1.5503	0.1171
3	1.0438	1.0964	1.0721	0.9632	0.9478	1.0247	0.0660
4	0.7062	0.8284	0.8843	0.6832	0.7854	0.7775	0.0837
5	0.5606	0.5580	0.5787	0.5453	0.5234	0.553	0.0204
7	0.5313	0.4990	0.5234	0.5136	0.5302	0.5197	0.0185

Table B11 Tensile strength of starch-10% PLA composite foams as a function of storage time.

Storage time (day)	Tensile strength of starch-10% PLA composite foams (MPa)						
	X_1	X_2	X_3	X_4	X_5	Mean	SD
1	0.7979	0.7904	0.7968	0.7316	0.8124	0.7858	0.0313
2	1.0476	0.9544	0.9537	1.0244	0.9483	0.9857	0.0467
3	0.8665	0.9810	0.7969	0.8092	0.8092	0.8526	0.0767
4	0.5420	0.6225	0.4922	0.4797	0.5103	0.5237	0.0571
5	0.3832	0.3820	0.4364	0.3893	0.3951	0.3972	0.0040
7	0.3340	0.3352	0.3350	0.3433	0.3400	0.3375	0.0014

Table B12 Tensile strength of starch-30% PLA composite foams as a function of storage time.

Storage time (day)	Tensile strength of starch-30% PLA composite foams (MPa)						
	X_1	X_2	X_3	X_4	X_5	mean	SD
1	0.9269	0.9322	0.9723	0.9573	0.9022	0.9382	0.0273
2	1.2806	1.3407	1.3587	1.2138	1.3358	1.3059	0.0591
3	0.9339	0.9762	0.9678	1.0383	0.9558	0.9743	0.0391
4	0.7428	0.7718	0.7202	0.7439	0.7317	0.7421	0.0192
5	0.5477	0.5061	0.5057	0.4959	0.5458	0.5202	0.0359
7	0.5090	0.4842	0.4394	0.4521	0.4187	0.4607	0.0412

Table B13 Tensile strength of starch-10% PCL composite foams as a function of storage time.

Storage time (day)	Tensile strength of starch-10% PCL composite foams (MPa)						
	X_1	X_2	X_3	X_4	X_5	mean	SD
1	0.7313	0.7323	0.6051	0.6166	0.5117	0.6394	0.0936
2	0.9218	0.9095	0.9330	0.8199	0.9426	0.9055	0.0494
3	0.7449	0.7427	0.7103	0.6648	0.7218	0.7169	0.0325
4	0.4696	0.4951	0.5139	0.4919	0.5123	0.5026	0.0276
5	0.4041	0.4136	0.4108	0.4028	0.3998	0.4062	0.0057
7	0.3984	0.3977	0.4155	0.3115	0.3871	0.3821	0.0407

Table B14 Tensile strength of starch-30% PCL composite foams as a function of storage time.

Storage time (day)	Tensile strength of starch-30% PCL composite foams (MPa)						
	X_1	X_2	X_3	X_4	X_5	mean	SD
1	0.8575	0.8790	0.7267	0.7416	0.8674	0.8149	0.0742
2	1.2226	1.1918	1.4511	1.2120	1.4750	1.3105	0.1399
3	1.1382	1.0505	0.9908	0.9479	0.9910	1.0237	0.0737
4	0.5569	0.6041	0.6647	0.6012	0.6308	0.6115	0.0398
5	0.6005	0.5582	0.4171	0.5102	0.5812	0.5334	0.0732
7	0.4283	0.3874	0.4158	0.4241	0.3961	0.4104	0.0178

Table B15 Tensile strength of starch foams containing glycerol as a plasticizer.

Plasticizer content (%)	Tensile strength of starch foams (MPa)						
	X_1	X_2	X_3	X_4	X_5	mean	SD
5	0.2436	0.2111	0.2019	0.2054	0.1873	0.2099	0.0207
10	0.2082	0.1926	0.1895	0.1835	0.1743	0.1896	0.0125
15	0.1947	0.1883	0.1859	0.1813	0.1858	0.1872	0.0049
20	0.0454	0.1441	0.1299	0.1423	0.1421	0.1208	0.0424
25	0.0988	0.1020	0.0965	0.0984	0.1027	0.0997	0.0026

Table B16 Tensile strength of starch foams containing urea as a plasticizer.

Plasticizer content (%)	Tensile strength of starch foams (MPa)						
	X_1	X_2	X_3	X_4	X_5	mean	SD
5	0.2509	0.2249	0.2407	0.2024	0.1973	0.2233	0.0233
10	0.1857	0.1945	0.1959	0.2065	0.1894	0.1944	0.0079
15	0.1979	0.1778	0.1809	0.1712	0.1846	0.1825	0.0099
20	0.1710	0.1154	0.1042	0.0909	0.1092	0.1181	0.0309
25	0.1258	0.1334	0.1239	0.1301	0.1246	0.1276	0.0040

Table B17 Tensile strength of starch foams containing ammonium chloride as a plasticizer.

Plasticizer content (%)	Tensile strength of starch foams (MPa)						
	X_1	X_2	X_3	X_4	X_5	mean	SD
5	0.2305	0.2412	0.2652	0.2494	0.2571	0.2487	0.0135
10	0.2144	0.2153	0.2161	0.2179	0.2169	0.2161	0.0013
15	0.1853	0.1850	0.1930	0.1858	0.2051	0.1909	0.0086
20	0.1218	0.1372	0.1795	0.1188	0.1583	0.1431	0.0250
25	0.1489	0.318	0.1309	0.1342	0.1472	0.1386	0.0087

C Elongation at Break of Starch-Based Composite Foams

Table C1 Elongation at break of starch foams as a function of relative humidity.

Relative humidity (%)	Elongation at break of starch foams (%)						
	X_1	X_2	X_3	X_4	X_5	mean	SD
11	3.69	4.02	4.28	4.01	3.63	3.93	0.2667
32	4.45	4.67	4.61	4.46	4.56	4.55	0.0951
42	6.08	6.21	6.38	6.21	6.29	6.23	0.1110
52	6.80	6.33	6.56	6.50	6.16	6.47	0.2416
67	6.67	6.47	6.32	6.62	6.50	6.51	0.1372
75	6.52	6.49	6.51	6.48	6.42	6.48	0.0391

Table C2 Elongation at break of starch-10% PVA composite foams as a function of relative humidity.

Relative humidity (%)	Elongation at break of starch-10% PVA composite foams (%)						
	X_1	X_2	X_3	X_4	X_5	mean	SD
11	6.01	5.89	6.12	5.99	5.82	5.97	0.1154
32	6.44	6.24	6.13	6.52	6.08	6.28	0.1918
42	7.62	8.12	8.05	7.61	6.78	7.64	0.5336
52	7.93	7.86	7.50	7.58	7.78	7.73	0.1835
67	7.56	7.75	8.11	8.22	7.61	7.85	0.2984
75	7.88	7.91	7.85	7.86	7.81	7.86	0.0370

Table C3 Elongation at break of starch-30% PVA composite foams as a function of relative humidity.

Relative humidity (%)	Elongation at break of starch-30% PVA composite foams (%)						
	X_1	X_2	X_3	X_4	X_5	mean	SD
11	4.38	4.26	4.22	4.18	4.32	4.72	0.0798
32	5.81	5.62	5.32	5.48	5.64	5.57	0.1840
42	6.87	6.90	6.91	7.04	7.12	6.96	0.1070
52	7.04	7.18	7.14	7.23	6.98	7.11	0.1023
67	7.19	7.26	7.09	7.39	6.82	7.15	0.2143
75	7.21	7.18	7.18	7.19	7.22	7.19	0.0181

Table C4 Elongation at break of starch-10% PLA composite foams as a function of relative humidity.

Relative humidity (%)	Elongation at break of starch-10% PLA composite foams (%)						
	X_1	X_2	X_3	X_4	X_5	mean	SD
11	5.11	5.04	4.91	4.82	5.23	5.02	0.1617
32	6.21	6.43	6.29	6.46	6.45	6.36	0.1118
42	7.04	6.92	6.98	7.04	7.00	6.99	0.0498
52	7.44	7.25	7.39	7.14	7.42	7.32	0.1287
67	7.82	7.61	7.74	7.78	7.63	7.71	0.0923
75	7.82	7.64	7.78	7.69	7.82	7.75	0.0812

Table C5 Elongation at break of starch-30% PLA composite foams as a function of relative humidity.

Relative humidity (%)	Elongation at break of starch-30% PLA composite foams (%)						
	X_1	X_2	X_3	X_4	X_5	mean	SD
11	3.86	3.78	4.12	4.09	4.23	4.01	0.1884
32	4.60	4.57	5.08	4.84	4.71	4.76	0.2079
42	6.45	6.25	6.21	6.31	5.95	6.24	0.1714
52	6.41	6.34	6.65	6.44	6.20	6.41	0.1039
67	6.61	6.54	6.56	6.63	6.70	6.61	0.0830
75	6.67	6.53	6.64	6.85	6.61	6.66	0.1183

Table C6 Elongation at break of starch-10% PCL composite foams as a function of relative humidity.

Relative humidity (%)	Elongation at break of starch-10% PCL composite foams (%)						
	X_1	X_2	X_3	X_4	X_5	mean	SD
11	5.12	5.29	5.09	5.32	5.32	5.22	0.1134
32	6.48	6.31	6.41	6.21	7.09	6.50	0.3452
42	7.14	7.00	7.19	7.29	7.10	7.14	0.1073
52	8.12	7.61	8.01	7.69	7.71	7.82	0.2229
67	8.53	8.41	6.33	7.50	8.64	7.88	0.9782
75	7.88	8.36	8.46	7.71	7.52	7.98	0.4089

Table C7 Elongation at break of starch-30% PCL composite foams as a function of relative humidity.

Relative humidity (%)	Elongation at break of starch-30% PCL composite foams (%)						
	X_1	X_2	X_3	X_4	X_5	Mean	SD
11	4.1	4.18	3.71	4.25	3.86	4.02	0.2672
32	4.96	7.72	5.11	4.81	4.87	4.89	0.1490
42	6.01	6.94	6.11	6.21	6.08	6.27	0.2488
52	6.90	6.81	6.69	6.83	6.87	6.82	0.0806
67	6.81	6.28	6.53	6.62	6.94	6.36	0.2554
75	6.91	6.57	6.32	6.54	6.29	6.52	0.2485

Table C8 Elongation at break of starch foams as a function of storage time.

Storage time (day)	Elongation at break of starch foams (%)						
	X_1	X_2	X_3	X_4	X_5	Mean	SD
1	4.27	4.16	4.52	4.32	4.43	4.34	0.1398
2	5.25	5.24	4.96	6.01	5.56	5.40	0.3997
3	5.80	5.91	5.88	5.57	4.92	5.61	0.4111
4	5.98	5.73	6.38	6.12	6.08	6.05	0.2354
5	6.18	5.71	5.89	5.84	5.85	5.89	0.1735
7	6.08	6.21	6.38	6.21	6.29	6.23	0.1110

Table C9 Elongation at break of starch-10% PVA composite foams as a function of storage time.

Storage time (day)	Elongation at break of starch-10% PVA composite foams (%)						
	X_1	X_2	X_3	X_4	X_5	mean	SD
1	5.93	5.17	5.27	5.13	5.79	5.45	0.3737
2	6.43	6.16	6.53	6.25	6.36	6.34	0.1457
3	7.14	7.02	6.83	7.16	7.16	7.16	0.1421
4	7.88	7.32	7.82	7.88	7.52	7.68	0.2523
5	7.66	7.56	7.84	7.44	7.35	7.57	0.1913
7	7.62	8.12	8.05	7.61	6.78	7.64	0.5336

Table C10 Elongation at break of starch-30% PVA composite foams as a function of storage time.

Storage time (day)	Elongation at break of starch-30% PVA composite foams (%)						
	X_1	X_2	X_3	X_4	X_5	mean	SD
1	5.03	4.62	4.84	5.14	4.94	4.91	0.1981
2	5.91	5.81	5.98	6.01	6.15	5.97	0.1257
3	6.87	7.00	6.75	7.20	7.06	6.97	0.1732
4	7.22	7.13	7.54	7.33	7.42	7.32	0.1614
5	7.62	7.71	7.30	6.99	7.28	7.38	0.2893
7	6.87	6.90	6.91	7.04	7.12	6.96	0.1070

Table C11 Elongation at break of starch-10% PLA composite foams as a function of storage time.

Storage time (day)	Elongation at break of starch-10% PLA composite foams (%)						
	X_1	X_2	X_3	X_4	X_5	mean	SD
1	5.57	4.84	5.48	5.29	5.18	5.27	0.2861
2	6.96	6.71	6.98	6.67	6.24	6.71	0.2991
3	7.41	6.93	6.76	7.11	7.15	7.07	0.2415
4	7.44	7.53	7.65	7.42	7.32	7.47	0.1243
5	7.04	7.11	7.15	7.00	7.14	7.08	0.0653
7	7.04	6.92	6.98	7.04	7.00	6.99	0.0498

Table C12 Elongation at break of starch-30% PLA composite foams as a function of storage time.

Storage time (day)	Elongation at break of starch-30% PLA composite foams (%)						
	X_1	X_2	X_3	X_4	X_5	mean	SD
1	4.63	4.374	4.62	4.15	4.52	4.45	0.2014
2	6.14	5.69	5.87	5.36	5.94	5.80	0.2940
3	6.63	6.11	6.23	6.11	6.24	6.26	0.2139
4	6.60	6.64	6.58	6.47	6.45	6.54	0.0834
5	6.58	6.27	6.31	6.57	6.38	6.42	0.1451
7	5.98	6.45	6.25	6.21	6.31	6.24	0.1714

Table C13 Elongation at break of starch-10% PCL composite foams as a function of storage time.

Storage time (day)	Elongation at break of starch-10% PCL composite foams (%)						
	X_1	X_2	X_3	X_4	X_5	mean	SD
1	5.05	5.14	5.33	5.27	5.18	5.19	0.1090
2	6.61	5.95	6.26	6.26	6.01	6.21	0.2609
3	6.96	6.83	7.38	6.68	6.65	6.90	0.2957
4	6.64	7.16	6.33	6.85	6.98	6.79	0.3204
5	7.26	7.15	7.01	6.84	7.26	7.10	0.1798
7	7.14	7.00	7.19	7.29	7.10	7.14	0.1073

Table C14 Elongation at break of starch-30% PCL composite foams as a function of storage time.

Storage time (day)	Elongation at break of starch-30% PCL composite foams (%)						
	X_1	X_2	X_3	X_4	X_5	mean	SD
1	4.79	5.08	4.88	4.57	4.58	4.78	0.2145
2	5.56	5.79	5.66	5.60	5.58	5.63	0.0928
3	6.22	6.18	5.91	6.28	5.91	6.10	0.1770
4	6.28	6.62	6.53	6.21	5.97	6.32	0.2599
5	6.24	6.47	6.43	6.62	6.47	6.44	0.1361
7	6.01	6.94	6.11	6.21	6.08	6.27	0.3813

Table C15 Elongation at break of starch foams containing glycerol as a plasticizer.

Plasticizer content (%)	Elongation at break of starch foams (%)						
	X_1	X_2	X_3	X_4	X_5	mean	SD
5	6.98	6.61	6.87	6.93	6.81	6.84	0.1435
10	7.91	7.36	7.56	7.48	7.84	7.63	0.2360
15	7.52	7.75	7.81	7.56	7.89	7.71	0.1600
20	7.71	8.05	7.96	7.68	7.66	7.81	0.1799
25	8.03	8.12	7.99	8.21	7.94	8.05	0.1075

Table C16 Elongation at break of starch foams containing urea as a plasticizer.

Plasticizer content (%)	Elongation at break of starch foams (%)						
	X_1	X_2	X_3	X_4	X_5	mean	SD
5	6.88	6.71	6.04	6.91	6.57	6.62	0.3530
10	7.41	7.44	7.46	7.65	7.21	7.43	0.1566
15	7.56	7.64	7.41	7.66	7.55	7.56	0.0980
20	7.63	7.54	7.68	7.84	7.51	7.64	0.1309
25	7.38	7.65	7.89	7.68	7.91	7.70	0.2153

Table C17 Elongation at break of starch foams containing ammonium chloride as a plasticizer.

Plasticizer content (%)	Elongation at break of starch foams (%)						
	X_1	X_2	X_3	X_4	X_5	mean	SD
5	6.64	6.69	6.97	6.91	6.89	6.82	0.1456
10	7.01	7.11	7.28	7.09	7.15	7.12	0.0990
15	7.21	7.18	7.29	7.02	7.41	7.22	0.1437
20	7.51	7.44	7.61	7.36	7.31	7.44	0.1192
25	7.45	7.42	7.68	7.68	7.94	7.63	0.2106

D Flexural Strength of Starch-Based Composite Foams

Table D1 Flexural strength of starch foams as a function of relative humidity.

Relative humidity (%)	Flexural strength of starch foams (MPa)						
	X_1	X_2	X_3	X_4	X_5	mean	SD
11	0.4497	0.3830	0.4577	0.3183	0.3269	0.3871	0.0657
32	0.5262	0.3786	0.5235	0.4905	0.5411	0.4920	0.0660
42	0.5930	0.6845	0.5795	0.5889	0.7388	0.6369	0.0710
52	0.5551	0.4409	0.5383	0.5749	0.6030	0.5424	0.0616
67	0.4899	0.4355	0.4758	0.5024	0.4956	0.4799	0.0266
75	0.4629	0.4679	0.4513	0.4454	0.4583	0.4572	0.0089

Table D2 Flexural strength of starch-10% PVA composite foams as a function of relative humidity.

Relative humidity (%)	Flexural strength of starch-10% PVA composite foams (MPa)						
	X_1	X_2	X_3	X_4	X_5	mean	SD
11	0.9203	0.8497	0.8711	0.9276	0.9917	0.9121	0.0552
32	1.0552	1.1393	1.0227	1.0452	1.0960	1.0717	0.0461
42	1.3387	1.0795	1.0728	1.1571	1.5146	1.2326	0.1906
52	1.1600	1.0852	1.1941	1.2886	1.0886	1.1633	0.0841
67	0.9422	0.9693	1.1489	1.0650	1.0795	1.0410	0.0845
75	0.9565	1.0634	1.0309	1.0227	1.0015	1.0150	0.0395

Table D3 Flexural strength of starch-30% PVA composite foams as a function of relative humidity.

Relative humidity (%)	Flexural strength of starch-30% PVA composite foams (MPa)						
	X_1	X_2	X_3	X_4	X_5	mean	SD
11	1.1080	1.2042	1.0176	1.0257	1.1432	1.0998	0.0791
32	1.3317	1.3785	1.3916	1.3992	1.4221	1.3846	0.0335
42	1.5725	1.5477	1.6766	1.3714	1.4808	1.5298	0.1131
52	1.4030	1.3953	1.3030	1.3035	1.3916	1.3613	0.0486
67	1.1736	1.2407	1.1413	1.1945	1.2548	1.2010	0.0469
75	1.0544	1.1829	0.9766	1.0222	1.0463	1.0565	0.0769

Table D4 Flexural strength of starch-10% PLA composite foams as a function of relative humidity.

Relative humidity (%)	Flexural strength of starch-10% PLA composite foams (MPa)						
	X_1	X_2	X_3	X_4	X_5	mean	SD
11	0.8821	0.8709	0.8176	0.8158	0.8327	0.8438	0.0308
32	1.0663	1.0594	1.0423	1.0745	1.0317	1.0548	0.0175
42	1.3371	1.3191	1.3308	1.2608	1.4772	1.3450	0.0798
52	1.0961	1.1463	1.0100	1.0415	0.9953	1.0579	0.0627
67	1.1207	1.0612	0.9985	1.0243	1.0572	1.0524	0.0461
75	1.0660	1.0257	0.9962	1.0758	0.9609	1.0249	0.6479

Table D5 Flexural strength of starch-30% PLA composite foams as a function of relative humidity.

Relative humidity (%)	Flexural strength of starch-30% PLA composite foams (MPa)						
	X_1	X_2	X_3	X_4	X_5	mean	SD
11	1.0957	1.1156	1.1657	1.2018	1.2560	1.1670	0.0649
32	1.3785	1.2881	1.2764	1.2901	1.2745	1.3015	0.0435
42	1.6789	1.2365	1.6003	1.3820	1.8532	1.5504	0.2437
52	1.3760	1.3841	1.4283	1.2860	1.3212	1.3591	0.0558
67	1.3265	1.3476	1.1674	1.2860	1.2937	1.2842	0.0698
75	1.2562	1.0996	1.1097	1.1940	1.1894	1.1698	0.0651

Table D6 Flexural strength of starch-10%PCL composite foams as a function of relative humidity.

Relative humidity (%)	Flexural strength of starch-10% PCL composite foams (MPa)						
	X_1	X_2	X_3	X_4	X_5	mean	SD
11	0.7440	0.6868	0.8004	0.8510	0.7173	0.7599	0.0658
32	1.2809	1.2689	0.9422	0.8516	0.9671	1.0621	0.1989
42	1.1074	1.1832	1.1275	1.1923	1.2226	1.1666	0.0477
52	0.9101	1.1476	1.1393	0.9043	1.1208	1.0444	0.1256
67	0.9673	1.0540	0.9960	0.8843	0.9301	0.9663	0.0644
75	0.7749	0.9323	1.0135	0.8618	1.1020	0.9369	0.1275

Table D7 Flexural strength of starch-30% PCL composite foams as a function of relative humidity.

Relative humidity (%)	Flexural strength of starch-30% PCL composite foams (MPa)						
	X_1	X_2	X_3	X_4	X_5	mean	SD
11	1.0949	1.2663	1.2310	1.0813	1.2132	1.1773	0.0838
32	1.4777	1.4479	1.5101	1.3387	1.3982	1.4345	0.0675
42	1.6826	1.5255	1.7511	1.5558	1.7766	1.6583	0.1133
52	1.3629	1.3366	1.2290	1.3965	1.2186	1.3087	0.0804
67	1.4373	1.4521	1.3319	1.4636	1.3271	1.4024	0.0672
75	1.2273	1.2858	1.3647	1.3459	1.2849	1.3017	0.0547

Table D8 Flexural strength of starch foams as a function of storage time.

Storage time (day)	Flexural strength of starch foams (MPa)						
	X_1	X_2	X_3	X_4	X_5	mean	SD
1	2.4426	2.5699	2.3090	2.3376	2.2871	2.3892	0.1172
2	2.7772	2.9675	2.8427	2.8740	2.9501	2.8823	0.0783
3	1.4933	1.5382	1.4772	1.5502	1.4440	1.5006	0.0438
4	1.1268	1.1654	1.1347	1.1432	1.1728	1.1486	0.0198
5	0.9090	0.9175	0.9327	0.9962	0.8718	0.9255	0.0454
7	0.5930	0.6845	0.5795	0.5889	0.7388	0.6369	0.0710

Table D9 Flexural strength of starch-10% PVA composite foams as a function of storage time.

Storage time (day)	Flexural strength of starch-10% PVA composite foams (MPa)						
	X_1	X_2	X_3	X_4	X_5	mean	SD
1	2.7539	2.7559	2.6296	2.8076	2.8420	2.7578	0.0806
2	2.6370	3.1391	2.8632	3.4561	3.7370	3.1665	0.4422
3	2.3137	2.4581	1.9468	1.9452	2.6029	2.2614	0.3059
4	1.5760	1.9224	2.0499	1.6373	1.8443	1.8060	0.1973
5	1.1676	1.3040	1.4038	1.6098	1.7192	1.4409	0.2240
7	1.3387	1.0795	1.0728	1.1571	1.5146	1.2326	0.1906

Table D10 Flexural strength of starch-30% PVA composite foams as a function of storage time.

Storage time (day)	Flexural strength of starch-30% PVA composite foams (MPa)						
	X_1	X_2	X_3	X_4	X_5	mean	SD
1	4.3571	4.4819	3.2029	3.5605	2.9094	3.7023	0.6954
2	5.3763	6.0382	6.4886	5.9775	3.9285	5.5618	0.9950
3	2.5507	4.2645	4.2603	2.9127	3.5041	3.4985	0.7759
4	2.7570	2.9011	2.9827	2.7618	2.5639	2.7933	0.1600
5	1.4427	0.0200	1.7088	2.0482	1.3706	1.7180	0.3149
7	1.5725	1.5477	1.6766	1.3714	1.4808	1.5298	0.1131

Table D11 Flexural strength of starch-10% PLA composite foams as a function of storage time.

Storage time (day)	Flexural strength of starch-10% PLA composite foams (MPa)						
	X_1	X_2	X_3	X_4	X_5	mean	SD
1	2.0250	2.4305	2.3228	2.3447	2.2668	0.1531	0.1023
2	4.0074	4.1300	4.0339	4.2770	4.0929	4.1082	0.1059
3	2.3402	2.2920	2.4390	2.3857	2.5910	2.4096	0.1150
4	1.5537	1.5907	1.5778	1.7278	1.5854	1.6071	0.0689
5	1.6083	1.6561	1.4894	1.4411	1.5255	1.5441	0.0874
7	1.3371	1.3191	1.3308	1.2608	1.4772	1.3452	0.0798

Table D12 Flexural strength of starch-30% PLA composite foams as a function of storage time.

Storage time (day)	Flexural strength of starch-30% PLA composite foams (MPa)						
	X_1	X_2	X_3	X_4	X_5	mean	SD
1	2.8571	2.7269	2.8069	2.8350	2.8231	2.8098	0.0498
2	5.1607	5.1751	5.1942	5.1652	5.1832	5.1756	0.0135
3	2.7841	2.8069	2.8231	3.1994	3.0124	2.9252	0.1782
4	1.8867	1.8148	1.9703	2.1805	2.0634	1.9832	0.1442
5	1.6570	1.7770	1.8602	1.6509	1.7122	1.7314	0.0880
7	1.6789	1.2365	1.6003	1.3820	1.8532	1.5520	0.2437

Table D13 Flexural strength of starch-10% PCL composite foams as a function of storage time.

Storage time (day)	Flexural strength of starch-10% PCL composite foams (MPa)						
	X_1	X_2	X_3	X_4	X_5	mean	SD
1	2.2061	2.2229	2.3265	1.7689	1.7841	2.0617	0.2644
2	3.2855	3.2342	3.3750	3.2696	3.3685	3.3066	0.0623
3	2.8614	3.1994	3.1573	2.8795	3.1712	3.0538	0.1681
4	1.7049	1.8885	1.9925	1.6666	1.7924	1.8090	0.1335
5	1.6300	1.6127	1.5150	1.4814	1.7630	1.6004	0.1105
7	1.1074	1.1832	1.1275	1.1923	1.2226	1.1666	0.0477

Table D14 Flexural strength of starch-30% PCL composite foams as a function of storage time.

Storage time (day)	Flexural strength of starch-30% PCL composite foams (MPa)						
	X_1	X_2	X_3	X_4	X_5	mean	SD
1	4.1533	4.2519	4.4813	4.4725	4.2144	4.3147	0.1522
2	5.7900	5.5681	5.6916	5.6802	5.7586	5.6977	0.0856
3	3.5041	3.8844	3.7937	3.7092	3.9765	3.7736	0.1807
4	2.1969	1.9324	1.9253	2.0046	1.7975	1.9713	0.1464
5	1.7841	1.7857	1.7471	1.9312	1.7855	1.8067	0.0715
7	1.6826	1.5255	1.7511	1.5558	1.7766	1.6583	0.1133

Table D15 Flexural strength of starch foams containing glycerol as a plasticizer.

Plasticizer content (%)	Flexural strength of starch foams (MPa)						
	X_1	X_2	X_3	X_4	X_5	mean	SD
5	1.1829	0.7954	0.8186	0.7532	0.8330	0.8766	0.1738
10	0.5365	0.6322	0.5927	0.5160	0.5247	0.5604	0.0500
15	0.2632	0.2906	0.2452	0.2947	0.1883	0.2564	0.0431
20	0.1993	0.2456	0.1387	0.1960	0.1587	0.1876	0.0412
25	0.1109	0.0865	0.1027	0.0900	0.1105	0.1001	0.0113

Table D16 Flexural strength of starch foams containing urea as a plasticizer.

Plasticizer content (%)	Flexural strength of starch foams (MPa)						
	X_1	X_2	X_3	X_4	X_5	mean	SD
5	0.9556	0.9014	0.8422	0.9478	0.8150	0.8924	0.0625
10	0.5628	0.6337	0.5639	0.6126	0.5559	0.5856	0.0348
15	0.3658	0.3441	0.3653	0.3693	0.3658	0.3620	0.0101
20	0.2989	0.2739	0.2866	0.2961	0.2608	0.2833	0.0159
25	0.1920	0.1777	0.2120	0.2173	0.2445	0.2087	0.0255

Table D17 Flexural strength of starch foams containing ammonium chloride as a plasticizer.

Plasticizer content (%)	Flexural strength of starch foams (MPa)						
	X_1	X_2	X_3	X_4	X_5	mean	SD
5	0.9311	0.9301	0.8719	0.8560	0.8719	0.8922	0.0356
10	0.5542	0.5626	0.5733	0.5578	0.5733	0.5642	0.0088
15	0.3938	0.3930	0.3804	0.4028	0.4023	0.3945	0.0091
20	0.2498	0.2325	0.2438	0.2342	0.2498	0.2420	0.0083
25	0.1943	0.2120	0.1838	0.2141	0.2031	0.2015	0.0126

E Maximum Strain of Starch-Based Composite Foams

Table E1 Maximum strain of starch foams as a function of relative humidity.

Relative humidity (%)	Maximum strain of starch foams (%)						
	X_1	X_2	X_3	X_4	X_5	mean	SD
11	44.06	13.80	45.91	46.62	45.94	45.27	1.2855
32	49.85	48.92	48.72	49.28	49.71	49.30	0.4868
42	50.78	49.52	52.35	52.71	51.79	51.43	1.2909
52	51.28	50.60	52.82	51.56	51.27	51.51	0.8162
67	51.41	51.22	52.20	51.61	51.13	51.51	0.4260
75	50.30	51.83	52.02	51.32	52.28	51.55	0.7801

Table E2 Maximum strain of starch-10% PVA composite foams as a function of relative humidity..

Relative humidity (%)	Maximum strain of starch-10% PVA composite foams (%)						
	X_1	X_2	X_3	X_4	X_5	mean	SD
11	48.47	51.11	50.31	49.86	48.80	49.71	1.0832
32	51.23	50.98	52.73	52.32	49.92	51.44	1.1182
42	56.69	55.55	59.43	56.72	55.90	56.86	1.5223
52	56.34	56.95	55.60	56.01	56.80	56.34	0.5575
67	56.75	56.08	52.98	55.67	55.73	55.44	1.4409
75	52.70	55.06	57.22	57.42	56.04	55.69	1.9241

Table E3 Maximum strain of starch-30% PVA composite foams as a function of relative humidity.

Relative humidity (%)	Maximum strain of starch-30% PVA composite foams (%)						
	X_1	X_2	X_3	X_4	X_5	mean	SD
11	52.59	50.25	57.77	55.68	52.91	53.84	2.9216
32	57.85	56.20	55.95	54.64	54.05	55.74	1.4816
42	60.52	61.14	57.46	60.53	58.52	59.63	1.5682
52	57.41	63.49	65.55	57.06	60.12	60.72	3.7309
67	58.47	59.28	62.19	60.01	57.51	59.49	1.7726
75	58.71	57.26	60.87	61.37	59.80	59.60	1.6621

Table E4 Maximum strain of starch-10% PLA composite foams as a function of relative humidity.

Relative humidity (%)	Maximum strain of starch-10% PLA composite foams (%)						
	X_1	X_2	X_3	X_4	X_5	mean	SD
11	43.95	42.25	54.06	50.18	47.18	47.52	4.7546
32	52.60	52.61	52.48	53.57	53.76	53.00	0.6121
42	57.41	56.77	57.57	59.82	56.18	57.55	1.3839
52	54.78	55.15	56.23	56.24	57.39	55.96	1.0304
67	57.46	57.51	58.11	58.75	58.23	58.01	0.5401
75	59.27	57.78	58.40	57.03	59.27	58.35	0.9666

Table E5 Maximum strain of starch-30% PLA composite foams as a function of relative humidity.

Relative humidity (%)	Maximum strain of starch-30% PLA composite foams (%)						
	X_1	X_2	X_3	X_4	X_5	mean	SD
11	51.02	50.46	50.72	51.03	50.35	50.72	0.3139
32	54.64	56.40	56.46	55.85	56.98	56.07	0.8934
42	59.50	62.22	62.59	63.46	60.04	61.56	1.7046
52	58.37	57.16	57.86	57.04	58.58	57.80	0.6933
67	59.68	58.84	61.32	60.24	59.83	59.98	0.9043
75	59.74	61.33	61.00	58.87	59.87	60.16	1.0011

Table E6 Maximum strain of starch-10% PCL composite foams as a function of relative humidity.

Relative humidity (%)	Maximum strain of starch-10% PCL composite foams (%)						
	X_1	X_2	X_3	X_4	X_5	mean	SD
11	47.91	49.21	49.50	46.16	48.84	48.34	1.3610
32	51.69	51.07	54.64	54.85	55.79	53.61	2.0907
42	57.98	55.97	58.57	59.17	59.24	58.19	1.3413
52	57.44	57.76	57.62	57.41	57.70	57.59	0.1546
67	58.75	57.41	57.31	57.44	57.89	57.76	0.5977
75	57.04	57.28	57.39	57.27	56.54	57.10	0.3382

Table E7 Maximum strain of starch-30% PCL composite foams as a function of relative humidity.

Relative humidity (%)	Maximum strain of starch-30% PCL composite foams (%)						
	X_1	X_2	X_3	X_4	X_5	mean	SD
11	53.28	52.98	51.09	51.85	52.78	52.40	0.9041
32	56.61	55.93	55.72	56.79	56.03	56.22	0.4607
42	59.56	60.90	58.90	62.74	58.26	60.07	1.7832
52	59.20	59.95	60.32	60.55	59.75	59.95	0.5247
67	60.51	60.70	61.76	60.93	61.46	61.07	0.5230
75	61.66	59.83	59.96	61.21	60.63	60.66	0.7847

Table E8 Maximum strain of starch foams as a function of storage time.

Storage time (day)	Maximum strain of starch foams (%)						
	X_1	X_2	X_3	X_4	X_5	mean	SD
1	39.07	37.87	42.65	42.20	42.41	40.84	2.2099
2	53.51	49.34	48.16	48.81	48.20	49.60	2.2355
3	48.01	49.07	51.07	53.05	54.89	51.22	2.8172
4	53.28	50.42	54.44	52.96	50.61	52.34	1.7587
5	51.48	51.05	51.99	47.13	54.21	51.17	2.5669
7	50.78	49.52	52.35	52.71	51.79	51.43	1.2909

Table E9 Maximum strain of starch-10% PVA composite foams as a function of storage time.

Storage time (day)	Maximum strain of starch-10% PVA composite foams (%)						
	X_1	X_2	X_3	X_4	X_5	mean	SD
1	45.89	41.14	49.39	48.26	41.39	45.21	3.8225
2	56.61	53.87	54.76	53.66	52.36	54.25	1.5727
3	54.00	53.60	56.55	58.16	58.83	56.23	2.3714
4	57.61	55.50	55.69	57.96	57.56	56.86	1.1714
5	59.38	55.56	56.29	55.11	56.52	56.57	1.6695
7	56.69	55.55	59.43	56.72	55.90	56.86	1.5223

Table E10 Maximum strain of starch-30% PVA composite foams as a function of storage time.

Storage time (day)	Maximum strain of starch-30% PVA composite foams (%)						
	X_1	X_2	X_3	X_4	X_5	mean	SD
1	56.97	54.86	56.97	49.67	53.28	54.35	3.0429
2	56.09	57.89	55.55	57.71	55.38	56.52	1.1965
3	62.59	55.16	59.18	58.16	57.61	58.54	2.7070
4	57.59	60.89	60.90	56.63	60.68	59.34	2.0608
5	60.46	57.86	56.91	62.49	60.52	59.65	2.2451
7	60.52	61.14	57.46	60.53	58.59	59.63	1.5682

Table E11 Maximum strain of starch-10% PLA composite foams as a function of storage time.

Storage time (day)	Maximum strain of starch-10% PLA composite foams (%)						
	X_1	X_2	X_3	X_4	X_5	mean	SD
1	50.49	45.46	46.79	46.80	48.69	47.65	1.9614
2	51.88	51.76	52.32	52.62	52.20	52.16	0.3469
3	53.70	54.93	52.55	54.94	54.79	54.19	1.0503
4	56.25	57.57	55.01	56.84	56.11	56.36	0.9452
5	56.18	57.31	57.41	58.31	56.83	57.21	0.7836
7	57.41	56.77	57.57	59.82	56.18	57.55	1.3839

Table E12 Maximum strain of starch-30% PLA composite foams as a function of storage time.

Storage time (day)	Maximum strain of starch-30% PLA composite foams (%)						
	X_1	X_2	X_3	X_4	X_5	mean	SD
1	53.61	55.43	54.62	55.69	55.22	54.92	0.8307
2	56.37	56.31	55.52	56.42	57.47	56.42	0.6943
3	58.31	57.78	57.96	56.08	58.82	57.79	1.0373
4	58.01	60.21	60.55	61.45	59.20	59.88	1.3221
5	60.27	59.04	60.45	60.83	62.69	60.66	1.3179
7	59.50	62.22	62.59	63.46	60.04	61.56	1.7046

Table E13 Maximum strain of starch-10% PCL composite foams as a function of storage time.

Storage time (day)	Maximum strain of starch-10% PCL composite foams (%)						
	X_1	X_2	X_3	X_4	X_5	mean	SD
1	48.44	47.88	49.73	49.70	51.17	49.38	1.2811
2	53.04	53.22	51.82	53.16	52.60	52.77	0.5858
3	53.83	53.79	54.28	54.95	52.83	53.94	0.7738
4	53.17	53.78	52.06	54.29	52.51	53.16	0.9074
5	54.01	54.29	56.42	56.62	54.84	55.24	1.2106
7	57.98	55.97	58.57	59.17	59.24	58.19	1.3413

Table E14 Maximum strain of starch-30% PCL composite foams as a function of storage time.

Storage time (day)	Maximum strain of starch-30% PCL composite foams (%)						
	X_1	X_2	X_3	X_4	X_5	mean	SD
1	52.03	53.68	53.00	52.87	52.02	52.72	0.7063
2	53.86	53.04	55.97	54.80	54.22	54.38	1.0953
3	55.95	54.99	57.18	55.34	54.55	55.60	1.0215
4	58.33	59.41	58.77	58.64	59.30	58.90	0.4508
5	58.17	59.76	57.92	57.29	59.29	58.49	1.0159
7	59.56	60.90	58.90	62.74	58.26	60.07	1.7832

Table E15 Maximum strain of starch foams containing glycerol as a plasticizer.

Plasticizer content (%)	Maximum strain of starch foams (%)						
	X_1	X_2	X_3	X_4	X_5	mean	SD
5	52.90	52.63	53.04	53.44	53.78	53.16	0.4545
10	56.56	54.67	53.89	56.48	54.80	55.28	1.1858
15	56.62	58.02	59.10	56.93	60.32	58.20	1.5355
20	59.03	59.58	66.35	62.72	65.08	62.63	3.1546
25	65.91	64.95	64.20	63.97	66.14	65.03	0.9804

Table E16 Maximum strain of starch foams containing urea as a plasticizer.

Plasticizer content (%)	Maximum strain of starch foams (%)						
	X_1	X_2	X_3	X_4	X_5	mean	SD
5	53.33	52.48	53.17	53.16	54.84	53.39	0.8733
10	55.53	55.02	55.51	54.85	54.10	55.00	0.5878
15	56.58	56.91	58.39	56.10	56.01	56.80	0.9639
20	62.24	62.62	63.17	63.69	62.49	63.24	0.9584
25	64.19	65.05	66.07	66.20	66.35	65.57	0.9276

Table E17 Maximum strain of starch foams containing ammonium chloride as a plasticizer.

Plasticizer content (%)	Maximum strain of starch foams (%)						
	X_1	X_2	X_3	X_4	X_5	mean	SD
5	53.13	51.89	52.94	53.05	54.19	53.04	0.8174
10	53.64	54.07	54.47	55.02	54.29	54.30	0.5088
15	59.85	58.69	58.91	57.05	57.34	58.37	1.1583
20	63.71	66.42	65.41	63.45	65.70	64.94	1.2074
25	69.11	67.48	66.21	67.13	67.48	67.48	1.0479

F Water Absorption of Starch-Based Composite Foams

Table F1 Water absorption of starch-based composite foams.

Foam type	Water absorption of starch-based composite foams (%)						
	X_1	X_2	X_3	X_4	X_5	mean	SD
Starch foams	129.64	127.84	122.09	124.46	130.49	126.91	3.5503
Starch-10% PVA foams	89.59	87.35	86.69	87.35	86.69	87.53	1.1973
Starch-30% PVA foams	73.99	73.07	70.32	77.30	77.47	74.43	3.0199
Starch-10% PLA foams	98.16	93.52	97.68	95.18	94.48	95.80	1.6374
Starch-30% PLA foams	78.21	80.08	75.56	75.36	77.49	77.34	2.7502
Starch-10% PCL foams	93.24	91.72	95.30	91.36	92.10	92.74	2.0267
Starch-30% PCL foams	78.28	73.78	73.37	78.52	78.92	76.57	1.9581

G *Weight Loss of Enzymatic Degradation of Starch-Based Composite Foams*

Table G1 Weight loss of enzymatic degradation of starch-based composite foams.

Reaction time (min)	Weight loss of enzymatic degradation of starch-based composite foams (%)			
	Starch foam	Starch-30% PVA	Starch-30% PLA	Starch-30% PCL
5	5.02	5.04	6.80	6.99
10	5.19	11.20	8.30	13.73
15	9.28	12.95	11.67	19.90
20	11.52	13.59	17.13	20.28
30	20.32	14.85	19.07	27.22
40	26.14	19.63	26.49	35.05
50	48.06	45.36	36.69	41.33
60	65.78	50.67	47.93	65.25
120	76.47	79.19	72.74	86.23
180	99.79	91.58	91.03	90.23

H Density of Starch-Based Composite Foams

Table H1 Density of starch-based composite foams.

Foam type	Density of starch-based composite foams (%)						
	X_1	X_2	X_3	X_4	X_5	mean	SD
Starch foams	0.1378	0.1448	0.1378	0.1357	0.1337	0.1380	0.0041
Starch-10% PVA foams	0.1723	0.1860	0.1888	0.1799	0.1990	0.1854	0.0099
Starch-30% PVA foams	0.2197	0.2480	0.2177	0.2058	0.2336	0.2249	0.0162
Starch-10% PLA foams	0.1637	0.1558	0.1530	0.1687	0.1668	0.1616	0.0038
Starch-30% PLA foams	0.2136	0.2158	0.2197	0.2262	0.2096	0.2170	0.0063
Starch-10% PCL foams	0.1853	0.1863	0.1836	0.1834	0.1765	0.1830	0.0068
Starch-30% PCL foams	0.1761	0.1662	0.1601	0.1673	0.1709	0.1681	0.0161

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