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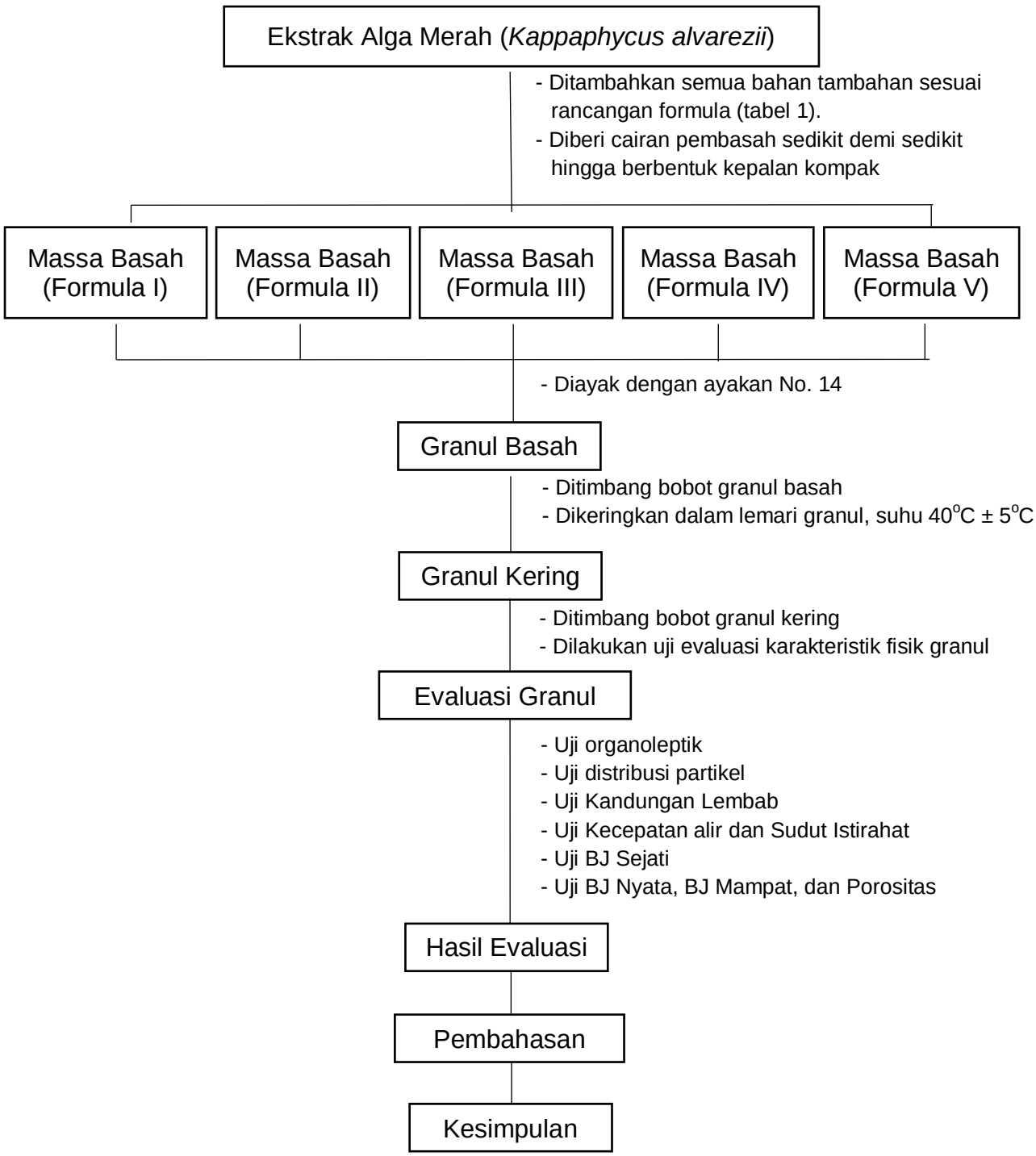
LAMPIRAN

Lampiran I. Skema Kerja

Skema Kerja Pembuatan Granul Ekstrak Alga Merah (*Kappaphycus alvarezii*) dengan variasi bahan pengikat



Lampiran II. Penetapan dosis karaginan ekstrak alga merah

Berdasarkan hasil penelitian . Syaharuddin Kasim dosis yang dapat memberikan efek penurunan kadar gula darah pada tikus yaitu 10 mg/200gBB, Selain itu, penelitian serupa yang dilakukan oleh (Wikanta: 2008) yang menunjukkan bahwa karaginan dengan dosis 10 mg/200gBB tikus juga mampu menurunkan kadar gula darah tikus.

Perhitungan dosis konversi 10 mg/200gBB (tikus) di konversi ke manusia yaitu sebagai berikut :

Dosis untuk manusia = 10 mg x 56 (konversi tikus-manusia)

= 560 mg

Ekstrak Alga merah = $\frac{560\ \text{mg}}{700\ \text{mg}}$ x 100% = 80%

Berdasarkan perhitungan di atas, sehingga untuk keperluan per bobot 700 mg dibutuhkan ekstrak alga merah sebanyak 560 mg (0,56 gram/80%).

Lampiran III. Uji Organoleptik

Pengamatan	F1	F2	F3	F4	F5
Bentuk	Tidak beraturan	Tidak beraturan	Tidak beraturan	Tidak beraturan	Tidak beraturan
Bau	Khas	Khas	Khas	Khas	Khas
Warna	Cokelat	Cokelat	Cokelat	Cokelat	Cokelat
Rasa	Tidak berasa	Tidak berasa	Tidak berasa	Tidak berasa	Tidak berasa

Lampiran IV. Uji Kandungan Lembab

Replikasi	F1	F2	F3	F4	F5
1	2.30%	2.50%	2.40%	2.89%	2.50%
2	2.30%	2.50%	2.40%	2.69%	2.50%
3	2.40%	2.65%	2.40%	3.20%	2.60%
Rata-rata	**2.33%**	**2.55%**	**2.40%**	**2.93%**	**2.53%**

Perhitungan Hasil rata-rata kandungan lembab 3 replikasi:

$\bar{x}$ f1 = $\frac{2.30+2.30+2.40}{3}$ = 2.33%

$\bar{x}$ f2 = $\frac{2.50+2.50+2.65}{3}$ = 2.55%

$\bar{x}$ f3 = $\frac{2.40+2.40+2.40}{3}$ = 2.40%

$\bar{x}$ f4 = $\frac{2.89+2.69+3.20}{3}$ = 2.93%

$\bar{x}$ f5 = $\frac{2.50+2.50+2.60}{3}$ = 2.53%

Lampiran V. Uji Distribusi Partikel

A. Uji Distribusi Partikel Formula 1 (F1)

Replikasi	No. mesh	Nilai Tengah Lubang (a) (mm)	Bobot awal (mg)	Bobot akhir (mg)	Berat tertahan (mg)	%tertahan (b) (%)	Nilai (a x b)
1	20	0.6	516.30	532.70	16.40	65.6	39.36
	40	0.425	502.20	507.60	5.40	21.6	9.18
	60	0.25	482.20	485.10	2.90	11.6	2.90
	80	0.2	469.30	469.60	0.30	1.2	0.24
	100	0.18	479.20	479.20	0.00	0	0.00
	SUM						51.680
	Ukuran Partikel (mm)						**0.517**
2	20	0.6	516.30	535.60	19.30	77.2	46.32
	40	0.425	502.20	507.40	5.20	20.8	8.84
	60	0.25	482.20	482.80	0.60	2.4	0.60
	80	0.2	469.30	469.40	0.10	0.4	0.08
	100	0.18	479.10	479.20	0.10	0.4	0.07
	SUM						55.912
	Ukuran Partikel (mm)						**0.559**
3	20	0.6	516.20	536.20	20.00	80	48.00
	40	0.425	502.20	506.90	4.70	18.8	7.99
	60	0.25	482.20	482.50	0.30	1.2	0.30
	80	0.2	469.30	469.30	0.00	0	0.00
	100	0.18	479.20	479.20	0.00	0	0.00
	SUM						56.290
	Ukuran Partikel (mm)						**0.563**

Replikasi	Ukuran Partikel
1	0.517
2	0.559
3	0.563
Rata-rata	**0,546**
Standar Deviasi	**0,025**

Contoh perhitungan ukuran partikel formula 1

Ukuran partikel $= \frac{\sum(\%tertahan)x\ (Nilai\ tengah\ Lubang)}{100\%}$

$= \frac{51.680\ mm\%}{100\%}$ = 0.517 mm

Ukuran partikel rata-rata $= \frac{Ukuran\ partikel\ 1+Ukuran\ partikel\ 2,+Ukuran\ partikel\ 3}{3}$

$= \frac{0.517+0.559+0.563}{3}$ = 0.546 mm

B. Uji Distribusi Partikel Formula 2 (F2)

Replikasi	No. mesh	Nilai Tengah Lubang (a) (mm)	Bobot awal (mg)	Bobot akhir (mg)	Berat tertahan (mg)	%tertahan (b) (%)	Nilai (a x b)
	20	0.6	516.20	530.70	14.50	58	34.80
	40	0.425	502.20	508.40	6.20	24.8	10.54
	60	0.25	482.10	485.80	3.70	14.8	3.70
1	80	0.2	469.30	469.70	0.40	1.6	0.32
	100	0.18	479.10	479.20	0.10	0.4	0.07
	SUM						49.432
	Ukuran Partikel (mm)						**0.494**
	20	0.6	516.20	530.30	14.10	56.4	33.84
	40	0.425	502.10	508.80	6.70	26.8	11.39
	60	0.25	482.10	485.70	3.60	14.4	3.60
2	80	0.2	469.30	469.60	0.30	1.2	0.24
	100	0.18	479.10	479.30	0.20	0.8	0.14
	SUM						49.214
	Ukuran Partikel (mm)						**0.492**
	20	0.6	516.20	531.40	15.20	60.8	36.48
	40	0.425	502.10	508.40	6.30	25.2	10.71
	60	0.25	482.10	485.30	3.20	12.8	3.20
3	80	0.2	469.30	469.60	0.30	1.2	0.24
	100	0.18	479.10	479.20	0.10	0.4	0.07
	SUM						50.702
	Ukuran Partikel (mm)						**0.507**

Replikasi	Ukuran Partikel
1	0.494
2	0.492
3	0.507
Rata-rata	**0,498**
Standar Deviasi	**0,008**

Perhitungan ukuran partikel formula 2

Ukuran partikel $= \frac{\sum(\%tertahan)x\ (Nilai\ tengah\ Lubang)}{100\%}$

$= \frac{49.432\ mm\%}{100\%}$ = 0.494 mm

Ukuran partikel rata-rata $= \frac{Ukuran\ partikel\ 1 + Ukuran\ partikel\ 2, + Ukuran\ partikel\ 3}{3}$

$= \frac{0.494+0.492+0.507}{3}$ = 0.498 mm

C. Uji Distribusi Partikel Formula 3 (F3)

Replikasi	No. mesh	Nilai Tengah Lubang (a) (mm)	Bobot awal (mg)	Bobot akhir (mg)	Berat tertahan (mg)	%tertahan (b) (%)	Nilai (a x b)
	20	0.6	516.20	531.80	15.60	62.4	37.44
	40	0.425	502.20	508.30	6.10	24.4	10.37
	60	0.25	482.10	485.30	3.20	12.8	3.20
1	80	0.2	469.30	469.50	0.20	0.8	0.16
	100	0.18	479.20	479.20	0.00	0	0.00
	SUM						51.170
	Ukuran Partikel (mm)						**0.512**
	20	0.6	516.20	534.20	18.00	72	43.20
	40	0.425	502.10	506.00	3.90	15.6	6.63
	60	0.25	482.10	484.80	2.70	10.8	2.70
2	80	0.2	469.30	469.50	0.20	0.8	0.16
	100	0.18	479.10	479.20	0.10	0.4	0.07
	SUM						52.762
	Ukuran Partikel (mm)						**0.528**
	20	0.6	516.20	535.50	19.30	77.2	46.32
	40	0.425	502.20	506.50	4.30	17.2	7.31
	60	0.25	482.10	483.50	1.40	5.6	1.40
3	80	0.2	469.30	469.40	0.10	0.4	0.08
	100	0.18	479.20	479.20	0.00	0	0.00
	SUM						55.110
	Ukuran Partikel (mm)						**0.551**

Replikasi	Ukuran Partikel
1	0.512
2	0.528
3	0.551
Rata-rata	**0,530**
Standar Deviasi	**0,020**

Perhitungan ukuran partikel formula 3

Ukuran partikel $= \frac{\sum(\%tertahan)x\ (Nilai\ tengah\ Lubang)}{100\%}$

$= \frac{51.170\ mm\%}{100\%}$ = 0.512 mm

Ukuran partikel rata-rata $= \frac{Ukuran\ partikel\ 1 + Ukuran\ partikel\ 2, + Ukuran\ partikel\ 3}{3}$

$= \frac{0.512+0.528+0.551}{3}$ = 0.530 mm

D. Uji Distribusi Partikel Formula 4 (F4)

Replikasi	No. mesh	Nilai Tengah Lubang (a) (mm)	Bobot awal (mg)	Bobot akhir (mg)	Berat tertahan (mg)	%tertahan (b) (%)	Nilai (a x b)
	20	0.6	516.20	529.80	13.60	54.4	32.64
	40	0.425	502.20	508.90	6.70	26.8	11.39
	60	0.25	482.10	486.40	4.30	17.2	4.30
1	80	0.2	469.20	469.60	0.40	1.6	0.32
	100	0.18	479.10	479.30	0.20	0.8	0.14
	SUM						48.794
	Ukuran Partikel (mm)						**0.488**
	20	0.6	516.20	529.90	13.70	54.8	32.88
	40	0.425	502.10	508.80	6.70	26.8	11.39
	60	0.25	482.10	486.50	4.40	17.6	4.40
2	80	0.2	469.20	469.60	0.40	1.6	0.32
	100	0.18	479.20	479.20	0.00	0	0.00
	SUM						48.990
	Ukuran Partikel (mm)						**0.490**
	20	0.6	516.20	529.90	13.70	54.8	32.88
	40	0.425	502.10	508.90	6.80	27.2	11.56
	60	0.25	482.10	486.50	4.40	17.6	4.40
3	80	0.2	469.30	469.60	0.30	1.2	0.24
	100	0.18	479.20	479.20	0.00	0	0.00
	SUM						49.080
	Ukuran Partikel (mm)						**0.491**

Replikasi	Ukuran Partikel
1	0.488
2	0.490
3	0.491
Rata-rata	**0,489**
Standar Deviasi	**0,002**

Perhitungan ukuran partikel formula 4

Ukuran partikel $= \frac{\sum(\%tertahan)x\ (Nilai\ tengah\ Lubang)}{100\%}$

$= \frac{48.794\ mm\%}{100\%}$ = 0.488 mm

Ukuran partikel rata-rata $= \frac{Ukuran\ partikel\ 1+Ukuran\ partikel\ 2,+Ukuran\ partikel\ 3}{3}$

$= \frac{0.488+0.490+0.491}{3}$ = 0.489 mm

E. Uji Distribusi Partikel Formula 5 (F5)

Replikasi	No. mesh	Nilai Tengah Lubang (a) (mm)	Bobot awal (mg)	Bobot akhir (mg)	Berat tertahan (mg)	%tertahan (b) (%)	Nilai (a x b)
	20	0.6	516.40	533.00	16.60	66.4	39.84
	40	0.425	502.30	507.20	4.90	19.6	8.33
	60	0.25	482.30	485.10	2.80	11.2	2.80
1	80	0.2	469.40	469.80	0.40	1.6	0.32
	100	0.18	479.30	479.40	0.10	0.4	0.07
	SUM						51.362
	Ukuran Partikel (mm)						**0.514**
	20	0.6	516.30	532.70	16.40	65.6	39.36
	40	0.425	502.20	508.30	6.10	24.4	10.37
	60	0.25	482.20	485.10	2.90	11.6	2.90
2	80	0.2	469.30	469.60	0.30	1.2	0.24
	100	0.18	479.20	479.20	0.00	0	0.00
	SUM						52.870
	Ukuran Partikel (mm)						**0.529**
	20	0.6	516.30	531.80	15.50	62	37.20
	40	0.425	502.20	508.40	6.20	24.8	10.54
	60	0.25	482.20	485.30	3.10	12.4	3.10
3	80	0.2	469.30	469.60	0.30	1.2	0.24
	100	0.18	479.20	479.20	0.00	0	0.00
	SUM						51.080
	Ukuran Partikel (mm)						**0.511**

Replikasi	Ukuran Partikel
1	0.514
2	0.529
3	0.511
Rata-rata	**0,518**
Standar Deviasi	**0,010**

Perhitungan ukuran partikel formula 5

Ukuran partikel $= \frac{\sum(\%tertahan)x\ (Nilai\ tengah\ Lubang)}{100\%}$

$= \frac{51.362\ mm\%}{100\%}$ = 0.514 mm

Ukuran partikel rata-rata $= \frac{Ukuran\ partikel\ 1+Ukuran\ partikel\ 2,+Ukuran\ partikel\ 3}{3}$

$= \frac{0.514+0.529+0.511}{3}$ = 0.518 mm

Lampiran VI. Uji Kecepatan alir dan Sudut Istirahat

Formula	Replikasi	m (g)	t (detik)	v (g/detik)	Rata-rata	Standar Deviasi
1	1	25	2,12	11,792	11,02	0,67
	2	25	2,35	10,638		
	3	25	2,35	10,638		
2	1	25	2,37	10,549	10,48	1,35
	2	25	2,75	9,091		
	3	25	2,12	11,792		
3	1	25	2,3	10,870	11,22	0,35
	2	25	2,16	11,574		
	3	25	2,23	11,211		
4	1	25	2,16	11,574	12,04	0,63
	2	25	2,12	11,792		
	3	25	1,96	12,755		
5	1	25	2,23	11,211	10,86	0,61
	2	25	2,23	11,211		
	3	25	2,46	10,163		

Formula	Replikasi	h (cm)	r (cm)	Tan α	α	Rata-rata	Standar Deviasi
1	1	2,1	5,22	0,402	21,915	21,256	0,656
	2	2,1	5,4	0,389	21,251		
	3	2	5,32	0,376	20,603		
2	1	1,8	4,9	0,367	20,171	21,116	1,317
	2	2	4,8	0,417	22,620		
	3	1,8	4,8	0,375	20,556		
3	1	1,9	5,2	0,365	20,072	20,775	1,394
	2	2,1	5,1	0,412	22,380		
	3	1,8	4,98	0,361	19,872		
4	1	2,1	4,7	0,447	24,075	23,212	1,576
	2	1,9	4,85	0,392	21,393		
	3	2,1	4,68	0,449	24,167		
5	1	1,8	4,62	0,390	21,286	20,452	1,019
	2	1,7	4,85	0,351	19,316		
	3	1,8	4,75	0,379	20,754		

Rumus:

$$\text{Kecepatan alir} = \frac{\text{Bobot granul (g)}}{\text{Waktu (s)}}$$

$$\text{Tan } \alpha = \frac{\text{h (cm)}}{\text{r (cm)}}$$

Contoh Perhitungan Formula 1

Kecepatan alir = $\frac{25}{2.12}$ = 11,792 g/s

tan α = $\frac{2.1}{5.22}$ = 0.402

α = 21.915°

Lampiran VII. Uji Bobot jenis sejati.

For-mula	Rep-Likasi	Vp (ml)	a (g)	b(g)	c(g)	d(g)	Bj Parafin (B-a)/Vp	Rata-rata	c-a	c+b	a+d	Bj Sejati	Rata-rata	Standar deviasi
	1	25	20.90	42.14	21.92	42.63	0.850		1.020	64.060	63.530	1.636		
1	2	25	20.90	42.16	21.93	42.62	0.850	0.850	1.030	64.090	63.520	1.536	1.579	0.051
	3	25	20.90	42.14	21.95	42.62	0.850		1.050	64.090	63.520	1.566		
	1	25	20.90	42.14	21.92	42.63	0.850		1.020	64.060	63.530	1.636		
2	2	25	20.89	42.14	21.91	42.61	0.850	0.850	1.020	64.050	63.500	1.576	1.582	0.052
	3	25	20.89	42.15	21.90	42.60	0.850		1.010	64.050	63.490	1.533		
	1	25	20.95	42.16	21.90	42.61	0.848		0.950	64.060	63.560	1.610		
3	2	25	20.94	42.12	21.90	42.60	0.847	0.848	0.960	64.020	63.540	1.695	1.650	0.043
	3	25	20.93	42.11	21.92	42.59	0.847		0.990	64.030	63.520	1.645		
	1	25	20.91	42.16	21.94	42.58	0.850		1.030	64.100	63.490	1.435		
4	2	25	20.92	42.16	21.93	42.61	0.850	0.850	1.010	64.090	63.530	1.533	1.469	0.055
	3	25	20.91	42.15	21.96	42.58	0.850		1.050	64.110	63.490	1.439		
	1	25	20.89	42.17	21.89	42.62	0.851		1.000	64.060	63.510	1.547		
5	2	25	20.89	42.17	21.91	42.63	0.851	0.851	1.020	64.080	63.520	1.550	1.589	0.070
	3	25	20.89	42.16	21.93	42.67	0.851		1.040	64.090	63.560	1.670		

Keterangan:
Vp = volume pikno
a = berat pikno kosong
b = berat pikno+ paraffin cair
c = berat pikno + granul
d = Berat pikno + granul + paraffin cair

Rumus:

BJ Parafin = $\frac{b-a}{Vp}$

BJ Sejati = $\frac{\textbf{(c-a) x Bj Parafin}}{(\textbf{c+b}) - (\textbf{a+d})}$

Contoh Perhitungan formula 1:

BJ Parafin = $\frac{42.14 - 20.90}{25}$ = 0.850 g/mL

BJ Sejati = $\frac{(1.020) \times 0{,}850}{(64.060) - (63.530)}$ = 1.636 g/mL

Lampiran VIII. Uji bobot jenis nyata, mampat, dan porositas

For-mula	V_0 (mL)	V_{10} (mL)	V_{500} (mL)	V_{1250} (mL)	Bj Sejati	Rata-rata	Bj Nyata	Rata-rata	Bj Mampat	Rata-rata	Indeks Kompresibilitas	SD	Rata-rata	Perbandingan Hausner	SD	Rata-rata	Porositas	Rata-rata
1	46	43	40	39	1,635	1,579	0,543	0,540	0,641	0,625	15.289	1.359	13,732	1.179	0.018	1,159	60,794	60,395
	47	44	41	41	1,537		0,532		0,610		12.787			1.146			60,328	
	46	43	40	40	1,565		0,543		0,625		13.120			1.150			60,064	
2	45	45	41	40	1,635	1,582	0,556	0,532	0,625	0,625	11.040	3.233	14,773	1.125	0.043	1,175	61,774	60,458
	48	44	40	40	1,576		0,521		0,625		16.640			1.200			60,343	
	48	45	41	40	1,534		0,521		0,625		16.640			1.200			59,257	
3	50	46	44	42	1,612	1,650	0,500	0,503	0,595	0,605	15.966	1.091	16,798	1.190	0.016	1,202	63,075	63,337
	50	46	42	41	1,694		0,500		0,610		18.033			1.220			64,005	
	49	46	43	41	1,645		0,510		0,610		16.393			1.195			62,933	
4	51	48	42	41	1,435	1,469	0,490	0,493	0,610	0,605	19.672	1.075	18,451	1.244	0.016	1,226	57,508	58,760
	51	47	43	42	1,532		0,490		0,595		17.647			1.214			61,146	
	50	46	42	41	1,439		0,500		0,610		18.033			1.220			57,626	
5	44	43	39	38	1,548	1,589	0,568	0,560	0,658	0,658	13.678	1.053	14,894	1.158	0.015	1,175	57,500	58,546
	45	42	38	38	1,55		0,556		0,658		15.502			1.184			57,555	
	45	42	38	38	1,669		0,556		0,658		15.502			1.184			60,582	

Rumus:

BJ nyata = $\frac{m_{granul}}{V_0}$

Bj mampat = $\frac{m_{granul}}{V_{1250}}$

Indeks kompresibilitas = $\frac{\text{Bj mampat} - \text{Bj nyata}}{\text{Bj mampat}}$ x 100%

Perbandingan hausner = $\frac{\text{Bj mampat}}{\text{Bj nyata}}$

Porositas = $\left\{1 - \frac{\textbf{Bj mampat}}{\textbf{Bj sejati}}\right\}$ x 100%

Contoh Perhitungan Formula 1:

BJ nyata = $\frac{25}{46}$ = 0.543 g/mL

Bj mampat = $\frac{25}{39}$= 0.641 g/mL

Indeks kompresibilitas = $\frac{0.641 - 0.543}{0.543}$ x 100% = 17.949

Perbandingan hausner = $\frac{0.61}{0.543}$ = 1.179

Porositas = $\left\{1 - \frac{0.641}{1.635}\right\}$ x 100% = 60.794%

Lampiran IX. Hasil Analisis SPSS

1. Distribusi Partikel

NPar Tests

Descriptive Statistics

	N	Mean	Std. Deviation	Minimum	Maximum
Ukuran Partikel (mm)	15	.51640	.025165	.488	.563

One-Sample Kolmogorov-Smirnov Test

		Ukuran Partikel (mm)
N		15
Normal Parameters[a,b]	Mean	.51640
	Std. Deviation	.025165
Most Extreme Differences	Absolute	.157
	Positive	.157
	Negative	-.130
Test Statistic		.157
Asymp. Sig. (2-tailed)		.200[c,d]

a. Test distribution is Normal.

b. Calculated from data.

c. Lilliefors Significance Correction.

d. This is a lower bound of the true significance.

Test of Homogeneity of Variances

Ukuran Partikel (mm)

Levene Statistic	df1	df2	Sig.
3.918	4	10	.036

Kruskal-Wallis Test

Ranks

	Konsentrasi Bahan Pengikat PVP K-25	N	Mean Rank
Ukuran Partikel (mm)	Konsentrasi PVP K-25 0.5%	3	13.00
	Konsentrasi PVP K-25 1%	3	5.00
	Konsentrasi PVP K-25 2%	3	10.67
	Konsentrasi PVP K-25 4%	3	2.00
	Kontrol (tanpa PVP K-25)	3	9.33
	Total	15	

Test Statistics[a,b]

	Ukuran Partikel (mm)
Chi-Square	11.833
df	4
Asymp. Sig.	.019

a. Kruskal Wallis Test

b. Grouping Variable: Konsentrasi Bahan Pengikat PVP K-25

Each node shows the sample average rank of Konsentrasi Bahan Pengikat PVP K-25.

Sample1-Sample2	Test Statistic	Std. Error	Std. Test Statistic	Sig.	Adj.Sig.
Konsentrasi PVP K-25 4%-Konsentrasi PVP K-25 1%	3.000	3.651	.822	.411	1.000
Konsentrasi PVP K-25 4%-Kontrol (tanpa PVP K-25)	-7.333	3.651	-2.008	.045	.446
Konsentrasi PVP K-25 4%-Konsentrasi PVP K-25 2%	8.667	3.651	2.373	.018	.176
Konsentrasi PVP K-25 4%-Konsentrasi PVP K-25 0.5%	11.000	3.651	3.012	.003	.026
Konsentrasi PVP K-25 1%-Kontrol (tanpa PVP K-25)	-4.333	3.651	-1.187	.235	1.000
Konsentrasi PVP K-25 1%-Konsentrasi PVP K-25 2%	-5.667	3.651	-1.552	.121	1.000
Konsentrasi PVP K-25 1%-Konsentrasi PVP K-25 0.5%	8.000	3.651	2.191	.028	.285
Kontrol (tanpa PVP K-25)-Konsentrasi PVP K-25 2%	1.333	3.651	.365	.715	1.000
Kontrol (tanpa PVP K-25)-Konsentrasi PVP K-25 0.5%	3.667	3.651	1.004	.315	1.000
Konsentrasi PVP K-25 2%-Konsentrasi PVP K-25 0.5%	2.333	3.651	.639	.523	1.000

Each row tests the null hypothesis that the Sample 1 and Sample 2 distributions are the same.
Asymptotic significances (2-sided tests) are displayed. The significance level is .05.

Gambar 10. Data Statistika hasil Post Hoc

2. Kandungan Lembab

Descriptive Statistics

	N	Mean	Std. Deviation	Minimum	Maximum
Kandungan Lembab	15	2.5487	.23832	2.30	3.20

One-Sample Kolmogorov-Smirnov Test

		Kandungan Lembab
N		15
Normal Parameters[a,b]	Mean	2.5487
	Std. Deviation	.23832
Most Extreme Differences	Absolute	.248
	Positive	.248
	Negative	-.148
Test Statistic		.248
Asymp. Sig. (2-tailed)		.014[c]

a. Test distribution is Normal.

b. Calculated from data.

c. Lilliefors Significance Correction.

Kruskal-Wallis Test

Ranks

	Konsentrasi Bahan Pengikat PVP K-25	N	Mean Rank
Kandungan Lembab	Konsentrasi PVP K-25 0,5%	3	2.50
	Konsentrasi PVP K-25 1%	3	9.67
	Konsentrasi PVP K-25 2%	3	4.50
	Konsentrasi PVP K-25 4%	3	14.00
	Tanpa PVP K-25	3	9.33
	Total	15	

Test Statistics[a,b]

	Kandungan Lembab
Chi-Square	12.944
df	4
Asymp. Sig.	.012

a. Kruskal Wallis Test

b. Grouping Variable: Konsentrasi Bahan Pengikat PVP K-25

Each node shows the sample average rank of Konsentrasi Bahan Pengikat PVP K-25.

Sample1-Sample2	Test Statistic	Std. Error	Std. Test Statistic	Sig.	Adj.Sig.
Konsentrasi PVP K-25 0,5%-Konsentrasi PVP K-25 2%	-2.000	3.582	-.558	.577	1.000
Konsentrasi PVP K-25 0,5%-Tanpa PVP K-25	-6.833	3.582	-1.907	.056	.565
Konsentrasi PVP K-25 0,5%-Konsentrasi PVP K-25 1%	-7.167	3.582	-2.001	.045	.454
Konsentrasi PVP K-25 0,5%-Konsentrasi PVP K-25 4%	-11.500	3.582	-3.210	.001	.013
Konsentrasi PVP K-25 2%-Tanpa PVP K-25	-4.833	3.582	-1.349	.177	1.000
Konsentrasi PVP K-25 2%-Konsentrasi PVP K-25 1%	5.167	3.582	1.442	.149	1.000
Konsentrasi PVP K-25 2%-Konsentrasi PVP K-25 4%	-9.500	3.582	-2.652	.008	.080
Tanpa PVP K-25-Konsentrasi PVP K-25 1%	.333	3.582	.093	.926	1.000
Tanpa PVP K-25-Konsentrasi PVP K-25 4%	4.667	3.582	1.303	.193	1.000
Konsentrasi PVP K-25 1%-Konsentrasi PVP K-25 4%	-4.333	3.582	-1.210	.226	1.000

Each row tests the null hypothesis that the Sample 1 and Sample 2 distributions are the same.
Asymptotic significances (2-sided tests) are displayed. The significance level is .05.

Gambar 11. Data Statistika hasil Post Hoc

3. Kecepatan Alir

Descriptive Statistics

	N	Mean	Std. Deviation	Minimum	Maximum
Kecepatan alir (mg/s)	15	11.12407	.859846	9.091	12.755

One-Sample Kolmogorov-Smirnov Test

		Kecepatan alir (mg/s)
N		15
Normal Parameters[a,b]	Mean	11.12407
	Std. Deviation	.859846
Most Extreme Differences	Absolute	.152
	Positive	.152
	Negative	-.140
Test Statistic		.152
Asymp. Sig. (2-tailed)		.200[c,d]

a. Test distribution is Normal.

b. Calculated from data.

c. Lilliefors Significance Correction.

d. This is a lower bound of the true significance.

Oneway

Test of Homogeneity of Variances

Kecepatan alir (mg/s)

Levene Statistic	df1	df2	Sig.
1.274	4	10	.343

ONE-WAY-ANOVA

Kecepatan alir (mg/s)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	4.037	4	1.009	1.599	.249
Within Groups	6.313	10	.631		
Total	10.351	14			

4. Sudut Istirahat

Descriptive Statistics

	N	Mean	Std. Deviation	Minimum	Maximum
Sudut istirahat	15	21.36207	1.445592	19.316	24.167

One-Sample Kolmogorov-Smirnov Test

		Sudut istirahat
N		15
Normal Parameters[a,b]	Mean	21.36207
	Std. Deviation	1.445592
Most Extreme Differences	Absolute	.158
	Positive	.158
	Negative	-.103
Test Statistic		.158
Asymp. Sig. (2-tailed)		.200[c,d]

a. Test distribution is Normal.

b. Calculated from data.

c. Lilliefors Significance Correction.

d. This is a lower bound of the true significance.

Oneway

Test of Homogeneity of Variances

Sudut istirahat

Levene Statistic	df1	df2	Sig.
1.324	4	10	.326

ONE-WAY-ANOVA

Sudut istirahat

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	13.999	4	3.500	2.294	.131
Within Groups	15.258	10	1.526		
Total	29.256	14			

5. Bobot Jenis Sejati

Descriptive Statistics

	N	Mean	Std. Deviation	Minimum	Maximum
Bobot jenis Sejati (g/mL)	15	1.57380	.076348	1.435	1.695

One-Sample Kolmogorov-Smirnov Test

		Bobot jenis Sejati (g/mL)
N		15
Normal Parameters[a,b]	Mean	1.57380
	Std. Deviation	.076348
Most Extreme Differences	Absolute	.163
	Positive	.095
	Negative	-.163
Test Statistic		.163
Asymp. Sig. (2-tailed)		.200[c,d]

a. Test distribution is Normal.

b. Calculated from data.

c. Lilliefors Significance Correction.

d. This is a lower bound of the true significance.

Oneway

Test of Homogeneity of Variances

Bobot jenis Sejati (g/mL)

Levene Statistic	df1	df2	Sig.
.470	4	10	.757

ONE-WAY-ANOVA

Bobot jenis Sejati (g/mL)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	.051	4	.013	4.240	.029
Within Groups	.030	10	.003		
Total	.082	14			

Post Hoc Tests

Multiple Comparisons

Dependent Variable: Bobot jenis Sejati (g/mL)

Tukey HSD

(I) Konsentrasi Bahan Pengikat PVP K-25	(J) Konsentrasi Bahan Pengikat PVP K-25	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Konsentrasi PVP K-25 0.5%	KOnsentrasi PVP K-25 1%	-.002333	.044920	1.000	-.15017	.14550
	Konsentrasi PVP K-25 2%	-.070667	.044920	.544	-.21850	.07717
	Konsentrasi PVP K-25 4%	.110333	.044920	.177	-.03750	.25817
	Tanpa PVP K-25 (kontrol)	-.009667	.044920	.999	-.15750	.13817
KOnsentrasi PVP K-25 1%	Konsentrasi PVP K-25 0.5%	.002333	.044920	1.000	-.14550	.15017
	Konsentrasi PVP K-25 2%	-.068333	.044920	.573	-.21617	.07950
	Konsentrasi PVP K-25 4%	.112667	.044920	.164	-.03517	.26050
	Tanpa PVP K-25 (kontrol)	-.007333	.044920	1.000	-.15517	.14050
Konsentrasi PVP K-25 2%	Konsentrasi PVP K-25 0.5%	.070667	.044920	.544	-.07717	.21850
	KOnsentrasi PVP K-25 1%	.068333	.044920	.573	-.07950	.21617
	Konsentrasi PVP K-25 4%	.181000*	.044920	.016	.03316	.32884
	Tanpa PVP K-25 (kontrol)	.061000	.044920	.665	-.08684	.20884
Konsentrasi PVP K-25 4%	Konsentrasi PVP K-25 0.5%	-.110333	.044920	.177	-.25817	.03750
	KOnsentrasi PVP K-25 1%	-.112667	.044920	.164	-.26050	.03517
	Konsentrasi PVP K-25 2%	-.181000*	.044920	.016	-.32884	-.03316
	Tanpa PVP K-25 (kontrol)	-.120000	.044920	.129	-.26784	.02784
Tanpa PVP K-25 (kontrol)	Konsentrasi PVP K-25 0.5%	.009667	.044920	.999	-.13817	.15750
	KOnsentrasi PVP K-25 1%	.007333	.044920	1.000	-.14050	.15517
	Konsentrasi PVP K-25 2%	-.061000	.044920	.665	-.20884	.08684
	Konsentrasi PVP K-25 4%	.120000	.044920	.129	-.02784	.26784

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

6. Bobot Jenis Nyata

Descriptive Statistics

	N	Mean	Std. Deviation	Minimum	Maximum
Bobot Jenis Nyata (g/mL)	15	.5257	.02673	.49	.57

One-Sample Kolmogorov-Smirnov Test

		Bobot Jenis Nyata (g/mL)
N		15
Normal Parameters[a,b]	Mean	.5257
	Std. Deviation	.02673
Most Extreme Differences	Absolute	.165
	Positive	.165
	Negative	-.141
Test Statistic		.165
Asymp. Sig. (2-tailed)		.200[c,d]

a. Test distribution is Normal.

b. Calculated from data.

c. Lilliefors Significance Correction.

d. This is a lower bound of the true significance.

Oneway

Test of Homogeneity of Variances

Bobot Jenis Nyata (g/mL)

Levene Statistic	df1	df2	Sig.
5.600	4	10	.012

Kruskal-Wallis Test

Ranks

	Konsentrasi Bahan Pengikat PVP K-25	N	Mean Rank
Bobot Jenis Nyata (g/mL)	Konsentrasi PVP K-25 0.5%	3	10.00
	Konsentrasi PVP K-25 1%	3	9.33
	Konsentrasi PVP K-25 2%	3	4.67
	Konsentrasi PVP K-25 4%	3	2.33
	Tanpa PVP K-25 (Kontrol)	3	13.67
	Total	15	

Test Statistics[a,b]

	Bobot Jenis Nyata (g/mL)
Chi-Square	12.410
Df	4
Asymp. Sig.	.015

a. Kruskal Wallis Test

b. Grouping Variable: Konsentrasi Bahan Pengikat PVP K-25

Each node shows the sample average rank of Konsentrasi Bahan Pengikat PVP K-25.

Sample1-Sample2	Test Statistic	Std. Error	Std. Test Statistic	Sig.	Adj.Sig.
Konsentrasi PVP K-25 4%-Konsentrasi PVP K-25 2%	2.333	3.615	.645	.519	1.000
Konsentrasi PVP K-25 4%-Konsentrasi PVP K-25 1%	7.000	3.615	1.936	.053	.529
Konsentrasi PVP K-25 4%-Konsentrasi PVP K-25 0.5%	7.667	3.615	2.121	.034	.340
Konsentrasi PVP K-25 4%-Tanpa PVP K-25 (Kontrol)	-11.333	3.615	-3.135	.002	.017
Konsentrasi PVP K-25 2%-Konsentrasi PVP K-25 1%	4.667	3.615	1.291	.197	1.000
Konsentrasi PVP K-25 2%-Konsentrasi PVP K-25 0.5%	5.333	3.615	1.475	.140	1.000
Konsentrasi PVP K-25 2%-Tanpa PVP K-25 (Kontrol)	-9.000	3.615	-2.489	.013	.128
Konsentrasi PVP K-25 1%-Konsentrasi PVP K-25 0.5%	.667	3.615	.184	.854	1.000
Konsentrasi PVP K-25 1%-Tanpa PVP K-25 (Kontrol)	-4.333	3.615	-1.199	.231	1.000
Konsentrasi PVP K-25 0.5%-Tanpa PVP K-25 (Kontrol)	-3.667	3.615	-1.014	.311	1.000

Each row tests the null hypothesis that the Sample 1 and Sample 2 distributions are the same.
Asymptotic significances (2-sided tests) are displayed. The significance level is .05.

Gambar 12. Data Statistika hasil Post Hoc

7. Bobot Jenis Mampat

Descriptive Statistics

	N	Mean	Std. Deviation	Minimum	Maximum
Bobot jenis Mampat (g/mL)	15	.62367	.021417	.595	.658

One-Sample Kolmogorov-Smirnov Test

		Bobot jenis Mampat (g/mL)
N		15
Normal Parameters[a,b]	Mean	.62367
	Std. Deviation	.021417
Most Extreme Differences	Absolute	.209
	Positive	.209
	Negative	-.146
Test Statistic		.209
Asymp. Sig. (2-tailed)		.078[c]

a. Test distribution is Normal.

b. Calculated from data.

c. Lilliefors Significance Correction.

Oneway

Test of Homogeneity of Variances

Bobot jenis Mampat (g/mL)

Levene Statistic	df1	df2	Sig.
3.410	4	10	.053

ONE-WAY-ANOVA

Bobot jenis Mampat (g/mL)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	.006	4	.001	18.064	.000
Within Groups	.001	10	.000		
Total	.006	14			

Post Hoc Tests

Multiple Comparisons

Dependent Variable: Bobot jenis Mampat (g/mL)

Tukey HSD

(I) Konsentrasi Bahan Pengikat PVP K-25	(J) Konsentrasi Bahan Pengikat PVP K-25	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Konsentrasi PVP K-25 0.5%	Konsentrasi PVP K-25 1%	.000333	.007214	1.000	-.02341	.02408
	Konsentrasi PVP K-25 2%	.020333	.007214	.104	-.00341	.04408
	Konsentrasi PVP K-25 4%	.020333	.007214	.104	-.00341	.04408
	Tanpa PVP K-25 (kontrol)	-.032667*	.007214	.008	-.05641	-.00892
Konsentrasi PVP K-25 1%	Konsentrasi PVP K-25 0.5%	-.000333	.007214	1.000	-.02408	.02341
	Konsentrasi PVP K-25 2%	.020000	.007214	.111	-.00374	.04374
	Konsentrasi PVP K-25 4%	.020000	.007214	.111	-.00374	.04374
	Tanpa PVP K-25 (kontrol)	-.033000*	.007214	.007	-.05674	-.00926
Konsentrasi PVP K-25 2%	Konsentrasi PVP K-25 0.5%	-.020333	.007214	.104	-.04408	.00341
	Konsentrasi PVP K-25 1%	-.020000	.007214	.111	-.04374	.00374
	Konsentrasi PVP K-25 4%	.000000	.007214	1.000	-.02374	.02374
	Tanpa PVP K-25 (kontrol)	-.053000*	.007214	.000	-.07674	-.02926
Konsentrasi PVP K-25 4%	Konsentrasi PVP K-25 0.5%	-.020333	.007214	.104	-.04408	.00341
	Konsentrasi PVP K-25 1%	-.020000	.007214	.111	-.04374	.00374
	Konsentrasi PVP K-25 2%	.000000	.007214	1.000	-.02374	.02374
	Tanpa PVP K-25 (kontrol)	-.053000*	.007214	.000	-.07674	-.02926
Tanpa PVP K-25 (kontrol)	Konsentrasi PVP K-25 0.5%	.032667*	.007214	.008	.00892	.05641
	Konsentrasi PVP K-25 1%	.033000*	.007214	.007	.00926	.05674
	Konsentrasi PVP K-25 2%	.053000*	.007214	.000	.02926	.07674
	Konsentrasi PVP K-25 4%	.053000*	.007214	.000	.02926	.07674

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

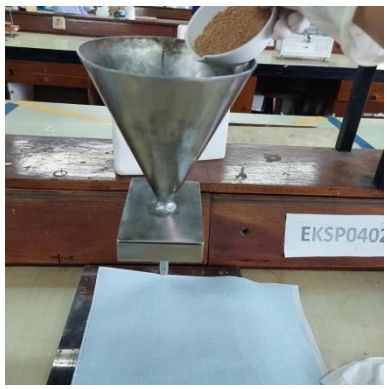
Lampiran X. Gambar Penelitian

Gambar 13. Evaluasi distribusi partikel granul. Alat *Shieve Shaker* (Merek Lokal SS-HB-EM-01).

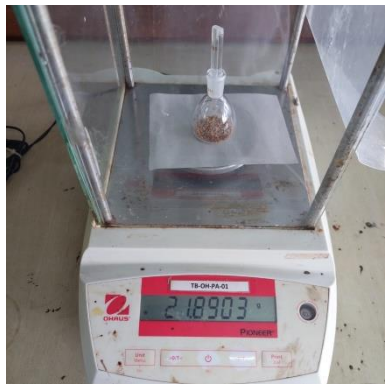
Gambar 16. Pengukuran diatemer granul. Alat Penggaris (Merek Stainless steel).

Gambar 14. Evaluasi kandungan lembab granul. Alat *Moisture analyzer* (Merek Mettler Toledo HE73).

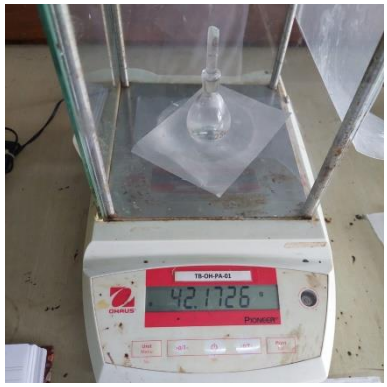
Gambar 17. Evaluasi bobot jenis sejati (Penimbangan piknometer kosong). Alat timbangan analitik (Merek Sartorius).



Gambar 15. Evaluasi Kecepatan alir dan sudut istirahat granul. Alat *Flow tester* (Merek Lokal FL-LO-15-01).



Gambar 18. Penimbangan piknometer + granul. Alat timbangan analitik (Merek Sartorius).



Gambar 19. Penimbangan piknometer + paraffin. Alat timbangan analitik (Merek Sartorius).

Gambar 20. Penimbangan piknometer + granul+ paraffin. Alat timbangan analitik (Merek Sartorius).

Gambar 21. Evaluasi Bobot jenis nyata, mampat dan porositas. Alat *Tap density dual holder* (Merek Lokal TD-LO-2H-01).