

BAB V

KESIMPULAN DAN SARAN

A. Kesimpulan

Dari hasil penelitian gel ekstrak etanol kulit buah manggis (*Garcinia Mangostana L.*) dapat disimpulkan bahwa :

1. Perbedaan kombinasi *gelling agent* Carbopol 940 dan CMC Na memberikan perbedaan yang tidak bermakna terhadap mutu fisik meliputi viskositas, daya sebar, dan daya lekat pada sediaan gel ekstrak etanol kulit buah manggis (*Garcinia mangostana L.*)
2. Kombinasi *gelling agent* Carbopol 940 dan CMC Na pada formula I dalam pembuatan gel ekstrak etanol kulit buah manggis (*Garcinia mangostana L.*) memberikan mutu fisik yang baik dan stabil.

B. Saran

1. Perlu dilakukan penelitian lebih lanjut dalam pembuatan gel ekstrak etanol kulit buah manggis terhadap uji *invivo* terhadap formula dengan perbedaan kombinasi *gelling agent* Carbopol 940 dan CMC Na (aktivitas inflamasi terhadap formula terbaik).
2. Perlu dilakukan uji terhadap mutu fisik dan stabilitas dengan suhu ruangan yang dikendalikan.

DAFTAR PUSTAKA

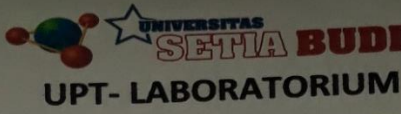
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LAMPIRAN

Lampiran 1. Hasil determinasi tanaman manggis



**UNIVERSITAS
SETIA BUDI
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No : 358/DET/UPT-LAB/12/III/2019
Hal : Surat Keterangan Determinasi Tumbuhan

Menerangkan bahwa :

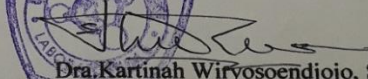
Nama : Nur Fitriya Rohmah
NIM : 19161182 B
Fakultas : Farmasi Universitas Setia Budi

Telah mendeterminasikan tumbuhan : **Manggis (*Garcinia mangostana* L..)**

Determinasi berdasarkan Steenis : FLORA
1b – 2b – 3b – 4b – 6b – 7b – 9b – 10b – 11b – 12b – 13b – 14b – 16a. golongan 10. 239b – 243b – 244b – 248b – 249b – 250a – 251b – 253b – 254a. familia 80. Guttiferae 1a. 1. *Garcinia*. 1b. ***Garcinia mangostana* L.**

Deskripsi :

Habitus : Pohon, tinggi 6 – 20 m.
Akar : Sistem akar tunggang.
Batang : Bulat, berkayu, percabangan monopodial.
Daun : Tunggal, memanjang sampai bulat telur memanjang, pangkal runcing sampai tumpul, ujung meruncing sampai runcing, tepi rata, tulang daun menyirip, seperti belulang, hijau tua mengkilat, panjang 12,5– 20,2 cm, lebar 5,1– 8,9 cm, tulang daun menyirip.
Bunga : Beraturan, bunga betina pada ujung ranting, daun kelopak terluar hijau kuning, 2 yang terdalam lebih kecil; daun mahkota bulat telur terbalik, berdaging tebal, hijau kuning; staminodia kerap kali dalam kelompok; bakal buah beruang 4 – 8. Kepala putik berjari-jari 4 – 8.
Buah : **Bentuk bola tertekan, garis tengah 3,5 – 7 cm, ungu tua. Dinding buah tebal, berdaging, ungu, dengan getah kuning.**
Biji : 1 – 3, diselimuti oleh selaput biji yang tebal berair, putih.
Pustaka : Steenis C.G.G.J., Bloembergen S. Eyma P.J. (1978): *FLORA*, PT Pradnya Paramita. Jl. KebonSirih 46. Jakarta Pusat, 1978.

Surakarta, 12 Maret 2019
Tim determinasi

Dra. Kartinah Wiryosoendjojo, SU.

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Lampiran 2. Perhitungan randemen kulit buah manggis

- Randemen kulit buah manggis

Bobot kering = 2000 gram

Bobot serbuk = 700 gram

$$\text{Rumus} = \frac{\text{bobot serbuk (gram)}}{\text{bobot kering (gram)}} \times 100\%$$

$$\text{prosentase rendemen} = \frac{700}{2000} \times 100\%$$

$$= 35 \%$$

Lampiran 3. Perhitungan rendemen ekstrak etanol kulit buah manggis

- Rendemen ekstrak pegagan

Berat gelas = 145,76 gram

Berat gelas+Ekstrak = 200 gram

Ekstrak kulit buah manggis = 54,24 gram

$$\text{Rumus} = \frac{\text{bobot ekstrak (gram)}}{\text{bobot serbuk (gram)}} \times 100\%$$

$$\text{prosentase rendemen} = \frac{54,24}{700} \times 100\%$$

$$= 7,75\%$$

Lampiran 4. Perhitungan penetapan kadar air ekstrak kulit buah manggis

No	Bobot ekstrak (gram)	Kadar air (%)
1	2	7,6
2	2	7,1
3	2	7,9
	Rata-rata	7,5

[Type text]

Lampiran 5. Perhitungan bahan pembuatan gel ekstrak etanol kulit buah manggis

a. Formula 1

Bahan	Formula (g)	Perhitungan (g)	Penimbangan (g)
Ekstrak kulit buah manggis	2	$\frac{2}{20} \times 100$	10
Karbopol	1	$\frac{1}{20} \times 100$	5
CMC	-	-	-
Gliserin	2	$\frac{2}{20} \times 100$	10
Propilenglikol	1	$\frac{1}{20} \times 100$	5
Metil Paraben	0,03	$\frac{0,03}{20} \times 100$	0,15
Aquadest	20	ad 100	ad 100

b. Formula 2

Bahan	Formula (g)	Perhitungan (g)	Penimbangan (g)
Ekstrak kulit buah manggis	2	$\frac{2}{20} \times 100$	10
Karbopol	0,5	$\frac{0,5}{20} \times 100$	2,5
CMC	0,5	$\frac{0,5}{20} \times 100$	2,5
Gliserin	2	$\frac{2}{20} \times 100$	10
Propilenglikol	1	$\frac{1}{20} \times 100$	5
Metil Paraben	0,03	$\frac{0,03}{20} \times 100$	0,15
Aquadest	20	ad 100	ad 100

[Type text]

Formula 3

Bahan	Formula (g)	Perhitungan (g)	Penimbangan (g)
Ekstrak kulit buah manggis	2	$\frac{2}{20} \times 100$	10
Karbopol	-	-	
CMC	1	$\frac{1}{20} \times 100$	5
Gliserin	2	$\frac{2}{20} \times 100$	10
Propilenglikol	1	$\frac{1}{20} \times 100$	5
Metil Paraben	0,03	$\frac{0,03}{20} \times 100$	0,15
Aquadest	20	ad 100	ad 100

Lampiran 6. Data hasil uji daya sebar krim ekstrak pegagan

a. Data pengujian minggu ke-1

Formula	Beban (g)	Replikasi		
		1 (cm)	2 (cm)	3 (cm)
1	50	5,05	5,10	5,10
	100	5,20	5,20	5,30
	150	5,35	5,40	5,55
	200	5,40	5,65	5,70
2	50	5,10	5,15	5,00
	100	5,25	5,30	5,20
	150	5,40	5,55	5,35
	200	5,60	5,80	5,60
3	50	4,80	4,85	5,80
	100	5,00	4,90	5,10
	150	5,10	5,15	5,20
	200	5,30	5,20	5,40

b. Data pengujian minggu ke-2

Formula	Beban (g)	Replikasi		
		1 (cm)	2 (cm)	3 (cm)
1	50	5,00	5,00	5,10
	100	5,15	5,10	5,20
	150	5,30	5,35	5,35
	200	5,40	5,50	5,50
2	50	5,00	5,05	5,00
	100	5,15	5,20	5,10
	150	5,30	5,30	5,25
	200	5,45	5,50	5,40
3	50	4,75	4,70	4,80
	100	4,90	4,80	5,00
	150	5,05	5,00	5,20
	200	5,15	5,20	5,30

[Type text]

c. Data pengujian minggu ke-3

Formula	Beban (g)	Replikasi		
		1 (cm)	2 (cm)	3 (cm)
1	50	5,20	5,10	5,10
	100	5,30	5,25	5,30
	150	5,35	5,40	5,40
	200	5,40	5,60	5,65
2	50	5,15	5,10	5,00
	100	5,20	5,25	5,15
	150	5,35	5,40	5,30
	200	5,50	5,60	5,50
3	50	4,80	4,90	4,86
	100	5,00	4,95	5,15
	150	5,10	5,10	5,30
	200	5,20	5,20	5,40

Lampiran 7. Data hasil uji daya lekat krim ekstrak pegagan

Minggu ke-	Formula 1			Formula 2			Formula 3		
	1	2	3	1	2	3	1	2	3
1	16,78	15,03	15,17	14,37	16,60	15,48	14,80	12,61	16,14
2	16,07	16,05	15,31	14,30	13,12	15,41	13,27	14,97	14,45
3	14,65	14,88	13,92	14,65	13,26	14,82	10,31	9,29	11,29

Lampiran 8. Data hasil pengujian viskositas

Minggu ke-	Formula 1			Formula 2			Formula 3		
	1	2	3	1	2	3	1	2	3
1	310	290	300	300	290	290	290	280	260
2	310	300	300	280	270	270	290	290	280
3	320	300	310	260	270	260	300	290	290

Lampiran 9. Proses maserasi ekstrak etanol kulit buah manggis

Lampiran 10. Pembuatan gel ekstrak etanol kulit buah manggis



[Type text]

Lampiran 11. Alat uji mutu fisik gel ekstrak etanol kulit buah manggis

[Type text]

Lampiran 12. Uji statistik dan analisis Anova satu arah formula gel

1. Daya Sebar

NPar Tests

One-Sample Kolmogorov-Smirnov Test

		daya sebar
N		9
Normal Parameters ^{a,b}	Mean	5.5456
	Std. Deviation	.24006
Most Extreme Differences	Absolute	.159
	Positive	.159
	Negative	-.136
Kolmogorov-Smirnov Z		.478
Asymp. Sig. (2-tailed)		.976

a. Test distribution is Normal.

b. Calculated from data.

Oneway

Test of Homogeneity of Variances

daya sebar

Levene Statistic	df1	df2	Sig.
1.369	2	6	.324

ANOVA

daya sebar

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	.124	2	.062	1.099	.392
Within Groups	.337	6	.056		
Total	.461	8			

Post Hoc Tests

Multiple Comparisons

Dependent Variable: daya sebar

Tukey HSD

(I) formula	(J) formula	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
1.00	2.00	-.13000	.19362	.788	-.7241	.4641
	3.00	-.28667	.19362	.364	-.8807	.3074
2.00	1.00	.13000	.19362	.788	-.4641	.7241
	3.00	-.15667	.19362	.712	-.7507	.4374
3.00	1.00	.28667	.19362	.364	-.3074	.8807
	2.00	.15667	.19362	.712	-.4374	.7507

[Type text]

Homogeneous Subsets

daya sebar

Tukey HSD^a

Formula	N	Subset for alpha = 0.05
		1
1.00	3	5.4067
2.00	3	5.5367
3.00	3	5.6933
Sig.		.364

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 3.000.

2. Daya Lekat

NPar Tests

One-Sample Kolmogorov-Smirnov Test

		Daya Lekat
N		9
Normal Parameters ^{a,b}	Mean	15.2211
	Std. Deviation	1.27443
	Absolute	.151
Most Extreme Differences	Positive	.111
	Negative	-.151
Kolmogorov-Smirnov Z		.454
Asymp. Sig. (2-tailed)		.986

a. Test distribution is Normal.

b. Calculated from data.

Oneway

Test of Homogeneity of Variances

Daya Lekat

Levene Statistic	df1	df2	Sig.
.659	2	6	.551

ANOVA

Daya Lekat

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	2.259	2	1.129	.631	.564
Within Groups	10.734	6	1.789		
Total	12.993	8			

[Type text]

Post Hoc Tests

Multiple Comparisons

Dependent Variable: Daya Lekat
Tukey HSD

(I) formula	(J) formula	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
1.00	2.00	.17667	1.09212	.986	-3.1742	3.5276
	3.00	1.14000	1.09212	.579	-2.2109	4.4909
2.00	1.00	-.17667	1.09212	.986	-3.5276	3.1742
	3.00	.96333	1.09212	.670	-2.3876	4.3142
3.00	1.00	-1.14000	1.09212	.579	-4.4909	2.2109
	2.00	-.96333	1.09212	.670	-4.3142	2.3876

Homogeneous Subsets

Daya Lekat

Tukey HSD^a

formula	N	Subset for alpha = 0.05
		1
3.00	3	14.5200
2.00	3	15.4833
1.00	3	15.6600
Sig.		.579

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 3.000.

3. Viskositas

NPar Tests

One-Sample Kolmogorov-Smirnov Test

		Viskositas
N		9
Normal Parameters ^{a,b}	Mean	282.2222
	Std. Deviation	19.22094
	Absolute	.213
Most Extreme Differences	Positive	.121
	Negative	-.213
Kolmogorov-Smirnov Z		.638
Asymp. Sig. (2-tailed)		.810

a. Test distribution is Normal.

b. Calculated from data.

[Type text]

Oneway

Test of Homogeneity of Variances

viskositas

Levene Statistic	df1	df2	Sig.
.483	2	6	.639

ANOVA

viskositas

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	1488.889	2	744.444	3.045	.122
Within Groups	1466.667	6	244.444		
Total	2955.556	8			

Post Hoc Tests

Multiple Comparisons

Dependent Variable: viskositas

Tukey HSD

(I) formula	(J) formula	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
1.00	2.00	30.00000	12.76569	.124	-9.1687	69.1687
	3.00	23.33333	12.76569	.239	-15.8353	62.5020
2.00	1.00	-30.00000	12.76569	.124	-69.1687	9.1687
	3.00	-6.66667	12.76569	.864	-45.8353	32.5020
3.00	1.00	-23.33333	12.76569	.239	-62.5020	15.8353
	2.00	6.66667	12.76569	.864	-32.5020	45.8353

Homogeneous Subsets

Viskositas

Tukey HSD^a

formula	N	Subset for alpha = 0.05
		1
2.00	3	270.0000
3.00	3	276.6667
1.00	3	300.0000
Sig.		.124

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 3.00

[Type text]

Lampiran 13. Uji statistik independent samples T-test

1. Stabilitas daya lekat

a. Formula 1

T-Test

Group Statistics

	minggu	N	Mean	Std. Deviation	Std. Error Mean
dayalekat	1.00	3	15.6600	.97247	.56146
	3.00	3	14.4833	.50123	.28939

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means	
		F	Sig.	t	df
dayalekat	Equal variances assumed	2.771	.171	1.863	4
	Equal variances not assumed			1.863	2.993

Independent Samples Test

		t-test for Equality of Means		
		Sig. (2-tailed)	Mean Difference	Std. Error Difference
dayalekat	Equal variances assumed	.136	1.17667	.63165
	Equal variances not assumed	.160	1.17667	.63165

Independent Samples Test

		t-test for Equality of Means	
		95% Confidence Interval of the Difference	
		Lower	Upper
dayalekat	Equal variances assumed	-.57707	2.93040
	Equal variances not assumed	-.83634	3.18967

b. Formula 2

Group Statistics

	minggu	N	Mean	Std. Deviation	Std. Error Mean
dayalekat	1.00	3	15.4833	1.11500	.64375
	3.00	3	14.2433	.85582	.49411

[Type text]

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means	
		F	Sig.	t	df
dayalekat	Equal variances assumed	.047	.838	1.528	4
	Equal variances not assumed			1.528	3.749

Independent Samples Test

		t-test for Equality of Means		
		Sig. (2-tailed)	Mean Difference	Std. Error Difference
dayalekat	Equal variances assumed	.201	1.24000	.81151
	Equal variances not assumed	.206	1.24000	.81151

Independent Samples Test

		t-test for Equality of Means	
		95% Confidence Interval of the Difference	
		Lower	Upper
dayalekat	Equal variances assumed	-1.01313	3.49313
	Equal variances not assumed	-1.07378	3.55378

c. Formula 3**Group Statistics**

	minggu	N	Mean	Std. Deviation	Std. Error Mean
dayalekat	1.00	3	14.5167	1.78197	1.02882
	3.00	3	10.2967	1.00007	.57739

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means	
		F	Sig.	t	df
dayalekat	Equal variances assumed	1.003	.373	3.577	4
	Equal variances not assumed			3.577	3.146

Independent Samples Test

		t-test for Equality of Means		
		Sig. (2-tailed)	Mean Difference	Std. Error Difference
dayalekat	Equal variances assumed	.023	4.22000	1.17977
	Equal variances not assumed	.035	4.22000	1.17977

[Type text]

Independent Samples Test

		t-test for Equality of Means	
		95% Confidence Interval of the Difference	
		Lower	Upper
dayalekat	Equal variances assumed	.94444	7.49556
	Equal variances not assumed	.56221	7.87779

2. Stabilitas daya sebar

a. Formula 1

T-Test

Group Statistics

	minggu	N	Mean	Std. Deviation	Std. Error Mean
dayasebar	1.00	3	5.4333	.10408	.06009
	3.00	3	5.2833	.02887	.01667

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means	
		F	Sig.	t	df
dayasebar	Equal variances assumed	5.000	.089	2.405	4
	Equal variances not assumed			2.405	2.306

Independent Samples Test

		t-test for Equality of Means		
		Sig. (2-tailed)	Mean Difference	Std. Error Difference
dayasebar	Equal variances assumed	.074	.15000	.06236
	Equal variances not assumed	.121	.15000	.06236

Independent Samples Test

		t-test for Equality of Means	
		95% Confidence Interval of the Difference	
		Lower	Upper
dayasebar	Equal variances assumed	-.02314	.32314
	Equal variances not assumed	-.08694	.38694

[Type text]

b. Formula 2**Group Statistics**

	minggu	N	Mean	Std. Deviation	Std. Error Mean
dayasebar	1.00	3	5.2500	.05000	.02887
	3.00	3	5.2000	.05000	.02887

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means	
		F	Sig.	t	df
dayasebar	Equal variances assumed	.000	1.000	1.225	4
	Equal variances not assumed			1.225	4.000

Independent Samples Test

		t-test for Equality of Means		
		Sig. (2-tailed)	Mean Difference	Std. Error Difference
dayasebar	Equal variances assumed	.288	.05000	.04082
	Equal variances not assumed	.288	.05000	.04082

Independent Samples Test

		t-test for Equality of Means	
		95% Confidence Interval of the Difference	
		Lower	Upper
dayasebar	Equal variances assumed	-.06335	.16335
	Equal variances not assumed	-.06335	.16335

c. Formula 3**Group Statistics**

	minggu	N	Mean	Std. Deviation	Std. Error Mean
dayasebar	1.00	3	5.0000	.10000	.05774
	3.00	3	5.0333	.10408	.06009

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means	
		F	Sig.	t	df
dayasebar	Equal variances assumed	.073	.801	-.400	4
	Equal variances not assumed			-.400	3.994

[Type text]

Independent Samples Test

		t-test for Equality of Means		
		Sig. (2-tailed)	Mean Difference	Std. Error Difference
dayasebar	Equal variances assumed	.710	-.03333	.08333
	Equal variances not assumed	.710	-.03333	.08333

Independent Samples Test

		t-test for Equality of Means	
		95% Confidence Interval of the Difference	
		Lower	Upper
dayasebar	Equal variances assumed	-.26470	.19804
	Equal variances not assumed	-.26485	.19818

3. Stabilitas viskositas

a. Formula 1

T-Test

Group Statistics

	minggu	N	Mean	Std. Deviation	Std. Error Mean
viskositas	1.00	3	300.0000	10.00000	5.77350
	3.00	3	310.0000	10.00000	5.77350

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means	
		F	Sig.	t	df
viskositas	Equal variances assumed	.000	1.000	-1.225	4
	Equal variances not assumed			-1.225	4.000

Independent Samples Test

		t-test for Equality of Means		
		Sig. (2-tailed)	Mean Difference	Std. Error Difference
viskositas	Equal variances assumed	.288	-10.00000	8.16497
	Equal variances not assumed	.288	-10.00000	8.16497

[Type text]

Independent Samples Test

		t-test for Equality of Means	
		95% Confidence Interval of the Difference	
		Lower	Upper
viskositas	Equal variances assumed	-32.66958	12.66958
	Equal variances not assumed	-32.66958	12.66958

b. Formula 2

Group Statistics

	minggu	N	Mean	Std. Deviation	Std. Error Mean
viskositas	1.00	3	293.3333	5.77350	3.33333
	3.00	3	273.3333	5.77350	3.33333

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means	
		F	Sig.	t	df
viskositas	Equal variances assumed	.000	1.000	4.243	4
	Equal variances not assumed			4.243	4.000

Independent Samples Test

		t-test for Equality of Means		
		Sig. (2-tailed)	Mean Difference	Std. Error Difference
viskositas	Equal variances assumed	.013	20.00000	4.71405
	Equal variances not assumed	.013	20.00000	4.71405

Independent Samples Test

		t-test for Equality of Means	
		95% Confidence Interval of the Difference	
		Lower	Upper
viskositas	Equal variances assumed	6.91171	33.08829
	Equal variances not assumed	6.91171	33.08829

c. Formula 3

Group Statistics

	minggu	N	Mean	Std. Deviation	Std. Error Mean
viskositas	1.00	3	276.6667	15.27525	8.81917
	3.00	3	293.3333	5.77350	3.33333

[Type text]

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means	
		F	Sig.	t	df
viskositas	Equal variances assumed	2.571	.184	-1.768	4
	Equal variances not assumed			-1.768	2.560

Independent Samples Test

		t-test for Equality of Means		
		Sig. (2-tailed)	Mean Difference	Std. Error Difference
viskositas	Equal variances assumed	.152	-16.66667	9.42809
	Equal variances not assumed	.191	-16.66667	9.42809

Independent Samples Test

		t-test for Equality of Means	
		95% Confidence Interval of the Difference	
		Lower	Upper
viskositas	Equal variances assumed	-42.84324	9.50991
	Equal variances not assumed	-49.81036	16.47703