

## BAB V

### KESIMPULAN DAN SARAN

#### A. Kesimpulan

1. Dari hasil penelitian dapat disimpulkan bahwa ibuprofen dapat dibuat sediaan *orally disintegrating tablet*, dengan kombinasi *Microcrystalline cellulose* dan Ac-di-sol<sup>®</sup> berpengaruh terhadap sifat mutu fisik tablet serta pelepasan obatnya.
2. Proporsi yang menghasilkan *orally disintegrating tablet* ibuprofen dengan hasil optimum adalah formula yang mengandung *Microcrystalline cellulose* 90% : Ac-di-sol<sup>®</sup> 10%.

#### B. Saran

1. Perlu dilakukan penelitian lebih lanjut untuk membuat *orally disintegrating tablet* ibuprofen dengan menggunakan kombinasi bahan penghancur dan pengikat yang lain.
2. Perlu dilakukan penelitian pembuatan *orally disintegrating tablet* ibuprofen dengan menggunakan metode *factorial design*.

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# LAMPIRAN





## Lampiran 2. Waktu alir granul

Replikasi	Formula I	Formula II	Formula III
1	6,49 detik	6,00 detik	5,51 detik
2	6,44 detik	5,53 detik	5,34 detik
3	6,57 detik	5,51 detik	5,52 detik
<b>Rata-rata</b>	6,5	5,68	5,46
<b>SD</b>	0,066	0,277	0,101
<b>CV</b>	1,007 %	4,8 %	1,85 %

## Lampiran 3. Daya serap air

Formula I

Bobot awal (g)	Bobot akhir (g)	Daya serap air (g/menit)
1,009	1,983	0,974
1,009	1,99	0,981
1,009	2,004	0,995
<b>Rata-rata</b>		0,9833
<b>SD</b>		0,012
<b>CV</b>		1,2%

Formula II

Bobot awal (g)	Bobot akhir (g)	Daya serap air (g/menit)
1,005	1,817	0,812
1,005	1,832	0,827
1,005	1,813	0,808
<b>Rata-rata</b>		0,8156
<b>SD</b>		0,01
<b>CV</b>		1,27%



Formula III

<b>Bobot awal (g)</b>	<b>Bobot akhir (g)</b>	<b>Daya serap air (g/menit)</b>
1,02	1,746	0,726
1,02	1,776	0,756
1,02	1,758	0,738
<b>Rata-rata</b>		0,74
<b>SD</b>		0,015
<b>CV</b>		2,03%

**Lampiran 4. Keseragaman bobot tablet**

<b>Tablet</b>	<b>Bobot tablet (mg)</b>		
	<b>Formula I</b>	<b>Formula II</b>	<b>Formula III</b>
1	200	205	207
2	203	204	208
3	203	200	206
4	204	198	206
5	201	200	208
6	198	208	209
7	199	209	207
8	200	207	207
9	201	205	207
10	203	201	208
11	204	204	206
12	203	203	204
13	198	208	206
14	198	209	208
15	205	200	208
16	199	205	205
17	203	204	207
18	201	201	205
19	198	202	205
20	198	203	208
<b>Bobot rata-rata</b>	200,95	203,8	206,75
<b>SD</b>	2,4	3,54	1,3327
<b>CV</b>	1,19%	1,74%	0,64%

Hasil perhitungan rentang keseragaman bobot

Formula	Kolom A	Kolom B
I	185,879 mg-216,021 mg	170,808 mg-231,093 mg
II	188,515 mg-219,085 mg	173,23 mg -234,37 mg
III	191,244 mg-222,256 mg	175,738 mg- 237,763 mg

Keterangan :

Kolom A : penyimpangan 7,5% dari bobot rata-ratanya

Kolom B : penyimpangan 15% dari bobot rata-ratanya

#### Lampiran 5. Kekerasan tablet

Replikasi	Formula I	Formula II	Formula III
1	8,0	7,2	6,0
2	7,5	6,8	5,6
3	7,9	7,5	5,7
<b>Rata-rata</b>	7,8	7,17	5,77
<b>SD</b>	0,2645	0,351	0,2081
<b>CV</b>	3,39%	4,89 %	3,61%

#### Lampiran 6. Kerapuhan tablet

$$\% \text{ kerapuhan} = \frac{\text{bobot awal} - \text{bobot akhir}}{\text{bobot awal}} \times 100\%$$

Formula	Bobot awal(gram)	Bobot akhir(gram)	% kerapuhan
I	4,268	4,258	0,23
II	4,152	4,129	0,55
III	3,966	3,933	0,83

#### Lampiran 7. Waktu pembasahan tablet

Replikasi	Formula 1	Formula II	Formula III
1	21 detik	23 detik	28 detik
2	20 detik	24 detik	28 detik
3	21 detik	24 detik	30 detik
<b>Rata-rata</b>	20,667	23,667	28,667
<b>SD</b>	0,577	0,5773	1,155
<b>CV</b>	2,79 %	2,44%	4,03%

**Lampiran 8. Waktu hancur tablet**

<b>Replikasi</b>	<b>Formula I</b>	<b>Formula II</b>	<b>Formula III</b>
<b>1</b>	28 detik	34	38
<b>2</b>	26 detik	34	40
<b>3</b>	28 detik	33	38
<b>Rata-rata</b>	27,33	33,67	38,67
<b>SD</b>	1,155	0,577	1,155
<b>CV</b>	4,23 %	1,71 %	2,99 %

**Lampiran 9. Tanggapan responden**

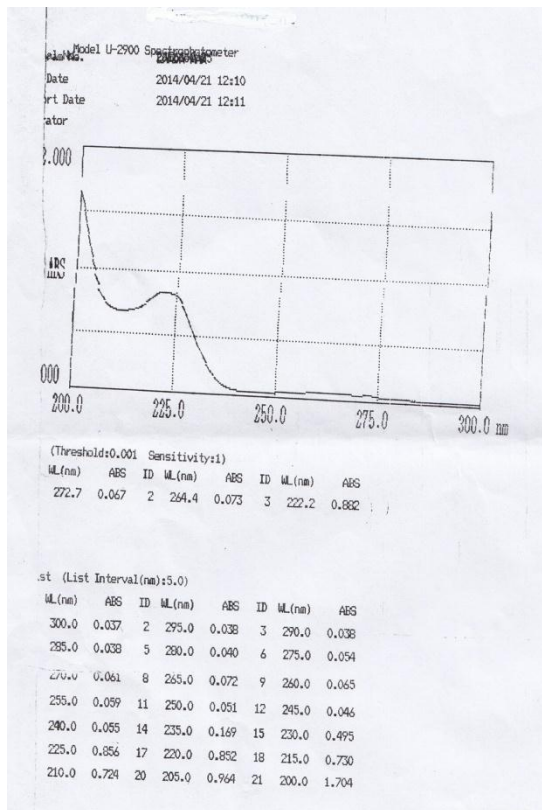
<b>Tablet</b>	<b>Nama Responden</b>	<b>Formula</b>		
		<b>I</b>	<b>II</b>	<b>III</b>
<b>1</b>	Arjuna	Manis	Manis	Manis
<b>2</b>	Arisma	Manis	Manis	Manis
<b>3</b>	Yeli	Manis	Manis	Manis
<b>4</b>	Wiwik	Manis	Manis	Manis
<b>5</b>	Fajar	Manis	Manis	Manis
<b>6</b>	Danil	Manis	Manis	Manis
<b>7</b>	Yona	Manis	Manis	Manis
<b>8</b>	Megi	Manis	Manis	Manis
<b>9</b>	Manis	Manis	Manis	Manis
<b>10</b>	Zidan	Manis	Manis	Manis
<b>11</b>	Zahra	Manis	Manis	Manis
<b>12</b>	Ummah	Manis	Manis	Manis
<b>13</b>	Wardah	Manis	Manis	Manis
<b>14</b>	Siti	Manis	Manis	Manis
<b>15</b>	Rahmad	Manis	Manis	Manis
<b>16</b>	Neni	Manis	Manis	Manis
<b>17</b>	Fatih	Manis	Manis	Manis
<b>18</b>	Habib	Manis	Manis	Manis
<b>19</b>	Niswa	Manis	Manis	Manis
<b>20</b>	Izan	Manis	Manis	Manis
<b>Rata-rata</b>		Manis	Manis	Manis

**Lampiran 10. Waktu larut tablet tiap responden**

<b>Tablet</b>	<b>Formula</b>		
	<b>I</b>	<b>II</b>	<b>III</b>
<b>1</b>	21 detik	27 detik	31 detik
<b>2</b>	20 detik	25 detik	31 detik
<b>3</b>	23 detik	25 detik	34 detik
<b>4</b>	22 detik	27 detik	35 detik
<b>5</b>	21 detik	26 detik	34 detik
<b>6</b>	21 detik	24 detik	30 detik
<b>7</b>	20 detik	29 detik	32 detik
<b>8</b>	24 detik	30 detik	32 detik
<b>9</b>	24 detik	26 detik	31 detik
<b>10</b>	23 detik	26 detik	35 detik
<b>11</b>	21 detik	26 detik	35 detik
<b>12</b>	22 detik	28 detik	34 detik
<b>13</b>	22 detik	28 detik	33 detik
<b>14</b>	21 detik	28 detik	34 detik
<b>15</b>	20 detik	21 detik	34 detik
<b>16</b>	25 detik	25 detik	33 detik
<b>17</b>	24 detik	25 detik	32 detik
<b>18</b>	22 detik	23 detik	31 detik
<b>19</b>	22 detik	27 detik	31 detik
<b>20</b>	20 detik	25 detik	35 detik
<b>Rata-rata</b>	21,9 detik	25,7 detik	32,85 detik
<b>SD</b>	1,52	2,32	1,66

## Lampiran 11. Penentuan panjang gelombang dan pembuatan kurva baku

### ➤ Penentuan panjang gelombang maksimum



Panjang gelombang maksimum ibuprofen adalah 222,2 nm

### ➤ Penentuan kurva baku

Kadar (ppm)	Absorbansi
16	0,652
14	0,541
12	0,470
10	0,418
8	0,314
6	0,259

Data regresi linear:

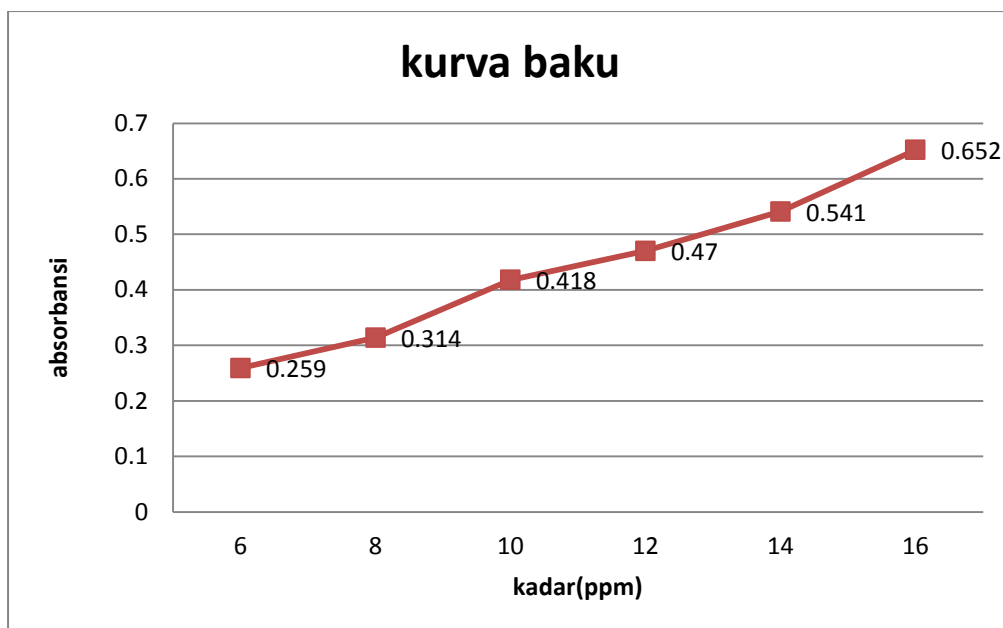
$$A = 0,0184$$

$$B = 0,0385$$

$$r = 0,9945$$

Persamaan regresi linear:

$$Y = 0,0184 + 0,0385 X$$



### Lampiran 12. Perhitungan kadar ibuprofen

Rumus kadar ibuprofen :  $\frac{\text{kadar (mg/ml)} \times \text{volume media disolusi} \times \text{fx}}{\text{dosis ibuprofen dalam 1 tablet}} \times 100 \%$

Volume media disolusi : 900 ml

Dosis ibuprofen dalam 1 tablet : 50 mg

Fx : faktor pengenceran

#### Formula I Replikasi 1

Waktu (detik)	Absorbansi	Kadar (g/ml)	Kadar dalam 900 ml(mg/900 ml)	Fx	Kadar (%)
15	0,211	5,003	22,51	5	45,02
30	0,220	5,236	23,56	5	47,12
45	0,345	8,483	38,174	5	76,34
60	0,361	8,899	40,04	5	80,08

Formula I Replikasi 2

<b>Waktu (detik)</b>	<b>Absorbansi</b>	<b>Kadar (g/ml)</b>	<b>Kadar dalam 900 ml(mg/900 ml)</b>	<b>Fx</b>	<b>Kadar (%)</b>
<b>15</b>	0,201	4,743	21,34	5	42,08
<b>30</b>	0,214	5,081	22,86	5	45,72
<b>45</b>	0,320	7,834	35,252	5	70,5
<b>60</b>	0,369	9,808	40,98	5	81,96

Formula I Replikasi 3

<b>Waktu (detik)</b>	<b>Absorbansi</b>	<b>Kadar (g/ml)</b>	<b>Kadar dalam 900 ml(mg/900 ml)</b>	<b>Fx</b>	<b>Kadar (%)</b>
<b>15</b>	0,205	4,847	21,81	5	43,62
<b>30</b>	0,217	5,158	23,213	5	46,42
<b>45</b>	0,333	8,171	36,771	5	73,54
<b>60</b>	0,370	9,132	41,96	5	83,92

Rata-rata Kadar Formula I

<b>Replikasi 1</b>	<b>Replikasi 2</b>	<b>Replikasi 3</b>	<b>Rata-rata</b>
<b>45,02</b>	42,08	43,62	43,5733333
<b>47,12</b>	45,72	46,42	46,42
<b>76,34</b>	70,5	73,54	73,46
<b>80,08</b>	81,96	83,92	81,9866667

Formula II Replikasi 1

<b>Waktu (detik)</b>	<b>Absorbansi</b>	<b>Kadar (mg/ml)</b>	<b>Kadar dalam 900 ml(mg/900 ml)</b>	<b>Fx</b>	<b>Kadar (%)</b>
<b>15</b>	0,200	4,717	21,22	5	42,46
<b>30</b>	0,218	5,184	23,33	5	46,66
<b>45</b>	0,445	11,081	49,86	5	99,72
<b>60</b>	0,438	10,899	49,05	5	98,08

Formula II Replikasi 2

<b>Waktu (detik)</b>	<b>Absorbansi</b>	<b>Kadar (g/ml)</b>	<b>Kadar dalam 900 ml(mg/900 ml)</b>	<b>Fx</b>	<b>Kadar (%)</b>
<b>15</b>	0,205	4,847	21,81	5	43,62
<b>30</b>	0,224	5,340	24,03	5	48,06
<b>45</b>	0,422	10,483	47,17	5	96,34
<b>60</b>	0,442	11,003	49,51	5	99,02

Formula II Replikasi 3

<b>Waktu (detik)</b>	<b>Absorbansi</b>	<b>Kadar (g/ml)</b>	<b>Kadar dalam 900 ml(mg/900 ml)</b>	<b>Fx</b>	<b>Kadar (%)</b>
<b>15</b>	0,210	4,977	22,39	5	44,78
<b>30</b>	0,212	5,039	22,63	5	45,66
<b>45</b>	0,434	10,795	48,54	5	97,02
<b>60</b>	0,440	10,951	49,28	5	99,58

Rata-rata kadar Formula II

<b>Replikasi 1</b>	<b>Replikasi 2</b>	<b>Replikasi 3</b>	<b>Rata-rata</b>
<b>42,46</b>	43,62	44,78	43,62
<b>46,66</b>	48,06	45,66	46,7933
<b>99,72</b>	96,34	97,02	97,6933
<b>98,08</b>	99,02	99,58	98,8933



Formula III Replikasi 1

<b>Waktu (detik)</b>	<b>Absorbansi</b>	<b>Kadar (g/ml)</b>	<b>Kadar dalam 900 ml(mg/900 ml)</b>	<b>Fx</b>	<b>Kadar (%)</b>
<b>15</b>	0,295	4,847	6,47	1	12,94
<b>30</b>	0,525	5,340	11,84	1	23,68
<b>45</b>	0,723	10,483	16,51	1	33,02
<b>60</b>	0,741	11,003	17,24	1	34,48

Formula III Replikasi 2

<b>Waktu (detik)</b>	<b>Absorbansi</b>	<b>Kadar (g/ml)</b>	<b>Kadar dalam 900 ml(mg/900 ml)</b>	<b>Fx</b>	<b>Kadar (%)</b>
<b>15</b>	0,300	7,314	6,58	1	13,16
<b>30</b>	0,504	12,613	22,7	1	22,7
<b>45</b>	0,750	19,003	17,10	1	34,2
<b>60</b>	0,760	19,262	17,34	1	34,68

Formula III Replikasi 3

<b>Waktu (detik)</b>	<b>Absorbansi</b>	<b>Kadar (g/ml)</b>	<b>Kadar dalam 900 ml(mg/900 ml)</b>	<b>Fx</b>	<b>Kadar (%)</b>
<b>15</b>	0,308	7,542	6,77	1	13,54
<b>30</b>	0,517	12,951	11,66	1	23,32
<b>45</b>	0,741	18,769	16,89	1	33,78
<b>60</b>	0,771	19,548	17,59	1	35,18

Rata-rata kadar Formula III

Replikasi 1	Replikasi 2	Replikasi 3	Rata-rata
12,94	13,16	13,54	13,21333333
23,68	22,7	23,32	23,2333
33,02	34,2	33,78	33,667
34,48	34,68	35,18	34,78

Persamaan Regresi Linear waktu vs kadar

Formula	Persamaan regresi linear	R
Formula I	$Y = 25,785 + 0,949 X$	0,9543
Formula II	$Y = 17,570 + 1,444 X$	0,9119
Formula III	$Y = 7,435 + 0,501 X$	0,9591

### Lampiran 13. Kuisisioner *Orally Disintegration Tablet* Ibuprofen

#### LEMBAR KUISISIONER TANGGAP RESPONDEN *ORALLY DISINTEGRATION TABLET* IBUPROFEN

Petunjuk pengisian :

1. Mengisi identitas diri pada tempat yang disediakan
2. Mencoba satu formula ODT ( sebelumnya berkumur dahulu dengan air putih, kemudian masukkan tablet ke dalam mulut dan biarkan tablet larut sendiri dan bercampur dengan saliva/air liur di dalam mulut, kemudian coba formula berikutnya dengan cara yang sama). Catat berapa waktu larut ODT.
3. Mengisi form penilaian pada kolom dibawah ini (centang salah satu) :

Identitas responden :

Nama :

Usia :

Formula	Manis	Sedang	Pahit
FI			
FII			
FIII			

## Lampiran 14. Uji *one-way* Anova

a. Waktu alir

### Oneway

#### Descriptives

waktu alir

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
formula 1	3	6.5000	.06557	.03786	6.3371	6.6629	6.44	6.57
formula 2	3	5.6800	.27731	.16010	4.9911	6.3689	5.51	6.00
formula 3	3	5.4567	.10116	.05840	5.2054	5.7080	5.34	5.52
Total	9	5.8789	.49921	.16640	5.4952	6.2626	5.34	6.57

#### Test of Homogeneity of Variances

waktu alir

Levene Statistic	df1	df2	Sig.
6.529	2	6	.031

#### ANOVA

waktu alir

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	1.811	2	.905	29.707	.001
Within Groups	.183	6	.030		
Total	1.994	8			

## Post Hoc Test

### Multiple Comparisons

waktu alir

LSD

(I) formula	(J) formula	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
formula 1	formula 2	.82000*	.14254	.001	.4712	1.1688
	formula 3	1.04333*	.14254	.000	.6945	1.3921
formula 2	formula 1	-.82000*	.14254	.001	-1.1688	-.4712
	formula 3	.22333	.14254	.168	-.1255	.5721
formula 3	formula 1	-1.04333*	.14254	.000	-1.3921	-.6945
	formula 2	-.22333	.14254	.168	-.5721	.1255

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

b. Daya serap air

## Oneway

### Descriptives

daya serap air

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
formula 1	3	.98333	.010693	.006173	.95677	1.00990	.974	.995
formula 2	3	.81567	.010017	.005783	.79078	.84055	.808	.827
formula 3	3	.74000	.015100	.008718	.70249	.77751	.726	.756
Total	9	.84633	.108359	.036120	.76304	.92963	.726	.995

### Test of Homogeneity of Variances

daya serap air

Levene Statistic	df1	df2	Sig.
.284	2	6	.763

### ANOVA

daya serap air

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	.093	2	.047	315.300	.000
Within Groups	.001	6	.000		
Total	.094	8			

### Post Hoc Tests

#### Multiple Comparisons

daya serap air

LSD

(I) formula	(J) formula	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
formula 1	formula 2	.167667*	.009918	.000	.14340	.19194
	formula 3	.243333*	.009918	.000	.21906	.26760
formula 2	formula 1	-.167667*	.009918	.000	-.19194	-.14340
	formula 3	.075667*	.009918	.000	.05140	.09994
formula 3	formula 1	-.243333*	.009918	.000	-.26760	-.21906
	formula 2	-.075667*	.009918	.000	-.09994	-.05140

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

c. Kekerasan

### Oneway

#### Descriptives

Kekerasan

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
formula 1	3	7.800	.2646	.1528	7.143	8.457	7.5	8.0
formula 2	3	7.167	.3512	.2028	6.294	8.039	6.8	7.5
formula 3	3	5.767	.2082	.1202	5.250	6.284	5.6	6.0
Total	9	6.911	.9333	.3111	6.194	7.629	5.6	8.0

#### Test of Homogeneity of Variances

Kekerasan

Levene Statistic	df1	df2	Sig.
.350	2	6	.718

#### ANOVA

Kekerasan

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	6.496	2	3.248	41.169	.000
Within Groups	.473	6	.079		
Total	6.969	8			

## Post Hoc Test

### Multiple Comparisons

kekerasan

LSD

(I) formula	(J) formula	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
formula 1	formula 2	.6333*	.2293	.033	.072	1.194
	formula 3	2.0333*	.2293	.000	1.472	2.594
formula 2	formula 1	-.6333*	.2293	.033	-1.194	-.072
	formula 3	1.4000*	.2293	.001	.839	1.961
formula 3	formula 1	-2.0333*	.2293	.000	-2.594	-1.472
	formula 2	-1.4000*	.2293	.001	-1.961	-.839

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

d. Waktu pembasahan

### Oneway

#### Descriptives

waktu pembasahan

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
formula 1	3	20.667	.5774	.3333	19.232	22.101	20.0	21.0
formula 2	3	23.667	.5774	.3333	22.232	25.101	23.0	24.0
formula 3	3	28.667	1.1547	.6667	25.798	31.535	28.0	30.0
Total	9	24.333	3.5707	1.1902	21.589	27.078	20.0	30.0



### Test of Homogeneity of Variances

waktu pembasahan

Levene Statistic	df1	df2	Sig.
2.667	2	6	.148

### ANOVA

waktu pembasahan

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	98.000	2	49.000	73.500	.000
Within Groups	4.000	6	.667		
Total	102.000	8			

### Post Hoc Tests

#### Multiple Comparisons

waktu pembasahan

LSD

(I) formula	(J) formula	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
formula 1	formula 2	-3.0000*	.6667	.004	-4.631	-1.369
	formula 3	-8.0000*	.6667	.000	-9.631	-6.369
formula 2	formula 1	3.0000*	.6667	.004	1.369	4.631
	formula 3	-5.0000*	.6667	.000	-6.631	-3.369
formula 3	formula 1	8.0000*	.6667	.000	6.369	9.631
	formula 2	5.0000*	.6667	.000	3.369	6.631

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

e. Waktu hancur

## Oneway

### Descriptives

waktu hancur

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
formula 1	3	27.33	1.155	.667	24.46	30.20	26	28
formula 2	3	33.67	.577	.333	32.23	35.10	33	34
formula 3	3	38.67	1.155	.667	35.80	41.54	38	40
Total	9	33.22	4.994	1.665	29.38	37.06	26	40

### Test of Homogeneity of Variances

waktu hancur

Levene Statistic	df1	df2	Sig.
1.778	2	6	.248

### ANOVA

waktu hancur

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	193.556	2	96.778	96.778	.000
Within Groups	6.000	6	1.000		
Total	199.556	8			

## Post Hoc Tests

### Multiple Comparisons

waktu hancur

LSD

(I) formula	(J) formula	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
formula 1	formula 2	-6.333*	.816	.000	-8.33	-4.34
	formula 3	-11.333*	.816	.000	-13.33	-9.34
formula 2	formula 1	6.333*	.816	.000	4.34	8.33
	formula 3	-5.000*	.816	.001	-7.00	-3.00
formula 3	formula 1	11.333*	.816	.000	9.34	13.33
	formula 2	5.000*	.816	.001	3.00	7.00

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

f. Disolusi

## Oneway

### Descriptives

Disolusi

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
formula 1	3	51.161667	1.0971820	.6334583	48.436115	53.887218	49.9700	52.1300
formula 2	3	59.353333	.1320353	.0762306	59.025339	59.681327	59.2100	59.4700
formula 3	3	21.875833	.1702266	.0982804	21.452967	22.298700	21.7200	22.0575
Total	9	44.130278	17.0727373	5.6909124	31.007010	57.253545	21.7200	59.4700

### Test of Homogeneity of Variances

Disolusi

Levene Statistic	df1	df2	Sig.
5.279	2	6	.048

### ANOVA

Disolusi

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	2329.326	2	1164.663	2794.703	.000
Within Groups	2.500	6	.417		
Total	2331.827	8			

### Post Hoc Tests

#### Multiple Comparisons

Disolusi

LSD

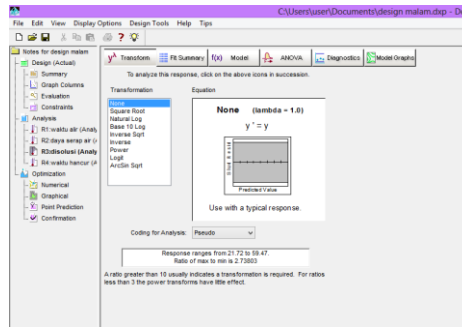
(I)	(J)	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
1	2	-8.1916667*	.5270924	.000	-9.481415	-6.901918
	3	29.2858333*	.5270924	.000	27.996085	30.575582
2	1	8.1916667*	.5270924	.000	6.901918	9.481415
	3	37.4775000*	.5270924	.000	36.187751	38.767249
3	1	-29.2858333*	.5270924	.000	-30.575582	-27.996085
	2	-37.4775000*	.5270924	.000	-38.767249	-36.187751

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

# Lampiran 15. Penentuan formula optimum

Notes for design malam

Run	Component 1 A: mikroplastik %	Component 2 B: acidol %	Response 1 waktu air detk	Response 2 daya serap detgramment	Response 3 disolusi %	Response 4 waktu hancur detk
1	100.000	0.000	6.49	0.974	52.13	28
2	100.000	0.000	6.44	0.981	49.97	26
3	100.000	0.000	6.57	0.995	51.39	28
4	50.000	50.000	6	0.812	59.47	34
5	50.000	50.000	5.53	0.827	59.38	34
6	50.000	50.000	5.51	0.808	59.21	33
7	0.000	100.000	5.51	0.728	21.72	38
8	0.000	100.000	5.34	0.756	21.85	40
9	0.000	100.000	5.52	0.738	22.06	38



Notes for design malam

Response 1 waktu air Transform: None

\*\*\* WARNING: The Cubic Model and higher are Aliased! \*\*\*

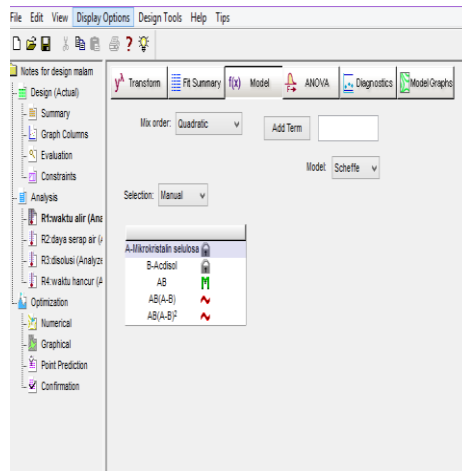
\*\*\* Mixture Component Coding is L\_Pseudo. \*\*\*

Summary (detailed tables shown below)

Source	p-value	p-value	Adjusted R-Squared	Predicted R-Squared
Linear	0.0006	0.0521	0.7931	0.7420
Quadratic	0.0521		0.8777	0.7938
Cubic				Aliased

Sequential Model Sum of Squares (Type II)

Source	Squares	df	Mean Square	F	p-value
Mean vs Total	311.05	1	311.05		
Linear vs linear	1.63	1	1.63	31.67	0.0008



Notes for design malam

Response 1 waktu air

ANOVA for Quadratic Mixture Model

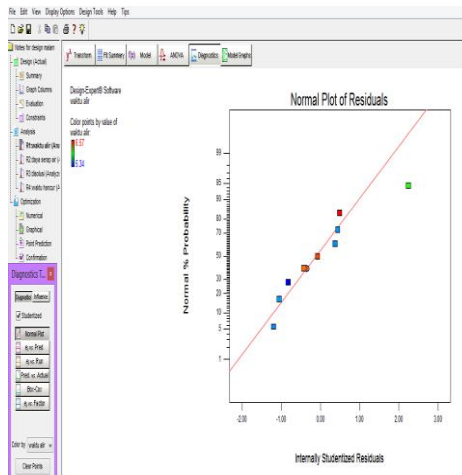
\*\*\* Mixture Component Coding is L\_Pseudo. \*\*\*

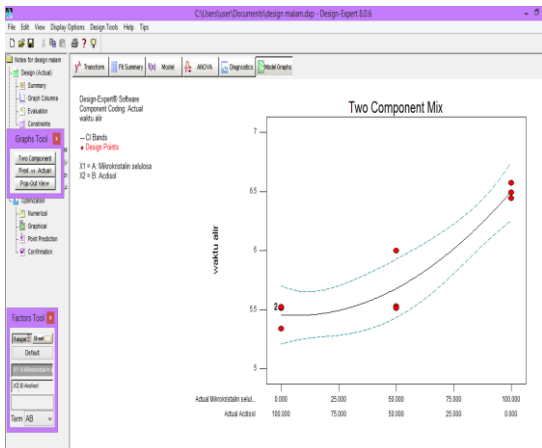
Analysis of variance table (Partial sum of squares - Type III)

Source	Squares	df	Mean Square	F	p-value
Model	1.81	2	0.91	29.71	0.0008
Linear Mixture	1.63	1	1.63	33.57	0.0003
AB	0.18	1	0.18	5.84	0.0521
Pure Error	0.18	6	0.030		
Cor Total	1.99	8			

The Model F-value of 29.71 implies the model is significant. There is only a 0.08% chance that a "Model F-Value" this large could occur due to noise.

Values of "Prob > F" less than 0.0500 indicate model terms are significant. In this case Linear Mixture Components are significant model terms. Values greater than 0.1000 indicate the model terms are not significant.





Transform

Response: 2

Equation:  $y' = y$

Response ranges from 0.726 to 0.995  
Ratio of max to min is 1.37652

Response: 2

\*\*\* WARNING: The Cubic Model and higher are Aliased \*\*\*

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

Source	p-value	p-value	Adjusted R-Squared	Predicted R-Squared
Linear	< 0.0001	0.0017	0.9377	0.9185
Quadratic	0.0017		0.9874	0.9788
Cubic				Aliased

Source	Sum of Squares	df	Mean Square	F	p-value
Mean vs Total	6.45	1	6.45		
Linear vs Linear	0.089	1	0.089	121.49	< 0.0001
Quadratic vs L	4.232E-003	1	4.232E-003	28.68	0.0017
Cubic vs Quad	0.000	0			Aliased
Residual	8.853E-004	6	1.476E-004		
Total	6.54	9	0.73		

Selection: Manual

Model: Scheffe

Selected terms: A-Mikrokrstalin selulosa, B-Aktisol, AB, AB(A-B), AB(A-B)^2

Response: 2

ANCOVA for Quadratic Mixture Model

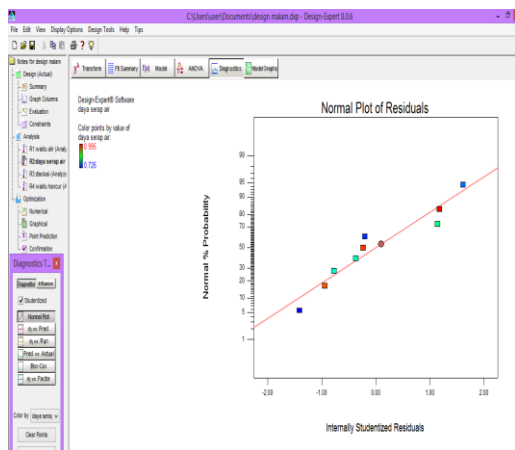
\*\*\* Mixture Component Coding is L\_Pseudo. \*\*\*

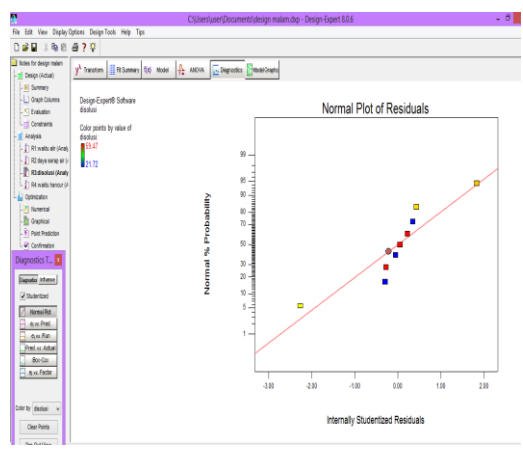
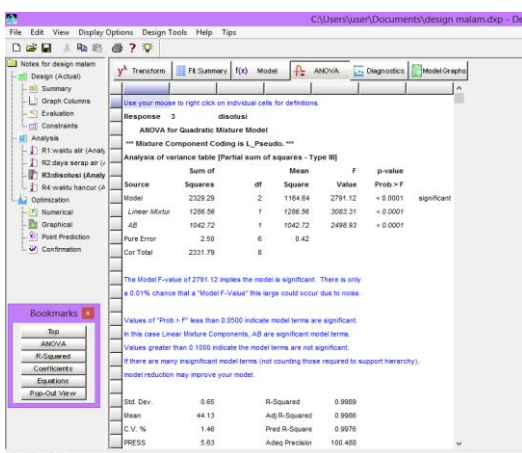
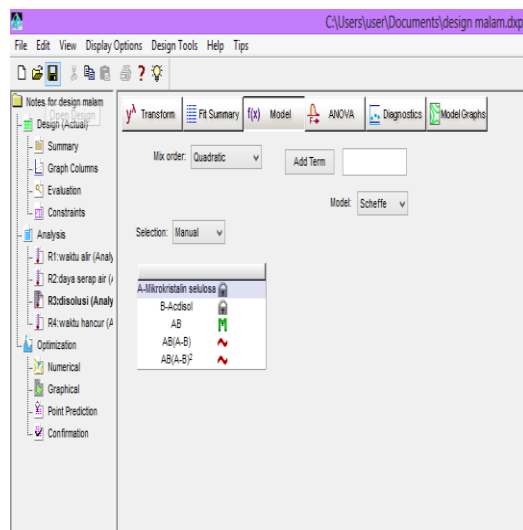
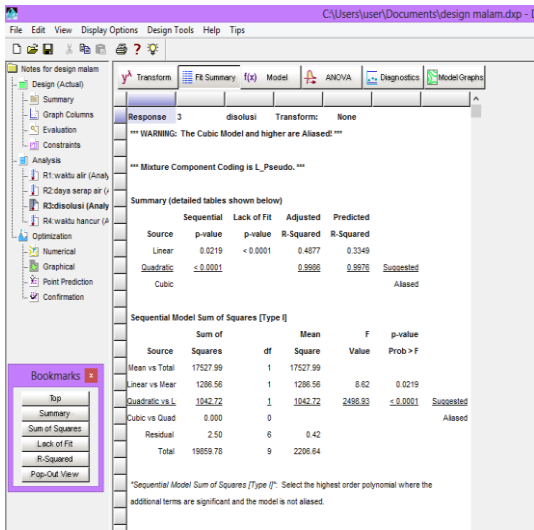
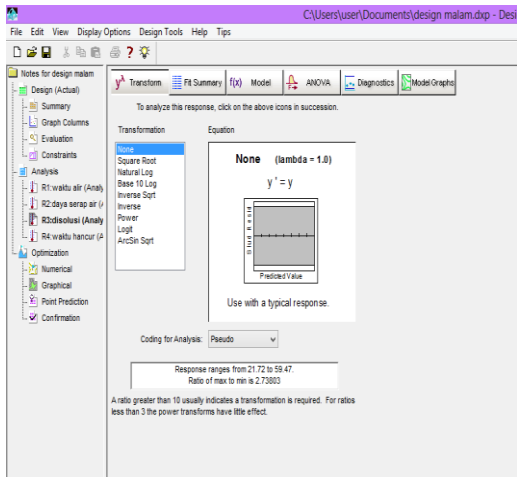
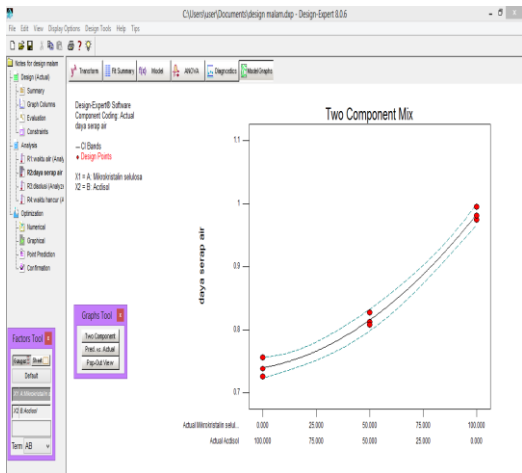
Source	Sum of Squares	df	Mean Square	F	p-value
Model	0.093	2	0.047	316.30	< 0.0001
Linear Mixture	0.089	1	0.089	601.92	< 0.0001
AB	4.232E-003	1	4.232E-003	28.68	0.0017
Pure Error	8.853E-004	6	1.476E-004		
Cor Total	0.094	8			

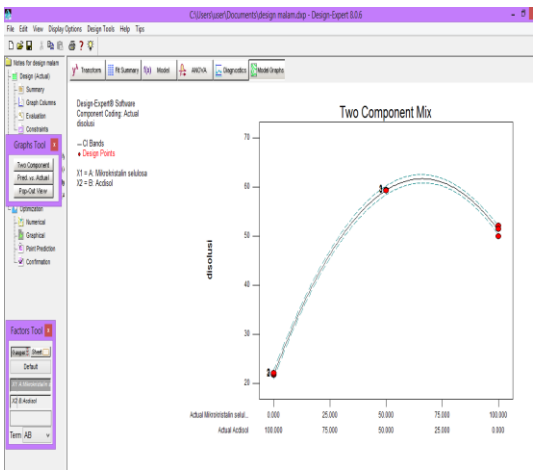
The Model F-value of 316.30 implies the model is significant. There is only a 0.01% chance that a "Model F-Value" this large could occur due to noise.

Values of "Prob > F" less than 0.0500 indicate model terms are significant. In this case Linear Mixture Components, AB are significant model terms. Values greater than 0.1000 indicate the model terms are not significant. If there are many insignificant model terms (not counting those required to support hierarchy), model reduction may improve your model.

Std. Dev.	R-Squared	Adjusted R-Squared	Pred R-Square
0.012	0.9668	0.9674	0.9788
0.05			34.696
1.44			
1.992E-003			







Notes for design malam

Design (Actual)

Response 4 waktu hancur Transform: None

\*\*\* WARNING: The Cubic Model and higher are Aliased \*\*\*

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

Summary (detailed tables shown below)

Source	p-value	Lack of Fit	Adjusted R-Squared	Predicted R-Squared
Linear	< 0.0001	0.3822	0.8956	0.8379
Quadratic	0.3822	0.9599	0.9323	Aliased
Cubic				Aliased

Sequential Model Sum of Squares (Type III)

Source	Sum of Squares	df	Mean Square	F Value	p-value	Prob > F
Mean vs Total	9933.44	1	9933.44			
Linear vs Mean	192.67	1	192.67	195.77	< 0.0001	Significant
Quadratic vs L	0.89	1	0.89	0.89	0.3822	
Cubic vs Quad	0.000	0				Aliased
Residual	6.00	6	1.00			
Total	10133.00	9	1125.89			

Sequential Model Sum of Squares (Type I) Select the highest order polynomial where the additional terms are significant and the model is not aliased.

Notes for design malam

Design (Actual)

To analyze this response, click on the above icons in succession.

Transformation

Equation

None (lambda = 1.0)

$y' = y$

Use with a typical response.

Coding for Analysis: Pseudo

Response ranges from 26 to 40  
Ratio of max to min is 1.53846

A ratio greater than 10 usually indicates a transformation is required. For ratios less than 3 the power transforms have little effect.

Notes for design malam

Design (Actual)

Mix order: Linear

Add Term

Model: Scheffe

Selection: Manual

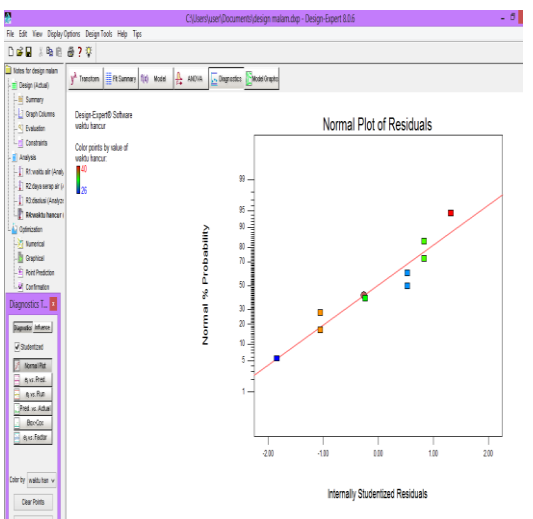
A-Mikrokrystal selulos

B-Acidol

AB

AB(A-B)

AB(A-B)<sup>2</sup>



Notes for design malam

Design (Actual)

Response 4 waktu hancur

ANOVA for Linear Mixture Model

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

Analysis of variance table (Partial sum of squares - Type III)

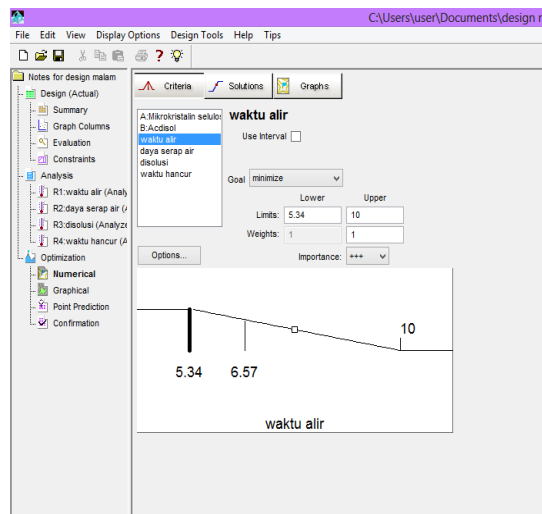
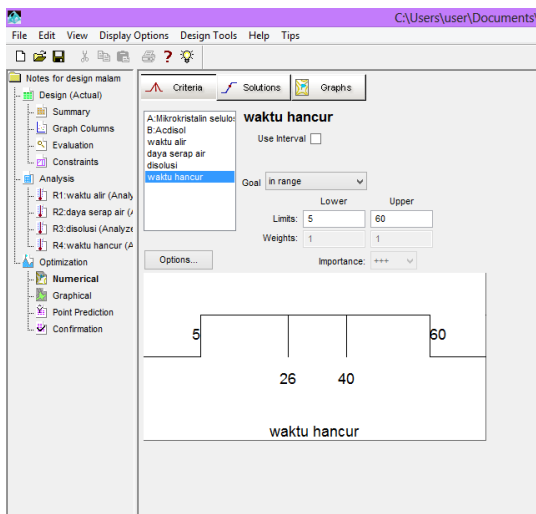
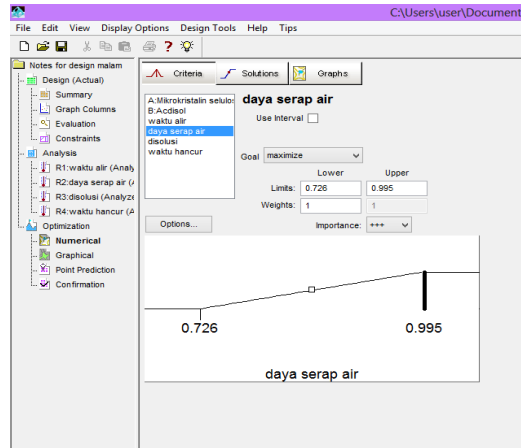
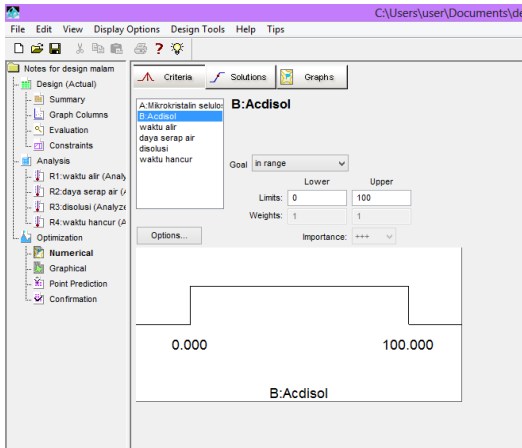
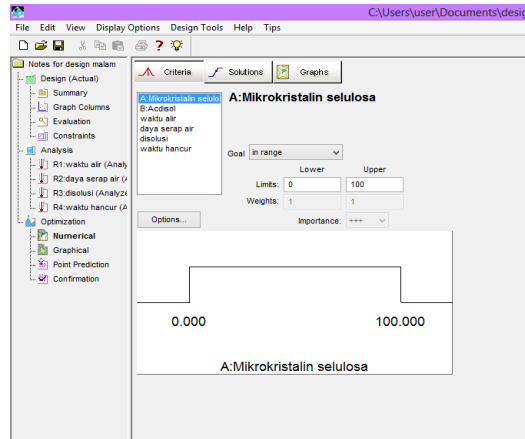
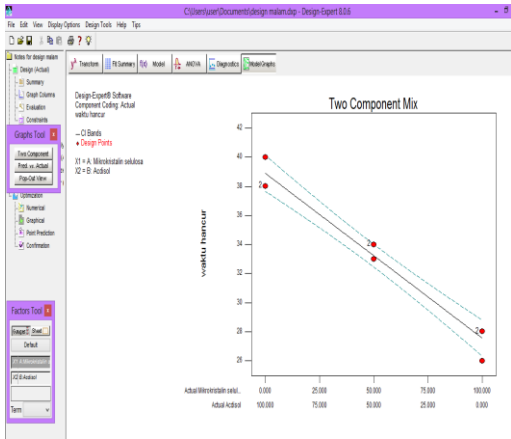
Source	Squares	df	Mean Square	F Value	Prob > F
Model	192.67	1	192.67	195.77	< 0.0001 significant
Linear Mixture	192.67	1	192.67	195.77	< 0.0001
Residual	6.00	7	0.86		
Lack of Fit	0.89	1	0.89	0.89	0.3822 not significant
Pure Error	6.00	6	1.00		
Cor Total	199.56	8			

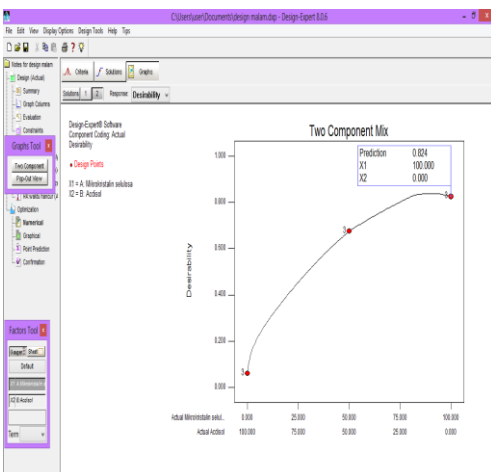
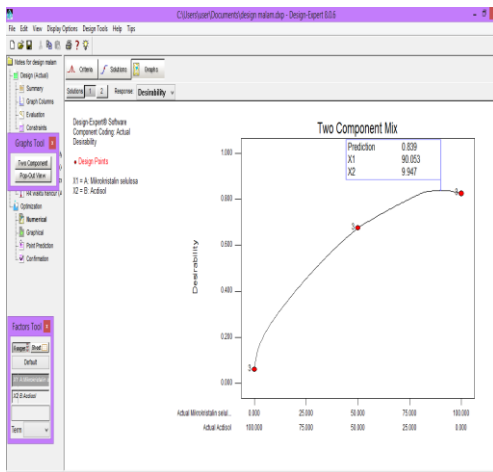
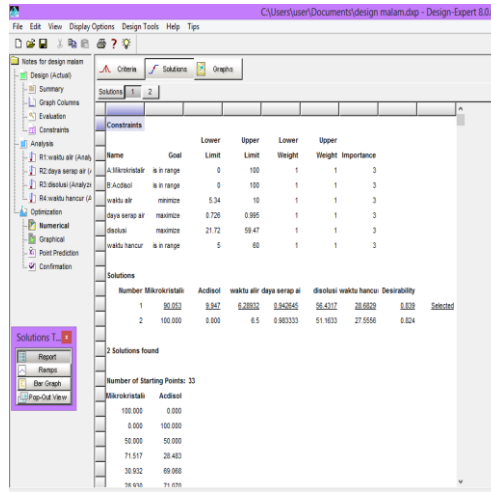
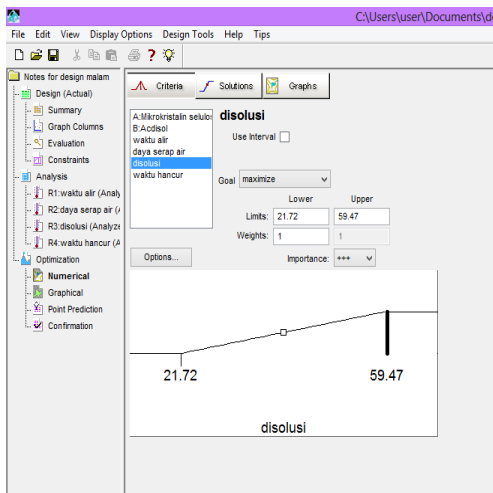
The Model F-value of 195.77 implies the model is significant. There is only a 0.01% chance that a "Model F-Value" this large could occur due to noise.

Values of "Prob > F" less than 0.0500 indicate model terms are significant. In this case Linear Mixture Components are significant model terms. Values greater than 0.1000 indicate the model terms are not significant. If there are many insignificant model terms (not counting those required to support hierarchy), model reduction may improve your model.

The "Lack of Fit F-value" of 0.89 implies the Lack of Fit is not significant relative to the pure error. There is a 38.22% chance that a "Lack of Fit F-value" this large could occur due to noise. Non-significant lack of fit is good -- we want the model to fit.







Notes for design malam

Design (Actual)

Component Name	Level	Low Level	High Level	Std. Dev.	Coding	
A	Mikrokristalin	90.05	0.00	100.00	0.000	Actual
B	Acidol	9.95	0.00	100.00	0.000	Actual
Total = 100.00						

Analysis

99% of Population

Response	Prediction	Std Dev	SE Mean	95% CI low	95% CI high	SE Pred	95% PI low	95% PI high	95% TI low	95% TI high
waktu air	6.28832	0.174573	0.0015039	6.08899	6.48884	0.1627	5.8170	6.78024	5.26945	7.30910
daya serap air	0.242545	0.012472	0.00567842	0.203755	0.280535	0.0154081	0.269037	0.278454	0.071603	1.01361
disolusi	58.6317	0.645982	0.301859	55.893	57.1703	0.710011	54.887	58.1793	52.058	61.2653
waktu hancur	28.8829	0.960302	0.460246	27.5075	29.7783	1.08466	26.184	31.2719	23.213	34.1529

Notes for design malam

Design (Actual)

Component Name	Level	Low Level	High Level	Std. Dev.	Coding	
A	Mikrokristalin	100.00	0.00	100.00	0.000	Actual
B	Acidol	0.00	0.00	100.00	0.000	Actual
Total = 100.00						

Analysis

99% of Population

Response	Prediction	Std Dev	SE Mean	95% CI low	95% CI high	SE Pred	95% PI low	95% PI high	95% TI low	95% TI high
waktu air	6.5	0.174579	0.100769	6.25337	6.74863	0.201566	6.0674	6.95236	5.4420	7.5572
daya serap air	0.883333	0.012472	0.0071022	0.868173	1.00049	0.0140264	0.848112	1.01785	0.90773	1.05889
disolusi	51.6833	0.645982	0.373946	51.2538	52.0759	0.745982	48.3302	52.8885	47.2516	55.0751
waktu hancur	27.6566	0.960302	0.522847	26.2142	28.7919	1.12138	24.8028	30.2072	21.9737	33.1384

## Lampiran 16. Uji mutu fisik granul dan tablet formula optimum

### a. Waktu alir

Pemeriksaan	Formula optimum	$\bar{x} \pm SD$
Waktu alir (detik)	6,0 detik	6,3±0,26
	6,4 detik	
	6,5 detik	

### a. Daya serap air

Bobot awal	Bobot akhir	Daya serap (gram/menit)
1,0073	1,9473	0,940
1,0070	1,952	0,945
1,0058	1,9468	0,941
	$\bar{x}$	0,942
	SD	0,0026

### b. Kerapuhan tablet

Bobot awal = 4,136 gram

Bobot akhir = 4,121 gram

$$\% \text{ kerapuhan} = \frac{\text{bobot awal} - \text{bobot akhir}}{\text{bobot awal}} \times 100\%$$

$$= \frac{4,136 - 4,121}{4,121} \times 100\%$$

$$= 0,363 \%$$

### c. Kekerasan tablet

Pemeriksaan	Replikasi	$\bar{x} \pm SD$
Kekerasan(kg)	7,70	7,73 ± 0,025
	7,75	
	7,73	

d. Keseragaman bobot

<b>Tablet</b>	<b>Bobot(mg)</b>
1	200
2	203
3	208
4	206
5	202
6	200
7	206
8	205
9	205
10	199
11	201
12	200
13	205
14	204
15	205
16	207
17	208
18	200
19	205
20	205
<b>Rata-rata</b>	203,7
<b>SD</b>	2,867238
<b>CV</b>	1,407579

Perhitungan penyimpangan bobot rata-rata menurut FI III:

<b>Pemeriksaan</b>	<b>Kolom A</b>	<b>Kolom B</b>
<b>Keseragaman bobot</b>	188,4225-218,9775	173,145-234,255

Ket

erangan :

Kolom A : penyimpangan 7,5% dari bobot rata-ratanya

Kolom B : penyimpangan 15% dari bobot rata-ratanya

e. Waktu pembasahan

<b>Pemeriksaan</b>	<b>Replikasi</b>	<b><math>\bar{x} \pm SD</math></b>
<b>Waktu pembasahan(detik)</b>	21,3	21,2 $\pm$ 0,057
	21,2	
	21,2	

f. Waktu hancur

<b>Pemeriksaan</b>	<b>Replikasi</b>	<b><math>\bar{x} \pm SD</math></b>
<b>Waktu hancur(detik)</b>	28,50	28,68 $\pm$ 0,2753
	29,00	
	28,55	

g. Uji disolusi formula optimum

Replikasi 1

<b>Waktu (detik)</b>	<b>Absorbansi</b>	<b>Kadar (g/ml)</b>	<b>Kadar dalam 900 ml(mg/900 ml)</b>	<b>Fx</b>	<b>Kadar (%)</b>
<b>15</b>	0,245	5,886	26,487	5	52,974
<b>30</b>	0,375	9,262	41,679	5	83,358
<b>45</b>	0,321	7,860	35,37	5	70,74
<b>60</b>	0,285	6,925	31,163	5	62,326

Replikasi 2

<b>Waktu (detik)</b>	<b>Absorbansi</b>	<b>Kadar (g/ml)</b>	<b>Kadar dalam 900 ml(mg/900 ml)</b>	<b>Fx</b>	<b>Kadar (%)</b>
<b>15</b>	0,235	5,625974	25,31688	5	50,63377
<b>30</b>	0,384	9,496104	42,73247	5	85,46494
<b>45</b>	0,316	7,72987	34,78442	5	69,56883
<b>60</b>	0,282	6,846753	30,81039	5	61,62078

Replikasi 3

<b>Waktu (detik)</b>	<b>Absorbansi</b>	<b>Kadar (g/ml)</b>	<b>Kadar dalam 900 ml(mg/900 ml)</b>	<b>Fx</b>	<b>Kadar (%)</b>
<b>15</b>	0,240	5,755844	25,9013	5	51,8026
<b>30</b>	0,380	9,392208	42,26494	5	84,52987
<b>45</b>	0,328	7,781818	35,081818	5	70,03636
<b>60</b>	0,280	6,794805	30,57662	5	61,15325

Rata-rata % kadar pelepasan formula optimum:

Replikasi 1	Replikasi 2	Replikasi 3	Rata-rata % kadar
<b>52,974</b>	50,63377	51,8026	51,80346
<b>83,358</b>	85,46494	84,52987	84,45094
<b>70,74</b>	69,56883	70,03636	70,11506
<b>62,326</b>	61,62078	61,15325	61,70001

h. Tanggapan responden

Tablet	Nama Responden	Formula optimum	Waktu larut(detik)
1	Arjuna	Manis	21
2	Arisma	Manis	20
3	Yeli	Manis	23
4	Wiwik	Manis	24
5	Fajar	Manis	24
6	Danil	Manis	25
7	Yona	Manis	25
8	Megi	Manis	25
9	Manis	Manis	23
10	Zidan	Manis	23
11	Zahra	Manis	21
12	Ummah	Manis	21
13	Wardah	Manis	27
14	Siti	Manis	22
15	Rahmad	Manis	23
16	Neni	Manis	23
17	Fatih	Manis	23
18	Habib	Manis	25
19	Niswa	Manis	25
20	Izan	Manis	23
<b>Rata-rata</b>			23,3 SD 1,75

**Lampiran 17. Kuisisioner *Orally Disintegration Tablet* Ibuprofen formula optimum**

LEMBAR KUISISIONER TANGGAP RESPONDEN *ORALLY DISINTEGRATION TABLET*  
IBUPROFEN

Petunjuk pengisian :

1. Mengisi identitas diri pada tempat yang disediakan
2. Mencoba satu formula ODT ( sebelumnya berkumur dahulu dengan air putih, kemudian masukkan tablet ke dalam mulut dan biarkan tablet larut sendiri dan bercampur dengan saliva/air liur di dalam mulut, kemudian coba formula berikutnya dengan cara yang sama). Catat waktu larut ODT
3. Mengisi form penilaian pada kolom dibawah ini (centang salah satu) :

Identitas responden :

Nama :

Usia :

Formula	Manis	Sedang	Pahit
FI			
FII			
FIII			

## Lampiran 18. Analisa statistika uji t

### a. Waktu alir

#### Descriptive Statistics

	N	Mean	Std. Deviation	Minimum	Maximum
waktualir	6	6.3000	.16733	6.00	6.50

## NPar Tests

#### One-Sample Kolmogorov-Smirnov Test

		Waktualir
N		6
Normal Parameters <sup>a,b</sup>	Mean	6.3000
	Std. Deviation	.16733
Most Extreme Differences	Absolute	.333
	Positive	.167
	Negative	-.333
Kolmogorov-Smirnov Z		.816
Asymp. Sig. (2-tailed)		.518

a. Test distribution is Normal.

b. Calculated from data.

## T-Test

#### Group Statistics

formula	N	Mean	Std. Deviation	Std. Error Mean
Waktualir formula perkiraan	3	6.3000	.00000	.00000
formula percobaan	3	6.3000	.26458	.15275



**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
Waktualir Equal variances assumed	12.000	.026	.000	4	1.000	.00000	.15275	-.42411	.42411
Equal variances not assumed			.000	2.000	1.000	.00000	.15275	-.65724	.65724

b. Daya serap air

**NPar Tests**

**Descriptive Statistics**

	N	Mean	Std. Deviation	Minimum	Maximum
daya serap air	6	.94250	.001761	.940	.945

**One-Sample Kolmogorov-Smirnov Test**

		daya serap air
N		6
Normal Parameters <sup>a,b</sup>	Mean	.94250
	Std. Deviation	.001761
Most Extreme Differences	Absolute	.278
	Positive	.222
	Negative	-.278
Kolmogorov-Smirnov Z		.682
Asymp. Sig. (2-tailed)		.741

a. Test distribution is Normal.

b. Calculated from data.

**T-Test**

**Group Statistics**

formula	N	Mean	Std. Deviation	Std. Error Mean
daya serap air formula perkiraan	3	.94300	.000000	.000000
formula percobaan	3	.94200	.002646	.001528

**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
daya serap air	Equal variances assumed	12.000	.026	.655	4	.548	.001000	.001528	-.003241	.005241
	Equal variances not assumed			.655	2.000	.580	.001000	.001528	-.005572	.007572

c. Waktu hancur

**NPar Tests**

**Descriptive Statistics**

	N	Mean	Std. Deviation	Minimum	Maximum
waktu hancur	6	28.6817	.17417	28.50	29.00

**One-Sample Kolmogorov-Smirnov Test**

		waktu hancur
N		6
Normal Parameters <sup>a..b</sup>	Mean	28.6817
	Std. Deviation	.17417
Most Extreme Differences	Absolute	.337
	Positive	.337
	Negative	-.163
Kolmogorov-Smirnov Z		.826
Asymp. Sig. (2-tailed)		.503

a. Test distribution is Normal.

b. Calculated from data.

**T-Test**

**Group Statistics**

formula	N	Mean	Std. Deviation	Std. Error Mean
waktu hancur formula perkiraan	3	28.6800	.00000	.00000
formula percobaan	3	28.6833	.27538	.15899

**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 hancur	Equal variances assumed	14.887	.018	-.021	4	.984	-.00333	.15899	-.44476	.43809
	Equal variances not assumed			-2.000		.985	-.00333	.15899	-.68741	.68074

d. Disolusi

**NPar Tests**

**Descriptive Statistics**

	N	Mean	Std. Deviation	Minimum	Maximum
Disolusi	6	56.4450	.26350	56.14	56.93

**One-Sample Kolmogorov-Smirnov Test**

		disolusi
N		6
Normal Parameters <sup>a,b</sup>	Mean	56.4450
	Std. Deviation	.26350
Most Extreme Differences	Absolute	.356
	Positive	.356
	Negative	-.144
Kolmogorov-Smirnov Z		.872
Asymp. Sig. (2-tailed)		.432

a. Test distribution is Normal.

b. Calculated from data.

**T-Test**

**Group Statistics**

formula	N	Mean	Std. Deviation	Std. Error Mean
disolusi formula perkiraan	3	56.4300	.00000	.00000
formula percobaan	3	56.4600	.41581	.24007

### 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
disolusi Equal variances assumed	11.490	.028	-.125	4	.907	-.03000	.24007	-.69654	.63654
Equal variances not assumed			-.125	2.000	.912	-.03000	.24007	-1.06294	1.00294

### Lampiran 19. Foto granul dan tablet



**Granul FI**



**Granul FII**



**Granul FIII**



**Granul formula optimum**



**Granul FI**



**Granul FII**



**Granul FIII**



**Granul formula optimum**

**Lampiran 20. Foto uji pembasahan ODT ibuprofen**



**FI**



**FII**



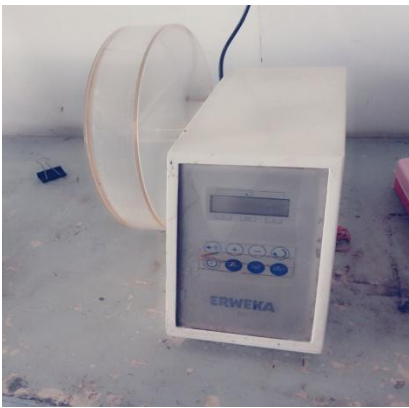


**FIII**



**Formula optimum**

**Lampiran 21. Foto alat-alat**



*Friabilator tester*



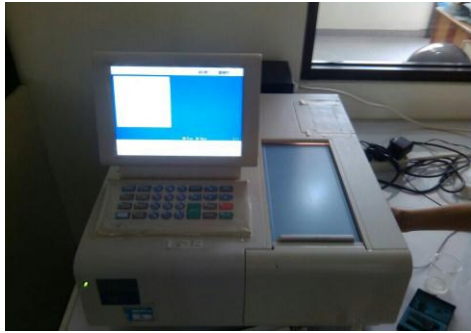
*Disintegrating tester*



*Hardnes tester*



**Neraca timbang**



*Spectrophotometer UV-Vis*



*Disolution tester*



**Alat pencetak tablet**