

BAB V

KESIMPULAN DAN SARAN

A. Kesimpulan

Hasil penelitian dan analisa data-data statistik terhadap uji sifat fisik tablet antalgin dapat disimpulkan:

1. Madu dapat digunakan sebagai bahan pengikat dalam pembuatan tablet antalgin.
2. Ada perbedaan yang signifikan antara ketiga formula tablet antalgin yang dibuat dengan pengikat madu pada konsentrasi 3%, 4% dan 5% yang meliputi kekerasan tablet, kerapuhan tablet, dan waktu hancur tablet. Sedangkan keseragaman bobot menunjukkan tidak ada perbedaan yang signifikan.

B. Saran

1. Perlu dilakukan penelitian dengan menggunakan bahan pengikat lain dengan konsentrasi yang berbeda terhadap bahan aktif antalgin.
2. Perlu dilakukan penelitian lebih lanjut tentang pembuatan tablet antalgin dengan metode lain.

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Lampiran 1. Foto tablet antalgin**Formula I****Formula II**



Formula III

Lampiran 2. Foto alat *Hardness Tester*



Lampiran 3. Gambar Alat *Friabilator Tester*



Lampiran 4. Foto *Oven*

Lampiran 5. Foto *Neraca Analitik*



Lampiran 6. Foto alat *Uji Waktu Alir*



Lampiran 7. Foto *Mesin kempa tablet*



Lampiran 8. Gambar alat *Moisture balance*



Lampiran 9. Data Waktu Alir Granul

Waktu Alir granul

No.	Madu 3%	Madu 4%	madu 5%
	Waktu Alir (detik)	Waktu Alir (detik)	Waktu Alir (detik)
1.	6,45	6,10	6,12
2.	7,20	6,18	5,23
3.	6,54	6,40	5,36
4.	7,41	5,45	5,10
5.	6,32	5,50	5,16
6.	6,42	6,15	5,14
7.	7,25	5,42	5,26
8.	6,36	6,28	6,05
9.	7,10	6,36	6,11
10.	7,18	6,21	5,21
\bar{x}	6,823	6,005	5,474
SD	0,437	0,390	0,434

Perhitungan statistik NPar Tests

Descriptive Statistics

	N	Mean	Std. Deviation	Minimum	Maximum
ujiwaktualir	30	6,1007	,69520	5,10	7,41

One-Sample Kolmogorov-Smirnov Test

		ujiwaktualir
N		30
Normal Parameters(a,b)	Mean	6,1007
	Std. Deviation	,69520
Most Extreme Differences	Absolute	,140
	Positive	,140
	Negative	-,138
Kolmogorov-Smirnov Z		,764
Asymp. Sig. (2-tailed)		,603

a Test distribution is Normal.

b Calculated from data.

Oneway

[DataSet0]

Descriptives

ujiwaktualir

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
formula 1	10	6,8230	,43744	,13833	6,5101	7,1359	6,32	7,41
formula 2	10	6,0050	,38954	,12318	5,7263	6,2837	5,42	6,40
formula 3	10	5,4740	,43354	,13710	5,1639	5,7841	5,10	6,12
Total	30	6,1007	,69520	,12693	5,8411	6,3603	5,10	7,41

Test of Homogeneity of Variances

ujiwaktualir

Levene Statistic	df1	df2	Sig.
,580	2	27	,567

Oneway

ANOVA

ujiwaktualir

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	9,236	2	4,618	26,088	,000
Within Groups	4,780	27	,177		
Total	14,016	29			

Post Hoc Tests

Multiple Comparisons

Dependent Variable: ujiwaktualir
Scheffe

(I) formula	(J) formula	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
formula 1	formula 2	,81800(*)	,18816	,001	,3307	1,3053
	formula 3	1,34900(*)	,18816	,000	,8617	1,8363
formula 2	formula 1	-,81800(*)	,18816	,001	-1,3053	-,3307
	formula 3	,53100(*)	,18816	,031	,0437	1,0183
formula 3	formula 1	-1,34900(*)	,18816	,000	-1,8363	-,8617
	formula 2	-,53100(*)	,18816	,031	-1,0183	-,0437

* The mean difference is significant at the .05 level.

Homogeneous Subsets

ujiwaktualir

Scheffe

formula	N	Subset for alpha = .05		
		1	2	3
formula 3	10	5,4740		
formula 2	10		6,0050	
formula 1	10			6,8230
Sig.		1,000	1,000	1,000

Means for groups in homogeneous subsets are displayed.

a Uses Harmonic Mean Sample Size = 10,000.

Lampiran 10. Data Sudut diam

Sudut diam granul

No.	Madu 3% Sudutdiam	Madu 4% Sudutdiam	Madu 5% Sudutdiam
1.	29,99	28,89	28,84
2.	29,77	28,91	28,47
3.	29,70	29,96	27,05
4.	30,92	29,73	27,84
5.	29,22	28,82	28,83
6.	29,86	28,89	28,26
7.	30,56	29,95	27,33
8.	30,87	29,33	27,96
9.	29,71	28,99	28,36
10.	29,91	28,85	28,84
\bar{x}	30,05	29,23	28,12
SD	0,553	0,473	0,588

**Perhitungan Statistik
NPar Tests**

Descriptive Statistics

	N	Mean	Std. Deviation	Minimum	Maximum
Sudutdiam	30	29.1337	.95964	27.05	30.92

One-Sample Kolmogorov-Smirnov Test

		sudutdiam
N		30
Normal Parameters ^{a,b}	Mean	29.1337
	Std. Deviation	.95964
Most Extreme Differences	Absolute	.122
	Positive	.093
	Negative	-.122
Kolmogorov-Smirnov Z		.671
Asymp. Sig. (2-tailed)		.759

a. Test distribution is Normal.

b. Calculated from data.

Oneway**Descriptives**

Sudutdiam

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
formula1	10	30.0510	.55318	.17493	29.6553	30.4467	29.22	30.92
formula2	10	29.2320	.47316	.14963	28.8935	29.5705	28.82	29.96
formula3	10	28.1180	.58780	.18588	27.6975	28.5385	27.05	28.84
Total	30	29.1337	.95964	.17520	28.7753	29.4920	27.05	30.92

Test of Homogeneity of Variances

Sudutdiam

Levene Statistic	df1	df2	Sig.
.079	2	27	.924

ANOVA

Sudutdiam

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	18.827	2	9.414	32.261	.000
Within Groups	7.879	27	.292		
Total	26.706	29			

Post Hoc Tests

Multiple Comparisons

Sudutdiam
Scheffe

(I) formulatab	(J) formulatab	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
formula1	formula2	.81900 [*]	.24158	.008	.1933	1.4447
	formula3	1.93300 [*]	.24158	.000	1.3073	2.5587
formula2	formula1	-.81900 [*]	.24158	.008	-1.4447	-.1933
	formula3	1.11400 [*]	.24158	.000	.4883	1.7397
formula3	formula1	-1.93300 [*]	.24158	.000	-2.5587	-1.3073
	formula2	-1.11400 [*]	.24158	.000	-1.7397	-.4883

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

Homogeneous Subsets

Sudutdiam

Scheffe^a

formulatab	N	Subset for alpha = 0.05		
		1	2	3
formula3	10	28.1180		
formula2	10		29.2320	
formula1	10			30.0510
Sig.		1.000	1.000	1.000

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 10,000.

Lampiran11. Uji keseragaman bobot tablet antalgin

Data keseragaman bobot tablet antalgin

No.	Madu 3%	Madu 4%	Madu 5%
	Bobot dalam mg	Bobot dalam mg	Bobot dalam mg
1.	607	604	615
2.	609	601	628
3.	615	607	620
4.	610	611	613
5.	621	617	612
6.	616	612	616
7.	611	619	618
8.	617	608	616
9.	614	621	612
10.	624	617	614
11.	612	615	623
12.	629	613	630
13.	623	616	622
14.	624	617	620
15.	613	614	621
16.	624	625	614
17.	625	619	617
18.	608	627	619
19.	612	623	615
20.	614	619	610
\bar{x}	616,40	615,25	617,75
SD	6,5647	6,7424	5,2403
CV	1,07 %	1,10 %	0,85%
$\bar{x} + 5\%$	647,25	646,01	648,6
$\bar{x} - 5\%$	585,58	584,49	586,9

Contoh perhitungan penyimpangan bobot tablet dengan bahan pengikat madu 3%.

a. Kolom A (5%)

$$\frac{5}{100} \times 616,40 \text{ mg} = 30,82 \text{ mg}$$

$$\text{Range bobot tablet} = 585,58 \text{ mg} - 647,25 \text{ mg}$$

b. Kolom B (10%)

$$\frac{10}{100} \times 616,40 \text{ mg} = 61,64 \text{ mg}$$

$$\text{Range bobot tablet} = 554,76 \text{ mg} - 677,04 \text{ mg}$$

Data uji keseragaman bobot tablet sesuai dengan range bobot tablet yang dipersyaratkan memenuhi syarat uji keseragaman bobot.

Contoh perhitungan CV pada keseragaman bobot tablet dengan bahan pengikat madu 3%.

$$\begin{aligned} \text{CV} &= \frac{\text{SD}}{\text{Bobot rata-rata tablet}} \times 100\% \\ &= \frac{6,5647}{616,40} \times 100\% \\ &= 1,067\% \end{aligned}$$

Perhitungan statistik keseragaman bobot

NPar Tests

Descriptive Statistics

	N	Mean	Std. Deviation	Minimum	Maximum
keseragamanbobot(mg)	60	616,47	6,199	601	630

One-Sample Kolmogorov-Smirnov Test

		keseragaman bobot(mg)
N		60
Normal Parameters ^{a,b}	Mean	616,47
	Std. Deviation	6,199
Most Extreme Differences	Absolute	,082
	Positive	,082
	Negative	-,054
Kolmogorov-Smirnov Z		,638
Asymp. Sig. (2-tailed)		,810

a. Test distribution is Normal.

b. Calculated from data.

Oneway

Descriptives

keseragamanbobot(mg)

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
					formula1	20		
formula2	20	615,25	6,742	1,508	612,09	618,41	601	627
formula3	20	617,75	5,240	1,172	615,30	620,20	610	630
Total	60	616,47	6,199	,800	614,87	618,07	601	630

Test of Homogeneity of Variances

keseragamanbobot(mg)

Levene Statistic	df1	df2	Sig.
,944	2	57	,395

ANOVA

keseragamanbobot(mg)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	62,633	2	31,317	,810	,450
Within Groups	2204,300	57	38,672		
Total	2266,933	59			

Lampiran 12. Data Uji kekerasan tablet

Data uji kekerasan tablet

No.	madu 3%	madu 4%	madu 5%
	Kekerasan (kg)	Kekerasan (kg)	Kekerasan (kg)
1.	11,6	12,4	14,1
2.	11,1	12,0	13,8
3.	11,1	11,8	13,0
4.	11,8	12,1	13,5
5.	11,4	12,8	14,0
6.	11,7	12,7	13,7
7.	12,0	11,8	13,8
8.	12,1	12,4	14,4
9.	11,7	12,8	12,7
10.	11,6	12,3	12,8
\bar{x}	11,610	12,310	13,580
SD	0,335	0,381	0,573

Perhitungan statistik kekerasan tablet

NPar Tests

Descriptive Statistics

	N	Mean	Std. Deviation	Minimum	Maximum
kekerasantablet	30	12,5000	,93255	11,10	14,40

One-Sample Kolmogorov-Smirnov Test

		kekerasantablet
N		30
Normal Parameters(a,b)	Mean	12,5000
	Std. Deviation	,93255
Most Extreme Differences	Absolute	,133
	Positive	,133
	Negative	-,101
Kolmogorov-Smirnov Z		,727
Asymp. Sig. (2-tailed)		,666

a Test distribution is Normal.

b Calculated from data.

Oneway

Descriptives

kekerasantablet

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
formula1	10	11,6100	,33483	,10588	11,3705	11,8495	11,10	12,10
formula2	10	12,3100	,38137	,12060	12,0372	12,5828	11,80	12,80
formula3	10	13,5800	,57310	,18123	13,1700	13,9900	12,70	14,40
Total	30	12,5000	,93255	,17026	12,1518	12,8482	11,10	14,40

Test of Homogeneity of Variances

kekerasantablet

Levene Statistic	df1	df2	Sig.
2,143	2	27	,137

ANOVA

kekerasantablet

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	19,946	2	9,973	51,056	,000
Within Groups	5,274	27	,195		
Total	25,220	29			

Post Hoc Tests**Multiple Comparisons**

Dependent Variable: kekerasantablet

Scheffe

(I) formula	(J) formula	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
formula1	formula2	-,70000(*)	,19765	,006	-1,2119	-,1881
	formula3	-1,97000(*)	,19765	,000	-2,4819	-1,4581
formula2	formula1	,70000(*)	,19765	,006	,1881	1,2119
	formula3	-1,27000(*)	,19765	,000	-1,7819	-,7581
formula3	formula1	1,97000(*)	,19765	,000	1,4581	2,4819
	formula2	1,27000(*)	,19765	,000	,7581	1,7819

* The mean difference is significant at the .05 level.

Homogeneous Subsets

kekerasantablet

Scheffe

formula	N	Subset for alpha = .05		
		1	2	3
formula1	10	11,6100		
formula2	10		12,3100	
formula3	10			13,5800
Sig.		1,000	1,000	1,000

Means for groups in homogeneous subsets are displayed.

a Uses Harmonic Mean Sample Size = 10,000.

Lampiran 13. Data Kerapuhan Tablet

Berat tablet (g)	madu 3%			madu 4%			madu 5%		
	1	2	3	1	2	3	1	2	3
Sebelum	12,102	12,010	12,134	12,021	12,139	12,033	12,018	12,022	12,081
Sesudah	12,020	11,915	12,045	11,940	12,057	11,969	11,963	11,970	12,010
Kerapuhan %	0,68%	0,79%	0,73%	0,67%	0,68%	0,53%	0,45%	0,43%	0,62%
\bar{x}	$\bar{x} = 0,73 \%$			$\bar{x} = 0,63\%$			$\bar{x} = 0,5\%$		
	SD = 0,055			SD = 0,083			SD = 0,104		

Contoh perhitungan % kerapuhan tablet = 0,68%

- Berat 20 tablet yang sudah di bebas debukan = 12,102 gram
- Berat 20 tablet setelah perlakuan = 12,020 gram
- % kerapuhan = $\frac{\text{berat awal} - \text{berat setelah perlakuan}}{\text{Berat awal}} \times 100 \%$

$$= \frac{12,102 - 12,020}{12,102} \times 100\%$$

$$= 0,68 \%$$

Perhitungan statistik kerapuhan tablet

NPar Tests

Descriptive Statistics

	N	Mean	Std. Deviation	Minimum	Maximum
kerapuhantablet	9	,6200	,12440	,43	,79

One-Sample Kolmogorov-Smirnov Test

		kerapuhan tablet
N		9
Normal Parameters(a,b)	Mean	,6200
	Std. Deviation	,12440
Most Extreme Differences	Absolute	,212
	Positive	,136
	Negative	-,212
Kolmogorov-Smirnov Z		,635
Asymp. Sig. (2-tailed)		,815

a Test distribution is Normal.

b Calculated from data.

Oneway

Descriptives

kerapuhantablet

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
formula 1	3	,7333	,05508	,03180	,5965	,8701	,68	,79
formula 2	3	,6267	,08386	,04842	,4183	,8350	,53	,68
formula 3	3	,5000	,10440	,06028	,2406	,7594	,43	,62
Total	9	,6200	,12440	,04147	,5244	,7156	,43	,79

Test of Homogeneity of Variances

kerapuhantablet

Levene Statistic	df1	df2	Sig.
1,370	2	6	,324

ANOVA

kerapuhantablet

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	,082	2	,041	5,857	,039
Within Groups	,042	6	,007		
Total	,124	8			

Post Hoc Tests

Multiple Comparisons

Dependent Variable: kerapuhantablet

Scheffe

(I) formula	(J) formula	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
formula1	formula2	,10667	,06826	,359	-,1123	,3256
	formula3	,23333(*)	,06826	,039	,0144	,4523
formula2	formula1	-,10667	,06826	,359	-,3256	,1123
	formula3	,12667	,06826	,256	-,0923	,3456
formula3	formula1	-,23333(*)	,06826	,039	-,4523	-,0144
	formula2	-,12667	,06826	,256	-,3456	,0923

* The mean difference is significant at the .05 level.

Homogeneous Subsets

kerapuhantablet

Scheffe

formula	N	Subset for alpha = .05	
		1	2
formula3	3	,5000	
formula2	3	,6267	,6267
formula1	3		,7333
Sig.		,256	,359

Means for groups in homogeneous subsets are displayed.

a Uses Harmonic Mean Sample Size = 3,000.

Lampiran 14. Data waktu hancur

No.	madu 3%	madu 4%	madu 5%
	Waktu hancur (detik)	Waktu hancur (detik)	Waktu hancur(detik)
1.	754	798	821
2.	768	816	836
3.	779	822	869
4.	785	853	881
5.	794	866	893
6.	706	754	850
7.	732	759	861
8.	747	772	871
9.	751	809	883
10.	773	827	892
11.	737	804	821
12.	748	817	836
13.	761	823	869
14.	790	841	886
15.	795	857	898
\bar{x}	761,33	814,53	864,47
SD	25,543	33,696	26,024

Perhitungan Statistik waktu hancur
NPar Tests

Descriptive Statistics

	N	Mean	Std. Deviation	Minimum	Maximum
Waktuhancur	45	813.44	50.970	706	898

One-Sample Kolmogorov-Smirnov Test

		waktuhancur
N		45
Normal Parameters ^{a,b}	Mean	813.44
	Std. Deviation	50.970
Most Extreme Differences	Absolute	.075
	Positive	.075
	Negative	-.074
Kolmogorov-Smirnov Z		.504
Asymp. Sig. (2-tailed)		.961

a. Test distribution is Normal.

b. Calculated from data.

Oneway**Descriptives**

Waktuhancur

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
					formula1	15		
formula2	15	814.53	33.696	8.700	795.87	833.19	754	866
formula3	15	864.47	26.024	6.719	850.05	878.88	821	898
Total	45	813.44	50.970	7.598	798.13	828.76	706	898

Test of Homogeneity of Variances

Waktuhancur

Levene Statistic	df1	df2	Sig.
.368	2	42	.694

ANOVA

Waktuhancur

	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	79800.311	2	39900.156	48.559	.000
Within Groups	34510.800	42	821.686		
Total	114311.111	44			

Post Hoc Tests

Multiple Comparisons

waktuhancur
Scheffe

(I) formula	(J) formula	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
formula1	formula2	-53.200 [*]	10.467	.000	-79.76	-26.64
	formula3	-103.133 [*]	10.467	.000	-129.70	-76.57
formula2	formula1	53.200 [*]	10.467	.000	26.64	79.76
	formula3	-49.933 [*]	10.467	.000	-76.50	-23.37
formula3	formula1	103.133 [*]	10.467	.000	76.57	129.70
	formula2	49.933 [*]	10.467	.000	23.37	76.50

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

Homogeneous Subsets

Waktuhancur

Scheffe^a

formula	N	Subset for alpha = 0.05		
		1	2	3
formula1	15	761.33		
formula2	15		814.53	
formula3	15			864.47
Sig.		1.000	1.000	1.000

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 15,000.