BAB V

KESIMPULAN DAN SARAN

A. Kesimpulan

Berdasarkan penelitian yang dilakukan dapat disimpulkan :

1. Kombinasi *gelling agent* Carbopol 940 dan Tragakan tidak berpengaruh terhadap mutu fisik sediaan gel ekstrak etanol kulit buah manggis yang meliputi organoleptis, homogenitas, pH, viskositas , daya lekat dan daya sebar sediaan gel. Sehingga memberikan mutu fisik gel ekstrak etanol kulit buah manggis (*Garcinia mangostana* L.) yang baik.

2. Ketiga formula memberikan uji mutu fisik yang baik dan uji stabilitas yang tidak stabil pada pengamatan daya sebar, daya lekat, dan viskositas.

B. Saran

Saran yang didapat dari hasil penelitian gel ekstrak kulit buah manggis(*Garcinia mangostana* L.) adalah :

1. Perlu dilakukan penelitian lebih lanjut mengenai uji antiinflamasi penyembuhan luka bakar dari gel ekstrak etanol kulit buah manggis (*Garcinia mangostana* L.).

2. Perlu dilakukan penelitian terhadap uji mutu fisik dan stabilitas dengan suhu ruangan yang dikendalikan.

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LAMPIRAN

Lampiran 1. Hasil Determinasi Tanaman

UPT- LABORATORIUM

No   : 356/DET/UPT-LAB/12/III/2019
Hal   : Surat Keterangan Determinasi Tumbuhan

Menerangkan bahwa :
Nama   : Renata Martina Hungga
NIM   : 19161249 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 kerapkali 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
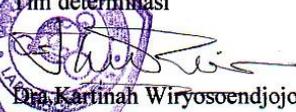
Dra Kartinah Wiryosoendjojo, SU.

Jl. Let.jen Sutoyo, Mojosongo-Solo 57127 Telp.0271-852518, Fax.0271-853275
Homepage :www.setiabudi.ac.id, e-mail : info@setiabudi.ac.id

Lampiran 2. Perhitungan randemen ekstrak etanol kulit buah manggis

- ➢ Randemen serbuk kulit buah manggis :

Bobot kering	= 2000	gram
Bobot serbuk	= 700	gram

Rumus $= \dfrac{bobot\ serbuk\ (gram)}{bobot\ kering\ (gram)} X\ 100\%$

Persentase randemen $= \dfrac{700}{2000} X 100\%$

$= 35\%$

- ➢ Randemen Ekstrak etanol kulit buah manggis :

Berat Gelas	= 145, 764	gram
Berat gelas + ekstrak	= 200	gram
Ekstrak kulit Buah manggis	= 54,236	gram

Rumus $= \dfrac{bobot\ ekstrak(gram)}{bobot\ serbuk(gram)}\ X\ 100\%$

Persentase randemen $= \dfrac{54,236}{700}\ X\ 100\%$

$= 7,75\%$

Lampiran 3. Perhitungan Formulasi

1. Formula 1

Ekstrak etanol kulit buah manggis	$: \frac{2}{20} X\ 100 = 10\ gram$
Carbopol	$: \frac{1}{20} X\ 100 = 5\ gram$
Gliserin	$: \frac{2}{20} X\ 100 = 10\ gram$
Propilenglikol	$: \frac{1}{20} X\ 100 = 5\ gram$
Metil Paraben	$: \frac{0,03}{20} X\ 100 = 0,15\ gram$
Aquadest	: ad 100

2. Formula 2

Ekstrak etanol kulit buah manggis	$: \frac{2}{20} X\ 100 = 10\ gram$
Carbopol	$: \frac{0,5}{20} X\ 100 = 7,5\ gram$
Tragakan	$: \frac{0,5}{20} X\ 100 = 7,5\ gram$
Gliserin	$: \frac{2}{20} X\ 100 = 10\ gram$
Propilenglikol	$: \frac{1}{20} X\ 100 = 5\ gram$
Metil Paraben	$: \frac{0,03}{20} X\ 100 = 0,15\ gram$
Aquadest	: ad 100

3. Formula 3

Ekstrak etanol kulit buah manggis	$: \frac{2}{20} X\ 100 = 10\ gram$
Tragakan	$: \frac{1}{20} X\ 100 = 5\ gram$
Gliserin	$: \frac{2}{20} X\ 100 = 10\ gram$
Propilenglikol	$: \frac{1}{20} X\ 100 = 5\ gram$
Metil Paraben	$: \frac{0,03}{20} X\ 100 = 0,15\ gram$
Aquadest	: ad 100

Lampiran 4. Data hasil pengujian viskositas gel ekstrak etanol kulit buah manggis

Penyimpanan	Replikasi	Formula 1	Formula 2	Formula 3
Hari ke-0	1	290	260	230
	2	300	270	250
	3	310	280	270
Rata- rata (dPa's)		300	270	250
Hari ke-7	1	309	284	265
	2	310	286	266
	3	312	285	264
Rata-rata (dPa's)		310	285	265
Hari ke-14	1	314	262	282
	2	315	266	277
	3	316	267	281
Rata-rata (dPa's)		315	265	280

Lampiran 5. Data hasil pengujian daya lekat gel ekstrak etanol kulit buah manggis

Penyimpanan	Replikasi	Formula 1	Formula 2	Formula 3
Hari ke-0	1	08,43	08,07	07,61
	2	08,48	08,12	07,66
	3	08,62	08,14	07,80
Rata- rata (detik)		08,51	08,11	07,69
Hari ke-7	1	10,22	10,00	14,93
	2	10,26	10,04	14,94
	3	10,45	10,11	14,98
Rata-rata (detik)		10,31	10,05	14,95
Hari ke-14	1	15,03	14,92	12,89
	2	15,11	14,96	13,05
	3	15,13	14,97	13,09
Rata-rata (detik)		15,09	14,95	13,01

Lampiran 6. Data hasil pengujian daya sebar gel ekstrak etanol kulit buah manggis

Data daya sebar hari ke 0

Formula	Berat (gr)	Replikaski (cm)			Rata- rata (cm)	Rata-rata formula (cm)
		I	II	III		
1	Tanpa Beban	5,5	5,6	5,8	5,6	
	50	5,6	5,6	5,9	5,7	
	100	5,7	5,7	6,0	5,8	5,80
	150	5,9	5,8	6,1	5,9	
	200	6,0	5,9	6,1	6,0	
2	Tanpa Beban	5,8	5,8	5,8	5,8	
	50	5,9	5,9	6,0	5,9	
	100	5,9	6,0	6,2	6,0	6,00
	150	6,0	6,2	6,2	6,1	
	200	6,1	6,3	6,3	6,2	
3	Tanpa Beban	6,0	6,3	6,3	6,2	
	50	6,1	6,4	6,5	6,3	
	100	6,1	6,5	6,6	6,4	6,40
	150	6,3	6,5	6,7	6,5	
	200	6,4	6,6	6,9	6,6	

Daya sebar hari ke-7

Formula	Berat (gr)	Replikaski (cm)			Rata- rata (cm)	Rata-rata formula (cm)
		I	II	III		
1	Tanpa Beban	5,3	5,5	5,5	5,4	
	50	5,5	5,6	5,6	5,5	
	100	5,6	5,6	5,9	5,7	5,66
	150	5,8	5,7	5,9	5,8	
	200	5,9	5,8	6,0	5,9	
2	Tanpa Beban	5,5	5,5	5,6	5,5	
	50	5,7	5,8	5,8	5,7	
	100	5,8	5,9	6,0	5,9	5,82
	150	5,8	5,9	6,0	5,9	
	200	6,0	6,1	6,3	6,1	
3	Tanpa Beban	6,0	6,2	6,2	6,1	
	50	6,1	6,3	6,4	6,2	
	100	6,1	6,4	6,5	6,3	6,32
	150	6,3	6,5	6,7	6,5	
	200	6,4	6,6	6,7	6,5	

Daya sebar hari ke-14

Formula	Berat (gr)	Replikaski (cm)			Rata- rata (cm)	Rata-rata formula (cm)
		I	II	III		
1	Tanpa Beban	5,2	5,2	5,3	5,2	5,44
	50	5,3	5,4	5,4	5,3	
	100	5,3	5,4	5,6	5,4	
	150	5,5	5,7	5,8	5,6	
	200	5,6	5,7	5,9	5,7	
2	Tanpa Beban	5,4	5,4	5,5	5,4	5,62
	50	5,4	5,5	5,6	5,5	
	100	5,5	5,6	5,8	5,6	
	150	5,7	5,8	5,8	5,7	
	200	5,8	5,9	6,1	5,9	
3	Tanpa Beban	6,0	6,1	6,0	6,0	6,24
	50	6,1	6,0	6,4	6,1	
	100	6,1	6,3	6,4	6,2	
	150	6,3	6,5	6,5	6,4	
	200	6,4	6,6	6,6	6,5	

Lampiran 7. Data hasil pengujian pH gel ekstrak etanol kulit buah manggis.

Formulasi	Minggu	pH
1	Hari ke 0	5
	Hari ke 7	5
	Hari ke 14	5
2	Hari ke 0	6
	Hari ke 7	6
	Hari ke 14	6
3	Hari ke 0	6
	Hari ke 7	6
	Hari ke 14	6

Lampiran 8. Gambar serbuk dan ekstrak kulit buah manggis

Serbuk Kulit Buah Manggis

Ekstrak Kulit Buah Manggis

Lampiran 9. Gambar Gel ekstrak etanol kulit buah manggis

Gel formula 1
(Carbopol 940 1 gram)

Gel formula 2
(Carbopol 940 0,5 gram
dan Tragakan 0,5 gram)

Gel formula 3
(Tragakan 1 gram)

Lampiran 10. Gambar alat uji yang digunakan

Alat Uji daya lekat

Viskometer

Timbangan analitik

Uji *Xanthone*
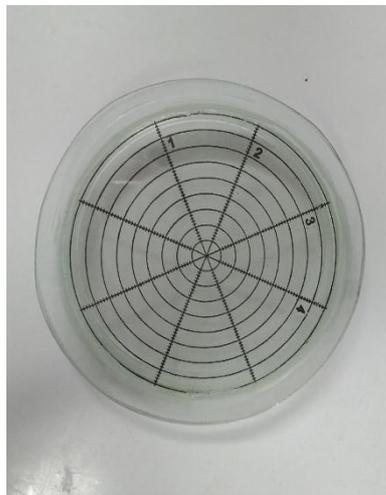
Alat uji daya sebar

Universal pH *stick*

Lampiran 11. Uji statistik kolmogrorov-Smirnov dan analisa ANOVA satu jalan formula gel ekstrak etanol kuli buah manggis.

1. Viskositas

NPar Tests

One-Sample Kolmogorov-Smirnov Test

		viskositas
N		9
Normal Parameters[a,b]	Mean	285,00
	Std. Deviation	21,360
Most Extreme Differences	Absolute	,101
	Positive	,092
	Negative	-,101
Kolmogorov-Smirnov Z		,304
Asymp. Sig. (2-tailed)		1,000

a. Test distribution is Normal.

b. Calculated from data.

Oneway

Test of Homogeneity of Variances

viskositas

Levene Statistic	df1	df2	Sig.
,425	2	6	,672

ANOVA

viskositas

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	2866,667	2	1433,333	10,979	,010
Within Groups	783,333	6	130,556		
Total	3650,000	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
Formula 1	Formula 2	26,667	9,329	,065	-1,96	55,29
	Formula 3	43,333*	9,329	,008	14,71	71,96
Formula 2	Formula 1	-26,667	9,329	,065	-55,29	1,96
	Formula 3	16,667	9,329	,252	-11,96	45,29
Formula 3	Formula 1	-43,333*	9,329	,008	-71,96	-14,71
	Formula 2	-16,667	9,329	,252	-45,29	11,96

*. The mean difference is significant at the 0.05 level.

Homogeneous Subsets

Viskositas

Tukey HSD[a]

Formula	N	Subset for alpha = 0.05	
		1	2
Formula 3	3	265,00	
Formula 2	3	281,67	281,67
Formula 1	3		308,33
Sig.		,252	,065

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

		dayalekat
N		9
Normal Parameters[a,b]	Mean	10,7344
	Std. Deviation	2,78215
Most Extreme Differences	Absolute	,227
	Positive	,227
	Negative	-,137
Kolmogorov-Smirnov Z		,682
Asymp. Sig. (2-tailed)		,741

a. Test distribution is Normal.

b. Calculated from data.

Oneway

Test of Homogeneity of Variances

dayalekat

Levene Statistic	df1	df2	Sig.
,127	2	6	,883

ANOVA

dayalekat

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	2,583	2	1,292	,131	,880
Within Groups	59,340	6	9,890		
Total	61,923	8			

Post Hoc Tests

Multiple Comparisons

Dependent Variable: dayalekat

Tukey HSD

(I) formula	(J) formula	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Formula 1	Formula 2	,42000	2,56775	,985	-7,4586	8,2986
	Formula 3	1,28667	2,56775	,874	-6,5919	9,1652
Formula 2	Formula 1	-,42000	2,56775	,985	-8,2986	7,4586
	Formula 3	,86667	2,56775	,940	-7,0119	8,7452
Formula 3	Formula 1	-1,28667	2,56775	,874	-9,1652	6,5919
	Formula 2	-,86667	2,56775	,940	-8,7452	7,0119

Homogeneous Subsets

dayalekat

Tukey HSD[a]

formula	N	Subset for alpha = 0.05
		1
Formula 3	3	10,0167
Formula 2	3	10,8833
Formula 1	3	11,3033
Sig.		,874

Means for groups in homogeneous subsets are

displayed.

a. Uses Harmonic Mean Sample Size = 3,000.

3. Daya sebar

NPar Tests

One-Sample Kolmogorov-Smirnov Test

		dayasebar
N		9
Normal Parameters[a,b]	Mean	5,9222
	Std. Deviation	,33756
Most Extreme Differences	Absolute	,175
	Positive	,175
	Negative	-,160
Kolmogorov-Smirnov Z		,524
Asymp. Sig. (2-tailed)		,947

a. Test distribution is Normal.

b. Calculated from data.

Oneway

Test of Homogeneity of Variances

dayasebar

Levene Statistic	df1	df2	Sig.
,802	2	6	,491

ANOVA

dayasebar

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	,761	2	,380	15,118	,005
Within Groups	,151	6	,025		
Total	,912	8			

Post Hoc Tests

Multiple Comparisons

Dependent Variable: dayasebar

Tukey HSD

(I) Formula	(J) Formula	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Formula 1	Formula 2	-,18000	,12950	,403	-,5773	,2173
	Formula 3	-,68667*	,12950	,004	-1,0840	-,2893
Formula 2	Formula 1	,18000	,12950	,403	-,2173	,5773
	Formula 3	-,50667*	,12950	,018	-,9040	-,1093
Formula 3	Formula 1	,68667*	,12950	,004	,2893	1,0840
	Formula 2	,50667*	,12950	,018	,1093	,9040

*. The mean difference is significant at the 0.05 level.

Homogeneous Subsets

dayasebar

Tukey HSD[a]

Formula	N	Subset for alpha = 0.05	
		1	2
Formula 1	3	5,6333	
Formula 2	3	5,8133	
Formula 3	3		6,3200
Sig.		,403	1,000

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 3,000.

Lampiran 12. Uji statistik Independent sample test gel ekstrak etanol kulit buah manggis

1. Viskositas

   1.1 Formula 1

   ## T-Test

   Group Statistics

	Minggu	N	Mean	Std. Deviation	Std. Error Mean
viskositas	1,00	3	300,00	10,000	5,774
	3,00	3	315,00	1,000	,577

   Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means							
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference		
									Lower	Upper
viskositas	Equal variances assumed	3,208	,148	-2,585	4	,061	-15,000	5,802	-31,110	1,110
	Equal variances not assumed			-2,585	2,040	,120	-15,000	5,802	-39,502	9,502

   1.2 Formula 2

   ## T-Test

   Group Statistics

	Minggu	N	Mean	Std. Deviation	Std. Error Mean
viskositas	1,00	3	270,00	10,000	5,774
	3,00	3	265,00	2,646	1,528

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
viskosit as	Equal variances assumed	1,903	,240	,837	4	,450	5,000	5,972	-11,581	21,581
	Equal variances not assumed			,837	2,279	,481	5,000	5,972	-17,908	27,908

1.3 Formula 3

T-Test

Group Statistics

	Minggu	N	Mean	Std. Deviation	Std. Error Mean
viskositas	1,00	3	250,00	20,000	11,547
	3,00	3	280,00	2,646	1,528

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
viskosit as	Equal variances assumed	2,868	,166	-2,576	4	,062	-30,000	11,648	-62,339	2,339
	Equal variances not assumed			-2,576	2,070	,119	-30,000	11,648	-78,527	18,527

2. Daya Sebar

2.1 Formula 1

T-Test

Group Statistics

	Minggu	N	Mean	Std. Deviation	Std. Error Mean
dayasebar	1,00	3	5,800	,1732	,1000
	3,00	3	5,433	,1528	,0882

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means							
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference		
									Lower	Upper	
dayasebar	Equal variances assumed	,182	,692	2,750	4	,051	,3667	,1333	-,0035	,7369	
	Equal variances not assumed			2,750	3,938	,052	,3667	,1333	-,0058	,7392	

2.2 Formula 2

T-Test

Group Statistics

	Minggu	N	Mean	Std. Deviation	Std. Error Mean
dayasebar	1,00	3	6,033	,1528	,0882
	3,00	3	5,633	,1528	,0882

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means					95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
dayasebar	Equal variances assumed	,000	1,000	3,207	4	,033	,4000	,1247	,0537	,7463
	Equal variances not assumed			3,207	4,000	,033	,4000	,1247	,0537	,7463

2.3 Formula 3.

T-Test

Group Statistics

	Minggu	N	Mean	Std. Deviation	Std. Error Mean
dayasebar	1,00	3	6,400	,2646	,1528
	3,00	3	6,267	,1528	,0882

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means					95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
dayasebar	Equal variances assumed	1,600	,275	,756	4	,492	,1333	,1764	-,3564	,6231
	Equal variances not assumed			,756	3,200	,501	,1333	,1764	-,4087	,6753

3. Daya Lekat

3.1 Formula 1

T-Test

Group Statistics

	Minggu	N	Mean	Std. Deviation	Std. Error Mean
dayalekat	1,00	3	8,5100	,09849	,05686
	3,00	3	15,0900	,05292	,03055

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means							
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference		
									Lower	Upper	
dayale kat	Equal variances assumed	1,639	,270	-101,937	4	,000	-6,58000	,06455	-6,75922	-6,40078	
	Equal variances not assumed			-101,937	3,066	,000	-6,58000	,06455	-6,78295	-6,37705	

3.2 Formula 2

T-Test

Group Statistics

	Minggu	N	Mean	Std. Deviation	Std. Error Mean
dayalekat	1,00	3	8,1100	,03606	,02082
	3,00	3	14,9500	,02646	,01528

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means							
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference		
									Lower	Upper	
dayale kat	Equal variances assumed	,400	,561	-264,912	4	,000	-6,84000	,02582	-6,91169	-6,76831	
	Equal variances not assumed			-264,912	3,670	,000	-6,84000	,02582	-6,91431	-6,76569	

3.3 Formula 3

T-Test

Group Statistics

	Minggu	N	Mean	Std. Deviation	Std. Error Mean
dayalekat	1,00	3	7,6900	,09849	,05686
	3,00	3	13,0100	,10583	,06110

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
dayale kat	Equal variances assumed	,041	,849	-63,738	4	,000	-5,32000	,08347	-5,55174	-5,08826
	Equal variances not assumed			-63,738	3,980	,000	-5,32000	,08347	-5,55221	-5,08779