# BAB V

# KESIMPULAN DAN SARAN

## A. Kesimpulan

Berdasarkan hasil penelitian dapat disimpulkan bahwa :

1. *Co-processed excipient* manitol-Avicel PH 101 mempunyai karakteristik fisik yang baik, meliputi kandungan lembab, viskositas, sifat alir, kompaktibilitas dan titik leleh nya, sehingga dapat digunakan sebagai bahan pengisi-pengikat tablet kempa langsung dengan mutu fisik yang baik.
2. Formula optimum *co-processed excipient* manitol-Avicel PH 101 berdasarkan pendekatan *simplex lattice design* adalah pada perbandingan 38,93 % manitol dan 61,07 % Avicel PH 101.

## B. Saran

Saran dari penelitian ini adalah :

1. *Co-processed excipient* sebagai bahan pengisi-pengikat tablet kempa langsung masih perlu dikembangkan dari material awal yang lain, dengan harga yang lebih murah, tetapi dapat menghasilkan karakteristik fisik *co-processed excipient* yang baik.
2. Optimalisasi pada *co-processing* secara *spray drying* perlu dilakukan agar didapatkan karakteristik fisik *co-processed excipient* yang lebih baik.

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# LAMPIRAN

**Lampiran 1. Surat keterangan bantuan bahan baku asetosal**

KONIMEX

Sukoharjo, 05 Desember 2012

Nomor : 003/KX-RP/XII/12
Perihal : Bahan Baku
Lamp. : Acetosal 250 g beserta CoA.

Kepada :
Yth. Dekan Fakultas Farmasi
Universitas Setia Budi
Jl. Let. Jend. Sutoyo
Solo 57127

up. Ibu Prof. Dr. R.A. Oetari SU., MM., Apt.

Dengan hormat,

Sehubungan dengan surat Ibu no. : 560.26/FF.0/A/SPM/XI/2012 tertanggal 26 November 2012 perihal Permohonan permintaan bahan baku Acetosal 250 g untuk penelitian bagi mahasiswa :

| No | Nama Mahasiswa | NIM |
|---|---|---|
| 1 | Chaterina Rosalia Muhartoyo | 15092662 A |
| 2 | Erna Kurniawati | 15092681 A |

melalui surat ini kami berikan bahan baku beserta CoA-nya sebagai berikut :
1. Acetosal sebanyak 250 g

Demikian, agar diterima dengan baik.

Hormat kami,
PT. KONIMEX

KONIMEX

Drs. J. Sunarto, Apt.
Apoteker Penanggung Jawab

c.c. : file

PT. KONIMEX
PHARMACEUTICAL LABORATORIES

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REPRESENTATIVE OFFICE :
JL. K.H. WAHID HASYIM 162
JAKARTA 10250 - INDONESIA
PHONE : (+62-21)-3145101, 3145102
3143542, 3143575
FAX : (+62-21)-3141856

MAILING ADDRESS :
P.O. BOX 1403 JAKARTA - INDONESIA

**Lampiran 2. Sertifikat analisis asetosal**

Novacyl
Peace of Mind

Manufacturing Plant
NOVACYL établissement Saint-Fons
RUE PROSPER MONNET
69190 - SAINT FONS
FRANCE

NOVACYL SAS
29 AVENUE JOANNÈS MASSET
Le Carré Joannès - CS 10619
69009 - LYON
FRANCE

PT KONIMEX
DESA SANGGRAHAN, KEC. GROGOL KAB SUKOHARJO
57192 SUKOHARJO / INDONESIA
INDONESIE

Attn:
FAX :

**Certificate of analysis**

Print date:
03.04.2012
Purchase order item/Date
PO # 120000483 / 14.03.2012
Delivery item/Date
82101105 900001 / 02.05.2012
Order item/Date
1337033 000010
Customer
70456
Truck number/Seal number
GROUPAGE/

Material: Our / Your reference
11079 RHODINE 3220 / ACETYLSALICYLIC ACID DRUM 50 KG /
RHODIA PDS : 230 FP RHO3220.2 - Dec 2010
NOVACYL PDS : ASA-3220-EP-1110-V1

This product complies with the specifications of the current editions of USP and Ph.EUR.
Our Rhodine is periodically checked in microbiology by CARSO LSEH of Lyon in accordance with the European Pharmacopeia.
This batch of Rhodine was manufactured in accordance with EU GMP Volume 4 Part II (ICH Q7) and with current files [R2-CEP 1993-007] and [US DMF N°11373].
* Compliance guaranteed, skip testing.

Batch FRH1206851 /Manufacturing date 08.03.2012/Re-Test date 08.03.2015
Quantity 2,200 KG

| Characteristic | Unit | Value | Lower Limit | Upper Limit |
|---|---|---|---|---|
| Identity<br>*Ph. Eur. / USP* | - | Guaranteed conformity | - | - |
| Ethanolic sol.-colour<br>*Ph. Eur.* | - | Liquid less coloured than B9 | - | - |
| Ethanolic sol.-turbidity<br>*Ph. Eur.* | - | Clear | - | - |
| Loss on drying<br>*Ph. Eur.* | % | 0.01 | - | 0.50 |
| Assay (on a dry basis)<br>*Ph. Eur.* | % | 100.0 | 99.5 | 101.0 |
| Sulphated ash<br>*Ph. Eur. / USP* | % | < 0.01 | - | 0.05 |
| Heavy Metals *<br>*Ph. Eur. / USP* | ppm | < 10 | - | 10 |

R3220-EUR-2
1 28.12.2011

Novacyl
Peace of Mind

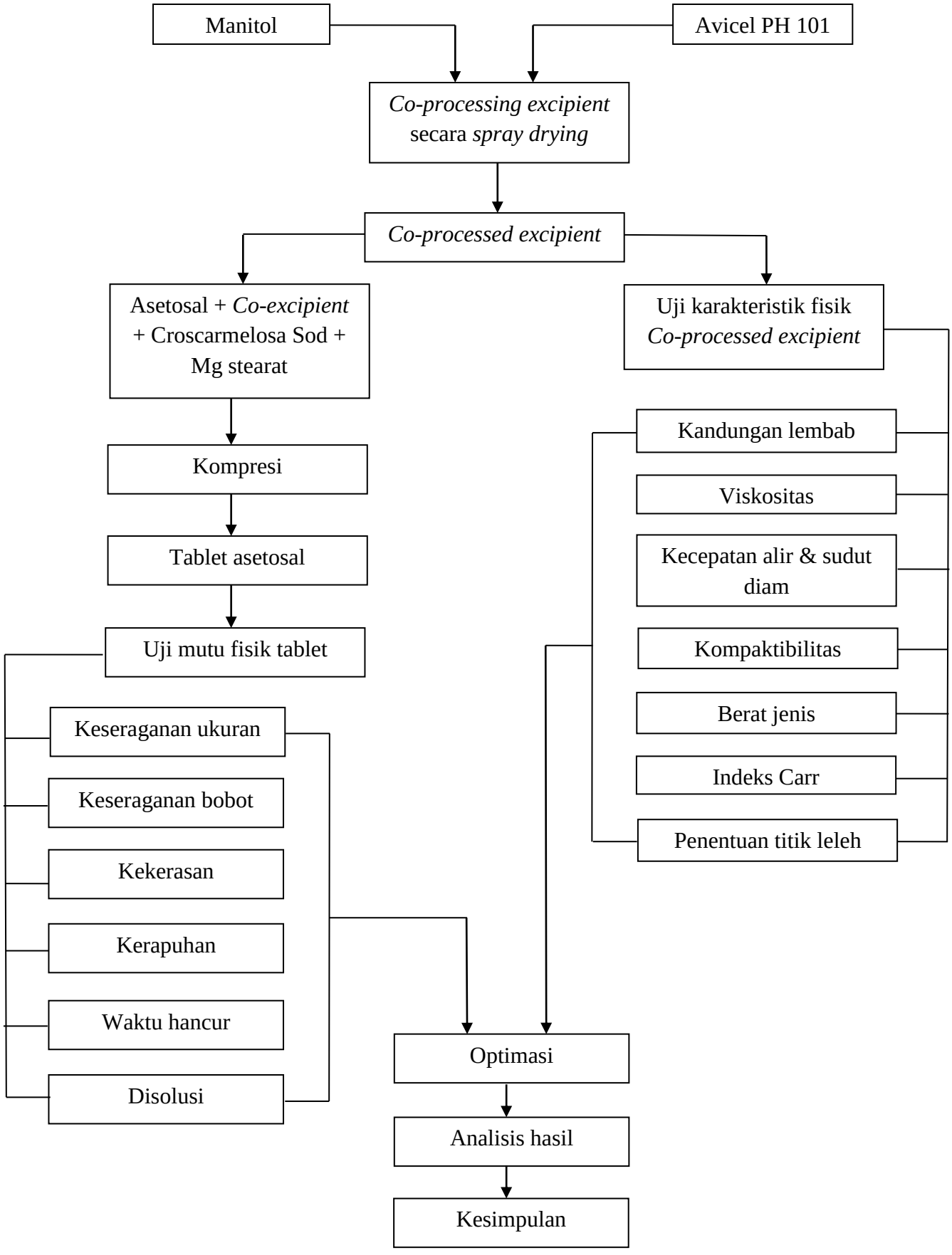
Material: Our / Your reference
11079 RHODINE 3220 / ACETYLSALICYLIC ACID DRUM 50 KG /
RHODIA PDS : 230 FP RHO3220.2 - Dec 2010
NOVACYL PDS : ASA-3220-EP-1110-V1
Batch FRH1206851 /Manufacturing date 08.03.2012/Re-Test date 08.03.2015 / Quantity 2,200 KG



| | | | | |
|---|---|---|---|---|
| Anhydride of acetylsalic acid | % | < 0.0300 | - | 0.1500 |
| *HPLC* | | | | |
| Acetylsalicylsalicylic acid | % | < 0.0300 | - | 0.1500 |
| *HPLC* | | | | |
| Salicylsalicylic acid | % | < 0.0300 | - | 0.1500 |
| *HPLC* | | | | |
| 4-hydroxybenzoic acid | % | < 0.0300 | - | 0.1500 |
| *HPLC* | | | | |
| 4-hydroxyisophtalic acid | % | < 0.0300 | - | 0.1500 |
| *HPLC* | | | | |
| Free salicylic acid | % | < 0.0300 | - | 0.1500 |
| *HPLC* | | | | |
| Unspecified impurities>0.05% | - | None | - | - |
| *HPLC* | | | | |
| Sum of related substances | % | < 0.0300 | - | 0.2500 |
| *HPLC* | | | | |
| Retained on 63 mu sieve | % | 28.7 | 0.0 | 40.0 |
| *ALPINE* | | | | |
| Retained on 250 mu sieve | % | 0.7 | - | 1.0 |

Batch released on :14.03.2012
Person responsible for batch release: Bernard Corrias, QA Manager.

**Lampiran 3. Skema jalannya penelitian**



**Lampiran 4. Data kandungan lembab dan viskositas *co-processed excipient***

| Kandungan lembab (%) | | | | | |
|---|---|---|---|---|---|
| Replikasi | Formula I | Formula II | Formula III | Formula IV | Formula V |
| 1. | 0,5 | 2,0 | 3,5 | 4,0 | 11,0 |
| 2. | 1,0 | 2,0 | 3,5 | 3,5 | 19,1 |
| 3. | 0,5 | 2,0 | 3,5 | 3,5 | 12,0 |
| $\bar{x}$ ± SD | 0,7 ± 0,29 | 2,0 ± 0,00 | 3,5± 0,00 | 3,7 ± 0,29 | 14,0 ± 4,42 |

| Viskositas (cP) | | | | | |
|---|---|---|---|---|---|
| Replikasi | Formula I | Formula II | Formula III | Formula IV | Formula V |
| 1. | 300,0 | 400,0 | 400,0 | 500,0 | 400,0 |
| 2. | 300,0 | 400,0 | 500,0 | 500,0 | 400,0 |
| 3. | 300,0 | 400,0 | 400,0 | 400,0 | 400,0 |
| $\bar{x}$ ± SD | 300,0±0,00 | 400,0±0,00 | 433,3±57,74 | 466,7±57,74 | 400,0±0,00 |

**Lampiran 5. Data dan perhitungan kecepatan alir *co-processed excipient***

Berat sampel = 50 gram

Kecepatan alir (gram/detik) = $\frac{\text{Berat sampel (gram)}}{\text{waktu alir (detik)}}$

| Waktu alir (detik) | | | | | |
|---|---|---|---|---|---|
| Replikasi | Formula I | Formula II | Formula III | Formula IV | Formula V |
| 1. | 3,44 | 2,34 | 2,88 | 4,37 | 5,65 |
| 2. | 3,70 | 2,47 | 2,85 | 4,38 | 5,90 |
| 3. | 3,71 | 2,56 | 2,69 | 4,33 | 5,95 |
| $\bar{x}$ ± SD | 3,62 ± 0,15 | 2,46 ± 0,11 | 2,81± 0,10 | 4,36 ± 0,03 | 5,83 ± 0,16 |

| Kecepatan alir (gram/detik) | | | | | |
|---|---|---|---|---|---|
| Replikasi | Formula I | Formula II | Formula III | Formula IV | Formula V |
| 1. | 14,54 | 21,37 | 17,36 | 11,44 | 8,85 |
| 2. | 13,51 | 20,24 | 17,54 | 11,42 | 8,47 |
| 3. | 13,48 | 19,53 | 17,83 | 11,55 | 8,40 |
| $\bar{x}$ ± SD | 13,84 ± 0,60 | 20,38± 0,93 | 17,83±0,66 | 11,47±0,07 | 8,58±0,24 |

**Lampiran 6. Data dan perhitungan sudut diam *co-processed excipient***

Tan α = $h/r$

- **Formula I**

| Replikasi | h | r | A |
|---|---|---|---|
| 1. | 5,876 | 12,038 | 26,018 |
| 2. | 5,862 | 12,281 | 25,516 |
| 3. | 5,562 | 12,275 | 24,376 |
| $\bar{x}$ ± SD | 5,767 ± 0,18 | 12,198 ± 0,14 | 25,303 ± 0,84 |

- **Formula II**

| Replikasi | H | r | A |
|---|---|---|---|
| 1. | 5,580 | 11,145 | 26,595 |
| 2. | 5,960 | 11,920 | 26,565 |
| 3. | 5,820 | 11,435 | 26,974 |
| $\bar{x}$ ± SD | 5,787 ± 0,18 | 11,500 ± 0,39 | 26,711 ± 0,23 |

- **Formula III**

| Replikasi | H | r | A |
|---|---|---|---|
| 1. | 6,530 | 11,200 | 30,244 |
| 2. | 6,090 | 11,465 | 27,976 |
| 3. | 6,430 | 11,860 | 28,465 |
| $\bar{x}$ ± SD | 6,350 ± 0,231 | 11,508 ± 0,332 | 28,895 ± 1,19 |

- **Formula IV**

| Replikasi | H | r | A |
|---|---|---|---|
| 1. | 5,750 | 12,655 | 24,445 |
| 2. | 5,710 | 12,365 | 24,787 |
| 3. | 6,620 | 12,275 | 28,338 |
| $\bar{x}$ ± SD | 6,027 ± 0,51 | 12,432 ± 0,20 | 25,857 ± 2,16 |

- **Formula V**

| Replikasi | H | R | α |
|---|---|---|---|
| 1. | 5,950 | 11,020 | 28,366 |
| 2. | 5,800 | 10,970 | 27,866 |
| 3. | 5,530 | 10,240 | 28,371 |
| $\bar{x}$ ± SD | 65,760 ± 0,21 | 10,743 ± 0,44 | 28,201 ± 0,29 |

**Lampiran 7. Data kompaktibilitas *co-processed excipient***

| Kompaktibilitas (kg) | | | | | |
|---|---|---|---|---|---|
| Replikasi | Formula I | Formula II | Formula III | Formula IV | Formula V |
| 1. | 6,4 | 8,0 | 10,4 | 10,5 | 9,3 |
| 2. | 6,0 | 8,7 | 9,4 | 10,5 | 9,2 |
| 3. | 6,2 | 8,0 | 9,5 | 10,4 | 8,7 |
| $\bar{x}$ ± SD | 6,2 ± 0,20 | 8,2 ± 0,40 | 9,8 ± 0,55 | 10,5 ± 0,06 | 9,1 ± 0,32 |

**Lampiran 8. Data dan perhitungan keseragaman ukuran tablet**

Perhitungan keseragaman ukuran menurut Farmakope Indonesia edisi III :

- **Ketebalan tablet**

  - **Formula I**

| Replikasi | Tebal tablet | Diameter tablet | Penyimpangan diameter dengan ketebalan tablet (x) |
|---|---|---|---|
| 1. | 4,00 | 8,00 | 2,00 |
| 2. | 4,00 | 8,00 | 2,00 |
| 3. | 4,00 | 8,10 | 2,03 |
| 4. | 4,05 | 8,00 | 1,98 |
| 5. | 4,10 | 8,00 | 1,95 |
| $\bar{x}$ ± SD | 4,03 ± 0,04 | 8,02 ± 0,04 | |
| CV (%) | 0,99 | 0,50 | |

  - **Formula II**

| Replikasi | Tebal tablet | Diameter tablet | Penyimpangan diameter dengan ketebalan tablet (x) |
|---|---|---|---|
| 1. | 4,00 | 8,00 | 2,00 |
| 2. | 4,00 | 8,10 | 2,03 |
| 3. | 3,95 | 8,10 | 2,05 |
| 4. | 4,00 | 8,00 | 2,00 |
| 5. | 4,10 | 8,00 | 1,95 |
| $\bar{x}$ ± SD | 4,01 ± 0,05 | 8,04 ± 0,05 | |
| CV (%) | 1,25 | 0,62 | |

  - **Formula III**

| Replikasi | Tebal tablet | Diameter tablet | Penyimpangan diameter dengan ketebalan tablet (x) |
|---|---|---|---|
| 1. | 4,00 | 8,00 | 2,00 |
| 2. | 3,95 | 8,05 | 2,04 |
| 3. | 4,00 | 8,00 | 2,00 |
| 4. | 4,00 | 8,00 | 2,00 |
| 5. | 4,00 | 8,00 | 2,00 |
| $\bar{x}$ ± SD | 3,99 ± 0,02 | 8,01± 0,02 | |
| CV (%) | 0,50 | 0,25 | |

- **Formula IV**

| Replikasi | Tebal tablet | Diameter tablet | Penyimpangan diameter dengan ketebalan tablet (x) |
|---|---|---|---|
| 1. | 3,95 | 8,10 | 2,05 |
| 2. | 4,00 | 8,00 | 2,00 |
| 3. | 3,95 | 8,00 | 2,03 |
| 4. | 4,00 | 8,00 | 2,00 |
| 5. | 4,00 | 8,00 | 2,00 |
| $\bar{x}$ ± SD | 3,98 ± 0,03 | 8,02 ± 0,04 | |
| CV (%) | 0,75 | 0,50 | |

- **Formula V**

| Replikasi | Tebal tablet | Diameter tablet | Penyimpangan diameter dengan ketebalan tablet (x) |
|---|---|---|---|
| 1. | 3,95 | 8,00 | 2,02 |
| 2. | 3,95 | 8,10 | 2,05 |
| 3. | 4,00 | 8,00 | 2,00 |
| 4. | 4,00 | 8,00 | 2,00 |
| 5. | 4,00 | 8,00 | 2,00 |
| $\bar{x}$ ± SD | 3,98 ±0,03 | 8,02 ± 0,04 | |
| CV (%) | 0,75 | 0,50 | |

**Lampiran 9. Data dan perhitungan keseragaman bobot tablet**

Perhitungan keseragaman bobot menurut Farmakope Indonesia edisi III untuk bobot tablet 250 mg :

- **Formula I**

| No. | Bobot tablet (mg) | Penyimpangan $\lvert x - \bar{x} \rvert$ | % penyimpangan $\left\lvert \frac{x - \bar{x}}{\bar{x}} \right\rvert$ x 100 % |
|---|---|---|---|
| 1. | 246,8 | 2,5 | 1,00 |
| 2. | 246,8 | 2,5 | 1,00 |
| 3. | 247,8 | 1,5 | 0,60 |
| 4. | 252,8 | 3,5 | 1,40 |
| 5. | 251,8 | 2,5 | 1,00 |
| 6. | 247,5 | 1,8 | 0,72 |
| 7. | 251,5 | 2,2 | 0,88 |
| 8. | 247,0 | 2,3 | 0,92 |
| 9. | 252,5 | 3,2 | 1,28 |
| 10. | 248,4 | 0,9 | 0,36 |
| 11. | 250,1 | 0,8 | 0,32 |
| 12. | 252,8 | 3,5 | 1,40 |
| 13. | 248,0 | 1,3 | 0,52 |
| 14. | 249,8 | 0,5 | 0,20 |
| 15. | 249,9 | 0,6 | 0,24 |
| 16. | 246,6 | 2,7 | 1,08 |
| 17. | 248,1 | 1,2 | 0,48 |
| 18. | 247,2 | 2,1 | 0,84 |
| 19. | 250,3 | 1,0 | 0,40 |
| 20. | 249,6 | 0,3 | 0,12 |
| $\bar{x}$ ± SD | 249,3 ± 2,14 | | |
| CV(%) | 0,86 | | |

- **Formula II**

| No. | Bobot tablet (mg) | Penyimpangan $[x - \bar{x}]$ | % penyimpangan $\left[\frac{x - \bar{x}}{\bar{x}}\right]$ x 100 % |
|---|---|---|---|
| 1. | 247,5 | 2,3 | 0,92 |
| 2. | 246,1 | 3,7 | 1,48 |
| 3. | 253,4 | 3,6 | 1,44 |
| 4. | 252,8 | 3,0 | 1,20 |
| 5. | 251,4 | 1,6 | 0,64 |
| 6. | 249,3 | 0,5 | 0,20 |
| 7. | 250,2 | 0,4 | 0,16 |
| 8. | 251,4 | 1,6 | 0,64 |
| 9. | 248,2 | 1,6 | 0,64 |
| 10. | 252,6 | 2,8 | 1,12 |
| 11. | 250,0 | 0,2 | 0,08 |
| 12. | 250,0 | 0,2 | 0,08 |
| 13. | 249,4 | 0,4 | 0,16 |
| 14. | 252,0 | 2,2 | 0,88 |
| 15. | 248,7 | 1,1 | 0,44 |
| 16. | 247,8 | 2,0 | 0,80 |
| 17. | 250,9 | 1,1 | 0,44 |
| 18. | 248,9 | 0,9 | 0,36 |
| 19. | 247,3 | 2,5 | 1,00 |
| 20. | 248,3 | 1,5 | 0,60 |
| $\bar{x} \pm SD$ | 249,8 ± 2,02 | | |
| CV(%) | 0,81 | | |

- **Formula III**

| No. | Bobot tablet (mg) | Penyimpangan $[x - \bar{x}]$ | % penyimpangan $\left[\frac{x - \bar{x}}{\bar{x}}\right]$ x 100 % |
|---|---|---|---|
| 1. | 248,3 | 0,4 | 0,16 |
| 2. | 250,6 | 1,9 | 0,76 |
| 3. | 249,2 | 0,5 | 0,20 |
| 4. | 250,8 | 2,1 | 0,84 |
| 5. | 246,5 | 2,2 | 0,88 |
| 6. | 248,8 | 0,1 | 0,04 |
| 7. | 245,6 | 3,1 | 1,25 |
| 8. | 247,1 | 1,6 | 0,64 |
| 9. | 247,6 | 1,1 | 0,44 |
| 10. | 249,9 | 1,2 | 0,48 |
| 11. | 246,0 | 2,7 | 1,09 |
| 12. | 247,9 | 0,8 | 0,32 |
| 13. | 251,8 | 3,1 | 1,25 |
| 14. | 247,4 | 1,3 | 0,52 |
| 15. | 253,9 | 5,2 | 2,09 |
| 16. | 248,8 | 0,1 | 0,04 |
| 17. | 247,4 | 1,3 | 0,52 |
| 18. | 251,4 | 2,7 | 1,09 |
| 19. | 247,7 | 1,0 | 0,40 |
| 20. | 247,7 | 1,0 | 0,40 |
| $\bar{x} \pm SD$ | 248,7 ± 2,12 | | |
| CV(%) | 0,85 | | |

- **Formula IV**

| No. | Bobot tablet (mg) | Penyimpangan $[x - \bar{x}]$ | % penyimpangan $\left[\frac{x - \bar{x}}{\bar{x}}\right]$ x 100 % |
|---|---|---|---|
| 1. | 249,9 | 1,4 | 0,56 |
| 2. | 246,2 | 2,3 | 0,93 |
| 3. | 250,9 | 2,4 | 0,97 |
| 4. | 246,2 | 2,3 | 0,93 |
| 5. | 248,3 | 0,2 | 0,08 |
| 6. | 246,3 | 2,2 | 0,89 |
| 7. | 248,6 | 0,1 | 0,04 |
| 8. | 247,6 | 0,9 | 0,36 |
| 9. | 247,2 | 1,3 | 0,52 |
| 10. | 248,3 | 0,2 | 0,08 |
| 11. | 246,9 | 1,6 | 0,64 |
| 12. | 251,0 | 2,5 | 1,01 |
| 13. | 249,8 | 1,3 | 0,52 |
| 14. | 250,4 | 1,9 | 0,76 |
| 15. | 247,3 | 1,2 | 0,48 |
| 16. | 248,1 | 0,4 | 0,16 |
| 17. | 249,0 | 0,5 | 0,20 |
| 18. | 246,7 | 1,8 | 0,72 |
| 19. | 251,6 | 3,1 | 1,25 |
| 20. | 250,2 | 1,7 | 0,68 |
| $\bar{x} \pm SD$ | 248,5 ± 1,74 | | |
| CV(%) | 0,70 | | |

- **Formula V**

| No. | Bobot tablet (mg) | Penyimpangan $[x - \bar{x}]$ | % penyimpangan $\left[\frac{x - \bar{x}}{\bar{x}}\right]$ x 100 % |
|---|---|---|---|
| 1. | 242,2 | 4,1 | 1,72 |
| 2. | 242,9 | 4,8 | 2,02 |
| 3. | 234,6 | 3,5 | 1,47 |
| 4. | 234,4 | 3,7 | 1,55 |
| 5. | 235,8 | 2,3 | 0,97 |
| 6. | 238,4 | 0,3 | 0,13 |
| 7. | 239,1 | 1,0 | 0,42 |
| 8. | 236,1 | 2,0 | 0,84 |
| 9. | 239,5 | 1,4 | 0,59 |
| 10. | 240,2 | 2,1 | 0,88 |
| 11. | 236,1 | 2,0 | 0,84 |
| 12. | 238,9 | 0,8 | 0,34 |
| 13. | 243,1 | 5,0 | 2,10 |
| 14. | 240,0 | 1,9 | 0,80 |
| 15. | 231,4 | 6,7 | 2,81 |
| 16. | 236,4 | 1,7 | 0,71 |
| 17. | 242,5 | 4,4 | 1,85 |
| 18. | 237,9 | 0,2 | 0,08 |
| 19. | 236,5 | 1,6 | 0,67 |
| 20. | 235,4 | 2,7 | 1,13 |
| $\bar{x}$ ± SD | 238,1 ± 3,19 | | |
| CV(%) | 1,34 | | |

**Lampiran 10. Data kekerasan tablet**

| No. | Kekerasan tablet (kg) | | | | |
|---|---|---|---|---|---|
| | Formula I | Formula II | Formula III | Formula IV | Formula V |
| 1. | 7,0 | 7,8 | 7,6 | 9,0 | 7,5 |
| 2. | 7,0 | 7,6 | 8,0 | 9,2 | 7,5 |
| 3. | 7,0 | 7,8 | 8,0 | 9,3 | 7,6 |
| $\bar{x}$ ± SD | 7,0 ± 0,00 | 7,7 ± 0,12 | 7,8 ± 0,23 | 9,2 ± 0,15 | 7,5 ± 0,06 |

**Lampiran 11. Data dan perhitungan kerapuhan tablet**

- **Formula I**

| | Replikasi 1 | Replikasi 2 | Replikasi 3 |
|---|---|---|---|
| Berat sebelum uji (gram) | 4,9392 | 4,9651 | 4,9491 |
| Berat setelah uji (gram) | 4,8956 | 4,9277 | 4,9085 |
| % kerapuhan | 0,88 | 0,75 | 0,82 |
| $\bar{x}$ ± SD | | | 0,82 ± 0,07 |

- **Formula II**

| | Replikasi 1 | Replikasi 2 | Replikasi 3 |
|---|---|---|---|
| Berat sebelum uji (gram) | 4,8696 | 4,8756 | 4,9852 |
| Berat setelah uji (gram) | 4,8370 | 4,8439 | 4,9508 |
| % kerapuhan | 0,67 | 0,65 | 0,69 |
| $\bar{x}$ ± SD | | | 0,67 ± 0,02 |

- **Formula III**

| | Replikasi 1 | Replikasi 2 | Replikasi 3 |
|---|---|---|---|
| Berat sebelum uji (gram) | 4,9030 | 4,8897 | 4,9525 |
| Berat setelah uji (gram) | 4,8766 | 4,8628 | 4,9217 |
| % kerapuhan | 0,54 | 0,55 | 0,62 |
| $\bar{x}$ ± SD | | | 0,57 ± 0,04 |

- **Formula IV**

| | Replikasi 1 | Replikasi 2 | Replikasi 3 |
|---|---|---|---|
| Berat sebelum uji (gram) | 5,0488 | 4,9776 | 4,9521 |
| Berat setelah uji (gram) | 5,0176 | 4,9438 | 4,9224 |
| % kerapuhan | 0,62 | 0,68 | 0,60 |
| $\bar{x}$ ± SD | | | 0,63 ± 0,04 |

- **Formula V**

| | Replikasi 1 | Replikasi 2 | Replikasi 3 |
|---|---|---|---|
| Berat sebelum uji (gram) | 4,7166 | 4,7172 | 4,7221 |
| Berat setelah uji (gram) | 4,6876 | 4,6889 | 4,6938 |
| % kerapuhan | 0,61 | 0,60 | 0,60 |
| $\bar{x}$ ± SD | | | 0,60 ± 0,01 |

Contoh perhitungan % kerapuhan adalah sebagai berikut :

$$\% \text{ kerapuhan} = \frac{\text{berat tablet sebelum uji} - \text{bobot tablet setelah uji}}{\text{berat tablet sebelum uji}} \text{ x } 100\ \%$$

$$= \frac{4{,}9392 - 4{,}8956}{4{,}9392} \text{ x } 100\ \%$$

$$= 0{,}88\ \%$$

**Lampiran 12. Data waktu hancur tablet**

| Replikasi | Waktu hancur (menit) | | | | |
|---|---|---|---|---|---|
| | F I | F II | F III | F IV | F V |
| 1. | 1,32 | 1,13 | 0,8 | 0,9 | 0,58 |
| 2. | 1,33 | 1,17 | 0,9 | 1,37 | 0,67 |
| 3. | 1,52 | 1,22 | 1,12 | 1,60 | 1,28 |
| 4. | 1,62 | 1,32 | 1,15 | 1,87 | 1,93 |
| 5. | 1,75 | 1,40 | 1,18 | 2,0 | 1,95 |
| $\bar{x}$ ± SD | 1,51 ± 0,19 | 1,25 ± 0,11 | 1,03 ± 0,17 | 1,55 ± 0,44 | 1,28 ± 0,66 |

**Lampiran 13. Data dan perhitungan disolusi tablet asetosal**

- Penentuan *operating time*

| Waktu (menit) | Absorbansi |
|---|---|
| 1 | 0,372 |
| 2 | 0,372 |
| 3 | 0,372 |
| 4 | 0,372 |
| 5 | 0,372 |
| 6 | 0,372 |
| 7 | 0,372 |
| 8 | 0,372 |
| 9 | 0,372 |
| 10 | 0,372 |

- Penentuan panjang gelombang maksimum

| Panjang gelombang (nm) | Absorbansi |
|---|---|
| **260** | **0,372** |
| 265 | 0,362 |
| 270 | 0,355 |
| 275 | 0,312 |
| 280 | 0.237 |

Panjang gelombang maksimum asetosal adalah 260 nm

Keterangan : larutan yang digunakan adalah larutan asetosal dengan konsentrasi 100 ppm.

- Pembuatan larutan induk asetosal

Kertas timbang + zat = 0,3167 g

Kertas + sisa = 0,2667 g +

Bobot zat = 0,0500 g

Kadar asetosal = 0,050 g / 50 ml =50 mg / 50 ml = 1000 mg/1000 ml = 1000 ppm

- Pengenceran

$V_1 . N_1 = V_2 . N_2$

$2 . 1000 = 50 . N_2$

$N_2 = 80$ ppm

$V_1 . N_1 = V_2 . N_2$

$2{,}5 . 1000 = 50 . N_2$

$N_2 = 100$ ppm

$V_1 . N_1 = V_2 . N_2$

$3 . 1000 = 50 . N_2$

$N_2 = 120$ ppm

$V_1 . N_1 = V_2 . N_2$

$3{,}5 . 1000 = 50 . N_2$

$N_2 = 140$ ppm

$V_1 . N_1 = V_2 . N_2$

$4 . 1000 = 50 . N_2$

N2 = 160 ppm

- Data kurva baku asetosal

| Konsentrasi (ppm) | Absorbansi |
|---|---|
| 80 | 0,318 |
| 100 | 0,385 |
| 120 | 0,429 |
| 140 | 0,513 |
| 160 | 0,571 |

Regresi linier :

a = 0,0628

b = $3,17 \times 10^{-3}$

r = 0,9966

**Disolusi**

Formula I Replikasi 1

| Waktu (menit) | Absorbansi | F p (kali) | Kadar (mg/1000ml) | Kadar (mg/500 ml) | Faktor koreksi | Kadar terkoreksi | Kadar terdisolusi (%) | Dosis |
|---|---|---|---|---|---|---|---|---|
| 5 | 0,441 | 1 | 119,306 | 59,653 | 0 | 59,653 | 74,57 | 80 |
| 10 | 0,579 | 1 | 162,839 | 81,420 | 1,193 | 82,613 | 103,27 | 80 |
| 15 | 0,604 | 1 | 170,726 | 85,363 | 1,628 | 86,991 | 108,74 | 80 |
| 30 | 0,585 | 1 | 164,732 | 82,366 | 1,707 | 84,073 | **105,09** | 80 |
| 45 | 0,585 | 1 | 164,732 | 82,366 | 1,647 | 84,013 | 105,02 | 80 |
| 60 | 0,578 | 1 | 162,524 | 81,262 | 1,647 | 82,909 | 103,64 | 80 |

Formula I Replikasi 2

| Waktu (menit) | Absorbansi | F p (kali) | Kadar (mg/1000ml) | Kadar (mg/500ml) | Faktor koreksi | Kadar terkoreksi | Kadar Terdisolusi (%) | Dosis |
|---|---|---|---|---|---|---|---|---|
| 5 | 0,426 | 1 | 114,574 | 57,287 | 0 | 57,287 | 71,61 | 80 |
| 10 | 0,545 | 1 | 152,114 | 76,057 | 1,146 | 77,203 | 96,50 | 80 |
| 15 | 0,554 | 1 | 154,953 | 77,476 | 1,521 | 78,997 | 98,75 | 80 |
| 30 | 0,566 | 1 | 158,738 | 79,369 | 1,550 | 80,919 | **101,15** | 80 |
| 45 | 0,568 | 1 | 159,369 | 79,685 | 1,587 | 81,272 | 101,59 | 80 |
| 60 | 0,574 | 1 | 161,262 | 80,631 | 1,594 | 82,225 | 102,78 | 80 |

Formula I Replikasi 3

| Waktu (menit) | Absorbansi | F p (kali) | Kadar (mg/1000ml) | Kadar (mg/500ml) | Faktor koreksi | Kadar terkoreksi | Kadar Terdisolusi (%) | Dosis |
|---|---|---|---|---|---|---|---|---|
| 5 | 0,479 | 1 | 131,293 | 65,647 | 0 | 65,647 | 82,06 | 80 |
| 10 | 0,569 | 1 | 159,685 | 79,842 | 1,313 | 81,155 | 101,44 | 80 |
| 15 | 0,577 | 1 | 162,208 | 81,104 | 1,597 | 82,701 | 103,38 | 80 |
| 30 | 0,577 | 1 | 162,208 | 81,104 | 1,622 | 82,726 | **103,41** | 80 |
| 45 | 0,573 | 1 | 160,946 | 80,473 | 1,622 | 82,095 | 102,62 | 80 |
| 60 | 0,567 | 1 | 159,054 | 79,527 | 1,609 | 81,136 | 101,42 | 80 |

Formula II Replikasi 1

| Waktu (menit) | Absorbansi | F p (kali) | Kadar (mg/1000ml) | Kadar (mg/500ml) | Faktor koreksi | Kadar terkoreksi | Kadar terdisolusi (%) | Dosis |
|---|---|---|---|---|---|---|---|---|
| 5 | 0,371 | 1 | 97,224 | 48,612 | 0 | 48,612 | 60,76 | 80 |
| 10 | 0,513 | 1 | 142,019 | 71,009 | 0,972 | 71,982 | 89,98 | 80 |
| 15 | 0,551 | 1 | 154,006 | 77,003 | 1,420 | 78,423 | 98,03 | 80 |
| 30 | 0,577 | 1 | 162,208 | 81,104 | 1,540 | 82,644 | **103,31** | 80 |
| 45 | 0,547 | 1 | 152,744 | 76,372 | 1,622 | 77,994 | 97,49 | 80 |
| 60 | 0,547 | 1 | 152,744 | 76,372 | 1,527 | 77,900 | 97,37 | 80 |

Formula II Replikasi 2

| Waktu (menit) | Absorbansi | F p (kali) | Kadar (mg/1000ml) | Kadar (mg/500ml) | Faktor koreksi | Kadar terkoreksi | Kadar terdisolusi (%) | Dosis |
|---|---|---|---|---|---|---|---|---|
| 5 | 0,347 | 1 | 89,653 | 44,826 | 0 | 44,826 | 56,03 | 80 |
| 10 | 0,514 | 1 | 142,334 | 71,167 | 0,897 | 72,064 | 90,08 | 80 |
| 15 | 0,536 | 1 | 149,274 | 74,637 | 1,423 | 76,061 | 95,08 | 80 |
| 30 | 0,585 | 1 | 164,732 | 82,366 | 1,493 | 83,859 | **104,82** | 80 |
| 45 | 0,576 | 1 | 161,893 | 80,946 | 1,647 | 82,594 | 103,24 | 80 |
| 60 | 0,567 | 1 | 159,054 | 79,527 | 1,619 | 81,146 | 101,43 | 80 |

Formula II Replikasi 3

| Waktu (menit) | Absorbansi | F p (kali) | Kadar (mg/1000ml) | Kadar (mg/500ml) | Faktor koreksi | Kadar terdisolusi | Kadar terdisolusi (%) | Dosis |
|---|---|---|---|---|---|---|---|---|
| 5 | 0,323 | 1 | 82,082 | 41,041 | 0 | 41,041 | 51,30 | 80 |
| 10 | 0,543 | 1 | 151,483 | 75,741 | 0,821 | 76,562 | 95,70 | 80 |
| 15 | 0,547 | 1 | 152,744 | 76,372 | 1,515 | 77,887 | 97,36 | 80 |
| 30 | 0,564 | 1 | 158,107 | 79,054 | 1,527 | 80,581 | **100,73** | 80 |
| 45 | 0,585 | 1 | 164,732 | 82,366 | 1,581 | 83,947 | 104,93 | 80 |
| 60 | 0,566 | 1 | 158,738 | 79,369 | 1,647 | 81,016 | 101,27 | 80 |

Formula III Replikasi 1

| Waktu (menit) | Absorbansi | F p (kali) | Kadar (mg/1000ml) | Kadar (mg/500ml) | Faktor koreksi | Kadar terkoreksi | Kadar terdisolusi (%) | Dosis |
|---|---|---|---|---|---|---|---|---|
| 5 | 0,246 | 1 | 57,792 | 28,896 | 0 | 28,896 | 36,12 | 80 |
| 10 | 0,372 | 1 | 97,539 | 48,770 | 0,578 | 49,348 | 61,68 | 80 |
| 15 | 0,400 | 1 | 106,372 | 53,186 | 0,975 | 54,162 | 67,70 | 80 |
| 30 | 0,468 | 1 | 127,823 | 63,912 | 1,064 | 64,975 | **81,22** | 80 |
| 45 | 0,511 | 1 | 141,388 | 70,694 | 1,278 | 71,972 | 89,97 | 80 |
| 60 | 0,526 | 1 | 146,120 | 73,060 | 1,414 | 74,474 | 93,09 | 80 |

Formula III Replikasi 2

| Waktu (menit) | Absorbansi | F p (kali) | Kadar (mg/1000ml) | Kadar (mg/500ml) | Faktor koreksi | Kadar terkoreksi | Kadar terdisolusi (%) | Dosis |
|---|---|---|---|---|---|---|---|---|
| 5 | 0,295 | 1 | 73,249 | 36,625 | 0 | 36,625 | 45,78 | 80 |
| 10 | 0,441 | 1 | 119,306 | 59,653 | 0,732 | 60,385 | 75,48 | 80 |
| 15 | 0,477 | 1 | 130,662 | 65,331 | 1,193 | 66,524 | 83,16 | 80 |
| 30 | 0,531 | 1 | 147,697 | 73,849 | 1,307 | 75,155 | **93,94** | 80 |
| 45 | 0,554 | 1 | 154,953 | 77,476 | 1,477 | 78,953 | 98,69 | 80 |
| 60 | 0,551 | 1 | 154,006 | 77,003 | 1,550 | 78,553 | 98,19 | 80 |

Formula III Replikasi 3

| Waktu (menit) | Absorbansi | F p (kali) | Kadar (mg/1000ml) | Kadar (mg/500ml) | Faktor koreksi | Kadar terkoreksi | Kadar terdisolusi (%) | Dosis |
|---|---|---|---|---|---|---|---|---|
| 5 | 0,290 | 1 | 71,672 | 35,836 | 0 | 35,836 | 44,79 | 80 |
| 10 | 0,428 | 1 | 115,205 | 57,603 | 0,717 | 58,319 | 72,90 | 80 |
| 15 | 0,453 | 1 | 123,091 | 61,546 | 1,152 | 62,698 | 78,37 | 80 |
| 30 | 0,489 | 1 | 134,448 | 67,224 | 1,231 | 68,455 | **85,57** | 80 |
| 45 | 0,519 | 1 | 143,912 | 71,956 | 1,344 | 73,300 | 91,63 | 80 |
| 60 | 0,556 | 1 | 155,584 | 77,792 | 1,439 | 79,231 | 99,04 | 80 |

Formula IV Replikasi 1

| Waktu (menit) | Absorbansi | F p (kali) | Kadar (mg/1000ml) | Kadar (mg/500ml) | Faktor koreksi | Kadar terkoreksi | Kadar terdisolusi (%) | Dosis |
|---|---|---|---|---|---|---|---|---|
| 5 | 0,304 | 1 | 76,088 | 38,044 | 0 | 38,044 | 47,56 | 80 |
| 10 | 0,464 | 1 | 126,562 | 63,281 | 0,761 | 64,042 | 80,05 | 80 |
| 15 | 0,517 | 1 | 143,281 | 71,640 | 1,266 | 72,906 | 91,13 | 80 |
| 30 | 0,557 | 1 | 155,899 | 77,950 | 1,433 | 79,382 | **99,23** | 80 |
| 45 | 0,572 | 1 | 160,631 | 80,315 | 1,559 | 81,874 | 102,34 | 80 |
| 60 | 0,594 | 1 | 167,571 | 83,785 | 1,606 | 85,392 | 106,74 | 80 |

Formula IV Replikasi 2

| Waktu (menit) | Absorbansi | F p (kali) | Kadar (mg/1000ml) | Kadar (mg/500ml) | Faktor koreksi | Kadar terkoreksi | Kadar terdisolusi (%) | Dosis |
|---|---|---|---|---|---|---|---|---|
| 5 | 0,305 | 1 | 76,404 | 38,202 | 0 | 38,202 | 47,75 | 80 |
| 10 | 0,482 | 1 | 132,240 | 66,120 | 0,764 | 66,884 | 83,60 | 80 |
| 15 | 0,528 | 1 | 146,751 | 73,375 | 1,322 | 74,698 | 93,37 | 80 |
| 30 | 0,531 | 1 | 147,697 | 73,849 | 1,468 | 75,316 | **94,15** | 80 |
| 45 | 0,562 | 1 | 157,476 | 78,738 | 1,477 | 80,215 | 100,27 | 80 |
| 60 | 0,572 | 1 | 160,631 | 80,315 | 1,575 | 81,890 | 102,36 | 80 |

Formula IV Replikasi 3

| Waktu (menit) | Absorbansi | F p (kali) | Kadar (mg/1000ml) | Kadar (mg/500ml) | Faktor koreksi | Kadar terkoreksi | Kadar terdisolusi (%) | Dosis |
|---|---|---|---|---|---|---|---|---|
| 5 | 0,321 | 1 | 81,451 | 40,726 | 0 | 40,726 | 50,91 | 80 |
| 10 | 0,475 | 1 | 130,032 | 65,016 | 0,815 | 65,830 | 82,29 | 80 |
| 15 | 0,505 | 1 | 139,495 | 69,748 | 1,300 | 71,048 | 88,81 | 80 |
| 30 | 0,564 | 1 | 158,107 | 79,054 | 1,395 | 80,449 | **100,56** | 80 |
| 45 | 0,597 | 1 | 168,517 | 84,259 | 1,581 | 85,840 | 107,30 | 80 |
| 60 | 0,602 | 1 | 170,095 | 85,047 | 1,685 | 86,732 | 108,42 | 80 |

Formula V Replikasi 1

| Waktu (menit) | Absorbansi | F p (kali) | Kadar (mg/1000ml) | Kadar (mg/500) | Faktor koreksi | Kadar terkoreksi | Kadar terdisolusi (%) | Dosis |
|---|---|---|---|---|---|---|---|---|
| 5 | 0,218 | 1 | 48,959 | 24,479 | 0 | 24,479 | 30,60 | 80 |
| 10 | 0,309 | 1 | 77,666 | 38,833 | 0,490 | 39,322 | 49,15 | 80 |
| 15 | 0,314 | 1 | 79,243 | 39,621 | 0,777 | 40,398 | 50,50 | 80 |
| 30 | 0,41 | 1 | 109,527 | 54,763 | 0,792 | 55,556 | **69,44** | 80 |
| 45 | 0,458 | 1 | 124,669 | 62,334 | 1,095 | 63,430 | 79,29 | 80 |
| 60 | 0,490 | 1 | 134,763 | 67,382 | 1,247 | 68,628 | 85,79 | 80 |

Formula V Replikasi 2

| Waktu (menit) | Absorbansi | F p (kali) | Kadar (mg/1000ml) | Kadar (mg/500) | Faktor koreksi | Kadar terkoreksi | Kadar terdisolusi (%) | Dosis |
|---|---|---|---|---|---|---|---|---|
| 5 | 0,210 | 1 | 46,435 | 23,218 | 0 | 23,218 | 29,02 | 80 |
| 10 | 0,317 | 1 | 80,189 | 40,095 | 0,464 | 40,559 | 50,70 | 80 |
| 15 | 0,352 | 1 | 91,230 | 45,615 | 0,802 | 46,417 | 58,02 | 80 |
| 30 | 0,42 | 1 | 112,681 | 56,341 | 0,912 | 57,253 | **71,57** | 80 |
| 45 | 0,457 | 1 | 124,353 | 62,177 | 1,127 | 63,303 | 79,13 | 80 |
| 60 | 0,495 | 1 | 136,341 | 68,170 | 1,244 | 69,414 | 86,77 | 80 |

Formula V Replikasi 3

| Waktu (menit) | Absorbansi | F p (kali) | Kadar (mg/1000ml) | Kadar (mg/500) | Faktor koreksi | Kadar terkoreksi | Kadar terdisolusi (%) | Dosis |
|---|---|---|---|---|---|---|---|---|
| 5 | 0,2 | 1 | 43,281 | 21,640 | 0 | 21,640 | 27,05 | 80 |
| 10 | 0,256 | 1 | 60,946 | 30,473 | 0,433 | 30,906 | 38,63 | 80 |
| 15 | 0,3 | 1 | 74,826 | 37,413 | 0,609 | 38,023 | 47,53 | 80 |
| 30 | 0,356 | 1 | 92,492 | 46,246 | 0,748 | 46,994 | **58,74** | 80 |
| 45 | 0,402 | 1 | 107,003 | 53,502 | 0,925 | 54,426 | 68,03 | 80 |
| 60 | 0,431 | 1 | 116,151 | 58,076 | 1,070 | 59,146 | 73,93 | 80 |

Kadar rata-rata asetosal yang terdisolusi (%)

| Waktu (menit) | Kadar terdisolusi (%) | | | | |
|---|---|---|---|---|---|
| | F I | F II | F III | F IV | F V |
| 5 | 76,08 ±5,39 | 56,03 ±4,73 | 42,23±5,32 | 48,74 ±1,88 | 28,89±1,78 |
| 10 | 100,40±3,50 | 91,92 ±3,28 | 70,02±7,33 | 81,98 ±1,80 | 46,16±6,57 |
| 15 | 103,62±5,00 | 96,82 ±1,55 | 76,41±7,91 | 91,10 ±2,28 | 52,02±5,41 |
| **30** | **103,22±1,98** | **102,95±2,07** | **86,91±6,47** | **97,98 ±3,39** | **66,58±6,87** |
| 45 | 103,08±1,76 | 101,89±3,90 | 93,43±4,63 | 103,30±3,61 | 75,48±6,45 |
| 60 | 102,61±1,12 | 100,03±2,30 | 96,77±3,22 | 105,84±3,13 | 82,16±7,14 |

Keterangan :

Formula I = manitol 100 % : Avicel PH 101 0 %
Formula II = manitol 75 % : Avicel PH 101 25 %
Formula III = manitol 50 % : Avicel PH 101 50 %
Formula IV = manitol 25 % : Avicel PH 101 75 %
Formula V = manitol 0 % : Avicel PH 101 100 %

Contoh perhitungan disolusi pada formula I.

1. Kadar mg/1000 ml diperoleh dengan memasukkan absorbansi yang diperoleh pada kurva baku $y = 0,0628 + 3,17 \times 10^{-3} X$.

   Absorbansi pada menit ke-5 adalah 0,441 sehingga diperoleh x= 119,306 mg/1000 ml.
2. Kadar yang didapat yaitu x (mg/1000 ml) dikalikan faktor pengenceran yaitu 1x.
3. Kadar mg/500 ml adalah kadar zat aktif dalam medium disolusi, dimana volume medium disolusi yang digunakan adalah 500 ml. Kadar yang diperoleh adalah 500 ml/1000 ml x 119,306 mg =59,653 mg/500 ml.
4. Pengambilan sampel tiap selang waktu sebanyak 10 ml diganti dengan medium disolusi (dapar asetat pH 4,5) yang baru dengan volume yang sama, karena setiap pengambilan terjadi pengurangan konsentrasi dalam medium disolusi. Agar konsentrasi medium dianggap tetap maka konsentrasi medium

yang diambil tersebut dijadikan faktor koreksi menit ke-10 yang diperoleh dari $\frac{10}{500}$ x 59,653 mg = 1,193

5. Kadar terkoreksi pada menit ke-10 diperoleh dari 1,193 + 81,420 = 82,613
6. Kadar terdisolusi dalam persen diperoleh dari kadar terkoreksi dibagi dengan dosis asetosal tiap tablet (80 mg) dikalikan 100%.

**Lampiran 14. Foto *co-processed excipient* manitol-Avicel PH 101**

*Co-processed excipient* formula I

*Co-processed excipient* formula II

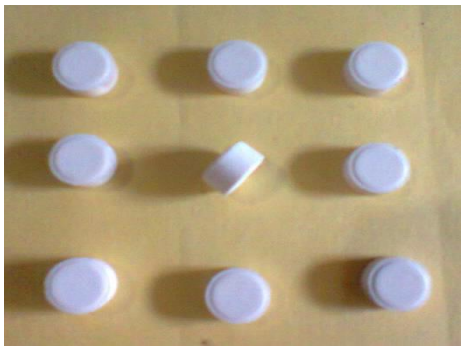
*Co-processed excipient* formula III

*Co-processed excipient* formula IV

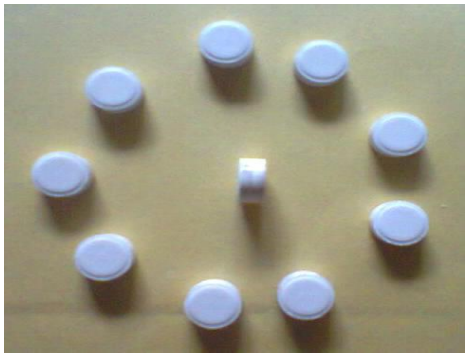
*Co-processed excipient* formula V

**Lampiran 15. Foto tablet kempa langsung asetosal dengan bahan pengisi-pengikat *co-processed excipient* manitol-Avicel PH 101**

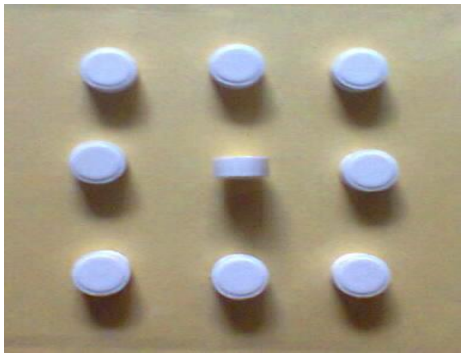
Tablet formula I



Tablet formula II



Tablet formula III



Tablet formula IV

Tablet formula V

**Lampiran 16. Foto alat yang digunakan dalam penelitian**

*Spray dryer* SD basic LabPlant

*Moisture balance*

Viskotester

Alat uji kecepatan alir

Alat uji titik leleh

*Density tester*

Alat pencetak tablet

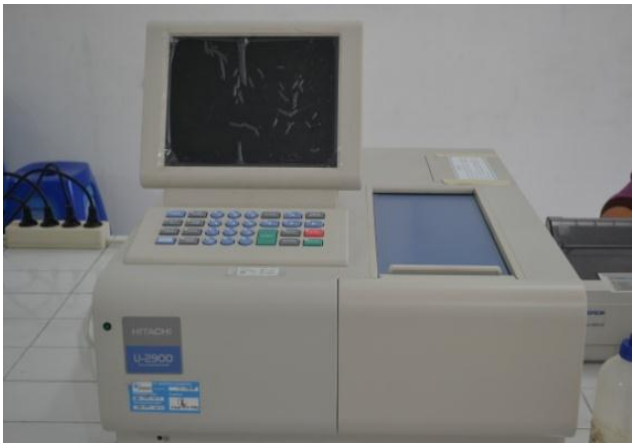
*Hardness tester*


*Friabilator tester*

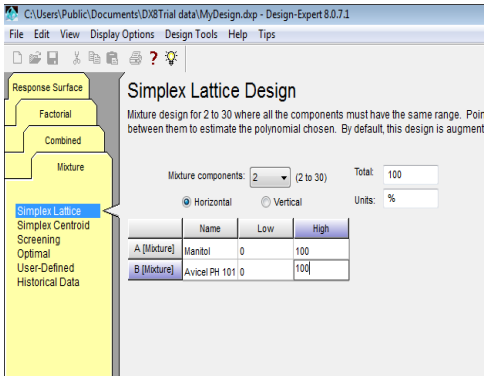

Alat uji waktu hancur

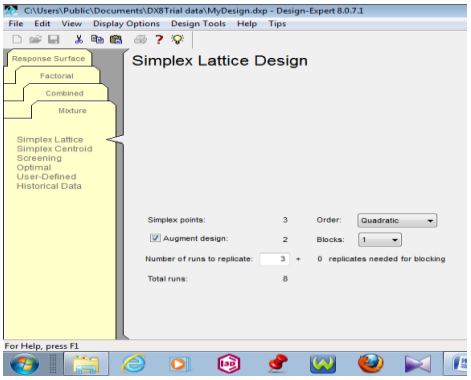
*Dissolution tester*

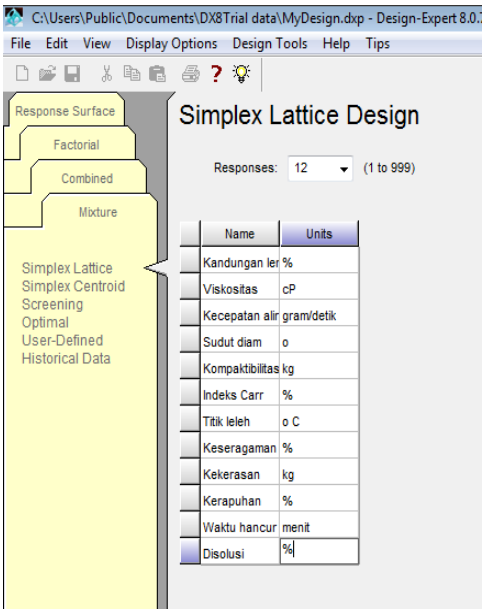
Spektrofotometer UV-Vis

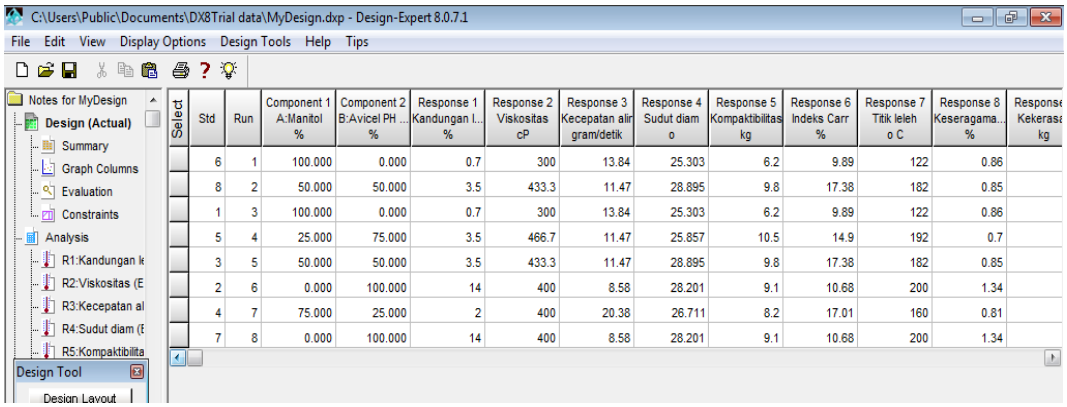


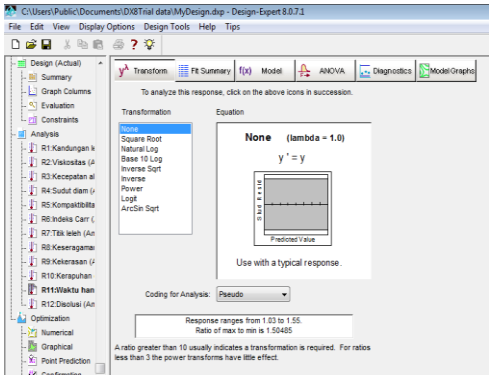
**Lampiran 17. Optimasi *Simplex Lattice Design* dengan *Software* Design Expert versi 8.0.7.1 ®**

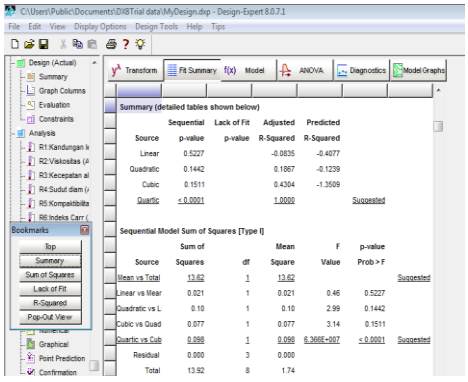


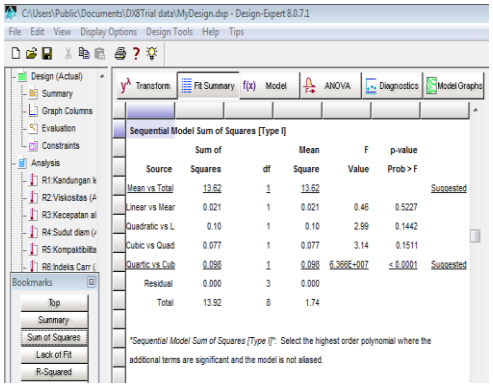



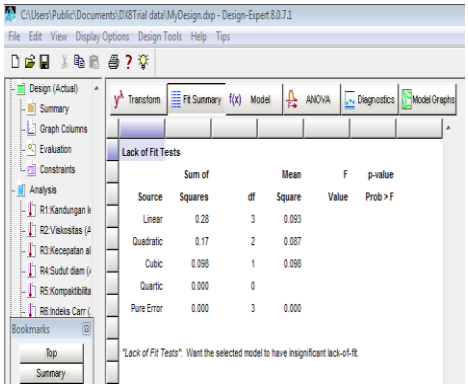



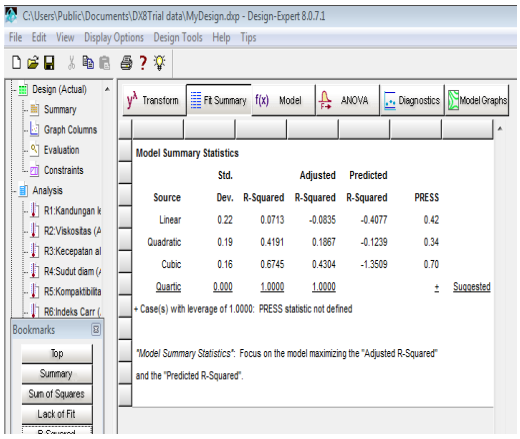

C:\Users\Public\Documents\DX8Trial data\MyDesign.dxp - Design-Expert 8.0.7.1
File Edit View Display Options Design Tools Help Tips
Notes for MyDesign
Design (Actual)
Summary
Graph Columns
Evaluation
Constraints
Analysis
R1:Kandungan k
R2:Viskositas (E
R3:Kecepatan al
R4:Sudut diam (E
R5:Kompaktibilita
Design Tool
Design Layout
Select
Std
Run
Component 1 A:Manitol %
Component 2 B:Avicel PH ... %
Response 1 Kandungan l... %
Response 2 Viskositas cP
Response 3 Kecepatan alir gram/detik
Response 4 Sudut diam o
Response 5 Kompaktibilitas kg
Response 6 Indeks Carr %
Response 7 Titik leleh o C
Response 8 Keseragama... %
Response Kekeras kg
6 1 100.000 0.000 0.7 300 13.84 25.303 6.2 9.89 122 0.86
8 2 50.000 50.000 3.5 433.3 11.47 28.895 9.8 17.38 182 0.85
1 3 100.000 0.000 0.7 300 13.84 25.303 6.2 9.89 122 0.86
5 4 25.000 75.000 3.5 466.7 11.47 25.857 10.5 14.9 192 0.7
3 5 50.000 50.000 3.5 433.3 11.47 28.895 9.8 17.38 182 0.85
2 6 0.000 100.000 14 400 8.58 28.201 9.1 10.68 200 1.34
4 7 75.000 25.000 2 400 20.38 26.711 8.2 17.01 160 0.81
7 8 0.000 100.000 14 400 8.58 28.201 9.1 10.68 200 1.34

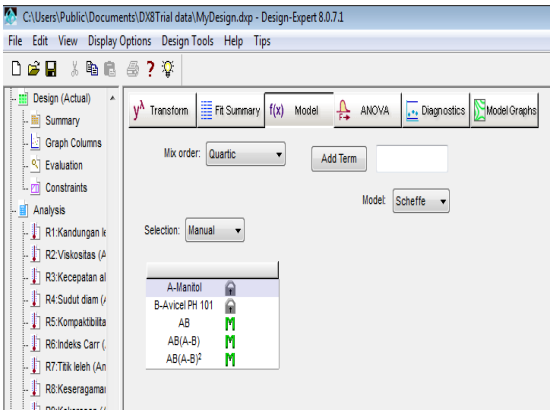

Transform
Fit Summary
Model
ANOVA
Diagnostics
Model Graphs
To analyze this response, click on the above icons in succession.
Transformation
Equation
None
(lambda = 1.0)
y ' = y
Use with a typical response.
Coding for Analysis:
Pseudo
Response ranges from 1.03 to 1.55.
Ratio of max to min is 1.50485
A ratio greater than 10 usually indicates a transformation is required. For ratios less than 3 the power transforms have little effect.

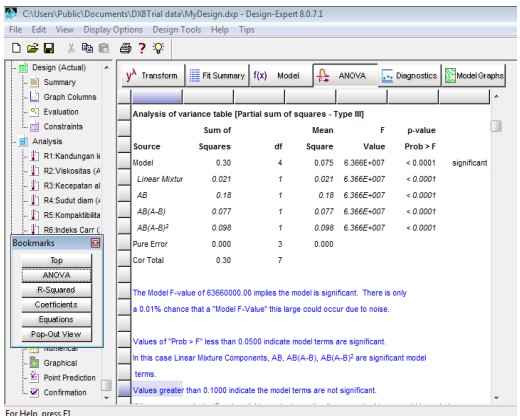

Summary (detailed tables shown below)
Sequential Model Sum of Squares [Type I]
Source
Sequential p-value
Lack of Fit p-value
Adjusted R-Squared
Predicted R-Squared
Linear 0.5227 -0.0835 -0.4077
Quadratic 0.1442 0.1867 -0.1239
Cubic 0.1511 0.4304 -1.3509
Quartic < 0.0001 1.0000 Suggested
Source Sum of Squares df Mean Square F Value p-value Prob > F
Mean vs Total 13.62 1 13.62 Suggested
Linear vs Mean 0.021 1 0.021 0.46 0.5227
Quadratic vs L 0.10 1 0.10 2.99 0.1442
Cubic vs Quad 0.077 1 0.077 3.14 0.1511
Quartic vs Cub 0.098 1 0.098 6.366E+007 < 0.0001 Suggested
Residual 0.000 3 0.000
Total 13.92 8 1.74

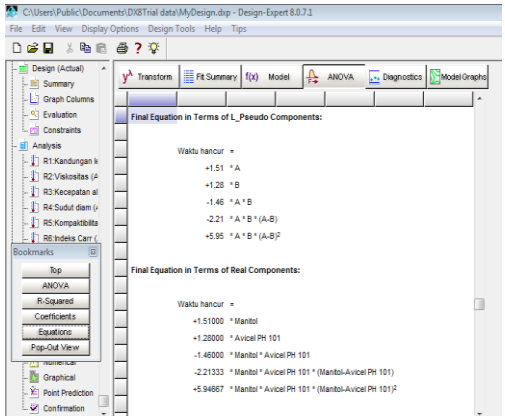

Sequential Model Sum of Squares [Type I]
Source Sum of Squares df Mean Square F Value p-value Prob > F
Mean vs Total 13.62 1 13.62 Suggested
Linear vs Mean 0.021 1 0.021 0.46 0.5227
Quadratic vs L 0.10 1 0.10 2.99 0.1442
Cubic vs Quad 0.077 1 0.077 3.14 0.1511
Quartic vs Cub 0.098 1 0.098 6.366E+007 < 0.0001 Suggested
Residual 0.000 3 0.000
Total 13.92 8 1.74
"Sequential Model Sum of Squares [Type I]": Select the highest order polynomial where the additional terms are significant and the model is not aliased.

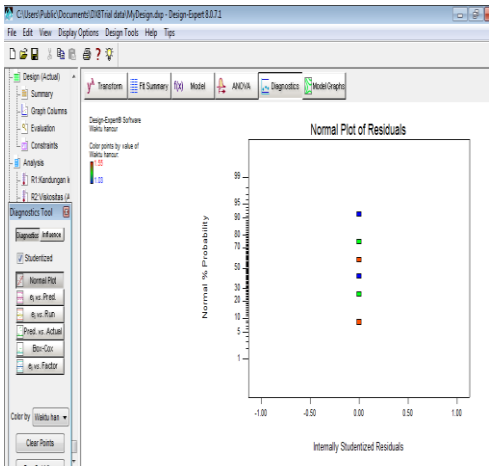

Lack of Fit Tests
Source Sum of Squares df Mean Square F Value p-value Prob > F
Linear 0.28 3 0.093
Quadratic 0.17 2 0.087
Cubic 0.098 1 0.098
Quartic 0.000 0
Pure Error 0.000 3 0.000
"Lack of Fit Tests": Want the selected model to have insignificant lack-of-fit.

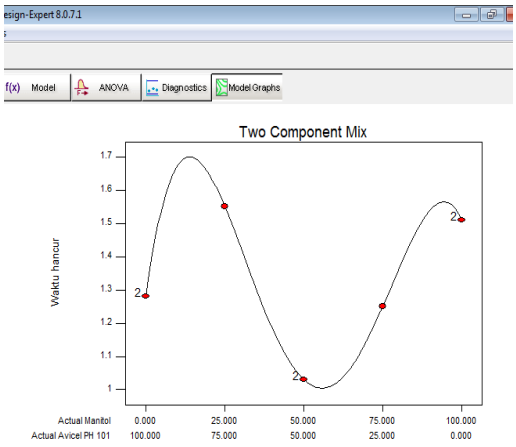

C:\Users\Public\Documents\DX8Trial data\MyDesign.dxp - Design-Expert 8.0.7.1
File Edit View Display Options Design Tools Help Tips
Transform Fit Summary f(x) Model ANOVA Diagnostics Model Graphs
Model Summary Statistics
Source Std. Dev. R-Squared Adjusted R-Squared Predicted R-Squared PRESS
Linear 0.22 0.0713 -0.0835 -0.4077 0.42
Quadratic 0.19 0.4191 0.1867 -0.1239 0.34
Cubic 0.16 0.6745 0.4304 -1.3509 0.70
Quartic 0.000 1.0000 1.0000 + Suggested
+ Case(s) with leverage of 1.0000: PRESS statistic not defined
"Model Summary Statistics": Focus on the model maximizing the "Adjusted R-Squared" and the "Predicted R-Squared".

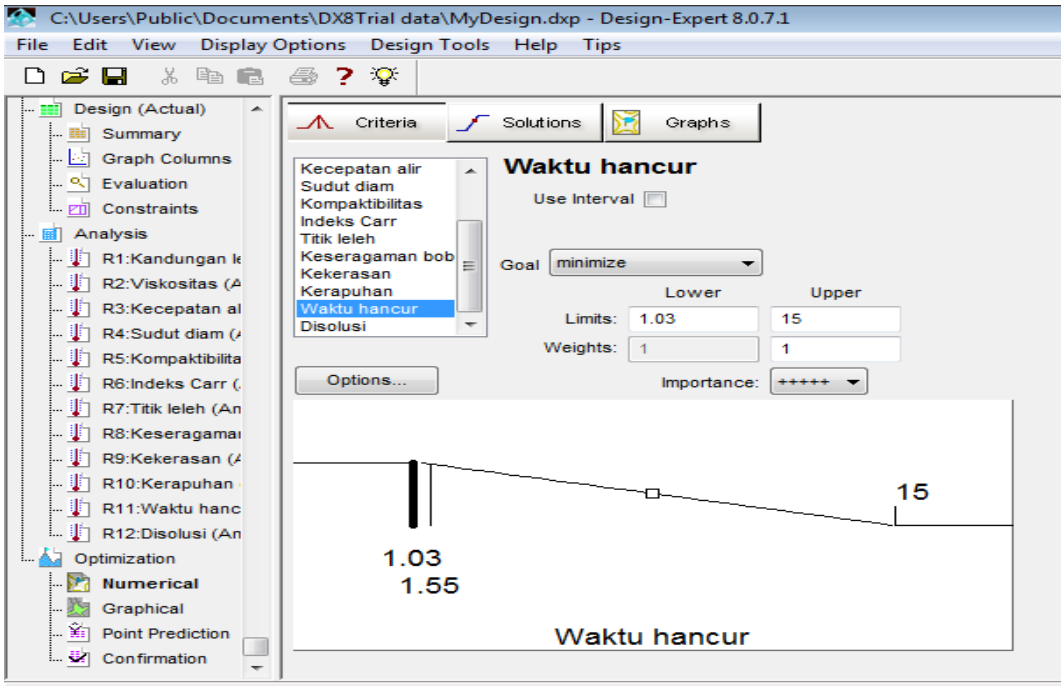

C:\Users\Public\Documents\DX8Trial data\MyDesign.dxp - Design-Expert 8.0.7.1
Transform Fit Summary f(x) Model ANOVA Diagnostics Model Graphs
Mix order: Quartic
Add Term
Model: Scheffe
Selection: Manual
A-Manitol
B-Avicel PH 101
AB
AB(A-B)
AB(A-B)²

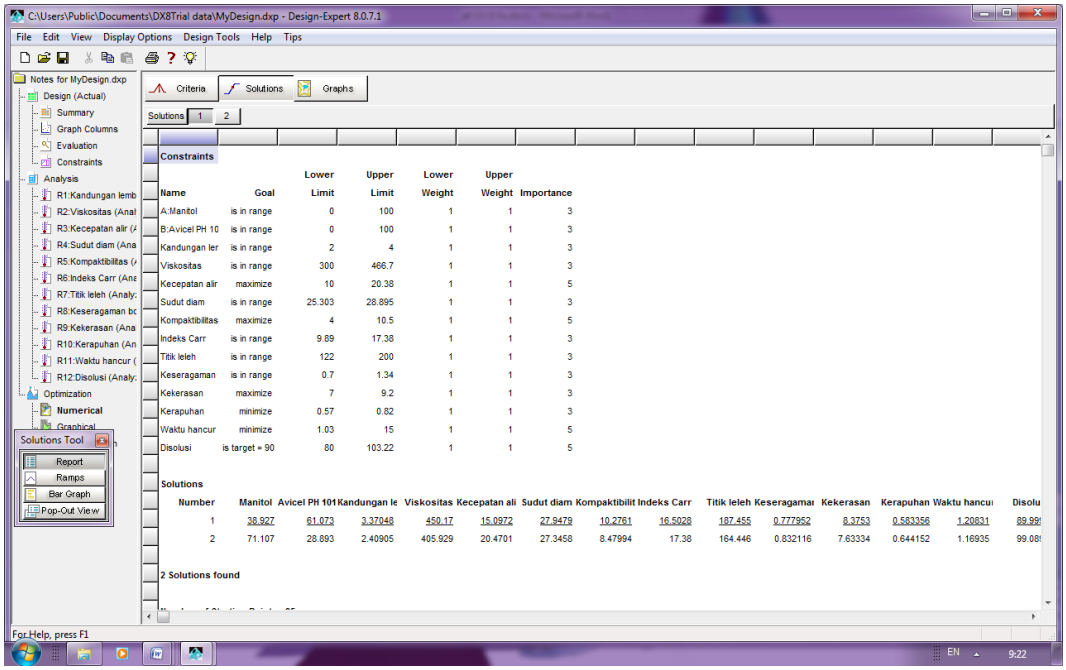

C:\Users\Public\Documents\DX8Trial data\MyDesign.dxp - Design-Expert 8.0.7.1
Transform Fit Summary f(x) Model ANOVA Diagnostics Model Graphs
Analysis of variance table [Partial sum of squares - Type III]
Source Sum of Squares df Mean Square F Value p-value Prob > F
Model 0.30 4 0.075 6.366E+007 < 0.0001 significant
Linear Mixtur 0.021 1 0.021 6.366E+007 < 0.0001
AB 0.18 1 0.18 6.366E+007 < 0.0001
AB(A-B) 0.077 1 0.077 6.366E+007 < 0.0001
AB(A-B)² 0.098 1 0.098 6.366E+007 < 0.0001
Pure Error 0.000 3 0.000
Cor Total 0.30 7
The Model F-value of 63660000.00 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, AB(A-B), AB(A-B)² are significant model terms.
Values greater than 0.1000 indicate the model terms are not significant.


C:\Users\Public\Documents\DX8Trial data\MyDesign.dxp - Design-Expert 8.0.7.1
Transform Fit Summary f(x) Model ANOVA Diagnostics Model Graphs
Final Equation in Terms of L_Pseudo Components:
Waktu hancur =
+1.51 * A
+1.28 * B
-1.46 * A * B
-2.21 * A * B * (A-B)
+5.95 * A * B * (A-B)²
Final Equation in Terms of Real Components:
Waktu hancur =
+1.51000 * Manitol
+1.28000 * Avicel PH 101
-1.46000 * Manitol * Avicel PH 101
-2.21333 * Manitol * Avicel PH 101 * (Manitol-Avicel PH 101)
+5.94667 * Manitol * Avicel PH 101 * (Manitol-Avicel PH 101)²


Normal Plot of Residuals
Normal % Probability
Internally Studentized Residuals


Model ANOVA Diagnostics Model Graphs
Two Component Mix
Waktu hancur
Actual Manitol 0.000 25.000 50.000 75.000 100.000
Actual Avicel PH 101 100.000 75.000 50.000 25.000 0.000


C:\Users\Public\Documents\DX8Trial data\MyDesign.dxp - Design-Expert 8.0.7.1
File Edit View Display Options Design Tools Help Tips
Design (Actual)
Summary
Graph Columns
Evaluation
Constraints
Analysis
Optimization
Numerical
Graphical
Point Prediction
Confirmation
Criteria
Solutions
Graphs
Kecepatan alir
Sudut diam
Kompaktibilitas
Indeks Carr
Titik leleh
Keseragaman bob
Kekerasan
Kerapuhan
Waktu hancur
Disolusi
Waktu hancur
Use Interval
Goal minimize
Lower Upper
Limits: 1.03 15
Weights: 1 1
Options...
Importance: +++++
1.03
1.55
15
Waktu hancur


Constraints
Solutions
Number Manitol Avicel PH 101 Kandungan le Viskositas Kecepatan ali Sudut diam Kompaktibilit Indeks Carr Titik leleh Keseragamai Kekerasan Kerapuhan Waktu hancui
1 38.927 61.073 3.37048 450.17 15.0972 27.9479 10.2761 16.5028 187.455 0.777952 8.3753 0.583356 1.20831
2 71.107 28.893 2.40905 405.929 20.4701 27.3458 8.47994 17.38 164.446 0.832116 7.63334 0.644152 1.16935
2 Solutions found