

## **BAB V**

### **KESIMPULAN DAN SARAN**

#### **A. Kesimpulan**

Hasil penelitian didapatkan bahwa campuran pengisi laktosa dan PVP pada proporsi laktosa 0%(172 mg) : PVP 100%(20 mg) sebagai formula optimum pada sifat fisik granul dan menghasilkan kapsul lendir bekitot yang memenuhi persyaratan uji sifat fisik kapsul.

#### **B. Saran**

1. Perlu diadakan penelitian lebih lanjut dalam formulasi kapsul lendir bekitot dengan mengoptimasi bahan tambahan yang lain selain bahan pengisi dan pengikat sehingga dapat diketahui apa pengaruhnya terhadap sifat fisik kapsul.
2. Perlu diadakan penelitian lebih lanjut dalam membuat formulasi dalam bentuk sediaan lain dari lendir bekitot dengan metode *simplex lattice design*.

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**Lampiran 1.** Foto alat dan bahan

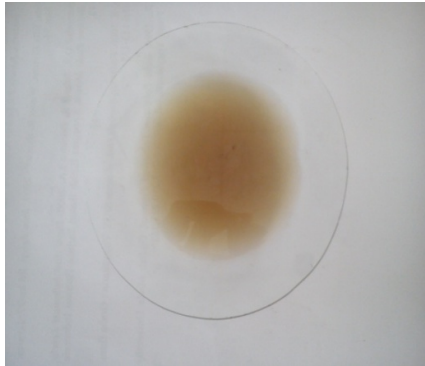
a. Hewan bekicot



d. Alat uji daya serap air



b. Lendir bekicot



e. Timbangan analitik



c. Cangkang kapsul



f. Alat uji waktu alir



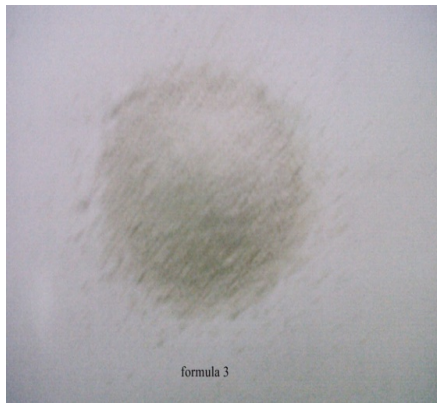
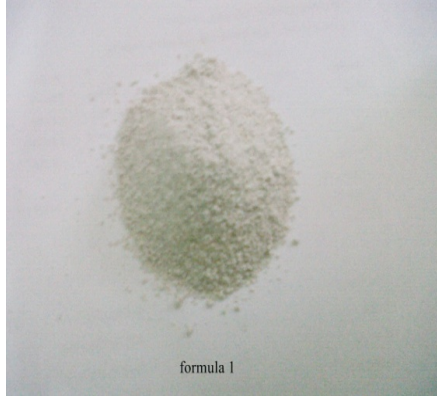
g. Alat uji waktu hancur



h. Mesin pencetak tablet



**Lampiran 2.** Foto granul lendir bekicot





**Lampiran 3.** Foto kapsul lendir  
bekicot



**Lampiran 4.** Foto uji higroskopisitas warna isi kapsul lendir bekicot





**Lampiran 5.** Perhitungan dosis lendir bekicot

Berdasarkan penelitian terdahulu dosis lendir bekicot yang berkhasiat sebagai anti inflamasi sebesar 23,72 mg/kgBB mencit (Tripurnomorini *et al.* 2000). Dosis tersebut jika dikonversikan ke dosis manusia adalah sebagai berikut:

Dosis lendir bekicot pada mencit	= 23,72 mg kg/BB
Faktor konversi dosis manusia (70 kg)	= 387,9
Dosis optimum untuk mencit (20 g)	= 0.02 kg
Perhitungan	= 23,72 mg/kg BB x 0,02 =0,4744 mg
Dosis optimum untuk manusia	= 0. 4744 x 387,9 =184 mg

**Lampiran 6.** Uji sifat fisik granul**Lampiran 6a.** Uji waktu alir granul

waktu alir granul (detik)				
Formula I	Formula II	Formula III	Formula IV	Formula V
5,30	5,52	5,58	6,09	6,45
5,13	6,00	6,00	6,15	6,39
5,22	5,54	6,08	6,30	6,40
X = 5,216	X = 5,686	X = 5,886	X = 6,180	X = 6,413
SD = 0,085	SD = 0,271	SD = 0,268	SD = 0,108	SD = 0,032

**Lampiran 6b.** Uji daya serap air granul

Daya serap air (g/menit)				
Formula I	Formula II	Formula III	Formula IV	Formula V
0,062	0,071	0,067	0,081	0,088
0,060	0,069	0,069	0,092	0,091
0,073	0,065	0,078	0,081	0,090
X = 0,065	X = 0,068	X = 0,071	X = 0,084	X = 0,089
SD = 0,007	SD = 0,003	SD = 0,005	SD = 0,006	SD = 0,001

**Lampiran 6c.** Uji waktu hancur granul

waktu hancur granul (menit)				
Formula I	Formula II	Formula III	Formula IV	Formula V
2,38	2,40	2,30	2,20	2,06
2,35	2,18	2,13	2,18	2,12
2,42	2,39	2,35	2,15	2,11
X = 2,383	X = 2,323	X = 2,260	X = 2,176	X = 2,096
SD = 0,035	SD = 0,124	SD = 0,115	SD = 0,025	SD = 0,032

**Lampiran 7.** Uji sifat fisik granul formula optimum lendir bekicot dengan campuran laktosa 0%(172 mg) : pvp 100%(20 mg).

**Lampiran 7a.** Uji waktu alir granul formula optimum

No	Waktu alir ( detik)
1	6,45
2	6,39
3	6,40
X	6,413
SD	0,032

**Lampiran 7b.** Uji daya serap air granul formula optimum

No	Daya serap air (g/menit)
1	0,088
2	0,091
3	0,090
X	0,089
SD	0,001

**Lampiran 7c.** Uji waktu hancur granul formula optimum

No	Waktu hancur ( menit )
1	2,06
2	2,12
3	2,11
X	2,096
SD	0,032

**Lampiran 8.** Hasil uji statistik dan persamaan berdasarkan *Simplex Lattice Design* dengan *Software Design Expert 8.0.6.1*.

**Response 1 waktu alir**

**ANOVA for Quadratic Mixture Model**

**\*\*\* Mixture Component Coding is L\_Pseudo. \*\*\***

**Analysis of variance table [Partial sum of squares - Type III]**

Source	Sum of Squares	df	Mean Square	F Value	p-value Prob > F	
Model	2.53	2	1.27	42.61	< 0.0001	significant
Linear Mixture	2.50	1	2.50	84.18	< 0.0001	
AB	0.031	1	0.031	1.04	0.3275	
Residual	0.36	12	0.030			
Lack of Fit	0.025	2	0.012	0.37	0.6986	not significant
Pure Error	0.33	10	0.033			
Cor Total	2.89	14				

Std. Dev.	0.17	R-Squared	0.8766
Mean	5.88	Adj R-Squared	0.8560
C.V. %	2.93	Pred R-Squared	0.8281
PRESS	0.50	Adeq Precision	14.983

Component	Coefficient Estimate	df	Standard Error	95% CI Low	95% CI High	VIF
A-laktosa	5.25	1	0.094	5.04	5.45	1.66
B-pvp	6.40	1	0.094	6.20	6.60	1.66
AB	0.43	1	0.43	-0.49	1.36	2.43

**Final Equation in Terms of L\_Pseudo Components:**

$$\begin{aligned} \text{waktu alir} &= \\ &+5.25 \quad * A \\ &+6.40 \quad * B \\ &+0.43 \quad * A * B \end{aligned}$$

**Final Equation in Terms of Real Components:**

$$\begin{aligned} \text{waktu alir} &= \\ &+4.82067 \quad * \text{laktosa} \\ &-36.04333 \quad * \text{pvp} \\ &+62.53714 \quad * \text{laktosa} * \text{pvp} \end{aligned}$$

**Final Equation in Terms of Actual Components:**

$$\begin{aligned} \text{waktu alir} &= \\ &+0.025108 \quad * \text{laktosa} \\ &-0.18773 \quad * \text{pvp} \\ &+1.69643\text{E-}003 \quad * \text{laktosa} * \text{pvp} \end{aligned}$$

Response 2 daya serap air

**ANOVA for Quadratic Mixture Model**

\*\*\* Mixture Component Coding is L\_Pseudo. \*\*\*

Analysis of variance table [Partial sum of squares - Type III]

Source	Sum of Squares	df	Mean Square	F Value	p-value Prob > F	
Model	1.334E-003	2	6.668E-004	24.49	< 0.0001	significant
Linear Mixture	1.294E-003	1	1.294E-003	47.51	< 0.0001	
AB	4.002E-005	1	4.002E-005	1.47	0.2487	
Residual	3.267E-004	12	2.723E-005			
Lack of Fit	5.608E-005	2	2.804E-005	1.04	0.3901	not significant
Pure Error	2.707E-004	10	2.707E-005			
Cor Total	1.660E-003	14				

Std. Dev.	5.218E-003	R-Squared	0.8032
Mean	0.076	Adj R-Squared	0.7704
C.V. %	6.88	Pred R-Squared	0.6912
PRESS	5.127E-004	Adeq Precision	11.256

Component	Coefficient Estimate	df	Standard Error	95% CI Low	95% CI High	VIF
A-laktosa	0.065	1	2.835E-003	0.058	0.071	1.66
B-pvp	0.091	1	2.835E-003	0.085	0.097	1.66
AB	-0.016	1	0.013	-0.044	0.012	2.43

**Final Equation in Terms of L\_Pseudo Components:**

$$\begin{aligned} \text{daya serap air} &= \\ &+0.065 \quad * A \\ &+0.091 \quad * B \\ &-0.016 \quad * A * B \end{aligned}$$

**Final Equation in Terms of Real Components:**

$$\begin{aligned} \text{daya serap air} &= \\ &+0.062933 \quad * \text{laktosa} \\ &+2.34613 \quad * \text{pvp} \\ &-2.24914 \quad * \text{laktosa} * \text{pvp} \end{aligned}$$

**Final Equation in Terms of Actual Components:**

$$\begin{aligned} \text{daya serap air} &= \\ &+3.27778\text{E-}004 \quad * \text{laktosa} \\ &+0.012219 \quad * \text{pvp} \\ &-6.10119\text{E-}005 \quad * \text{laktosa} * \text{pvp} \end{aligned}$$

**Response 3 waktu hancur**

**ANOVA for Quadratic Mixture Model**

**\*\*\* Mixture Component Coding is L\_Pseudo. \*\*\***

**Analysis of variance table [Partial sum of squares - Type III]**

Source	Sum of Squares	df	Mean Square	F Value	p-value Prob > F
Model	0.16	2	0.078	14.80	0.0006 significant
Linear Mixture	0.16	1	0.16	29.46	0.0002
AB	7.714E-004	1	7.714E-004	0.15	0.7089
Residual	0.063	12	5.279E-003		
Lack of Fit	8.190E-005	2	4.095E-005	6.473E-003	0.9936 not significant
Pure Error	0.063	10	6.327E-003		
Cor Total	0.22	14			
Std. Dev.	0.073		R-Squared		0.7116
Mean	2.25		Adj R-Squared		0.6635
C.V. %	3.23		Pred R-Squared		0.5949
PRESS	0.089		Adeq Precision	8.863	

Component	Coefficient		Standard Error	95% CI		VIF
	Estimate	df		Low	High	
A-laktosa	2.38	1	0.039	2.30	2.47	1.66
B-pvp	2.10	1	0.039	2.01	2.18	1.66
AB	0.069	1	0.18	-0.32	0.46	2.43

**Final Equation in Terms of L\_Pseudo Components:**

$$\begin{aligned} \text{waktu hancur} &= \\ &+2.38 \quad * A \\ &+2.10 \quad * B \\ &+0.069 \quad * A * B \end{aligned}$$

**Final Equation in Terms of Real Components:**

$$\begin{aligned} \text{waktu hancur} &= \\ &+2.43400 \quad * \text{laktosa} \\ &-9.66200 \quad * \text{pvp} \\ &+9.87429 \quad * \text{laktosa} * \text{pvp} \end{aligned}$$

**Final Equation in Terms of Actual Components:**

$$\begin{aligned} \text{waktu hancur} &= \\ &+0.012677 \quad * \text{laktosa} \\ &-0.050323 \quad * \text{pvp} \\ &+2.67857E-004 \quad * \text{laktosa} * \text{pvp} \end{aligned}$$



**Lampiran 9.** Uji sifat fisik kapsul lendir bekicot dengan campuran laktosa  
0%(172 mg) : pvp 100%(20 mg).

**Lampiran 9a.** Uji keseragaman bobot

No	Berat (mg)	Penyimpangan (%)
1	481	0,04%
2	479	0,45%
3	487	1,20%
4	485	0,78%
5	479	0,45%
6	478	0,66%
7	479	0,45%
8	478	0,66%
9	478	0,66%
10	485	0,78%
11	483	0,37%
12	479	0,45%
13	478	0,66%
14	479	0,45%
15	477	0,87%
16	484	0,58%
17	487	1,20%
18	484	0,58%
19	485	0,78%
20	479	0,45%
X	481,2	0,6260
SD	3,38	0,2707
CV	0,70%	

Perhitungan koefisien variasi

$$CV = \frac{3,38}{481,2} \times 100\%$$

$$= 0,70\%$$

Dari data perhitungan keseragaman bobot kapsul didapatkan nilai  $cv \leq 5\%$  sehingga formula optimum memenuhi standart keseragaman bobot.

Perhitungan penyimpangan bobot kapsul optimum:

a) Kolom A (7,5%)

$$\frac{7,5}{100} \times 481,2 \text{ mg} = 36,09 \text{ mg}$$

Range bobot kapsul 445,11 mg – 517,29 mg

b) Kolom B (15%)

$$\frac{15}{100} \times 481,2 \text{ mg} = 72,18 \text{ mg}$$

Range bobot kapsul 408,4 mg – 554 mg

Data uji keseragaman bobot kapsul sesuai dengan range bobot kapsul yang dipersyaratkan jadi formula optimum memenuhi syarat uji keseragaman bobot.

Contoh perhitungan penyimpangan bobot kapsul masing-masing

$$\begin{aligned} \text{Penyimpangan (\%)} &= \frac{\text{bobot rata-rata kapsul} - \text{bobot kapsul}}{\text{bobot rata-rata kapsul}} \times 100\% \\ &= \frac{481,2 - 381}{481,2} \times 100\% \\ &= 0,04\% \end{aligned}$$



FIV	566	569	569	569	569	569	569
	565	568	568	568	568	568	568
	565	568	568	568	568	568	568
	567	569	569	569	569	569	569
	565	568	568	568	568	568	568
X	565,6	568,4	568,4	568,4	568,4	568,4	568,4
SD	0,89	0,54	0,54	0,54	0,54	0,54	0,54
FV	564	568	568	568	568	568	568
	565	568	568	568	568	568	568
	564	569	569	569	569	569	569
	566	569	569	569	569	569	569
	566	568	568	568	568	568	568
X	565	568,4	568,4	568,4	568,4	568,4	568,4
SD	1,00	0,54	0,54	0,54	0,54	0,54	0,54

### Lampiran 9c2. Uji higroskopisitas tiap minggu

	Minggu ke- (mg)		
	2	3	4
FI	569	570	571
	570	572	574
	569	571	573
	570	571	572
	570	572	573
X	569,6	571,2	572,6
SD	0,54	0,83	1,14
FII	569	572	574
	569	571	573
	568	570	572
	569	571	572
	570	572	574
X	569	571,2	573
SD	0,70	0,83	1,00

FIII	569	570	572
	570	572	573
	572	573	574
	570	571	573
	570	572	574
X	570,2	571,6	573,2
SD	1,09	1,14	0,83
FIV	572	573	575
	570	572	574
	571	573	574
	572	573	575
	571	572	573
X	571,2	572,6	574,2
SD	0,83	0,54	0,83
FV	570	572	574
	571	572	573
	572	574	575
	572	573	575
	570	572	574
X	571	572,6	574,2
SD	1,00	0,89	0,83

**Lampiran 10.** Data hasil percobaan formula laktosa 174,741 mg : pvp 17,259 mg

**Lampiran 10a.** Data hasil percobaan waktu alir formula laktosa 174,741 mg : pvp 17,259 mg

No	Waktu alir ( detik )
1	6,20
2	6,24
3	6,28
X	6,233
SD	0,030

**Lampiran 10b.** Data hasil percobaan daya serap air formula laktosa 174,741 mg : pvp 17,259 mg

No	Daya serap air (g/detik)
1	0,085
2	0,085
3	0,087
X	0,085
SD	0,001

**Lampiran 10c.** Data hasil percobaan waktu hancur formula laktosa 174,741 mg : pvp 17,259 mg

No	Waktu hancur ( menit )
1	2,18
2	2,16
3	2,14
X	2,160
SD	0,020



**Lampiran 11.** Data hasil prediksi oleh software *design expert* formula laktosa

174,741 mg : pvp 17,259 mg

Laktosa	Pvp	Waktu alir	Daya sarep air	Waktu hancur
174,741	17,259	6,26355	0,0841681	2,15451

**Lampiran 12.** Uji anova**Lampiran 12a.** Hasil uji anova uji waktu alir FI,FII,FIII,FIV,FV**NPar Tests****Descriptive Statistics**

	N	Mean	Std. Deviation	Minimum	Maximum
waktu alir kapsul	15	5.8767	.45412	5.13	6.45

**One-Sample Kolmogorov-Smirnov Test**

		waktu alir kapsul
N		15
Normal Parameters <sup>a,b</sup>	Mean	5.8767
	Std. Deviation	.45412
Most Extreme Differences	Absolute	.207
	Positive	.143
	Negative	-.207
Kolmogorov-Smirnov Z		.802
Asymp. Sig. (2-tailed)		.541

a. Test distribution is Normal.

b. Calculated from data.

## Oneway

### Descriptives

waktu alir kapsul

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
formula 1	3	5.2167	.08505	.04910	5.0054	5.4279	5.13	5.30
formula 2	3	5.6867	.27154	.15677	5.0121	6.3612	5.52	6.00
formula 3	3	5.8867	.26858	.15506	5.2195	6.5538	5.58	6.08
formula 4	3	6.1800	.10817	.06245	5.9113	6.4487	6.09	6.30
formula 5	3	6.4133	.03215	.01856	6.3335	6.4932	6.39	6.45
Total	15	5.8767	.45412	.11725	5.6252	6.1281	5.13	6.45

### Test of Homogeneity of Variances

waktu alir kapsul

Levene Statistic	df1	df2	Sig.
4.990	4	10	.052

### ANOVA

waktu alir kapsul

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	2.555	4	.639	19.262	.000
Within Groups	.332	10	.033		
Total	2.887	14			

## Post Hoc Tests

### Multiple Comparisons

waktu alir kapsul

Tukey HSD

(I) formula kapsul	(J) formula kapsul	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
formula 1	formula 2	-.47000*	.14870	.061	-.9594	.0194
	formula 3	-.67000*	.14870	.008	-1.1594	-.1806
	formula 4	-.96333*	.14870	.001	-1.4527	-.4740
	formula 5	-1.19667*	.14870	.000	-1.6860	-.7073
formula 2	formula 1	.47000	.14870	.061	-.0194	.9594
	formula 3	-.20000	.14870	.672	-.6894	.2894
	formula 4	-.49333*	.14870	.048	-.9827	-.0040
	formula 5	-.72667*	.14870	.004	-1.2160	-.2373
formula 3	formula 1	.67000*	.14870	.008	.1806	1.1594
	formula 2	.20000	.14870	.672	-.2894	.6894
	formula 4	-.29333	.14870	.343	-.7827	.1960
	formula 5	-.52667*	.14870	.034	-1.0160	-.0373
formula 4	formula 1	.96333*	.14870	.001	.4740	1.4527
	formula 2	.49333*	.14870	.048	.0040	.9827
	formula 3	.29333	.14870	.343	-.1960	.7827
	formula 5	-.23333	.14870	.546	-.7227	.2560
formula 5	formula 1	1.19667*	.14870	.000	.7073	1.6860
	formula 2	.72667*	.14870	.004	.2373	1.2160
	formula 3	.52667*	.14870	.034	.0373	1.0160
	formula 4	.23333	.14870	.546	-.2560	.7227

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

## Homogeneous Subsets

waktu alir kapsul

Tukey HSD<sup>a</sup>

formula kapsul	N	Subset for alpha = 0.05			
		1	2	3	4
formula 1	3	5.2167			
formula 2	3	5.6867	5.6867		
formula 3	3		5.8867	5.8867	
formula 4	3			6.1800	6.1800
formula 5	3				6.4133
Sig.		.061	.672	.343	.546

Means for groups in homogeneous subsets are displayed.

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

**Lampiran 12b.** Hasil uji anova uji daya serap air FI,FII,FIII,FIV,FV

**NPar Tests**

**Descriptive Statistics**

	N	Mean	Std. Deviation	Minimum	Maximum
dya serap air kapsul	15	.07580	.010890	.060	.092

**One-Sample Kolmogorov-Smirnov Test**

		dya serap air kapsul
N		15
Normal Parameters <sup>a,b</sup>	Mean	.07580
	Std. Deviation	.010890
Most Extreme Differences	Absolute	.137
	Positive	.137
	Negative	-.135
Kolmogorov-Smirnov Z		.530
Asymp. Sig. (2-tailed)		.941

a. Test distribution is Normal.

b. Calculated from data.



## Oneway

### Descriptives

dya serap air kapsul

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
					1	3		
2	3	.06833	.003055	.001764	.06074	.07592	.065	.071
3	3	.07133	.005859	.003383	.05678	.08589	.067	.078
4	3	.08467	.006351	.003667	.06889	.10044	.081	.092
5	3	.08967	.001528	.000882	.08587	.09346	.088	.091
Total	15	.07580	.010890	.002812	.06977	.08183	.060	.092

### Test of Homogeneity of Variances

dya serap air kapsul

Levene Statistic	df1	df2	Sig.
2.818	4	10	.084

### ANOVA

dya serap air kapsul

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	.001	4	.000	12.836	.001
Within Groups	.000	10	.000		
Total	.002	14			

## Post Hoc Tests

### Multiple Comparisons

dya serap air kapsul

Tukey HSD

(I) formula kapsul	(J) formula kapsul	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
1	2	-.003333	.004248	.929	-.01731	.01065
	3	-.006333	.004248	.590	-.02031	.00765
	4	-.019667*	.004248	.006	-.03365	-.00569
	5	-.024667*	.004248	.001	-.03865	-.01069
2	1	.003333	.004248	.929	-.01065	.01731
	3	-.003000	.004248	.950	-.01698	.01098
	4	-.016333*	.004248	.021	-.03031	-.00235
	5	-.021333*	.004248	.004	-.03531	-.00735
3	1	.006333	.004248	.590	-.00765	.02031
	2	.003000	.004248	.950	-.01098	.01698
	4	-.013333	.004248	.063	-.02731	.00065
	5	-.018333*	.004248	.010	-.03231	-.00435
4	1	.019667*	.004248	.006	.00569	.03365
	2	.016333*	.004248	.021	.00235	.03031
	3	.013333	.004248	.063	-.00065	.02731
	5	-.005000	.004248	.764	-.01898	.00898
5	1	.024667*	.004248	.001	.01069	.03865
	2	.021333*	.004248	.004	.00735	.03531
	3	.018333*	.004248	.010	.00435	.03231
	4	.005000	.004248	.764	-.00898	.01898

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

## Homogeneous Subsets

### dya serap air kapsul

Tukey HSD<sup>a</sup>

formulakapsul	N	Subset for alpha = 0.05		
		1	2	3
1	3	.06500		
2	3	.06833		
3	3	.07133	.07133	
4	3		.08467	.08467
5	3			.08967
Sig.		.590	.063	.764

Means for groups in homogeneous subsets are displayed.

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

**Lampiran 12c.** Hasil uji anova uji waktu hancur FI,FII,FIII,FIV,FV**NPar Tests****Descriptive Statistics**

	N	Mean	Std. Deviation	Minimum	Maximum
waktu hancur kapsul	15	2.2480	.12525	2.06	2.42

**One-Sample Kolmogorov-Smirnov Test**

		waktu hancur kapsul
N		15
Normal Parameters <sup>a,b</sup>	Mean	2.2480
	Std. Deviation	.12525
Most Extreme Differences	Absolute	.192
	Positive	.183
	Negative	-.192
Kolmogorov-Smirnov Z		.745
Asymp. Sig. (2-tailed)		.636

a. Test distribution is Normal.

b. Calculated from data.

## Oneway

### Descriptives

waktu hancur kapsul

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
formula 1	3	2.3833	.03512	.02028	2.2961	2.4706	2.35	2.42
formula 2	3	2.3233	.12423	.07172	2.0147	2.6319	2.18	2.40
formula 3	3	2.2600	.11533	.06658	1.9735	2.5465	2.13	2.35
formula 4	3	2.1767	.02517	.01453	2.1142	2.2392	2.15	2.20
formula 5	3	2.0967	.03215	.01856	2.0168	2.1765	2.06	2.12
Total	15	2.2480	.12525	.03234	2.1786	2.3174	2.06	2.42

### Test of Homogeneity of Variances

waktu hancur kapsul

Levene Statistic	df1	df2	Sig.
4.908	4	10	.055

### ANOVA

waktu hancur kapsul

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	.156	4	.039	6.179	.009
Within Groups	.063	10	.006		
Total	.220	14			

## Post Hoc Tests

### Multiple Comparisons

waktu hancur kapsul

Tukey HSD

(I) formula kapsul	(J) formula kapsul	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
formula 1	formula 2	.06000	.06494	.881	-.1537	.2737
	formula 3	.12333	.06494	.376	-.0904	.3371
	formula 4	.20667	.06494	.059	-.0071	.4204
	formula 5	.28667*	.06494	.009	.0729	.5004
formula 2	formula 1	-.06000	.06494	.881	-.2737	.1537
	formula 3	.06333	.06494	.860	-.1504	.2771
	formula 4	.14667	.06494	.235	-.0671	.3604
	formula 5	.22667*	.06494	.037	.0129	.4404
formula 3	formula 1	-.12333	.06494	.376	-.3371	.0904
	formula 2	-.06333	.06494	.860	-.2771	.1504
	formula 4	.08333	.06494	.707	-.1304	.2971
	formula 5	.16333	.06494	.163	-.0504	.3771
formula 4	formula 1	-.20667	.06494	.059	-.4204	.0071
	formula 2	-.14667	.06494	.235	-.3604	.0671
	formula 3	-.08333	.06494	.707	-.2971	.1304
	formula 5	.08000	.06494	.735	-.1337	.2937
formula 5	formula 1	-.28667*	.06494	.009	-.5004	-.0729
	formula 2	-.22667*	.06494	.037	-.4404	-.0129
	formula 3	-.16333	.06494	.163	-.3771	.0504
	formula 4	-.08000	.06494	.735	-.2937	.1337

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



## Homogeneous Subsets

### waktu hancur kapsul

Tukey HSD<sup>a</sup>

formula kapsul	N	Subset for alpha = 0.05	
		1	2
formula 5	3	2.0967	
formula 4	3	2.1767	2.1767
formula 3	3	2.2600	2.2600
formula 2	3		2.3233
formula 1	3		2.3833
Sig.		.163	.059

Means for groups in homogeneous subsets are displayed.

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

**Lampiran 13.** Hasil uji t antara hasil prediksi berdasarkan SLD dan hasil percobaan

**Lampiran 13a.** Hasil uji t waktu alir

### NPar Tests

#### Descriptive Statistics

	N	Mean	Std. Deviation	Minimum	Maximum
waktualir	6	6.2517750	.02839684	6.20000	6.28000

#### One-Sample Kolmogorov-Smirnov Test

		waktualir
N		6
Normal Parameters <sup>a,b</sup>	Mean	6.2517750
	Std. Deviation	.02839684
Most Extreme Differences	Absolute	.327
	Positive	.173
	Negative	-.327
Kolmogorov-Smirnov Z		.802
Asymp. Sig. (2-tailed)		.541

a. Test distribution is Normal.

b. Calculated from data.

### T-Test

#### Group Statistics

perlakuan	N	Mean	Std. Deviation	Std. Error Mean
Waktualir percobaan	3	6.2400000	.04000000	.02309401
prediksi	3	6.2635500	.00000000	.00000000

## 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
waktu	Equal variances assumed	4.000	.116	-1.020	4	.366	-.023094	.023550	-.040569	.0876925
ualir	Equal variances not assumed			-1.020	2.000	.415	-.023094	.023550	-.075815	.1229151

### Lampiran 13b. Uji t daya serap air

#### NPar Tests

##### Descriptive Statistics

	N	Mean	Std. Deviation	Minimum	Maximum
dayaserap	6	.0849133	.00110197	.08416	.08700

##### One-Sample Kolmogorov-Smirnov Test

		Dayaserap
N		6
Normal Parameters <sup>a,b</sup>	Mean	.0849133
	Std. Deviation	.00110197
Most Extreme Differences	Absolute	.302
	Positive	.302
	Negative	-.247
Kolmogorov-Smirnov Z		.740
Asymp. Sig. (2-tailed)		.644

a. Test distribution is Normal.

b. Calculated from data.

#### T-Test

##### Group Statistics

perlakuan		N	Mean	Std. Deviation	Std. Error Mean
dayaserap	percobaan	3	.0856667	.00115470	.00066667
	prediksi	3	.0841600	.00000000	.00000000

**Independent Samples Test**

	Levene's Test for		t-test for Equality of Means							
	Equality of								95% Confidence	
	Variances								Interval of the	
	F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper	
dayas Equal	16.000	.016	2.26	4	.087	.001506	.000666	-.003357	.003357	
erap variances assumed			0			.67	.67	.000344	.63	
Equal			2.26	2.00	.152	.001506	.000666	-.004375	.004375	
variances not assumed			0	0		.67	.67	.001361	.1077	

### Lampiran 13c. Uji t waktu hancur

#### NPar Tests

##### Descriptive Statistics

	N	Mean	Std. Deviation	Minimum	Maximum
Waktuhancur	6	2.1572550	.01300162	2.14000	2.18000

##### One-Sample Kolmogorov-Smirnov Test

		waktuhancur
N		6
Normal Parameters <sup>a,b</sup>	Mean	2.1572550
	Std. Deviation	.01300162
Most Extreme Differences	Absolute	.250
	Positive	.250
	Negative	-.250
Kolmogorov-Smirnov Z		.613
Asymp. Sig. (2-tailed)		.847

a. Test distribution is Normal.

b. Calculated from data.

#### T-Test

##### Group Statistics

perlakuan		N	Mean	Std. Deviation	Std. Error Mean
Waktuhancur	percobaan	3	2.1600000	.02000000	.01154701
	prediksi	3	2.1545100	.00000000	.00000000

