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Lampiran

Lampiran 1. Hasil Pengujian Laju Transmisi Uap Air Edible Film Karagenan/Gelatin dengan Penambahan Minyak Kanola dan Gluten

P	U	Waktu (Jam)								Slope	Luas Cawan (m)	Slope / Luas Cawan	Rata"
		0	1	2	3	4	5	6	7				
K1G1	1	23.0308	23.0506	23.0706	23.0948	23.1144	23.1413	23.1655	23.1781	0.0219	0.0016	13.6875	13.3333
	2	23.0854	23.1071	23.1311	23.1523	23.1777	23.201	23.2148	23.2253	0.0209	0.0016	13.0625	
	3	24.4245	24.4517	24.4784	24.4994	24.5238	24.5466	24.5580	24.5697	0.0212	0.0016	13.2500	
K2G1	1	24.9628	24.9921	25.0141	25.0402	25.0623	25.0852	25.1105	25.1242	0.0233	0.0016	14.5625	12.8125
	2	26.8306	26.8570	26.8789	26.9036	26.9234	26.9471	26.9699	26.9835	0.0221	0.0016	13.8125	
	3	24.3378	24.3480	24.3695	24.3830	24.3995	24.4125	24.4292	24.4522	0.0161	0.0016	10.0625	
K3G1	1	21.5429	21.5617	21.5836	21.6018	21.6225	21.6422	21.6553	21.6684	0.0184	0.0016	11.5000	12.2292
	2	26.3165	26.3434	26.3649	26.3866	26.4059	26.4272	26.4490	26.4704	0.0216	0.0016	13.5000	
	3	23.0801	23.0995	23.1200	23.1388	23.1581	23.1783	23.1911	23.2115	0.0187	0.0016	11.6875	
K1G2	1	26.0613	26.0895	26.1236	26.1456	26.1704	26.1946	26.2137	26.2366	0.0248	0.0016	15.5000	16.3333
	2	24.1987	24.2266	24.2636	24.2859	24.3091	24.3324	24.3602	24.3898	0.0266	0.0016	16.6250	
	3	27.0133	27.0402	27.0782	27.0991	27.1278	27.1521	27.1812	27.2005	0.0270	0.0016	16.8750	
K2G2	1	25.0234	25.0547	25.0872	25.1100	25.1311	25.1567	25.1746	25.1953	0.0242	0.0016	15.1250	15.1042
	2	25.2060	25.2336	25.2665	25.2828	25.3065	25.3262	25.3455	25.3658	0.0224	0.0016	14.0000	
	3	23.1948	23.2292	23.2652	23.2881	23.3117	23.3371	23.3598	23.3784	0.0259	0.0016	16.1875	
K3G2	1	24.8311	24.8555	24.8872	24.9064	24.9269	24.9461	24.9633	24.9837	0.0215	0.0016	13.4375	15.5833
	2	23.6857	23.7059	23.7327	23.7659	23.7896	23.8125	23.8447	23.8762	0.0277	0.0016	17.3125	
	3	24.4412	24.4704	24.5094	24.5292	24.5572	24.5810	24.6013	24.6203	0.0256	0.0016	16.0000	
K1G3	1	23.5312	23.5468	23.5572	23.5728	23.5879	23.6006	23.6193	23.6301	0.0143	0.0016	8.9375	9.7708
	2	23.2251	23.2468	23.2622	23.2791	23.3000	23.3185	23.3387	23.3584	0.0188	0.0016	11.7500	
	3	24.7216	24.7382	24.7477	24.7615	24.7762	24.7904	24.8064	24.8183	0.0138	0.0016	8.6250	
K2G3	1	23.9975	24.0145	24.0254	24.0418	24.0566	24.0685	24.0861	24.1007	0.0146	0.0016	9.1250	8.9792
	2	23.3200	23.3394	23.3524	23.3670	23.3829	23.3979	23.4144	23.4295	0.0154	0.0016	9.6250	
	3	24.5766	24.5930	24.6000	24.6149	24.6274	24.6392	24.6552	24.6703	0.0131	0.0016	8.1875	
K3G3	1	23.6633	23.6742	23.6782	23.6866	23.6949	23.7041	23.7155	23.7249	0.0086	0.0016	5.3750	5.2292
	2	23.1998	23.2108	23.2143	23.2226	23.2337	23.2414	23.2528	23.2623	0.0088	0.0016	5.5000	
	3	24.1790	24.1881	24.1918	24.1983	24.2072	24.2146	24.2234	24.2351	0.0077	0.0016	4.8125	

Lampiran 2. Hasil Analisis Sidik Ragam Laju Transmisi Uap Air Edible Film Karagenan/Gelatin dengan Penambahan Minyak Kanola dan Gluten

Laju Transmisi Uap Air

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.
Corrected Model	309.909[a]	7	44.273	25.281	.000
Intercept	3649.272	1	3649.272	2083.829	.000
Gluten	22.708	2	11.354	6.483	.007
Canola	266.153	2	133.077	75.990	.000
Gluten * Canola	16.274	3	5.425	3.098	.051
Error	33.273	19	1.751		
Total	4330.813	27			
Corrected Total	343.182	26			

a. R Squared = ,903 (Adjusted R Squared = ,867)

Lampiran 3. Hasil Uji Lanjut Metode Duncan Laju Transmisi Uap Air Edible Film Karagenan/Gelatin dengan Penambahan Minyak Kanola dan Gluten

Laju Transmisi Uap Air

Duncan[a,b]

Penambahan Gluten	N	Subset 1	Subset 2
15 gram	6	10.406250	
5 gram	12		12.281250
0 gram	9		13.145833
Sig.		1.000	.199

Means for groups in homogeneous subsets are displayed.

Based on observed means.

The error term is Mean Square(Error) = 1,751.

a. Uses Harmonic Mean Sample Size = 8,308.

b. The group sizes are unequal. The harmonic mean of the group sizes is used. Type I error levels are not guaranteed.

Laju Transmisi Uap Air

Duncan[a,b]

penambahan canola	N	Subset		
		1	2	3
40%	9	7.993056		
0%	9		12.791667	
20%	9			15.673611
Sig.		1.000	1.000	1.000

Means for groups in homogeneous subsets are displayed.

Based on observed means.

The error term is Mean Square(Error) = 1,751.

Lampiran 4. Hasil Pengujian Kuat Tarik Edible Film Karagenan/Gelatin dengan Penambahan Minyak Kanola dan Gluten

Perlakuan	Ulangan	Kuat Tarik (N/mm2)	Rata"
K1G1	1	0.3441	0.3598
	2	0.4172	
	3	0.3181	
K2G1	1	0.2321	0.2310
	2	0.1890	
	3	0.2719	
K3G1	1	0.4441	0.4082
	2	0.3339	
	3	0.4466	
K1G2	1	0.3900	0.4351
	2	0.3020	
	3	0.6134	
K2G2	1	0.3414	0.2781
	2	0.3818	
	3	0.1110	
K3G2	1	0.0577	0.0371
	2	0.0280	
	3	0.0255	
K1G3	1	0.2356	0.3003
	2	0.3744	
	3	0.2910	
K2G3	1	0.5360	0.4917
	2	0.4751	
	3	0.4639	
K3G3	1	0.3101	0.2891
	2	0.3114	
	3	0.2457	

Lampiran 5. Hasil Analisa Sidik Ragam Kuat Tarik Edible Film Karagenan/Gelatin dengan Penambahan Minyak Kanola dan Gluten

Kuat Tarik

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	.382[a]	7	.055	5.933	.001
Intercept	2.294	1	2.294	249.707	.000
Gluten	.182	2	.091	9.899	.001
Canola	.061	2	.031	3.328	.058
Gluten * Canola	.140	3	.047	5.086	.009
Error	.175	19	.009		
Total	3.226	27			
Corrected Total	.556	26			

a. R Squared = ,686 (Adjusted R Squared = ,570)

Lampiran 6.   Hasil Uji Lanjut Metode Duncan Kuat Tarik Edible Film Karagenan/Gelatin dengan Penambahan Minyak Kanola dan Gluten

Kuat Tarik

Duncan[a,b]

Penambahan Gluten	N	Subset 1	Subset 2
15 gram	6	.163067	
5 gram	12		.352233
0 gram	9		.365089
Sig.		1.000	.788

Means for groups in homogeneous subsets are displayed.
 Based on observed means.
 The error term is Mean Square(Error) = ,009.
a. Uses Harmonic Mean Sample Size = 8,308.
b. The group sizes are unequal. The harmonic mean of the group sizes is used. Type I error levels are not guaranteed.

Kuat Tarik

Duncan[a,b]

penambahan canola	N	Subset 1	Subset 2
40%	9	.250089	
0%	9	.333000	.333000
20%	9		.360356
Sig.		.082	.552

Means for groups in homogeneous subsets are displayed.

Based on observed means.

The error term is Mean Square(Error) = ,009.

a. Uses Harmonic Mean Sample Size = 9,000.

Lampiran 7. Hasil Pengujian Persen Panjang Edible Film Karagenan/Gelatin dengan Penambahan Minyak Kanola dan Gluten

Perlakuan	Ulangan	Persen Panjang (%)	Rata"
K1G1	1	98.31	78.84
	2	49.01	
	3	89.19	
K2G1	1	92.35	94.48
	2	93.31	
	3	97.77	
K3G1	1	57.78	63.44
	2	66.02	
	3	66.53	
K1G2	1	27.78	77.08
	2	105.18	
	3	98.27	
K2G2	1	57.40	49.53
	2	51.78	
	3	39.42	
K3G2	1	38.48	33.64
	2	32.11	
	3	30.32	
K1G3	1	51.28	48.58
	2	43.19	
	3	51.28	
K2G3	1	72.73	68.58
	2	72.55	
	3	60.47	
K3G3	1	46.57	45.54
	2	47.12	
	3	42.93	

Lampiran 8. Hasil Analisa Sidik Ragam Persen Panjang Edible Film Karagenan/Gelatin dengan Penambahan Minyak Kanola dan Gluten

Persen Panjang

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	7460.679[a]	7	1065.811	3.007	.027
Intercept	89960.754	1	89960.754	253.771	.000
Gluten	1842.341	2	921.171	2.599	.101
Canola	1410.016	2	705.008	1.989	.164
Gluten * Canola	2008.786	3	669.595	1.889	.166
Error	6735.411	19	354.495		
Total	118000.210	27			
Corrected Total	14196.090	26			

a. R Squared = ,526 (Adjusted R Squared = ,351)

Lampiran 9. Hasil Uji Lanjut Metode Duncan Persen Panjang Edible Film Karagenan/Gelatin dengan Penambahan Minyak Kanola dan Gluten

Persen Panjang

Duncan[a,b]

Penambahan Gluten	N	Subset 1	Subset 2
15 gram	6	39.5883	
5 gram	9		67.6100
0 gram	12		69.0092
Sig.		1.000	.881

Means for groups in homogeneous subsets are displayed.
 Based on observed means.
 The error term is Mean Square(Error) = 354,495.
a. Uses Harmonic Mean Sample Size = 8,308.
b. The group sizes are unequal. The harmonic mean of the group sizes is used. Type I error levels are not guaranteed.

Persen Panjang

Duncan[a,b]

penambahan canola	N	Subset 1	Subset 2
40%	9	53.4156	
0%	9	54.2356	
20%	9		78.3633
Sig.		.927	1.000

Lampiran 10. Hasil Pengujian Ketebalan Edible Film Karagenan/Gelatin dengan Penambahan Minyak Kanola dan Gluten

| Perlakuan | Ulangan | Ketebalan Titik (mm) | | | | | Rata" |
		1	2	3	4	5	
K1G1	1	0.10	0.09	0.09	0.08	0.09	0.09
	2	0.08	0.09	0.09	0.10	0.09	0.09
	3	0.09	0.10	0.09	0.09	0.09	0.09
K2G1	1	0.10	0.09	0.09	0.10	0.10	0.10
	2	0.08	0.09	0.09	0.09	0.10	0.09
	3	0.09	0.09	0.08	0.08	0.09	0.09
K3G1	1	0.11	0.11	0.10	0.10	0.11	0.11
	2	0.10	0.11	0.10	0.10	0.10	0.10
	3	0.11	0.11	0.09	0.10	0.09	0.10
K1G2	1	0.10	0.09	0.09	0.10	0.10	0.10
	2	0.11	0.12	0.11	0.12	0.11	0.11
	3	0.08	0.10	0.10	0.10	0.10	0.10
K2G2	1	0.09	0.08	0.09	0.09	0.10	0.09
	2	0.08	0.10	0.10	0.08	0.09	0.09
	3	0.10	0.09	0.09	0.09	0.10	0.09
K3G2	1	0.13	0.13	0.14	0.14	0.13	0.13
	2	0.12	0.12	0.11	0.11	0.11	0.11
	3	0.13	0.14	0.13	0.13	0.13	0.13
K1G3	1	0.12	0.13	0.12	0.12	0.14	0.13
	2	0.13	0.10	0.10	0.13	0.14	0.12
	3	0.12	0.14	0.13	0.14	0.14	0.13
K2G3	1	0.11	0.11	0.10	0.11	0.11	0.11
	2	0.12	0.13	0.13	0.12	0.12	0.12
	3	0.11	0.11	0.13	0.11	0.11	0.11
K3G3	1	0.11	0.13	0.13	0.12	0.13	0.12
	2	0.11	0.10	0.11	0.11	0.10	0.11
	3	0.10	0.11	0.11	0.12	0.12	0.11

Lampiran 11. Hasil Analisa Sidik Ragam Ketebalan Edible Film Karagenan/Gelatin dengan Penambahan Minyak Kanola dan Gluten

Ketebalan

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	.004[a]	7	.001	14.667	.000
Intercept	.290	1	.290	6739.694	.000
Gluten	.001	2	.000	6.786	.006
Canola	.002	2	.001	19.026	.000
Gluten * Canola	.002	3	.001	12.985	.000
Error	.001	19	4.298E-5		
Total	.310	27			
Corrected Total	.005	26			

a. R Squared = ,844 (Adjusted R Squared = ,786)

Lampiran 12. Hasil Uji Lanjut Metode Duncan Ketebalan Edible Film Karagenan/Gelatin dengan Penambahan Minyak Kanola dan Gluten

Ketebalan

Duncan[a,b]

Penambahan Gluten	N	Subset 1	Subset 2
15 gram	12	.1000	
5 gram	9	.1067	
0 gram	6		.1183
Sig.		.052	1.000

Means for groups in homogeneous subsets are displayed.

Based on observed means.

The error term is Mean Square(Error) = 4,30E-005.

a. Uses Harmonic Mean Sample Size = 8,308.

b. The group sizes are unequal. The harmonic mean of the group sizes is used. Type I error levels are not guaranteed.

Ketebalan

Duncan[a,b]

penambahan canola	N	Subset 1	Subset 2	
40%	9	.0956		
0%	9		.1056	
20%	9			.1178
Sig.		1.000	1.000	1.000

Means for groups in homogeneous subsets are displayed.

Based on observed means.

The error term is Mean Square(Error) = 4,30E-005.

a. Uses Harmonic Mean Sample Size = 9,000.

Lampiran 13. Hasil Pegujian Daya Larut Film Karagenan/Gelatin dengan Penambahan Minyak Kanola dan Gluten

Perlakuan	Ulangan	Daya Larut (%)	Rata"
K1G1	1	53.03	54.66
	2	55.96	
	3	54.99	
K2G1	1	58.02	58.37
	2	56.94	
	3	60.14	
K3G1	1	61.16	59.05
	2	55.10	
	3	60.90	
K1G2	1	63.58	67.22
	2	68.34	
	3	69.74	
K2G2	1	75.28	79.91
	2	83.47	
	3	80.99	
K3G2	1	85.21	85.53
	2	88.35	
	3	83.02	
K1G3	1	73.78	75.62
	2	79.08	
	3	74.00	
K2G3	1	59.65	61.02
	2	60.98	
	3	62.43	
K3G3	1	62.29	61.06
	2	58.78	
	3	62.11	

Lampiran 14. Hasil Analisa Sidik Ragam Daya Larut Edible Film Karagenan/Gelatin dengan Penambahan Minyak Kanola dan Gluten

Daya Larut

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	2835.232[a]	7	405.033	57.392	.000
Intercept	114665.158	1	114665.158	16247.758	.000
Gluten	24.596	2	12.298	1.743	.202
Canola	1586.941	2	793.471	112.433	.000
Gluten * Canola	958.143	3	319.381	45.255	.000
Error	134.089	19	7.057		
Total	123947.305	27			
Corrected Total	2969.320	26			

a. R Squared = ,955 (Adjusted R Squared = ,938)

Lampiran 15. Hasil Uji Lanjut Metode Duncan Daya Larut Edible Film Karagenan/Gelatin dengan Penambahan Minyak Kanola dan Gluten

Daya Larut

Duncan[a,b]

Penambahan Gluten	N	Subset	
		1	2
15 gram	12	64.5883	
5 gram	9	65.8333	
0 gram	6		73.2933
Sig.		.351	1.000

Means for groups in homogeneous subsets are displayed.

Based on observed means.

The error term is Mean Square(Error) = 7,057.

a. Uses Harmonic Mean Sample Size = 8,308.

b. The group sizes are unequal. The harmonic mean of the group sizes is used. Type I error levels are not guaranteed.

Daya Larut

Duncan[a,b]

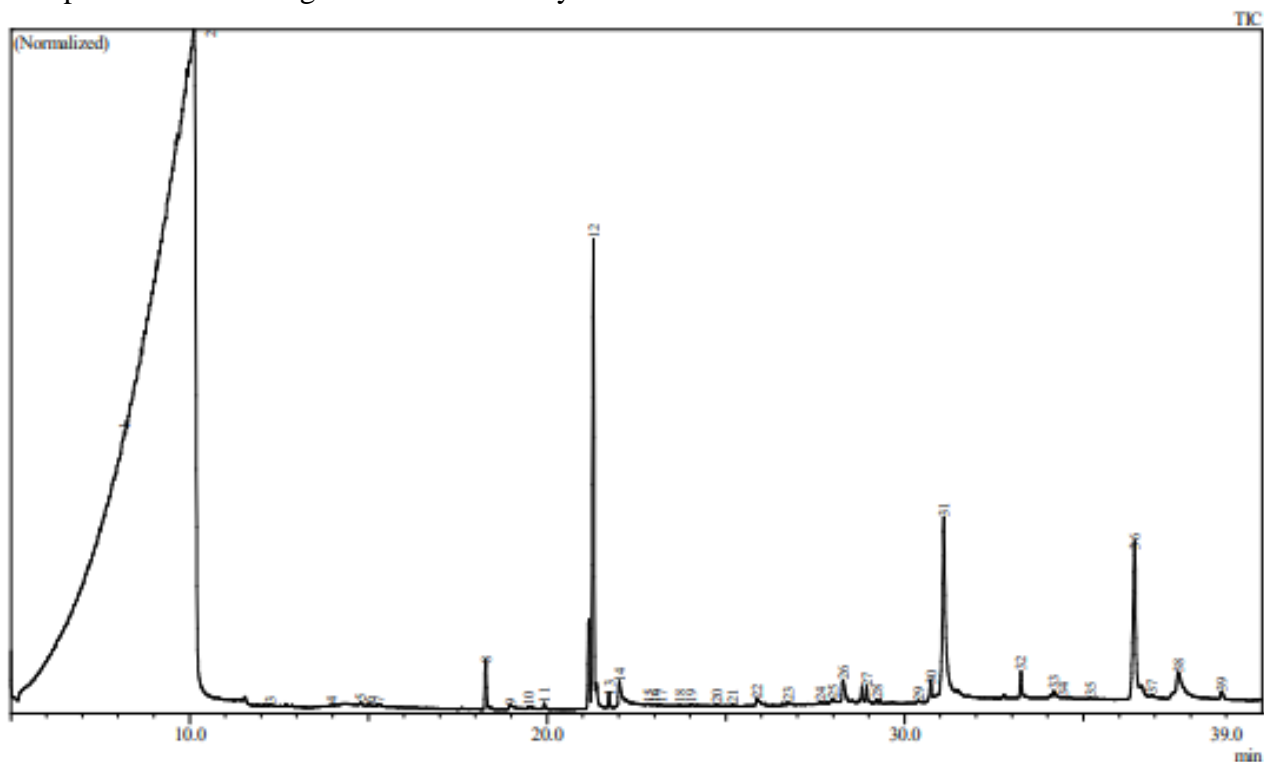| penambahan canola	N	Subset 1	Subset 2	
40%	9	57.3600		
0%	9		65.9000	
20%	9			77.5533
Sig.		1.000	1.000	1.000

Means for groups in homogeneous subsets are displayed.

Based on observed means.

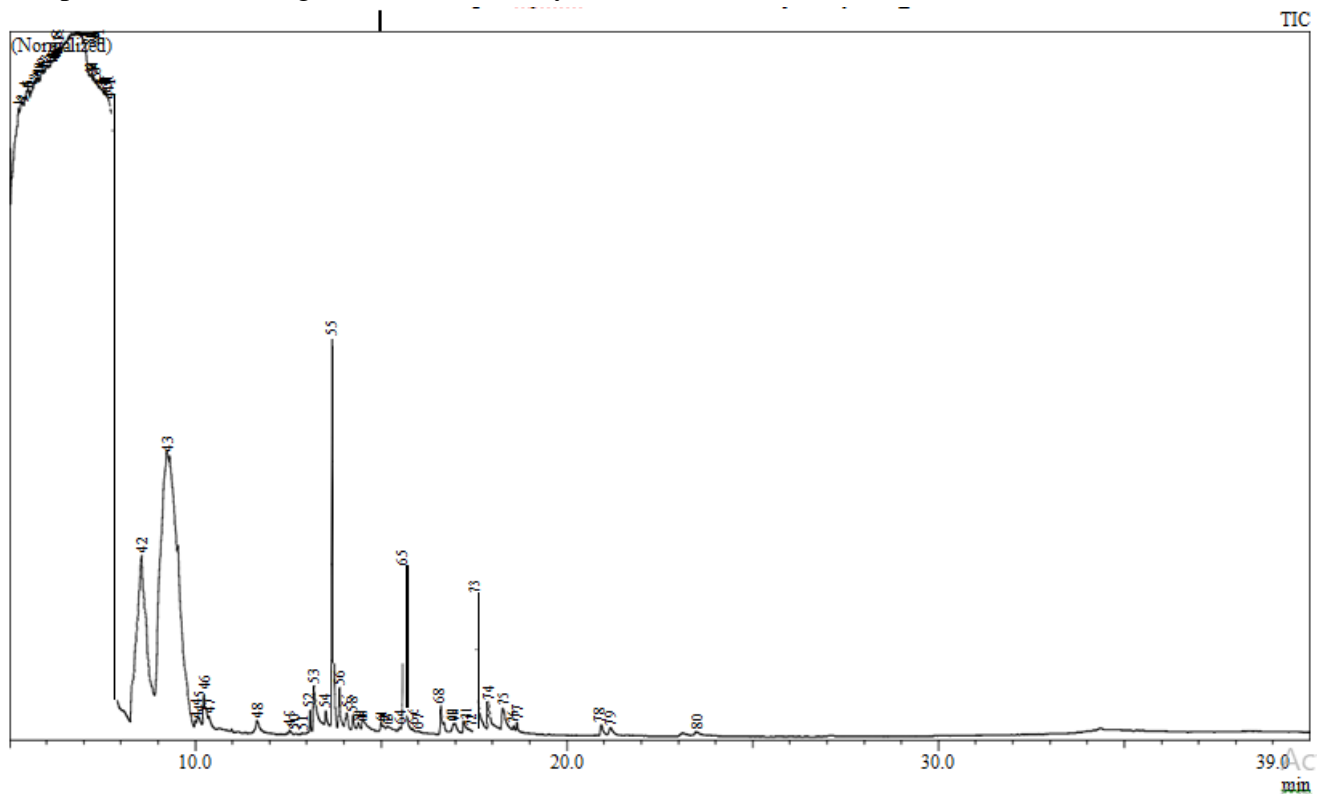The error term is Mean Square(Error) = 4,30E-005.

a. Uses Harmonic Mean Sample Size = 9,000.

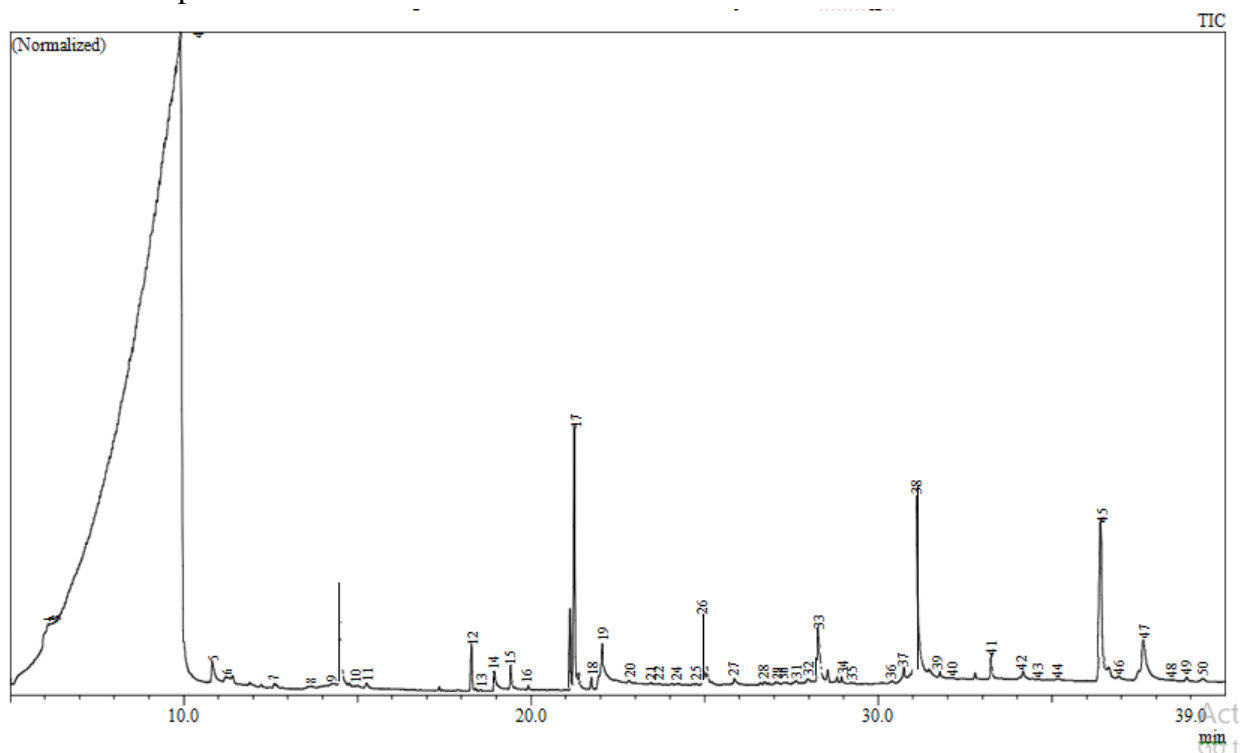Lampiran 16. Kromatogram dan Profil Senyawa Volatil *Edible Film* K1G1

Tabel Komponen Senyawa Volatil Produk K1G1				
No.	Golongan	RT (min)	Senyawa	Area (%)
1	Asam	21.301	9-Octadecanoic Acid	2.36
		22.034	Oleic Acid	0.42
		18.293	Hexadecanoic acid	0.20
		21.750	Octadecanoic acid	0.07
		18.984	Ascorbic acid	0.05
		22.850	9,11-Octadecadienoic	0.04
		26.746	Oleoyl chloride	0.04
2	Alkohol	10.121	1,2,3-Propanetriol	82.37
		36.439	8-Pentadecanol	1.33
		28.950	13-Docosen-1-ol	0.18
		29.223	1-Hexacosanol	0.03
3	Alkana	30.75	1,54-Dibromotetrapentacone	0.15
		15.025	Tetradecane	0.02
		30.401	1-Cyclohexyldimethylsilyloxybutane	0.02
		12.281	Cyclododecane	0.01
4	Keton	33.262	3,6-Nonadecadione	0.14
		34.183	2,5-Heptadecadione	0.07
5	Fenol	13.975	Polygalitol	0.11
6	Ester	25.204	Methyl Icosanoate	0.02

Lampiran 17. Kromatogram dan Profil Senyawa Volatil *Edible Film* K3G3
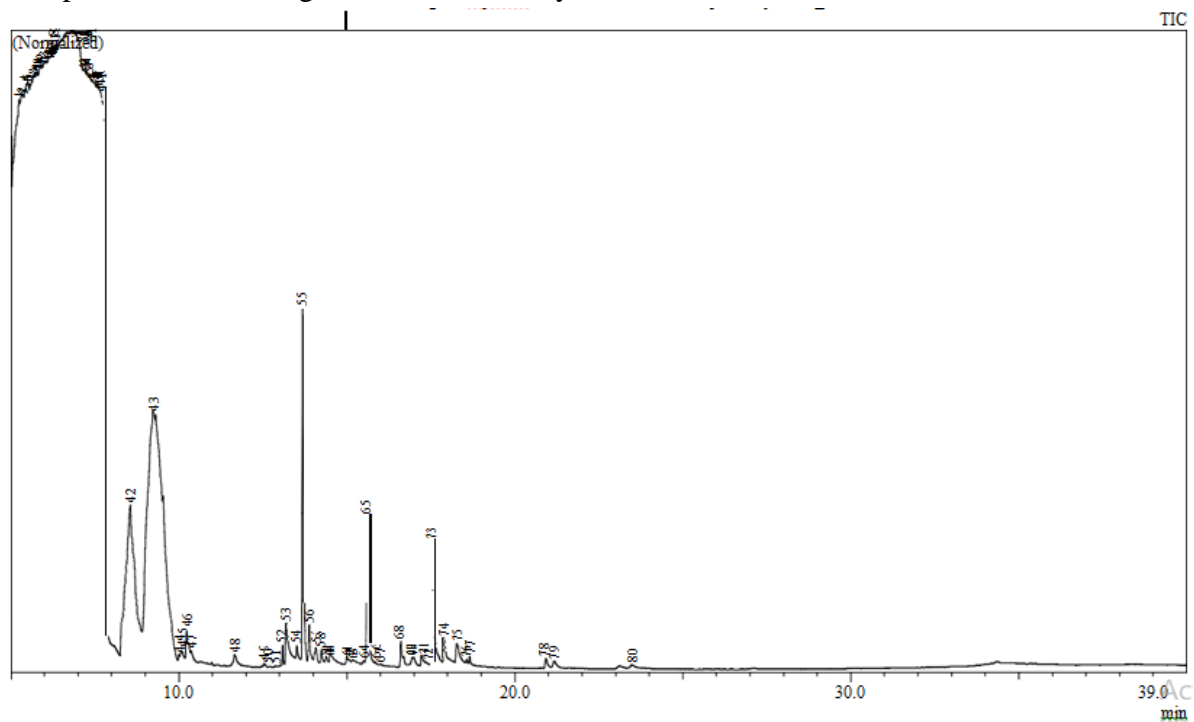

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Tabel Komponen Senyawa Volatil Produk K3G3 Tanpa Aroma				
No.	Golongan	RT (min)	Senyawa	Area (%)
1	Alkohol	8.841	1,2,3-Propanetriol	85.96
		36.43	8-Pentadecanol	1.76
		28.817	13-Docosen-1-ol	0.05
		29.22	1-Hexacosanol	0.01
2	Asam	31.089	9-Octadecanoic Acid	3.75
		37.65	Oleoyl chloride	0.84
		28.279	Hexadecanoic acid	0.61
		18.957	Ascorbic acid	0.09
		21.738	Octadecanoic acid	0.07
		22.831	9,11-Octadecadienoic	0.04
		25.192	Eicosanoic Acid	0.04
		28.55	Benzenedicarboxylic	0.01
3	Alkana	30.733	Tetrapentacontane	0.19
		30.388	1-Cyclohexyldimethylsilyloxybutane	0.04
		9.600	Butane	0.01
4	Steroid	35.202	Dehydroergosterol	0.15
		39.359	Ergosta	0.06
5	Amida	24.963	Decanamide	0.49
6	Keton	33.266	3,6-Nonadecadione	0.37
7	Terpenoid	34.179	Tetramethyl	0.25

Lampiran 18. Kromatogram dan Profil Senyawa Volatil *Edible Film* K3G3 dengan penambahan Aroma *Butter*

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Tabel Komponen Senyawa Volatil Produk K3G3 Aroma Butter				
No.	Golongan	RT (min)	Senyawa	Area (%)
1	Asam	6.092	Butanoic Acid	2.23
		21.293	9-Octadecenoic Acid	1.42
		37.642	Oleoyl chloride	0.70
		28.282	Hexadecanoic acid	0.60
		10.838	Decanoic Acid	0.21
		22.833	9,11-Octadecadienoic	0.18
		18.962	Ascorbic acid	0.17
		21.742	Octadecanoic acid	0.06
		15.283	Eicosanoic Acid	0.04
		31.783	Benzenedicarboxylic	0.02
2	Alkana	6.225	Butane	0.31
		30.74	Tetrapentacontane	0.12
		30.401	1-Cyclohexyldimethylsilyloxybutane	0.02
3	Alkohol	9.922	1,2,3-Propanetriol	85.28
		36.438	8-Pentadecanol	1.45
		28.953	13-Docosen-1-ol	0.12
4	Keton	33.263	3,6-Nonadecadione	0.14
		34.179	2,5-Heptadecadione	0.08
5	Steroid	39.357	Ergosta	0.03
		35.199	Dehydroergosterol	0.02
6	Amida	24.969	Decanamide	0.53
7	Terpenoid	38.533	Tetramethyl	0.04

Lampiran 19. Kromatogram dan Profil Senyawa Volatil Produk Aroma *Butter*

| **Tabel Komponen Senyawa Volatil Aroma Butter** |
|||||
No.	Golongan	RT (min)	Senyawa	Area (%)
1	Asam	9.241	Butyric Acid	8.19
		5.246	Acetic Acid	5.46
		10.236	Hydrazinecarboxylic acid	0.16
		16.611	2(3H)-Furanone	0.13
		14.067	Butanoic Acid	0.11
		17.222	Tetradecanoic Acid	0.07
		13.088	Decanoic Acid	0.06
		20.925	Hexadecanoic acid	0.05
		23.473	9-Octadecenoic Acid	0.03
		17.383	Vinyl decanoate	0.02
		15.850	Dodecanoic Acid	0.01
2	Alkohol	7.680	1,2-Propanediol	5.82
		5.687	(3-Methyl-oxiran-2-yl)-methanol	2.23
		6.318	Ethanol	1.53
		6.784	Oxiranemethanol	1.38
		5.626	Isopropyl Alcohol	1.31
		13.199	Ethylene glycol	0.37
		12.867	5-Thiazoleethanol	0.01
3	Anhidrat	8.568	Butanoic Anhydride	2.90
		21.170	Decanoic anhydride	0.05
4	Alkana	5.573	Propane	1.07
		17.896	Octylbutan	0.22
		18.567	Trimethyloctane	0.03
5	Amina	6.142	5-Amino-6-Nitroso	2.21
		7.425	Ethanamine	1.90
		7.168	o-Methylisourea hydrogen sulfate	1.61
		10.075	Methyldiethanolamine	0.06
		14.993	Pentylamine	0.04
6	Keton	7.208	2,4-Dithiahexan-5-One	1.62
		5.757	2-Butanone	1.58
7	Steroid	6.371	Alpha-Hydroperoxy	1.54
8	Aldehid	7.591	Tridecanal-4,4-D2	2.16
9	Flavonoid	15.596	5-Pentylpentan	0.77
10	Fenol	14.497	Vanillin	0.15
11	Ester	13.511	Isobornyl Isovalerate	0.11
12	Terpenoid	18.655	Isophytol	0.03
13	Amida	15.058	Octanamide	0.03

Lampiran 20. Total Senyawa Volatil Edible Film dan Produk Aroma *Butter*

No.	Produk	Asam	Alkohol	Alkana	Anhidrat	Fenol	Terpenoid	Flavonoid	Aldehid	Keton	Amida	Amina	Ester	Steroid
1	K1G1	7	4	4		1				2			1	
2	K3G3	8	4	3			1			1	1			2
3	K3G3 + Aroma Butter	10	3	3			1			2	1			2
4	Aroma Butter	11	7	3	2	1		1	1	2		5	1	2

Lampiran 21. Dokumentasi Kegiatan Penelitian