Supplementary Information (SI) for Sustainable Food Technology.
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Fabrication and characterization of custard apple seed starch/ corn starch bio-nanocomposite films immobilized with chitosan nanoparticles and pomegranate peel powder for extending the shelf life of *Litchi chinensis* fruit

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The supporting information includes 39 pages, 7 figures and 31 tables.

List of Figures

Figure SI.1: FTIR transmittance mode spectra of custard apple seed starch (CaSS)

Figure SI.2: XRD diffractogram of custard apple seed starch (CaSS)

Figure SI.3: *L**, *a**, *b** and *ΔE* colour value of CaSS/CAR/GUG, CaSS/CAR/GUG/CS, CaSS/CAR/GUG/CS/PPP, CaSS/CAR/GUG/CS/PPP/ChNP1, CaSS/CAR/GUG/CS/PPP/ChNP3 and CaSS/CAR/GUG/CS/PPP/ChNP5 films. (Means of three replicates ± standard deviation) of films stored at 27 ± 2 °C with 65±5 % RH. Results are expressed as the mean of three different trials, with statistical significance and standard deviation determined according to One-sample T test.

Figure SI.4: The viscosity of film forming solution of CaSS/CAR/GUG (A), CaSS/CAR/GUG/CS (B), CaSS/CAR/GUG/CS/PPP (C), CaSS/CAR/GUG/CS/PPP/ChNP1 (D), CaSS/CAR/GUG/CS/PPP/ChNP3 (E) and CaSS/CAR/GUG/CS/PPP/ChNP5 (F).

Figure SI.5: GC-MS chromatogram of the developed films CaSS/CAR/GUG (A), CaSS/CAR/GUG/CS (B), CaSS/CAR/GUG/CS/PPP (C), CaSS/CAR/GUG/CS/PPP/ChNP1 (D), CaSS/CAR/GUG/CS/PPP/ChNP3 (E) and CaSS/CAR/GUG/CS/PPP/ChNP5 (F).

Figure SI.6: XRD micrograph of the developed films ingredients CaSS/CAR/GUG (A), CaSS/CAR/GUG/CS (B), CaSS/CAR/GUG/CS/PPP (C), CaSS/CAR/GUG/CS/PPP/ChNP1 (D), CaSS/CAR/GUG/CS/PPP/ChNP3 (E) and CaSS/CAR/GUG/CS/PPP/ChNP5 (F).

Figure SI.7: Inhibition zone of microbial strains in the presence of films active solution against *Pseudomonas fluorescence*: MTCC-103 and *Botrytis cinerea*: MTCC-2104. Concentration used: 100 µL.

List of Tables

Table SI.1: Total volatile bioactive components of the CaSS/CAR/GUG film obtained by headspace GC-MS analysis.

Table SI.2: Total volatile bioactive components of the CaSS/CAR/GUG/CS film obtained by headspace GC-MS analysis.

Table SI.3: Total volatile bioactive components of the CaSS/CAR/GUG/CS/PPP film obtained by headspace GC-MS analysis.

Table SI.4: Total volatile bioactive components of the CaSS/CAR/GUG/CS/PPP/ChNP1 film obtained by headspace GC-MS analysis.

Table SI.5: Total volatile bioactive components of the CaSS/CAR/GUG/CS/PPP/ChNP3 film obtained by headspace GC-MS analysis.

Table SI.6: Total volatile bioactive components of the CaSS/CAR/GUG/CS/PPP/ChNP5 film obtained by headspace GC-MS analysis.

Table SI.7: One sample ‘T’ test for moisture content in the CaSS.

Table SI.8: One sample ‘T’ test for ash content in the CaSS.

Table SI.9: One sample ‘T’ test for fat content in the CaSS.

Table SI.10: One sample ‘T’ test for protein content in the CaSS.

Table SI.11: One sample ‘T’ test for size distribution by intensity of ChNPs.

Table SI.12: One sample ‘T’ test for zeta potential distribution of ChNPs.

Table SI.13: One sample ‘T’ test for thickness of A (CaSS/CAR/GUG), B (CaSS/CAR/GUG/CS), C (CaSS/CAR/GUG/CS/PPP), D (CaSS/CAR/GUG/CS/PPP/ChNP1), E (CaSS/CAR/GUG/CS/PPP/ChNP3) and F (CaSS/CAR/GUG/CS/PPP/ChNP5) films.

Table SI.14: One sample ‘T’ test for moisture content of A (CaSS/CAR/GUG), B (CaSS/CAR/GUG/CS), C (CaSS/CAR/GUG/CS/PPP), D (CaSS/CAR/GUG/CS/PPP/ChNP1), E (CaSS/CAR/GUG/CS/PPP/ChNP3) and F (CaSS/CAR/GUG/CS/PPP/ChNP5) films.

Table SI.15: One sample 'T' test for water solubility of A (CaSS/CAR/GUG), B (CaSS/CAR/GUG/CS), C (CaSS/CAR/GUG/CS/PPP), D (CaSS/CAR/GUG/CS/PPP/ChNP1), E (CaSS/CAR/GUG/CS/PPP/ChNP3) and F (CaSS/CAR/GUG/CS/PPP/ChNP5) films.

Table SI.16: One sample 'T' test for tensile strength of A (CaSS/CAR/GUG), B (CaSS/CAR/GUG/CS), C (CaSS/CAR/GUG/CS/PPP), D (CaSS/CAR/GUG/CS/PPP/ChNP1), E (CaSS/CAR/GUG/CS/PPP/ChNP3) and F (CaSS/CAR/GUG/CS/PPP/ChNP5) films.

Table SI.17: One sample 'T' test for colour *L** values of A (CaSS/CAR/GUG), B (CaSS/CAR/GUG/CS), C (CaSS/CAR/GUG/CS/PPP), D (CaSS/CAR/GUG/CS/PPP/ChNP1), E (CaSS/CAR/GUG/CS/PPP/ChNP3) and F (CaSS/CAR/GUG/CS/PPP/ChNP5) films.

Table SI.18: One sample 'T' test for colour *a** values of A (CaSS/CAR/GUG), B (CaSS/CAR/GUG/CS), C (CaSS/CAR/GUG/CS/PPP), D (CaSS/CAR/GUG/CS/PPP/ChNP1), E (CaSS/CAR/GUG/CS/PPP/ChNP3) and F (CaSS/CAR/GUG/CS/PPP/ChNP5) films.

Table SI.19: One sample 'T' test for colour *b** values of A (CaSS/CAR/GUG), B (CaSS/CAR/GUG/CS), C (CaSS/CAR/GUG/CS/PPP), D (CaSS/CAR/GUG/CS/PPP/ChNP1), E (CaSS/CAR/GUG/CS/PPP/ChNP3) and F (CaSS/CAR/GUG/CS/PPP/ChNP5) films.

Table SI.20: One sample 'T' test for colour *ΔE* values of A (CaSS/CAR/GUG), B (CaSS/CAR/GUG/CS), C (CaSS/CAR/GUG/CS/PPP), D (CaSS/CAR/GUG/CS/PPP/ChNP1), E (CaSS/CAR/GUG/CS/PPP/ChNP3) and F (CaSS/CAR/GUG/CS/PPP/ChNP5) films.

Table SI.21: One sample 'T' test for opacity value of A (CaSS/CAR/GUG), B (CaSS/CAR/GUG/CS), C (CaSS/CAR/GUG/CS/PPP), D (CaSS/CAR/GUG/CS/PPP/ChNP1), E (CaSS/CAR/GUG/CS/PPP/ChNP3) and F (CaSS/CAR/GUG/CS/PPP/ChNP5) films.

Table SI.22: One sample 'T' test for water vapor transmission rate of A (CaSS/CAR/GUG), B (CaSS/CAR/GUG/CS), C (CaSS/CAR/GUG/CS/PPP), D (CaSS/CAR/GUG/CS/PPP/ChNP1), E (CaSS/CAR/GUG/CS/PPP/ChNP3) and F (CaSS/CAR/GUG/CS/PPP/ChNP5) films.

Table SI.23: One-Way ANOVA: Duncan test for moisture content change in the litchi samples in A (CaSS/CAR/GUG), B (CaSS/CAR/GUG/CS), C (CaSS/CAR/GUG/CS/PPP), D (CaSS/CAR/GUG/CS/PPP/ChNP1), E (CaSS/CAR/GUG/CS/PPP/ChNP3) and F (CaSS/CAR/GUG/CS/PPP/ChNP5) films at 27 ± 2 °C with 65 ± 5 % RH relative humidity (RH).

Table SI.24: One-Way ANOVA: Duncan test for weight loss percentage in the litchi samples in A (CaSS/CAR/GUG), B (CaSS/CAR/GUG/CS), C (CaSS/CAR/GUG/CS/PPP), D (CaSS/CAR/GUG/CS/PPP/ChNP1), E (CaSS/CAR/GUG/CS/PPP/ChNP3) and F (CaSS/CAR/GUG/CS/PPP/ChNP5) films at 27 ± 2 °C with 65 ± 5 % RH relative humidity (RH).

Table SI.25: One-Way ANOVA: Duncan test for pH value change in the litchi samples in A (CaSS/CAR/GUG), B (CaSS/CAR/GUG/CS), C (CaSS/CAR/GUG/CS/PPP), D (CaSS/CAR/GUG/CS/PPP/ChN P1), E (CaSS/CAR/GUG/CS/PPP/ChNP3) and F (CaSS/CAR/GUG/CS/PPP/ChNP5) films at 27 ± 2 °C with 65 ± 5 % RH relative humidity (RH).

Table SI.26: One-Way ANOVA: Duncan test for firmness change in the litchi samples in A (CaSS/CAR/GUG), B (CaSS/CAR/GUG/CS), C (CaSS/CAR/GUG/CS/PPP), D (CaSS/CAR/GUG/CS/PPP/ChN P1), E (CaSS/CAR/GUG/CS/PPP/ChNP3) and F (CaSS/CAR/GUG/CS/PPP/ChNP5) films at 27 ± 2 °C with 65 ± 5 % RH relative humidity (RH).

Table SI.27: One-Way ANOVA: Duncan test for total soluble solid (TSS) change in the litchi samples in A (CaSS/CAR/GUG), B (CaSS/CAR/GUG/CS), C (CaSS/CAR/GUG/CS/PPP), D (CaSS/CAR/GUG/CS/PPP/ChNP1), E (CaSS/CAR/GUG/CS/PPP/ChNP3) and F (CaSS/CAR/GUG/CS/PPP/ChNP5) films at 27 ± 2 °C with 65 ± 5 % RH relative humidity (RH).

Table SI.28: One-Way ANOVA: Duncan test for titratable acidity (TA) change in the litchi samples in A (CaSS/CAR/GUG), B (CaSS/CAR/GUG/CS), C (CaSS/CAR/GUG/CS/PPP), D (CaSS/CAR/GUG/CS/PPP/ChN P1), E (CaSS/CAR/GUG/CS/PPP/ChNP3) and F (CaSS/CAR/GUG/CS/PPP/ChNP5) films at 27 ± 2 °C with 65 ± 5 % RH relative humidity (RH).

Table SI.29: One-Way ANOVA: Duncan test for TSS:TA ratio change in the litchi samples in A (CaSS/CAR/GUG), B (CaSS/CAR/GUG/CS), C (CaSS/CAR/GUG/CS/PPP), D (CaSS/CAR/GUG/CS/PPP/ChN P1), E (CaSS/CAR/GUG/CS/PPP/ChNP3) and F (CaSS/CAR/GUG/CS/PPP/ChNP5) films at 27 ± 2 °C with 65 ± 5 % RH relative humidity (RH).

Table SI.30: One-Way ANOVA: Duncan test for percent of fresh litchi samples in A (CaSS/CAR/GUG), B (CaSS/CAR/GUG/CS), C (CaSS/CAR/GUG/CS/PPP), D (CaSS/CAR/GUG/CS/PPP/ChN P1), E (CaSS/CAR/GUG/CS/PPP/ChNP3) and F (CaSS/CAR/GUG/CS/PPP/ChNP5) films at 27 ± 2 °C with 65 ± 5 % RH relative humidity (RH).

Table SI.31: One-Way ANOVA: Duncan test for colour ΔE values of the litchi samples in A (CaSS/CAR/GUG), B (CaSS/CAR/GUG/CS), C (CaSS/CAR/GUG/CS/PPP), D (CaSS/CAR/GUG/CS/PPP/ChN P1), E (CaSS/CAR/GUG/CS/PPP/ChNP3) and F (CaSS/CAR/GUG/CS/PPP/ChNP5) films at 27 ± 2 °C with 65 ± 5 % RH relative humidity (RH).

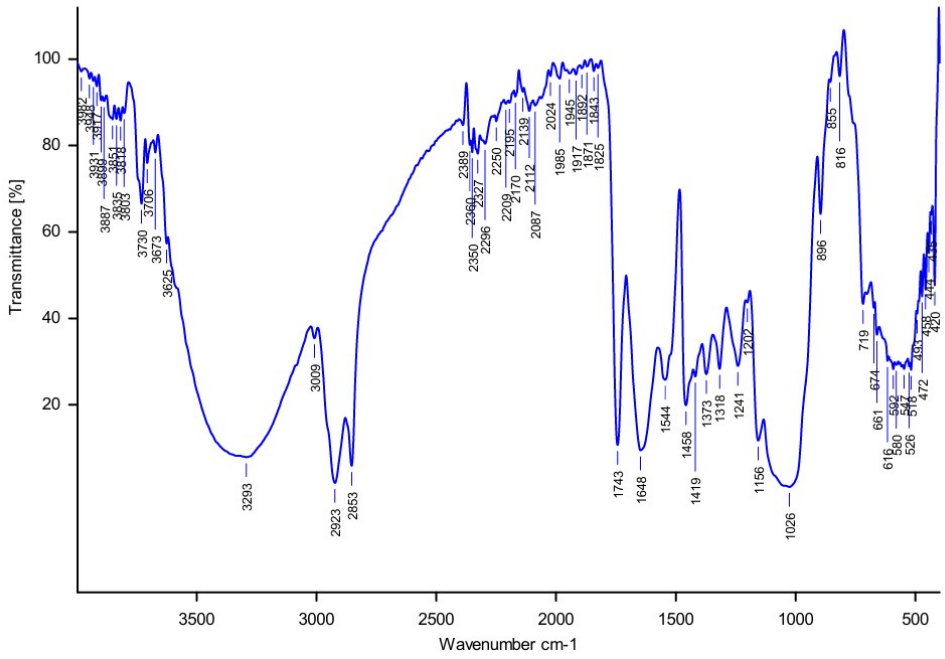


Figure SI.1: FTIR transmittance mode spectra of custard apple seed starch (CaSS)

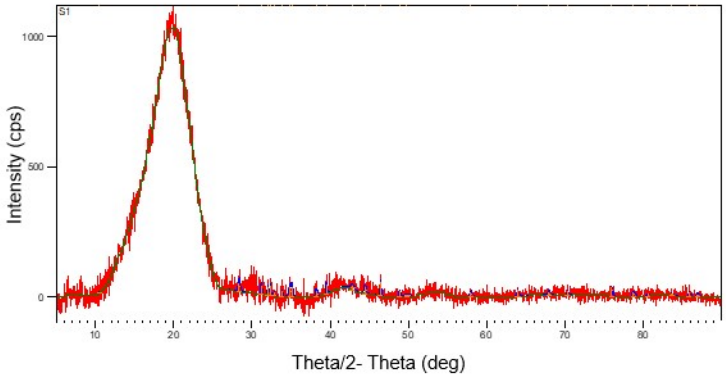


Figure SI.2: XRD diffractogram of custard apple seed starch (CaSS)

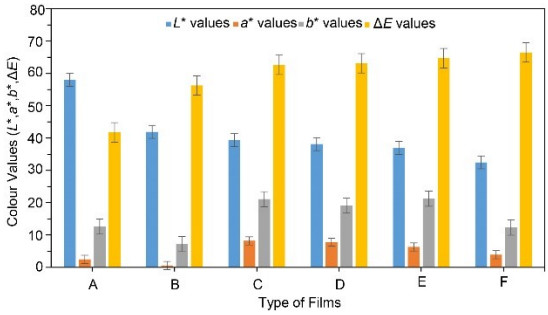
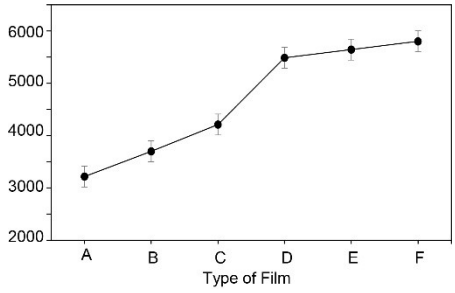
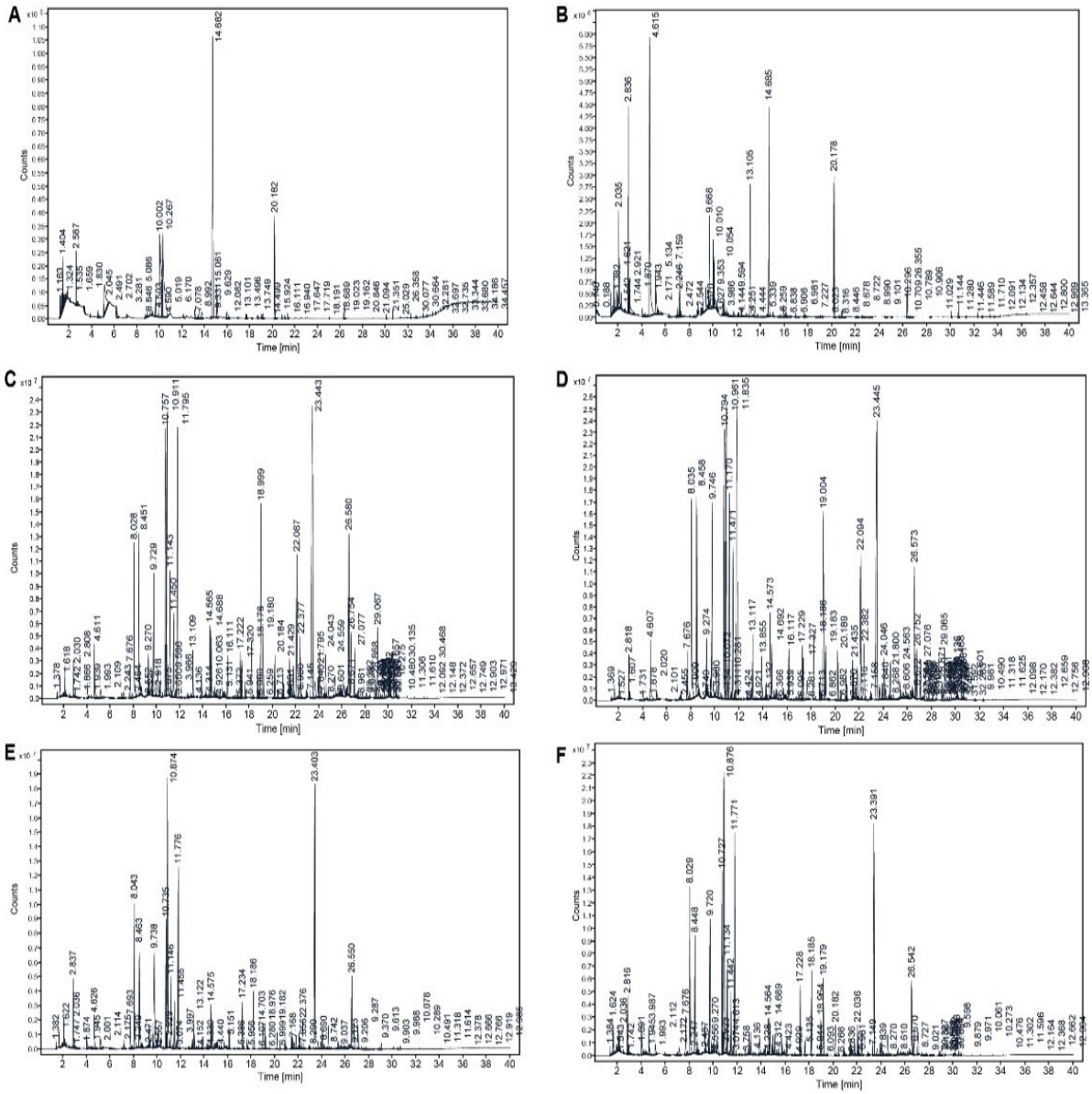


Figure SI.3: *L**, *a**, *b** and *ΔE* colour value of CaSS/CAR/GUG, CaSS/CAR/GUG/CS, CaSS/CAR/GUG/CS/PPP, CaSS/CAR/GUG/CS/PPP/ChNP1, CaSS/CAR/GUG/CS/PPP/ChNP3 and CaSS/CAR/GUG/CS/PPP/ChNP5 films. (Means of three replicates ± standard deviation) of films stored at 27 ± 2 °C with 65±5 % RH. Results are expressed as the mean of three different trials, with statistical significance and standard deviation determined according to One-sample T test.



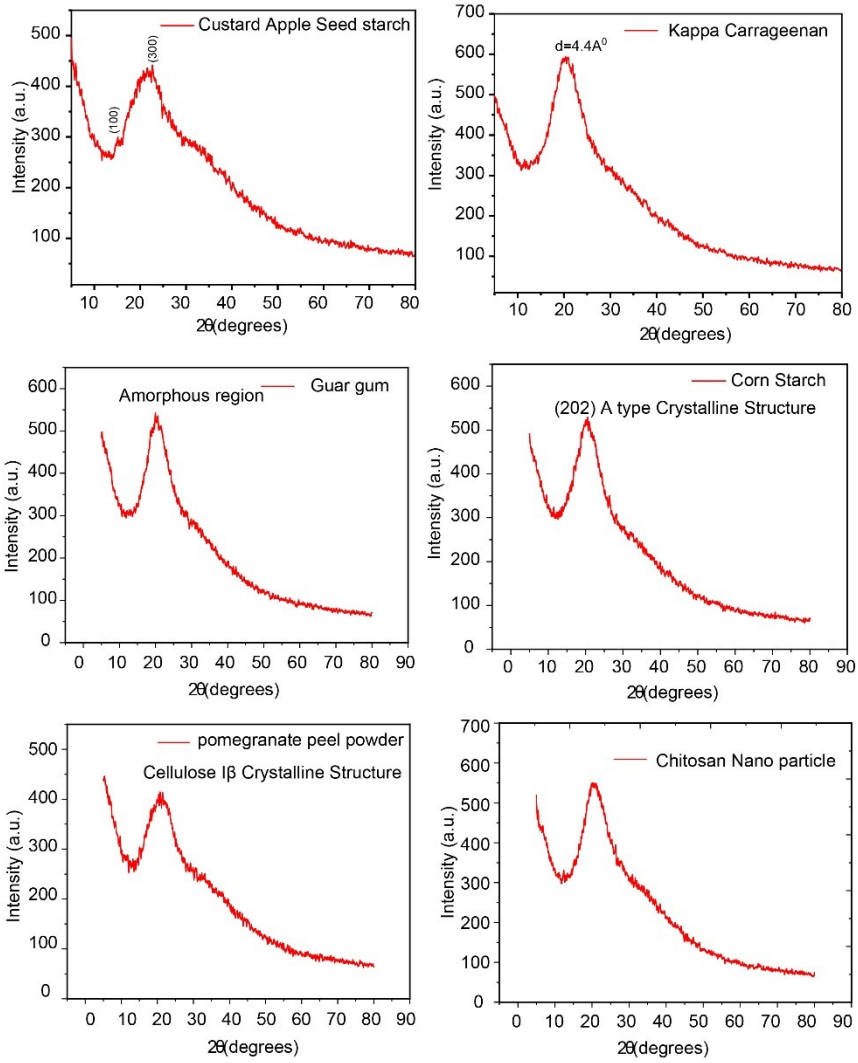
178

179 Figure SI.4: The viscosity of film forming solution of CaSS/CAR/GUG (A), CaSS/CAR/GUG/CS (B),
180 CaSS/CAR/GUG/CS/PPP (C), CaSS/CAR/GUG/CS/PPP/ChNP1 (D), CaSS/CAR/GUG/CS/PPP/ChNP3 (E) and
181 CaSS/CAR/GUG/CS/PPP/ChNP5 (F).



182

183 Figure SI.5: GC-MS chromatogram of the developed films CaSS/CAR/GUG (A), CaSS/CAR/GUG/CS (B),
184 CaSS/CAR/GUG/CS/PPP (C), CaSS/CAR/GUG/CS/PPP/ChNP1 (D), CaSS/CAR/GUG/CS/PPP/ChNP3 (E) and
185 CaSS/CAR/GUG/CS/PPP/ChNP5 (F).



186

187 Figure SI.6: XRD micrograph of the developed films ingredients CaSS/CAR/GUG (A), CaSS/CAR/GUG/CS (B),
188 CaSS/CAR/GUG/CS/PPP (C), CaSS/CAR/GUG/CS/PPP/ChNP1 (D), CaSS/CAR/GUG/CS/PPP/ChNP3 (E) and
189 CaSS/CAR/GUG/CS/PPP/ChNP5 (F).

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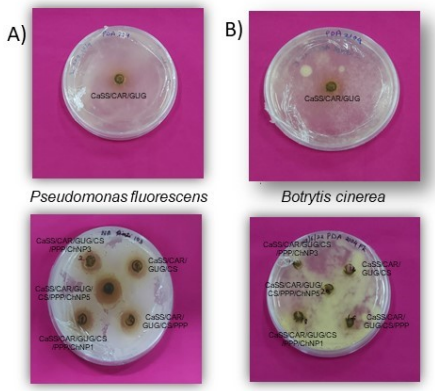

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192 Figure SI.7: Inhibition zone of microbial strains in the presence of films active solution against *Pseudomonas*
193 *fluorescence*: MTCC-103 (A) and *Botrytis cinerea*: MTCC-2104 (B). Concentration used: 100 µL.

194

Table SI.1: Total volatile bioactive components of the CaSS/CAR/GUG film obtained by headspace GC-MS analysis.

No	Retention Time (min)	Name of the compound	Area (%)
1	14.682	Benzeneacetic acid, α,3,4- tris[(trimethylsilyl)oxy]-, methyl	20.4301
2	10.002	Cyclotetrasiloxane, octamethyl- 1	18.5217
3	10.267	Benzene, 1,2-dichloro-	17.1828
4	20.182	5-Amino-1-methyl-1H-pyrazole-4- carboxamide, 3TMS	6.8543
5	5.086	Cyclotrisiloxane, hexamethyl-	6.3838
6	1.404	Acetic acid, cyano-	2.9007
7	15.061	1-Nonanol	2.6287
8	1.324	Topotecan	2.5628
9	8.992	Ethyl 4-hydroxymandelate, 2TMS derivative	2.4627
10	2.587	Silanediol, dimethyl-	1.8203
11	1.535	Benzeneethanamine, 3-fluoro-β,5- dihydroxy-N-methyl	1.5991
12	9.629	2,2,7,7-Tetramethyloctane	1.4766
13	13.496	2,5-Dihydroxybenzaldehyde, 2TMS derivative	1.1969
14	26.358	Cycloheptasiloxane, tetradecamethyl	1.1324
15	13.101	Undecanal	0.8833
16	13.749	Anthranilanilide, 2TMS	0.7433
17	1.163	Carbon dioxide	0.6925
18	9.331	Butanoic acid, 4-(1,1- dimethyl ethoxy)-3-hydroxy-, methyl es	0.5191
19	3.281	4-Fluorohistamine	0.4827
20	5.019	Cyclotrisiloxane, hexamethyl-	0.4608
21	2.702	Silanediol, dimethyl-	0.4503
22	21.351	2,5-Dimethylhexane-2,5- dihydroperoxide	0.3717
23	19.162	Thymol	0.3716
24	17.647	5-Amino-1-methyl-1H-pyrazole-4- carboxamide, 3TMS	0.3477
25	4.503	Hexanal	0.3219
26	12.082	Octyl chloroformate	0.3219
27	30.664	Cyclooctasiloxane, hexadecamethyl	0.3098
28	20.846	α-Terpinyl acetate	0.2963
29	16.111	Decanal	0.2752
30	19.023	Nordazepam, TMS derivative	0.2732
31	17.719	5-Amino-1-methyl-1H-pyrazole-4- carboxamide, 3TMS	0.2708
32	1.659	1-Pentanol, 4-amino-	0.2607
33	18.689	Anethole	0.2600
34	14.499	Anthranilanilide, 2TMS	0.2057
35	21.094	Eugenol	0.1997
36	33.680	Heptasiloxane, hexadecamethyl-	0.1617
37	32.281	Heptasiloxane, hexadecamethyl-	0.1484
38	7.078	Oxime-, methoxy-phenyl-_	0.1449
39	2.045	2-Heptanol, 6-amino-2-methyl-	0.1354
40	32.735	Heptasiloxane, 1,1,3,3,5,5,7,7,9,9,11,11,13,13- tetradecamet	0.1336

41	18.191	E-11,13-Tetradecadien-1-ol	0.1233
42	34.186	Heptasiloxane, hexadecamethyl	0.1183
43	3.846	Butane, 1-chloro-3-methyl-	0.1121
44	16.940	Cyclotetrasiloxane, octamethyl-	0.0836
45	35.907	Heptasiloxane, 1,1,3,3,5,5,7,7,9,9,11,11,13,13- tetradecamet	0.0665

Table SI.2: Total volatile bioactive components of the CaSS/CAR/GUG/CS film obtained by headspace GC-MS analysis.

No	Retention Time (min)	Name of the compound	Area (%)
1	4.615	Cyclobutanol, 2-ethyl-	16.2411
2	14.685	Cyclopentasiloxane, decamethyl- 1	10.0877
3	20.178	5-Amino-1-methyl-1H-pyrazole-4- carboxamide, 3TMS	7.5047
4	2.836	Silanediol, dimethyl-	7.0308
5	13.105	Nonanal	6.7319
6	9.668	Decane, 2,2-dimethyl-	4.7479
7	10.010	Cyclotetrasiloxane, octamethyl-	3.9662
8	5.134	Cyclotrisiloxane, hexamethyl-	3.5364
9	2.035	2-Ethyl-oxetane	3.4952
10	2.921	Butanal, 3-methyl-	3.4771
11	10.054	Cyclotetrasiloxane, octamethyl-	2.9025
12	7.159	Oxime-, methoxy-phenyl-_	2.7963
13	26.355	Cycloheptasiloxane, tetradecamethyl	2.1899
14	1.621	Acetonitrile	2.1217
15	9.353	Butanoic acid, 4-(1,1- dimethylethoxy)-3-hydroxy-, methyl es	1.4700
16	5.339	Cyclotrisiloxane, hexamethyl-	0.9939
17	10.906	Eucalyptol	0.8889
18	10.789	2,2,4,4-Tetramethyloctane	0.7747
19	9.594	5-Hepten-2-one, 6-methyl-	0.7739
20	1.382	(2-Aziridinylethyl)amine	0.7388
21	13.484	"2,5-Dihydroxybenzaldehyde, 2TMS derivative"	0.6726
22	15.924	Dodecane	0.6621
23	7.227	Oxime-, methoxy-phenyl-_	0.6482
24	1.870	Penicillamine	0.5340
25	2.246	Cyclopentane, methyl-	0.5140
26	6.981	Triethylsilanol	0.5108
27	1.542	2-Formylhistamine	0.4690
28	10.296	Benzene, 1,4-dichloro-	0.4618
29	20.836	α-Terpinyl acetate	0.4540
30	3.986	Cyclobutene, 2-propenylidene-	0.4536
31	12.357	Cyclotrisiloxane, hexamethyl	0.4534
32	11.710	2-Octenal, (E)-	0.4521
33	1.943	o-n-Butylhydroxylamine	0.4193
34	30.665	Cyclooctasiloxane, hexadecamethyl-	0.4106

35	16.108	Undecanal	0.4078
36	8.722	3-Hydroxy-4- methoxy benzaldehyde, TBDMS	0.3784
37	11.144	3,5-Octadien-2-ol	0.3740

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201 Table SI.3: Total volatile bioactive components of the CaSS/CAR/GUG/CS/PPP film obtained by headspace GC-
202 MS analysis.

No	Retention Time (min)	Name of the compound	Area (%)
1	23.443	Caryophyllene	11.8737
2	10.911	Cyclobutene, 1,2-bis(1- methylethenyl)-, trans	9.5281
3	10.757	o-Cymene	8.4781
4	11.795	γ-Terpinene	6.4117
5	18.999	(-)-Neomenthol acetate	4.6608
6	26.580	β-Bisabolene	4.1935
7	22.087	Geranyl acetate	3.8290
8	8.451	Camphene	2.9349
9	8.028	α-Pinene	2.8850
10	9.729	β-Pinene	2.7746
11	11.143	trans-β-Ocimene	1.9728
12	22.377	Cyclohexane, 1-ethenyl-1-methyl2,4-bis(1-methylethenyl)	1.6623
13	29.067	Caryophyllene oxide	1.5471
14	26.754	γ-Muurolene	1.5444
15	11.450	β-Ocimene	1.4503
16	19.180	3-Methyl-5-(propan-2-yl)phenol	1.3801
17	14.565	Citronellal	1.1983
18	14.688	Cyclopentasiloxane, decamethyl-	1.1888
19	27.077	Cadina-1(6),4-diene,t rans-	1.1743
20	24.043	Alloaromadendrene	1.1016
21	18.176	Neral	1.0809
22	10.063	Cyclotetrasiloxane, octamethyl	1.0577
23	24.559	Humulene	1.0013
24	4.611	Hexanal	0.9965
25	20.184	5-Amino-1-methyl-1H-pyrazole-4- carboxamide, 3TMS	0.8814
26	21.429	γ-Muurolene	0.8721
27	17.222	Citral	0.8170
28	13.109	Nonanal	0.7878
29	16.111	Decanal	0.7405
30	21.795	Copaene	0.6626
31	17.320	Benzene, 2-methoxy-1-methyl-4- (1-methylethyl)-	0.6554
32	9.270	α-Calacorene	0.6328
33	7.676	Tricyclo [2.2.1.0(2,6)]heptane, 1,7,7-trimethyl	0.6160
34	20.869	α-Cubebene	0.5505
35	21.500	1,2,4-Metheno-1H-indene, octahydro-1,7a-dimethyl-5-(1- methyl)	0.4987
36	13.849	2,4,6-Octatriene, 2,6-dimethyl-, (E,E)-	0.4946

37	18.703	(+)-Borneol acetate	0.4946
38	25.384	γ-Muurolene	0.4677
39	28.868	1(2H)-Naphthalenone, 3,4,4a,5,6,7-hexahydro-4a,5- dimethyl-3	0.4599
40	30.135	11,11-Dimethyl-4,8- dimethylenebicyclo- undecan3	0.4285
41	30.468	14-Hydroxycaryophyllene	0.4184
42	9.596	5-Hepten-2-one, 6-methyl-	0.4160
43	23.902	Bicyclo[3.1.1]hept-2-ene, 2,6- dimethyl-6-(4-methyl-3-penten	0.3949
44	10.275	(+)-3-Carene	0.3678
45	24.181	Azulene, 1,2,3,5,6,7,8,8aoctahydro-1,4-dimethyl-7-(1-methyl)	0.3557
46	1.618	Acetonitrile	0.3503
47	2.808	Silanediol, dimethyl-	0.3472
48	17.627	2,6-Octadien-1-ol, 3,7-dimethyl-	0.3294
49	3.986	1,3,5-Cycloheptatriene	0.3145
50	2.030	2-Ethyl-oxetane	0.3046
51	20.956	6-Octen-1-ol, 3,7-dimethyl-, acetate	0.2809
52	26.232	Naphthalene, 1,2,4a,5,6,8ahexahydro-4,7-dimethyl-1-(1-methyl)	0.2771
53	5.131	Cyclotrisiloxane, hexamethyl-	0.2619
54	30.657	14-Hydroxycaryophyllene	0.2580
55	9.354	Butanoic acid, 4-(1,1- dimethylethoxy)-3-hydroxy-, methylene)	0.2406
56	25.627	4a,8-Dimethyl-2-(prop-1-en-2-yl)- 1,2,3,4,4a,5,6,7-octahydro	0.2244
57	25.829	Liguloxide	0.2160
58	2.918	Butanal, 3-methyl	0.2128
59	22.910	Bicyclo[7.2.0]undec-4-ene, 4,11,11-trimethyl-8-methylene	0.1918
60	20.440	Cyclohexane, 1-ethenyl-1-methyl2-(1-methylethenyl)-4-(1-methylene)	0.1909
61	25.918	Naphthalene, 2,3,4,4a,5,6- hexahydro-1,4a-dimethyl-7-(1-methylene)	0.1892
62	7.145	Oxime-, methoxy-phenyl-	0.1859
63	15.003	trans-3(10)-Caren-2-ol	0.1764
64	27.383	Naphthalene, 1,2,3,4,4a,7- hexahydro-1,6-dimethyl-4-(1-methyl)	0.1745
65	11.610	5-Heptenal, 2,6-dimethyl-	0.1619

Table SI.4: Total volatile bioactive components of the CaSS/CAR/GUG/CS/PPP/ChNP1 film obtained by headspace GC-MS analysis.

No	Retention Time (min)	Name of the compound	Area (%)
1	10.961	Cyclobutane, 1,2-bis(1- methylethenyl)-, trans	11.3871
2	10.794	o-Cymene	11.0599
3	23.445	Caryophyllene	9.3599
4	11.835	γ-Terpinene	8.2321
5	9.746	β-Pinene	3.9995
6	19.004	Cyclohexanol, 5-methyl-2-(1- methylethyl)-, acetate, (1α,2β)	3.8362
7	8.035	α-Pinene	3.5233
8	8.458	Camphene	3.4387
9	22.094	Geranyl acetate	3.3442
10	11.170	trans-β-Ocimene	3.2759

11	26.573	β-Bisabolene	2.6898
12	11.471	β-Ocimene	2.5636
13	22.382	Cyclohexane, 1-ethenyl-1-methyl2,4-bis(1-methylethenyl)-	1.2985
14	14.573	6-Octenal, 3,7-dimethyl-, (S)-	1.2186
15	18.186	2,6-Octadienal, 3,7-dimethyl-, (E)-	1.0687
16	26.752	γ-Muurolene	1.0109
17	29.065	Caryophyllene oxide	0.9835
18	19.183	3-Methyl-5-(propan-2-yl)phenol	0.9741
19	4.607	Hexanal	0.9620
20	13.117	Nonanal	0.9002
21	10.072	Cyclotetrasiloxane, octamethyl-	0.8769
22	13.855	2,4,6-Octatriene, 2,6-dimethyl-, (E,E)-	0.8561
23	14.692	Cyclopentasiloxane, decamethyl-	0.8559
24	20.189	5-Amino-1-methyl-1H-pyrazole-4- carboxamide, 3TMS	0.8285
25	27.076	Cadina-1(6),4-diene,t rans-	0.8211
26	17.229	2,6-Octadienal, 3,7-dimethyl-, (E)-	0.8194
27	24.046	Alloaromadendrene	0.8106
28	7.676	Tricyclo[2.2.1.0(2,6)]heptane, 1,7,7-trimethyl	0.7934
29	9.274	Bicyclo[3.1.1]heptane, 6,6-dimethyl-2-methylene-, (1S)-	0.7755
30	21.435	1,2,4-Metheno-1H-indene,octahydro-1,7a-dimethyl-5-(1-methyl)	0.7650
31	24.563	Humulene	0.7477
32	16.117	Decanal	0.7461
33	17.327	Benzene, 2-methoxy-1-methyl-4- (1-methylethyl)-	0.5996
34	21.800	cis-Thujopsene	0.5665
35	10.281	(+)-3-Carene	0.4509
36	20.873	α-Cubebene	0.4462
37	21.506	1,2,4-Metheno-1H-indene,octahydro-1,7a-dimethyl-5-(1-methyl)	0.4358
38	18.709	(+)-Borneol acetate	0.3914
39	2.818	Silanediol, dimethyl-	0.3885
40	23.669	Bicyclo[7.2.0]undecane, 10,10- dimethyl-2,6-bis(methylene)-	0.3594
41	28.871	Longipinocarvone	0.3310
42	25.389	γ-Muurolene	0.3256
43	17.633	Geraniol	0.3243
44	23.908	cis-α-Bergamotene	0.2940
45	14.217	2,4,6-Octatriene, 2,6-dimethyl-, (E,E)-	0.2857
46	30.136	11,11-Dimethyl-4,8-dimethylenebicyclo-undecan3-ol	0.2781
47	30.468	14-Hydroxycaryophyllene	0.2749
48	24.186	(1S,4aR,7R)-1,4a-Dimethyl-7- (prop-1-en-2-yl)-1,2,3,4,4a,5,6	0.2706
49	9.601	5-Hepten-2-one, 6-methyl-	0.2700
50	20.961	6-Octen-1-ol, 3,7-dimethyl-, acetate	0.2601
51	5.132	Cyclotrisiloxane, hexamethyl-	0.2408
52	26.364	Octa siloxane, 1,1,3,3,5,5,7,7,9,9,11,11,13,13,15, 15-hexadec	0.2356

53	21.640	Ylangene	0.2197
54	1.607	Acetonitrile	0.2086
55	2.020	2-Ethyl-oxetane	0.2034
56	12.659	Cyclohexene, 1-methyl-4-(1- methyl ethylidene)-	0.1989
57	3.980	1,2,4-Metheno-1H-indene, octahydro-1,7a-dimethyl-5-(1- methyl)	0.1903
58	9.355	Butanoic acid, 3-methyl-, 1- ethenyl-1,5-dimethyl-4-hexeny	0.1840
59	11.625	5-Hepten-1-ol, 2-ethenyl-6-methyl-	0.1826
60	26.237	Naphthalene, 1,2,4a,5,6,8ahexahydro-4,7-dimethyl-1-(1-methyl)	0.1792
61	30.661	1,1,3,3,5,5,7,7,9,9-Decamethyl-9-(2-methylpropoxy) pentasilo	0.1685

206

207 Table SI.5: Total volatile bioactive components of the CaSS/CAR/GUG/CS/PPP/ChNP3 film obtained by
208 headspace GC-MS analysis.

No	Retention Time (min)	Name of the compound	Area (%)
1	23.403	Caryophyllene	14.6995
2	10.874	Cyclohexene, 1-methyl-5-(1- methylethenyl)-, (R)-	11.4530
3	11.776	γ-Terpinene	6.2324
4	8.043	α-Pinene	5.1947
5	9.738	β-Pinene	5.0990
6	10.735	o-Cymene	4.9724
7	8.463	Camphene	3.4980
8	26.550	β-Bisabolene	3.0687
9	11.146	Bicyclo[3.1.1]hept-2-ene, 3,6,6- trimethyl	2.1225
10	18.186	2,6-Octadienal, 3,7-dimethyl-, (E)-	2.1126
11	2.837	Silanediol, dimethyl-	1.7960
12	17.234	Neral	1.6476
13	11.455	β-Ocimene	1.5748
14	14.575	6-Octenal, 3,7-dimethyl-, (S)	1.4647
15	10.078	1,1,3,3,5,5,7,7-Octamethyl-7-(2- methylpropoxy) tetrasiloxan	1.3884
16	22.376	8-Isopropenyl-1,5-dimethylcyclodeca-1,5-diene	1.3184
17	4.626	Cyclopentanol, 2-methyl-, trans-	1.2560
18	13.122	Nonanal	1.2252
19	7.693	Tricyclo[2.2.1.0(2,6)]heptane, 1,7,7-trimethyl	1.1522
20	26.743	γ-Muurolene	1.1220
21	27.074	Cadina-1(6),4-diene,t rans-	1.0992
22	24.560	Humulene	1.0476
23	18.976	Cyclohexanol, 5-methyl-2-(1- methylethyl)-, acetate, (1α,2β)	1.0416
24	14.703	Cyclopentasiloxane, decamethyl-	1.0325
25	19.182	3-Methyl-5-(propan-2-yl)phenol	0.9978
26	24.039	Alloaromadendrene	0.8734
27	16.123	Decanal	0.7625
28	21.439	γ-Muurolene	0.7500
29	9.287	Bicyclo[3.1.1]heptane, 6,6- dimethyl-2-methylene-, (1S)-	0.7080

30	20.197	5-Amino-1-methyl-1H-pyrazole-4- carboxamide, 3TMS	0.6598
31	5.151	Cyclotrisiloxane, hexamethyl-	0.6540
32	13.865	2,4,6-Octatriene, 2,6-dimethyl-, (E,E)-	0.5944
33	22.047	Geranyl acetate	0.5898
34	3.997	1,3,5-Cycloheptatriene	0.5818
35	1.622	Hydroperoxide, 1-methylethyl	0.5516
36	21.804	Copaene	0.5402
37	2.929	Heptane	0.5098
38	2.036	n-Hexane	0.4995
39	21.511	1,2,4-Metheno-1H-indene, octahydro-1,7a-dimethyl-5-(1- methyl)	0.4606
40	7.168	Oxime-, methoxy-phenyl-_	0.4603
41	22.129	(-)-β-Bourbonene	0.4566
42	9.613	5-Hepten-2-one, 6-methyl-	0.4444
43	23.663	Alloaromadendrene	0.4085
44	20.881	α-Cubebene	0.3687
45	17.639	Geraniol	0.3634
46	25.393	γ-Muurolene	0.3450
47	12.985	Linalyl acetate	0.3118
48	23.907	cis-α-Bergamotene	0.3071
49	24.183	(1S,4aR,7R)-1,4a-Dimethyl-7- (prop-1-en-2-yl)-1,2,3,4,4a,5,6	0.2831
50	10.289	(+)-3-Carene	0.2751
51	29.059	Caryophyllene oxide	0.2708
52	9.370	l-Gala-l-ido-octose	0.2644
53	9.988	Decane	0.2576
54	11.614	5-Heptenal, 2,6-dimethyl-	0.2449
55	15.696	cis-7-Decen-1-al	0.2243
56	15.016	trans-3(10)-Caren-2-ol	0.2240
57	14.343	(1R,2R,5S)-5-Methyl-2-(prop-1-en2-yl)cyclohexanol	0.2229
58	21.646	Ylangene	0.2211
59	25.636	4a,8-Dimethyl-2-(prop-1-en-2-yl)- 1,2,3,4,4a,5,6,7-octahydro	0.2145
60	14.232	2,4,6-Octatriene, 2,6-dimethyl-, (E,E)-	0.2088
61	15.139	Cyclohexanol, 1-methyl-4-(1- methylethyl)-	0.2051
62	26.237	Naphthalene, 1,2,4a,5,6,8ahexahydro-4,7-dimethyl-1-(1-meth 2)	0.1975

Table SI.6: Total volatile bioactive components of the CaSS/CAR/GUG/CS/PPP/ChNP5 film obtained by headspace GC-MS analysis.

No	Retention Time (min)	Name of the compound	Area (%)
1	10.876	3-Methyl-5-(propan-2-yl) phenol	11.5440
2	23.391	Caryophyllene	10.3681
3	11.771	γ-Terpinene	6.7091
4	9.720	14-Hydroxycaryophyllene	6.6157
5	10.727	o-Cymene	6.3858
6	8.029	α-Pinene	5.0162

7	8.448	Camphene	3.3013
8	18.185	2,6-Octadienal, 3,7-dimethyl-, €	2.6787
9	26.542	β-Bisabolene	2.5853
10	19.179	3-Methyl-5-(propan-2-yl)phenol	2.3723
11	11.134	trans-β-Ocimene	2.3254
12	17.228	Neral	2.0097
13	11.442	3-Carene	1.6940
14	18.964	Cyclohexanol, 5-methyl-2-(1- methylethyl)-, acetate, (1α)	1.1848
15	3.987	1,3,5-Cycloheptatriene	1.1652
16	14.689	Cyclopentasiloxane, decamethyl-	1.1633
17	14.564	7-Octenal, 3,7-dimethyl-	1.1290
18	7.676	Tricyclo[2.2.1.0(2,6)]heptane, 1,7,7-trimethyl	1.1278
19	2.816	Silanediol, dimethyl-	1.0921
20	10.061	1,1,3,3,5,5,7,7-Octamethyl-7-(2- methylpropoxy)tetrasiloxan	0.9716
21	20.182	5-Amino-1-methyl-1H-pyrazole-4- carboxamide, 3TMS	0.9612
22	22.036	Geranyl acetate	0.9572
23	1.624	Hydroperoxide, 1-methylethyl	0.9097
24	22.362	Cyclohexane, 1-ethenyl-1-methyl2,4-bis(1-methylethenyl)-	0.9030
25	27.063	1-Isopropyl-4,7 dimethyl1,2,3,5,6,8ahexahydronaphthalen	0.8587
26	26.732	γ-Muurolene	0.8505
27	4.613	Hexanal	0.8239
28	24.548	1,4,7,-Cycloundecatriene, 1,5,9,9- tetramethyl-, Z,Z,Z	0.7526
29	14.959	p-Mentha-1,5-dien-8-ol	0.7235
30	15.702	Cyclohexene, 3-acetoxy-4-(1-hydroxy-1-methylethyl)-1-methyl	0.6857
31	9.270	Bicyclo[3.1.1]heptane, 6,6- dimethyl-2-methylene-,(1S)-	0.6831
32	24.026	Alloaromadendrene	0.6310
33	13.107	Nonanal	0.6041
34	13.850	2,4,6-Octatriene, 2,6-dimethyl-, (E,E)-	0.6021
35	21.424	1,2,4-Metheno-1H-indene, octahydro-1,7a-dimethyl-5-(1- methyl)	0.5709
36	12.971	Linalyl acetate	0.5506
37	16.110	3-Decen-1-ol, (E)-	0.5480
38	9.598	5-Hepten-2-one, 6-methyl-	0.5466
39	17.627	Geraniol	0.4406
40	15.127	Cyclohexanol, 1-methyl-4-(1- methylethyl)-	0.4305
41	21.790	Copaene	0.4281
42	5.135	Cyclotrisiloxane, hexamethyl-	0.4251
43	2.036	Geranyl acetate	0.3744
44	2.112	3-Buten-2-ol, 2-methyl-	0.3604
45	2.923	Heptane	0.3504
46	7.149	Oxime-, methoxy-phenyl-_	0.3475
47	21.496	1,2,4-Metheno-1H-indene, octahydro-1,7a-dimethyl-5-(1- methyl)	0.3407
48	29.052	Caryophyllene oxide	0.3389

49	9.353	2-Dimethylsilyloxytetradecane	0.3328
50	12.662	p-(1-Propenyl)-toluene	0.3312
51	10.273	(+)-3-Carene	0.3273
52	22.114	(-)-β-Bourbonene	0.3146
53	8.670	2-Heptenal, (Z)-	0.3027
54	11.596	6-Octen-1-ol, 3,7-dimethyl-, formate	0.2918
55	23.649	10,10-Dimethyl-2,6- dimethylenebicyclo[7.2.0]undecane	0.2900
56	14.329	(1R,2R,5S)-5-Methyl-2-(prop-1-en2-yl) cyclohexanol	0.2812
57	20.866	(1S,4aR,8aS)-1-Isopropyl-7- methyl-4-methylene-1,2,3,4,4a,5	0.2717
58	25.380	γ-Muurolene	0.2526
59	23.895	cis-α-Bergamotene	0.2432
60	14.215	2,4,6-Octatriene, 2,6-dimethyl-, (E,E)-	0.2047
61	9.971	Decane	0.1983

Table SI.7: One sample 'T' test for moisture content in the CaSS.

One-Sample Test				
Test Value = 0				
	t	df	Sig. (2-tailed)	Mean Difference
CaSS	43.782	2	.001	1.79333

Table SI.8: One sample 'T' test for ash content in the CaSS.

One-Sample Test				
Test Value = 0				
	t	df	Sig. (2-tailed)	Mean Difference
CaSS	42.930	2	.001	1.38000

Table SI.9: One sample 'T' test for fat content in the CaSS.

One-Sample Test				
Test Value = 0				
	t	df	Sig. (2-tailed)	Mean Difference
CaSS	40.493	2	.001	.97333

Table SI.10: One sample 'T' test for protein content in the CaSS.

One-Sample Test				
Test Value = 0				
	t	df	Sig. (2-tailed)	Mean Difference
CaSS	46.112	2	.000	.81333

Table SI.11: One sample 'T' test for size distribution by intensity of ChNPs.

One-Sample Test				
Test Value = 0				
	t	df	Sig. (2-tailed)	Mean Difference
ChNPs	75.016	2	.000	178.43333

Table SI.12: One sample 'T' test for zeta potential distribution of ChNPs.

One-Sample Test				
Test Value = 0				
	t	df	Sig. (2-tailed)	Mean Difference
ChNPs	-135.053	2	.000	9.77000

Table SI.13: One sample 'T' test for thickness of A (CaSS/CAR/GUG), B (CaSS/CAR/GUG/CS), C (CaSS/CAR/GUG/CS/PPP), D (CaSS/CAR/GUG/CS/PPP/ChNP1), E (CaSS/CAR/GUG/CS/PPP/ChNP3) and F (CaSS/CAR/GUG/CS/PPP/ChNP5) films.

One-Sample Statistics				
	N	Mean	Std. Deviation	Std. Error Mean
A	10	1.4210E2	1.91195	.60461
B	10	1.4630E2	.82327	.26034
C	10	1.5050E2	1.17851	.37268
D	10	1.5520E2	.91894	.29059
E	10	1.6040E2	1.34990	.42687
F	10	1.6640E2	2.87518	.90921

One-Sample Test				
Test Value = 0				
	t	df	Sig. (2-tailed)	Mean Difference
A	235.027	9	.000	142.10000
B	561.954	9	.000	146.30000
C	403.834	9	.000	150.50000
D	534.080	9	.000	155.20000
E	375.754	9	.000	160.40000
F	183.016	9	.000	166.40000

Table SI.14: One sample 'T' test for moisture content of A (CaSS/CAR/GUG), B (CaSS/CAR/GUG/CS), C (CaSS/CAR/GUG/CS/PPP), D (CaSS/CAR/GUG/CS/PPP/ChNP1), E (CaSS/CAR/GUG/CS/PPP/ChNP3) and F (CaSS/CAR/GUG/CS/PPP/ChNP5) films.

One-Sample Statistics				
	N	Mean	Std. Deviation	Std. Error Mean
A	3	27.1567	.01528	.00882
B	3	25.4267	1.10753	.63944
C	3	22.8333	.23094	.13333
D	3	21.0633	.25106	.14495
E	3	19.7667	.30551	.17638
F	3	18.2633	.06351	.03667

One-Sample Test				
Test Value = 0				
	t	df	Sig. (2-tailed)	Mean Difference
A	3.079E3	2	.000	27.15667
B	39.764	2	.001	25.42667

C	171.250	2	.000	22.83333
D	145.312	2	.000	21.06333
E	112.066	2	.000	19.76667
F	498.091	2	.000	18.26333

Table SI.15: One sample 'T' test for water solubility of A (CaSS/CAR/GUG), B (CaSS/CAR/GUG/CS), C (CaSS/CAR/GUG/CS/PPP), D (CaSS/CAR/GUG/CS/PPP/ChNP1), E (CaSS/CAR/GUG/CS/PPP/ChNP3) and F (CaSS/CAR/GUG/CS/PPP/ChNP5) films.

One-Sample Statistics				
	N	Mean	Std. Deviation	Std. Error Mean
A	3	65.4000	.51962	.30000
B	3	69.0567	.07506	.04333
C	3	74.7267	.54602	.31524
D	3	75.9567	.12503	.07219
E	3	75.3300	.36497	.21071
F	3	74.2000	.17436	.10066

One-Sample Test				
Test Value = 0				
	t	df	Sig. (2-tailed)	Mean Difference
A	218.000	2	.000	65.40000
B	1.594E3	2	.000	69.05667
C	237.045	2	.000	74.72667
D	1.052E3	2	.000	75.95667
E	357.500	2	.000	75.33000
F	737.102	2	.000	74.20000

Table SI.16: One sample 'T' test for tensile strength of A (CaSS/CAR/GUG), B (CaSS/CAR/GUG/CS), C (CaSS/CAR/GUG/CS/PPP), D (CaSS/CAR/GUG/CS/PPP/ChNP1), E (CaSS/CAR/GUG/CS/PPP/ChNP3) and F (CaSS/CAR/GUG/CS/PPP/ChNP5) films.

One-Sample Statistics				
	N	Mean	Std. Deviation	Std. Error Mean
A	3	6.4333	.25658	.14814
B	3	9.1367	.16803	.09701
C	3	10.4400	.31512	.18193
D	3	13.5400	.44000	.25403
E	3	16.6133	.22811	.13170
F	3	18.8233	.27135	.15667

One-Sample Test				
Test Value = 0				
	t	df	Sig. (2-tailed)	Mean Difference
A	43.428	2	.001	6.43333
B	94.182	2	.000	9.13667
C	57.383	2	.000	10.44000

D	53.300	2	.000	13.54000
E	126.147	2	.000	16.61333
F	120.149	2	.000	18.82333

Table SI.17: One sample 'T' test for colour *L** values of A (CaSS/CAR/GUG), B (CaSS/CAR/GUG/CS), C (CaSS/CAR/GUG/CS/PPP), D (CaSS/CAR/GUG/CS/PPP/ChNP1), E (CaSS/CAR/GUG/CS/PPP/ChNP3) and F (CaSS/CAR/GUG/CS/PPP/ChNP5) films.

One-Sample Statistics				
	N	Mean	Std. Deviation	Std. Error Mean
A	3	58.0067	.11150	.06438
B	3	41.9233	.09452	.05457
C	3	39.3700	.16462	.09504
D	3	38.1133	.00577	.00333
E	3	36.9767	.00577	.00333
F	3	32.4867	.57951	.33458

One-Sample Test				
Test Value = 0				
	t	df	Sig. (2-tailed)	Mean Difference
A	901.041	2	.000	58.00667
B	768.263	2	.000	41.92333
C	414.230	2	.000	39.37000
D	1.143E4	2	.000	38.11333
E	1.109E4	2	.000	36.97667
F	97.097	2	.000	32.48667

Table SI.18: One sample 'T' test for colour *a** values of A (CaSS/CAR/GUG), B (CaSS/CAR/GUG/CS), C (CaSS/CAR/GUG/CS/PPP), D (CaSS/CAR/GUG/CS/PPP/ChNP1), E (CaSS/CAR/GUG/CS/PPP/ChNP3) and F (CaSS/CAR/GUG/CS/PPP/ChNP5) films.

One-Sample Statistics				
	N	Mean	Std. Deviation	Std. Error Mean
A	3	2.4900	.01000	.00577
B	3	.5933	.22811	.13170
C	3	8.2033	.06658	.03844
D	3	7.7733	.00577	.00333
E	3	6.3233	.01528	.00882
F	3	3.9133	.23029	.13296

One-Sample Test				
Test Value = 0				
	t	df	Sig. (2-tailed)	Mean Difference
A	431.281	2	.000	2.49000
B	4.505	2	.046	.59333
C	213.396	2	.000	8.20333
D	2.332E3	2	.000	7.77333

E	716.999	2	.000	6.32333
F	29.433	2	.001	3.91333

Table SI.19: One sample 'T' test for colour *b** values of A (CaSS/CAR/GUG), B (CaSS/CAR/GUG/CS), C (CaSS/CAR/GUG/CS/PPP), D (CaSS/CAR/GUG/CS/PPP/ChNP1), E (CaSS/CAR/GUG/CS/PPP/ChNP3) and F (CaSS/CAR/GUG/CS/PPP/ChNP5) films.

One-Sample Statistics				
	N	Mean	Std. Deviation	Std. Error Mean
A	3	12.6033	.01155	.00667
B	3	7.2100	.71014	.41000
C	3	21.1067	.02082	.01202
D	3	19.1333	.05508	.03180
E	3	21.2467	.02517	.01453
F	3	12.3167	.59011	.34070

One-Sample Test				
Test Value = 0				
	t	df	Sig. (2-tailed)	Mean Difference
A	1.891E3	2	.000	12.60333
B	17.585	2	.003	7.21000
C	1.756E3	2	.000	21.10667
D	601.715	2	.000	19.13333
E	1.462E3	2	.000	21.24667
F	36.151	2	.001	12.31667

Table SI.20: One sample 'T' test for colour *ΔE* values of A (CaSS/CAR/GUG), B (CaSS/CAR/GUG/CS), C (CaSS/CAR/GUG/CS/PPP), D (CaSS/CAR/GUG/CS/PPP/ChNP1), E (CaSS/CAR/GUG/CS/PPP/ChNP3) and F (CaSS/CAR/GUG/CS/PPP/ChNP5) films.

One-Sample Statistics				
	N	Mean	Std. Deviation	Std. Error Mean
A	3	41.7800	.10583	.06110
B	3	56.2533	.18583	.10729
C	3	62.6567	.13577	.07839
D	3	63.1333	.02082	.01202
E	3	64.7167	.02082	.01202
F	3	66.5133	.53725	.31018

One-Sample Test				
Test Value = 0				
	t	df	Sig. (2-tailed)	Mean Difference
A	683.786	2	.000	41.78000
B	524.312	2	.000	56.25333
C	799.330	2	.000	62.65667
D	5.253E3	2	.000	63.13333
E	5.385E3	2	.000	64.71667

F	214.435	2	.000	66.51333

Table SI.21: One sample 'T' test for opacity value of A (CaSS/CAR/GUG), B (CaSS/CAR/GUG/CS), C (CaSS/CAR/GUG/CS/PPP), D (CaSS/CAR/GUG/CS/PPP/ChNP1), E (CaSS/CAR/GUG/CS/PPP/ChNP3) and F (CaSS/CAR/GUG/CS/PPP/ChNP5) films.

One-Sample Statistics				
	N	Mean	Std. Deviation	Std. Error Mean
A	3	8.4843	.00388	.00224
B	3	5.5174	.01207	.00697
C	3	4.8487	.00353	.00204
D	3	9.7123	.00452	.00261
E	3	9.4148	.00191	.00110
F	3	9.5514	.00335	.00412

One-Sample Test				
Test Value = 0				
	t	df	Sig. (2-tailed)	Mean Difference
A	3.789E3	2	.000	8.48427
B	792.009	2	.000	5.51735
C	2.381E3	2	.000	4.84867
D	3.725E3	2	.000	9.71226
E	8.540E3	2	.000	9.41479
F	18.501	2	.003	6.55141

Table SI.22: One sample 'T' test for water vapor transmission rate of A (CaSS/CAR/GUG), B (CaSS/CAR/GUG/CS), C (CaSS/CAR/GUG/CS/PPP), D (CaSS/CAR/GUG/CS/PPP/ChNP1), E (CaSS/CAR/GUG/CS/PPP/ChNP3) and F (CaSS/CAR/GUG/CS/PPP/ChNP5) films.

One-Sample Statistics				
	N	Mean	Std. Deviation	Std. Error Mean
A	3	11.6400	.29866	.17243
B	3	10.8000	.22338	.12897
C	3	9.5733	.06658	.03844
D	3	8.5400	.43509	.25120
E	3	7.4567	.07371	.04256
F	3	6.7270	.22729	.13123

One-Sample Test				
Test Value = 0				
	t	df	Sig. (2-tailed)	Mean Difference
A	67.504	2	.000	11.64000
B	83.740	2	.000	10.80000
C	249.034	2	.000	9.57333
D	33.997	2	.001	8.54000
E	175.215	2	.000	7.45667
F	51.263	2	.000	6.72703

Table SI.23: One-Way ANOVA: Duncan test for moisture content change in the litchi samples in A (CaSS/CAR/GUG), B (CaSS/CAR/GUG/CS), C (CaSS/CAR/GUG/CS/PPP), D (CaSS/CAR/GUG/CS/PPP/ChNP1), E (CaSS/CAR/GUG/CS/PPP/ChNP3) and F (CaSS/CAR/GUG/CS/PPP/ChNP5) films at 27 ± 2 °C with 65 ± 5 % RH relative humidity (RH).

0^{th} Day		
Subset for alpha = 0.05		
Group	N	1
E	3	82.1400
A	3	82.1500
F	3	82.1567
D	3	82.1600
C	3	82.1600
B	3	82.1633
Sig.		.217

Means for groups in homogeneous subsets are displayed.

1^{st} Day				
Group	N	Subset for alpha = 0.05		
		1	2	3
A	3	80.0800		
B	3		81.8433	
C	3		81.9167	
D	3			82.0067
E	3			82.0533
F	3			82.0600
Sig.	3	1.000	.061	.178

2^{nd} Day						
Group	N	Subset for alpha = 0.05				
		1	2	3	4	5
A	3	79.1333				
B	3		79.8867			
C	3			80.9267		
D	3				81.6600	
E	3				81.8033	81.8033
F	3					81.8967
Sig.	3	1.000	1.000	1.000	.153	.340

3^{rd} Day					
Group	N	Subset for alpha = 0.05			
		1	2	3	4
A	3	78.1267			
B	3		79.7233		
C	3			80.4167	

D	3				80.9400
E	3				81.0133
F	3				81.0333
Sig.	3	1.000	.061	.178	

283

4th Day							
Group	N	Subset for alpha = 0.05					
		1	2	3	4	5	6
A	3	77.1133					
B	3		78.9967				
C	3			79.4467			
D	3				80.1500		
E	3					80.5133	
F	3						80.7100
Sig.	3	1.000	1.000	1.000	1.000	1.000	1.000

284

5th Day						
Group	N	Subset for alpha = 0.05				
		1	2	3	4	5
A	3	75.1433				
B	3		78.0267			
C	3			78.4867		
D	3				79.7633	
E	3					80.0367
F	3					80.0867
Sig.	3	1.000	1.000	1.000	1.000	.564

285

286

Group		0	1	2	3	4	5
A	Mean	82.1500	80.0800	79.1333	78.1267	77.1133	75.1433
	N	3	3	3	3	3	3
	Std. Deviation	.01000	.05292	.09292	.08386	.03215	.04041
B	Mean	82.1633	81.8433	79.8867	79.7233	78.9967	78.0267
	N	3	3	3	3	3	3
	Std. Deviation	.02082	.07371	.16166	.04726	.12583	.11719
C	Mean	82.1600	81.9167	80.9267	80.4167	79.4467	78.4867
	N	3	3	3	3	3	3
	Std. Deviation	.03606	.03786	.13796	.00577	.06429	.07572
D	Mean	82.1600	82.0067	81.6600	80.9400	80.1500	79.7633
	N	3	3	3	3	3	3
	Std. Deviation	.01000	.02082	.10536	.15716	.01000	.17616
E	Mean	82.1400	82.0600	81.8967	81.0333	80.7100	80.0867
	N	3	3	3	3	3	3
	Std. Deviation	.02000	.02000	.10116	.02082	.04000	.08021
F	Mean	82.1567	82.0533	81.8033	81.0133	80.5133	80.0367
	N	3	3	3	3	3	3
	Std. Deviation	.00577	.02887	.06506	.15044	.12097	.07234

287

Table SI.24: One-Way ANOVA: Duncan test for weight loss percentage in the litchi samples in A (CaSS/CAR/GUG), B (CaSS/CAR/GUG/CS), C (CaSS/CAR/GUG/CS/PPP), D (CaSS/CAR/GUG/CS/PPP/ChNP1), E (CaSS/CAR/GUG/CS/PPP/ChNP3) and F (CaSS/CAR/GUG/CS/PPP/ChNP5) films at 27 ± 2 °C with 65 ± 5 % RH relative humidity (RH).

1st Day						
Group	N	Subset for alpha = 0.05				
		1	2	3	4	5
E	3	1.1000				
F	3	1.1667				
D	3		1.5000			
C	3			2.1667		
B	3				3.1667	
A	3					3.5000
Sig.	3	.558	1.000	1.000	1.000	1.000

2nd Day						
Group	N	Subset for alpha = 0.05				
		1	2	3	4	5
E	3	1.7000				
F	3	1.8667				
D	3		2.3667			
C	3			3.0000		
B	3				4.1000	
A	3					4.4667
Sig.	3	.206	1.000	1.000	1.000	1.000

3rd Day					
Group	N	Subset for alpha = 0.05			
		1	2	3	4
E	3	2.2667			
F	3	2.4333			
D	3		3.0000		
C	3			3.9667	
B	3				5.5333
A	3				5.7667
Sig.	3	.496	1.000	1.000	.345

4th Day					
Group	N	Subset for alpha = 0.05			
		1	2	3	4
E	3	2.7333			
F	3	2.9333			
D	3		3.4667		
C	3				

B	3			4.0667	
A	3				6.0333 6.2000
Sig.	3	.064	1.000	1.000	.115

295

5th Day						
Group	N	Subset for alpha = 0.05				
		1	2	3	4	5
E	3	3.2000				
F	3	3.4667	3.9333			
D	3					
C	3			5.5000		
B	3				6.3000	
A	3					7.0000
Sig.	3	.154	1.000	1.000	1.000	1.000

296

Group		0	1	2	3	4	5
A	Mean	.0000	3.5000	4.4667	5.7667	6.2000	7.0000
	N	3	3	3	3	3	3
	Std. Deviation	.00000	.10000	.15275	.23094	.10000	.10000
B	Mean	.0000	3.1667	4.1000	5.5333	6.0333	6.3000
	N	3	3	3	3	3	3
	Std. Deviation	.00000	.05774	.10000	.32146	.15275	.30000
C	Mean	.0000	2.1667	3.0000	3.9667	4.0667	5.5000
	N	3	3	3	3	3	3
	Std. Deviation	.00000	.05774	.17321	.55076	.15275	.26458
D	Mean	.0000	1.5000	2.3667	3.0000	3.4667	3.9333
	N	3	3	3	3	3	3
	Std. Deviation	.00000	.10000	.15275	.10000	.15275	.30551
E	Mean	.0000	1.1000	1.7000	2.2667	2.7333	3.2000
	N	3	3	3	3	3	3
	Std. Deviation	.00000	.20000	.17321	.15275	.05774	.10000
F	Mean	.0000	1.1667	1.8667	2.4333	2.9333	3.4667
	N	3	3	3	3	3	3
	Std. Deviation	.00000	.20817	.15275	.11547	.05774	.05774

297

298 Table SI.25: One-Way ANOVA: Duncan test for pH value change in the litchi samples in A (CaSS/CAR/GUG), B
299 (CaSS/CAR/GUG/CS), C (CaSS/CAR/GUG/CS/PPP), D (CaSS/CAR/GUG/CS/PPP/ChN P1), E
300 (CaSS/CAR/GUG/CS/PPP/ChNP3) and F (CaSS/CAR/GUG/CS/PPP/ChNP5) films at 27 ± 2 °C with 65 ± 5 % RH
301 relative humidity (RH).

0th Day		
Subset for alpha = 0.05		
Group	N	1
C	3	5.2200
A	3	5.2267
B	3	5.2267
F	3	5.2267
D	3	5.2300

E	3	5.2367
Sig.		.184

Means for groups in homogeneous subsets are displayed.

1st Day				
Group	N	Subset for alpha = 0.05		
		1	2	3
A	3	4.8967		
B	3		5.0767	
C	3			5.1533
D	3			5.1700
E	3			5.1767
F	3			5.1833
Sig.	3	1.000	1.000	.063

2nd Day						
Group	N	Subset for alpha = 0.05				
		1	2	3	4	5
A	3	4.8133				
B	3		4.9733			
C	3			5.0300		
F	3			5.0500	5.0500	
D	3				5.0633	5.0633
E	3					5.0833
Sig.	3	1.000	1.000	.151	.327	.151

3rd Day					
Group	N	Subset for alpha = 0.05			
		1	2	3	4
A	3	4.7800			
B	3		4.8100		
C	3			4.9633	
D	3				4.9967
F	3				5.0200
E	3				5.0267
Sig.	3	1.000	1.000	1.000	.053

4th Day						
Group	N	Subset for alpha = 0.05				
		1	2	3	4	5
A	3	4.5100				
B	3		4.7200			
C	3			4.8567		

D	3				4.9333	
F	3				4.9667	4.9667
E	3					4.9800
Sig.	3	1.000	1.000	1.000	.083	.464

307

5th Day						
Group	N	Subset for alpha = 0.05				
		1	2	3	4	5
A	3	4.3567				
B	3		4.5800			
C	3			4.6833		
D	3				4.8000	
F	3				4.8600	4.8600
E	3					4.9100
Sig.	3	1.000	1.000	1.000	.082	.139

308

Group		0	1	2	3	4	5
A	Mean	5.2267	4.8967	4.8133	4.7800	4.5100	4.3567
	N	3	3	3	3	3	3
	Std. Deviation	.00577	.01528	.01528	.02000	.03606	.06351
B	Mean	5.2267	5.0767	4.9733	4.8100	4.7200	4.5800
	N	3	3	3	3	3	3
	Std. Deviation	.01528	.02082	.02082	.01000	.02000	.03464
C	Mean	5.2200	5.1533	5.0300	4.9633	4.8567	4.6833
	N	3	3	3	3	3	3
	Std. Deviation	.01000	.02517	.01732	.01528	.02309	.03512
D	Mean	5.2300	5.1700	5.0633	4.9967	4.9333	4.8000
	N	3	3	3	3	3	3
	Std. Deviation	.02000	.01000	.02082	.01528	.01528	.04583
E	Mean	5.2367	5.1833	5.0833	5.0267	4.9800	4.9100
	N	3	3	3	3	3	3
	Std. Deviation	.00577	.00577	.00577	.01528	.01000	.01000
F	Mean	5.2267	5.1767	5.0500	5.0200	4.9667	4.8600
	N	3	3	3	3	3	3
	Std. Deviation	.01528	.01528	.01000	.02000	.01528	.01732

309

310 Table SI.26: One-Way ANOVA: Duncan test for firmness change in the litchi samples in A (CaSS/CAR/GUG), B
311 (CaSS/CAR/GUG/CS), C (CaSS/CAR/GUG/CS/PPP), D (CaSS/CAR/GUG/CS/PPP/ChNP1), E
312 (CaSS/CAR/GUG/CS/PPP/ChNP3) and F (CaSS/CAR/GUG/CS/PPP/ChNP5) films at 27 ± 2 °C with 65 ± 5 % RH
313 relative humidity (RH).

0th Day		
Subset for alpha = 0.05		
Group	N	1
D	3	9.2300
F	3	9.2333
A	3	9.2433
C	3	9.2467
E	3	9.2467

B	3	9.2533
Sig.		.124

314

1st Day						
Group	N	Subset for alpha = 0.05				
		1	2	3	4	5
A	3	8.6800				
B	3		8.8067			
C	3			8.8833		
D	3				9.0700	
E	3					9.1333
F	3					9.1400
Sig.	3	1.000	1.000	1.000	1.000	.646

315

2nd Day							
Group	N	Subset for alpha = 0.05					
		1	2	3	4	5	6
A	3	8.1367					
B	3		8.4200				
C	3			8.6267			
D	3				8.9267		
F	3					9.0233	
E	3						9.1167
Sig.	3	1.000	1.000	1.000	1.000	1.000	1.000

316

3rd Day					
Group	N	Subset for alpha = 0.05			
		1	2	3	4
A	3	7.1633			
C	3		8.1867		
B	3		8.2400		
D	3			8.8933	
F	3				8.9967
E	3				9.0267
Sig.	3	1.000	.121	1.000	.366

317

4th Day						
Group	N	Subset for alpha = 0.05				
		1	2	3	4	5
A	3	7.0833				
B	3		7.8367			
C	3			8.1000		
D	3				8.8067	

F	3				8.8467	8.8467
E	3					8.9067
Sig.	3	1.000	1.000	1.000	.309	.137

318

5th Day					
Group	N	Subset for alpha = 0.05			
		1	2	3	4
A	3	6.7367			
B	3		7.1900		
C	3			7.9933	
D	3				8.6800
F	3				8.7233
E	3				8.8267
Sig.	3	1.000	1.000	1.000	.064

319

Group		0	1	2	3	4	5
A	Mean	9.2433	8.6800	8.1367	7.1633	7.0833	6.7367
	N	3	3	3	3	3	3
	Std. Deviation	.00577	.02646	.02517	.03055	.05686	.15948
B	Mean	9.2533	8.8067	8.4200	8.2400	7.8367	7.1900
	N	3	3	3	3	3	3
	Std. Deviation	.02309	.00577	.01732	.07000	.04726	.03606
C	Mean	9.2467	8.8833	8.6267	8.1867	8.1000	7.9933
	N	3	3	3	3	3	3
	Std. Deviation	.00577	.01155	.02517	.01528	.05000	.03512
D	Mean	9.2300	9.0700	8.9267	8.8933	8.8067	8.6800
	N	3	3	3	3	3	3
	Std. Deviation	.02000	.01732	.03055	.02082	.05033	.01732
E	Mean	9.2467	9.1333	9.1167	9.0267	8.9067	8.8267
	N	3	3	3	3	3	3
	Std. Deviation	.00577	.01528	.01528	.03786	.04041	.05859
F	Mean	9.2333	9.1400	9.0233	8.9967	8.8467	8.7233
	N	3	3	3	3	3	3
	Std. Deviation	.02082	.02000	.03215	.03512	.02517	.10263

320

321 Table SI.27: One-Way ANOVA: Duncan test for total soluble solid (TSS) change in the litchi samples in A
322 (CaSS/CAR/GUG), B (CaSS/CAR/GUG/CS), C (CaSS/CAR/GUG/CS/PPP), D (CaSS/CAR/GUG/CS/PPP/ChN
323 P1), E (CaSS/CAR/GUG/CS/PPP/ChNP3) and F (CaSS/CAR/GUG/CS/PPP/ChNP5) films at 27 ± 2 °C with 65 ±
324 5 % RH relative humidity (RH).

0th Day		
Subset for alpha = 0.05		
Group	N	1
A	3	17.2067
D	3	17.2100
B	3	17.2167
C	3	17.2200
E	3	17.2200
F	3	17.2200

Sig.		.186

325

1st Day					
Group	N	Subset for alpha = 0.05			
		1	2	3	4
E	3	17.3533			
D	3		17.4433		
F	3		17.4533		
B	3			17.6900	
C	3			17.7400	
A	3				17.9400
Sig.	3	1.000	.698	.070	1.000

326

2nd Day						
Group	N	Subset for alpha = 0.05				
		1	2	3	4	5
E	3	17.8433				
F	3	17.9000	17.9000			
D	3		17.9433			
C	3			18.1700		
B	3				18.3167	
A	3					18.5867
Sig.	3	.153	.266	1.000	1.000	1.000

327

3rd Day							
Group	N	Subset for alpha = 0.05					
		1	2	3	4	5	6
E	3	18.4567					
D	3		18.7500				
F	3			18.8933			
C	3				19.1600		
A	3					19.2267	
B	3						19.7567
Sig.	3	1.000	1.000	1.000	1.000	1.000	1.000

328

4th Day					
Group	N	Subset for alpha = 0.05			
		1	2	3	4
E	3	19.6433			
F	3	19.6567			
D	3	19.6833			
C	3		19.7933		
B	3			19.9100	

A	3				20.0433
Sig.	3	.158	1.000	1.000	1.000

329

5th Day							
Group	N	Subset for alpha = 0.05					
		1	2	3	4	5	6
E	3	19.8200					
F	3		19.9767				
D	3			20.0733			
C	3				20.6133		
B	3					20.7767	
A	3						21.0733
Sig.	3	1.000	1.000	1.000	1.000	1.000	1.000

330

Group		0	1	2	3	4	5
A	Mean	17.2067	17.9400	18.5867	19.2267	20.0433	21.0733
	N	3	3	3	3	3	3
	Std. Deviation	.00577	.01000	.07234	.02517	.04933	.02517
B	Mean	17.2167	17.6900	18.3167	19.7567	19.9100	20.7767
	N	3	3	3	3	3	3
	Std. Deviation	.01528	.05292	.03786	.04041	.01000	.04933
C	Mean	17.2200	17.7400	18.1700	19.1600	19.7933	20.6133
	N	3	3	3	3	3	3
	Std. Deviation	.01000	.03606	.04583	.03606	.00577	.08145
D	Mean	17.2100	17.4433	17.9433	18.7500	19.6833	20.0733
	N	3	3	3	3	3	3
	Std. Deviation	.01000	.02082	.03512	.05568	.02309	.05508
E	Mean	17.2200	17.3533	17.8433	18.4567	19.6433	19.8200
	N	3	3	3	3	3	3
	Std. Deviation	.01000	.02082	.04163	.03055	.00577	.02646
F	Mean	17.2200	17.4533	17.9000	18.8933	19.6567	19.9767
	N	3	3	3	3	3	3
	Std. Deviation	.01000	.02517	.02646	.01528	.05132	.00577

331

332 Table SI.28: One-Way ANOVA: Duncan test for titratable acidity (TA) change in the litchi samples in A
333 (CaSS/CAR/GUG), B (CaSS/CAR/GUG/CS), C (CaSS/CAR/GUG/CS/PPP), D (CaSS/CAR/GUG/CS/PPP/ChN
334 P1), E (CaSS/CAR/GUG/CS/PPP/ChNP3) and F (CaSS/CAR/GUG/CS/PPP/ChNP5) films at 27 ± 2 °C with 65 ±
335 5 % RH relative humidity (RH).

0th Day		
Subset for alpha = 0.05		
Group	N	1
E	3	.4167
F	3	.4167
C	3	.4200
D	3	.4233
A	3	.4267
B	3	.4300

Sig.		.108

336

1st Day					
Group	N	Subset for alpha = 0.05			
		1	2	3	4
A	3	.3600			
B	3		.3767		
C	3		.3867	.3867	
F	3			.3933	.3933
D	3			.3967	.3967
E	3				.4033
Sig.	3	1.000	.091	.105	.105

337

2nd Day					
Group	N	Subset for alpha = 0.05			
		1	2	3	4
A	3	.3033			
B	3		.3300		
C	3			.3433	
D	3			.3467	
F	3				.3667
E	3				.3700
Sig.	3	1.000	1.000	.594	.594

338

3rd Day						
Group	N	Subset for alpha = 0.05				
		1	2	3	4	5
A	3	.2833				
B	3		.3033			
C	3			.3267		
D	3				.3400	
F	3				.3400	
E	3					.3567
Sig.	3	1.000	1.000	1.000	1.000	1.000

339

4th Day					
Group	N	Subset for alpha = 0.05			
		1	2	3	4
A	3	.2433			
B	3		.2633		
F	3			.3033	
C	3			.3067	.3067
D	3			.3233	.3233

E	3				.3267
Sig.	3	1.000	1.000	.051	.051

340

5th Day				
Group	N	Subset for alpha = 0.05		
		1	2	3
A	3	.2233		
B	3	.2333		
C	3		.2733	
D	3		.2800	
F	3		.2967	.2967
E	3			.3133
Sig.	3	.416	.085	.185

341

Group		0	1	2	3	4	5
A	Mean	.4267	.3600	.3033	.2833	.2433	.2233
	N	3	3	3	3	3	3
	Std. Deviation	.00577	.01000	.00577	.00577	.00577	.01528
B	Mean	.4300	.3767	.3300	.3033	.2633	.2333
	N	3	3	3	3	3	3
	Std. Deviation	.01000	.00577	.01000	.00577	.00577	.02082
C	Mean	.4200	.3867	.3433	.3267	.3067	.2733
	N	3	3	3	3	3	3
	Std. Deviation	.01000	.00577	.00577	.00577	.00577	.01528
D	Mean	.4233	.3967	.3467	.3400	.3233	.2800
	N	3	3	3	3	3	3
	Std. Deviation	.00577	.00577	.00577	.00000	.01155	.01000
E	Mean	.4167	.4033	.3700	.3567	.3267	.3133
	N	3	3	3	3	3	3
	Std. Deviation	.00577	.00577	.01000	.00577	.01528	.01528
F	Mean	.4167	.3933	.3667	.3400	.3033	.2967
	N	3	3	3	3	3	3
	Std. Deviation	.01155	.00577	.00577	.01000	.01528	.00577

342

343 Table SI.29: One-Way ANOVA: Duncan test for TSS:TA ratio change in the litchi samples in A (CaSS/CAR/GUG),
344 B (CaSS/CAR/GUG/CS), C (CaSS/CAR/GUG/CS/PPP), D (CaSS/CAR/GUG/CS/PPP/ChN P1), E
345 (CaSS/CAR/GUG/CS/PPP/ChNP3) and F (CaSS/CAR/GUG/CS/PPP/ChNP5) films at 27 ± 2 °C with 65 ± 5 % RH
346 relative humidity (RH).

0th Day		
Subset for alpha = 0.05		
Group	N	1
B	3	40.0540
A	3	40.3330
D	3	40.6583
C	3	41.0157
F	3	41.2807
E	3	41.3333
Sig.		.109

347

1st Day				
Group	N	Subset for alpha = 0.05		
		1	2	3
E	3	43.0303		
D	3	43.9813		
F	3	44.3770		
C	3		45.8867	
B	3		46.9713	
A	3			49.8590
Sig.	3	.079	.131	1.000

348

2nd Day					
Group	N	Subset for alpha = 0.05			
		1	2	3	4
E	3	48.2500			
F	3	48.8263			
D	3		51.7690		
C	3		52.9320		
B	3			55.5410	
A	3				61.2907
Sig.	3	.574	.266	1.000	1.000

349

3rd Day						
Group	N	Subset for alpha = 0.05				
		1	2	3	4	5
E	3	51.7577				
D	3		55.1473			
F	3		55.6017			
C	3			58.6667		
B	3				65.1463	
A	3					67.8763
Sig.	3	1.000	.640	1.000	1.000	1.000

350

4th Day					
Group	N	Subset for alpha = 0.05			
		1	2	3	4
E	3	60.2217			
D	3	60.9310	60.9310		
C	3	64.5593	64.5593		
F	3		64.9160		
B	3			75.6320	
A	3				82.4017

Sig.	3	.052	.071	1.000	1.000

351

5th Day				
Group	N	Subset for alpha = 0.05		
		1	2	3
E	3	63.3540		
F	3	67.3540	67.3540	
D	3	71.7557	71.7557	
C	3		75.5800	
B	3			89.5473
A	3			94.6500
Sig.	3	.074	.080	.237

352

Group		0	1	2	3	4	5
A	Mean	40.3330	49.8590	61.2907	67.8763	82.4017	94.6500
	N	3	3	3	3	3	3
	Std. Deviation	.55697	1.39900	1.30122	1.29785	2.01935	6.40466
B	Mean	40.0540	46.9713	55.5410	65.1463	75.6320	89.5473
	N	3	3	3	3	3	3
	Std. Deviation	.96652	.64236	1.77839	1.16659	1.66981	8.48256
C	Mean	41.0157	45.8867	52.9320	58.6667	64.5593	75.5800
	N	3	3	3	3	3	3
	Std. Deviation	1.00059	.71948	.86669	1.15509	1.24765	4.43961
D	Mean	40.6583	43.9813	51.7690	55.1473	60.9310	71.7557
	N	3	3	3	3	3	3
	Std. Deviation	.55074	.68317	.86834	.16398	2.29497	2.74063
E	Mean	41.3333	43.0303	48.2500	51.7577	60.2217	63.3540
	N	3	3	3	3	3	3
	Std. Deviation	.59826	.57655	1.39007	.92822	2.85577	3.04220
F	Mean	41.2807	44.3770	48.8263	55.6017	64.9160	67.3540
	N	3	3	3	3	3	3
	Std. Deviation	1.05232	.59120	.80276	1.68041	3.38774	1.30597

353

354 Table SI.30: One-Way ANOVA: Duncan test for percent of fresh litchi samples in A (CaSS/CAR/GUG), B
355 (CaSS/CAR/GUG/CS), C (CaSS/CAR/GUG/CS/PPP), D (CaSS/CAR/GUG/CS/PPP/ChN P1), E
356 (CaSS/CAR/GUG/CS/PPP/ChNP3) and F (CaSS/CAR/GUG/CS/PPP/ChNP5) films at 27 ± 2 °C with 65 ± 5 % RH
357 relative humidity (RH).

1st Day				
Group	N	Subset for alpha = 0.05		
		1	2	3
A	3	81.6667		
B	3	85.0000		
C	3		91.6667	
D	3		96.6667	96.6667
E	3			1.0000E2
F	3			1.0000E2
Sig.	3	.183	.055	.203

358

2nd Day				
Group	N	Subset for alpha = 0.05		
		1	2	3
B	3	68.3333		
A	3	71.6667		
C	3		80.0000	
D	3		83.3333	
F	3			91.6667
E	3			93.3333
Sig.	3	.147	.147	.454

359

3rd Day					
Group	N	Subset for alpha = 0.05			
		1	2	3	4
A	3	61.6667			
B	3	61.6667			
C	3		70.0000		
D	3		73.3333		
F	3			83.3333	
E	3				88.3333
Sig.	3	1.000	.147	1.000	1.000

360

4th Day					
Group	N	Subset for alpha = 0.05			
		1	2	3	4
A	3	55.0000			
B	3	58.3333	58.3333		
C	3		61.6667		
D	3			71.6667	
F	3			73.3333	
E	3				81.6667
Sig.	3	.244	.244	.552	1.000

361

5th Day					
Group	N	Subset for alpha = 0.05			
		1	2	3	4
A	3	48.3333			
B	3	51.6667	51.6667		
C	3		56.6667	56.6667	
D	3			61.6667	
F	3				68.3333
E	3				73.3333
Sig.	3	.183	.055	.055	.055

362

Group		0	1	2	3	4	5
A	Mean	1.0000E2	81.6667	71.6667	61.6667	55.0000	48.3333
	N	3	3	3	3	3	3
	Std. Deviation	.00000	2.88675	2.88675	2.88675	5.00000	2.88675
B	Mean	1.0000E2	85.0000	68.3333	61.6667	58.3333	51.6667
	N	3	3	3	3	3	3
	Std. Deviation	.00000	5.00000	2.88675	2.88675	2.88675	2.88675
C	Mean	1.0000E2	91.6667	80.0000	70.0000	61.6667	56.6667
	N	3	3	3	3	3	3
	Std. Deviation	.00000	2.88675	.00000	.00000	2.88675	2.88675
D	Mean	1.0000E2	96.6667	83.3333	73.3333	71.6667	61.6667
	N	3	3	3	3	3	3
	Std. Deviation	.00000	2.88675	2.88675	2.88675	2.88675	2.88675
E	Mean	1.0000E2	1.0000E2	93.3333	88.3333	81.6667	73.3333
	N	3	3	3	3	3	3
	Std. Deviation	.00000	.00000	2.88675	2.88675	2.88675	2.88675
F	Mean	1.0000E2	1.0000E2	91.6667	83.3333	73.3333	68.3333
	N	3	3	3	3	3	3
	Std. Deviation	.00000	.00000	2.88675	2.88675	2.88675	2.88675

Table SI.31: One-Way ANOVA: Duncan test for colour *ΔE* values of the litchi samples in A (CaSS/CAR/GUG), B (CaSS/CAR/GUG/CS), C (CaSS/CAR/GUG/CS/PPP), D (CaSS/CAR/GUG/CS/PPP/ChN P1), E (CaSS/CAR/GUG/CS/PPP/ChNP3) and F (CaSS/CAR/GUG/CS/PPP/ChNP5) films at 27 ± 2 °C with 65 ± 5 % RH relative humidity (RH).

0^{th} Day			
Subset for alpha = 0.05			
Group	N	1	2
C	3	63.8167	
B	3	63.8533	63.8533
F	3	63.8733	63.8733
E	3	63.9000	63.9000
A	3	63.9267	63.9267
D	3		63.9433
Sig.		.059	.114

1^{st} Day						
Group	N	Subset for alpha = 0.05				
		1	2	3	4	5
E	3	64.2500				
D	3		65.0167			
F	3			65.3433		
C	3			65.4367	65.4367	
B	3				65.6300	
A	3					66.7100
Sig.	3	1.000	1.000	.411	.103	1.000

2^{nd} Day

Group	N	Subset for alpha = 0.05		
		1	2	3
C	3	66.5800		
E	3	66.6400		
D	3		67.5400	
B	3		67.6067	
F	3		67.7567	
A	3			68.8100
Sig.	3	.743	.272	1.000

371

3rd Day						
Group	N	Subset for alpha = 0.05				
		1	2	3	4	5
C	3	67.7767				
E	3	68.0400	68.0400			
F	3		68.3533	68.3533		
D	3			68.7533		
B	3				69.6500	
A	3					71.5733
Sig.	3	.244	.171	.087	1.000	1.000

372

4th Day						
Group	N	Subset for alpha = 0.05				
		1	2	3	4	5
E	3	68.5433				
F	3		69.2133			
C	3		69.7233	69.7233		
D	3			69.9300		
B	3				70.6100	
A	3					72.4967
Sig.	3	1.000	.075	.444	1.000	1.000

373

5th Day						
Group	N	Subset for alpha = 0.05				
		1	2	3	4	5
E	3	70.2200				
F	3	70.4033				
D	3		71.6333			
C	3			72.8033		
B	3				73.5467	
A	3					74.1300
Sig.	3	.270	1.000	1.000	1.000	1.000

374

Group		0	1	2	3	4	5
A	Mean	63.9267	66.7100	68.8100	71.5733	72.4967	74.1300
	N	3	3	3	3	3	3
	Std. Deviation	.05132	.19000	.08544	.18037	.29366	.22605
B	Mean	63.8533	65.6300	67.6067	69.6500	70.6100	73.5467
	N	3	3	3	3	3	3
	Std. Deviation	.01528	.15716	.26764	.29103	.12124	.15011
C	Mean	63.8167	65.4367	66.5800	67.7767	69.7233	72.8033
	N	3	3	3	3	3	3
	Std. Deviation	.11015	.10017	.15395	.37846	.25403	.10693
D	Mean	63.9433	65.0167	67.5400	68.7533	69.9300	71.6333
	N	3	3	3	3	3	3
	Std. Deviation	.06351	.12583	.11000	.35852	.43715	.31943
E	Mean	63.9000	64.2500	66.6400	68.0400	68.5433	70.2200
	N	3	3	3	3	3	3
	Std. Deviation	.02646	.13892	.30050	.14933	.49863	.12530
F	Mean	63.8733	65.3433	67.7567	68.3533	69.2133	70.4033
	N	3	3	3	3	3	3
	Std. Deviation	.03512	.04509	.28919	.06658	.09292	.15308

375