BAB V
KESIMPULAN DAN SARAN

A. Kesimpulan

1. Kombinasi *superdisintegrant sodium starch glycolate* dan *filler-binder ludipress*® berpengaruh terhadap mutu fisik dan profil disolusi pada sediaan FDT metoklopramid HCl dengan konsentrasi *sodium starch glycolate* yang rendah dan *ludipress*® yang tinggi meningkatkan kekerasan, menurunkan kerapuhan, mempercepat waktu hancur, dan meningkatkan profil disolusi (Q_3 dan DE_3).

2. Komposisi optimum kombinasi *sodium starch glycolate* yaitu pada konsentrasi 2% (3 mg) dan *ludipress*® 58% (87 mg) dalam sediaan FDT metoklopramid terhadap parameter kritis kekerasan, kerapuhan, waktu hancur, dan profil disolusi (Q_3 dan DE_3).

B. Saran

1. Perlu dilakukan penelitian lebih lanjut dalam formula FDT metoklopramid HCl dengan menggunakan *superdisintegrant* dan *filler-binder* lainnya untuk menghasilkan formula tablet dengan waktu disintegrasi yang lebih cepat.

2. Perlu dilakukan metode optimasi formula yang berbeda dalam menganalisis sifat fisik tablet FDT.

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LAMPIRAN

Lampiran 1. Sertifikat analisis metoklopramid HCl

```
xxprrpx.p                          37.8.6 Test result Report (mdf)*                    Date: 25/07/19
  Page:  1                                PHAPROS, PT                                   Time: 11:03:54

Quality Order    Batch    Item Number      Insp Loc Location Procedure      Qty Pending Qty Accepted Qty Rejected Order Date Due Date Eff Date St

BB.17/0308       2099   14313102            PM    gbb    Pemeriksaan BB/BK      20.0       20.0         0.0 06/04/17  14/04/17 10/04/17 c
                        METOCLOPRAMIDE HCL

         Op Number  Characteristic       Actual Results        Specification        Measure    Pass

         200 01    PEMERIAN              sesuai                *                               yes

             02    KELARUTAN             sesuai                *                               yes

             03    IDENTIFIKASI          sesuai                *                               yes

             04    KADAR AIR             5.326                 4.5|5.5              PERSEN      yes

             05    KEMURNIAN KROMATOGRAFI sesuai               SESUAI                           yes

             06    LOGAM BERAT           20                    <=20                 PPM        yes
                        <20

             07    KEJERNIHAN & WARNA    sesuai                SESUAI                           yes

             08    ABU SULFAT            0                     <=0.1                PERSEN      yes

             09    KADAR                 99.5                  99.0|101.0           PERSEN      yes

             101   PETUGAS SAMPLING      san                   *                               yes

             102   PEMERIKSA             an,av                 *                               yes

             103   CATATAN               -                     *                               yes
```

Lampiran 2. Sertifikat analisis *sodium starch glycolate*

spectrum®
CHEMICAL MFG CORP

Certificate Of Analysis

Item Number	S1962		Lot Number	1HE0090
Item	Sodium Starch Glycolate, pH 5.5-7.5, Type A, NF			
CAS Number	9063-38-1			
Molecular Formula			Molecular Weight	

Test	Specification		Result
	min	max	
SODIUM (Na; ALCOHOL-WASHED, DRIED BASIS)	2.8	4.2%	3.0 %
pH (1g in 30ml of Water)	5.5	7.5	5.8
MICROBIAL LIMITS	TO PASS TEST		PASSES TEST
LOSS ON DRYING		10.0%	7.2 %
IRON (Fe)		0.002%	<0.002 %
SODIUM CHLORIDE		7.0 %	4.1 %
SODIUM GLYCOLATE		2.0%	<2.0 %
ELEMENTAL IMPURITIES	AS REPORTED		NO ELEMENTAL IMPURITIES PRESENT
IDENTIFICATION	TO PASS TEST		PASSES TEST
EXPIRATION DATE			30-NOV-2019
DATE OF MANUFACTURE			23-DEC-2017
APPEARANCE			WHITE FREE FLOWING POWDER
RESIDUAL SOLVENTS	TO PASS TEST		NO RESIDUAL SOLVENTS USED

Spectrum Chemical Mfg Corp
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Gardena 90248 CA

Certificate of Analysis Results Certified By:

Adan Hernandez
Quality Control Manager
Spectrum Chemicals & Laboratory Products

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Read and understand label and SDS before handling any chemicals. All Spectrum's chemicals are for manufacturing, processing, repacking or research purposes by experienced personnel only. It is the customer's responsibility to provide adequate hazardous material training and ensure that appropriate Personal Protective Equipment (PPE) is used before handling any chemical.

Lampiran 3. Sertifikat analisis *ludipress*®

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12940 Jakarta

Indonesia

2018-10-12
ENO/QA
Hr. Dr. Florian Wildschek
florian.wildschek@basf.com
Certificate No 5231
Page 1 of 3

Inspection Certificate 3.1 according to EN 10204

Ludipress®

1KG Plastic bottle
Purchase Order/Customer Product#
4946995595
000000000050015498

Material	50015498
Order	3015046792 000010
Delivery	3190910640 000010
Lot	13781024U0
Lot/Qty	2.000 KG
Total	2.000 KG

Test Parameter	Requirements	UoM	Results
Appearance	white, freeflowing powder		conforms
Soluble PVP (photometr.)	Min.: 3.0 Max.: 4.0	g/100g	3.8
Insoluble PVP (gravimetr.)	Min.: 3.0 Max.: 4.0	g/100g	3.3
Water (Karl-Fischer-Titr.)	Max.: 6.0	g/100g	5.7
Heavy Metals	Max.: 10	mg/kg	max. 10
Lactose Monohydrate (polarim.)	Min.: 91.1 Max.: 94.9	g/100g	92.8
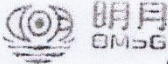
The aforementioned data shall constitute the agreed contractual quality of the product at the time of passing of risk. The data are controlled at regular intervals as part of our quality assurance program. Neither these data nor the properties of product specimens shall imply any legally binding guarantee of certain properties or of fitness for a specific purpose. No liability of ours can be derived therefrom.

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Lampiran 4. Sertifikat analisis manitol

地址：青岛市黄岛区明月路777号　　　　邮编：266400
记录编号：09SM02027-R06(02)

青岛明月海藻集团有限公司
甘露醇检验报告
QINGDAO BRIGHT MOON SEAWEED GROUP CO.,LTD
MANNITOL INSPECTION REPORT

产品名称 Product Name	甘露醇 MANNITOL	产品规格 Specifications		药用辅料 （Pharmaceutical excipients）
生产批号 Batch No.	H361812023	批量.kg Quantity		15000
包装规格 Packing Size	25kg/纸板桶/铝箔袋 drums/bags	生产日期 Production Date		12/24/2018
检验日期 Test Date	12/28/2018	有效期 Valid Date		12/23/2021
性状,Characters	白色结晶性粉末,无臭，味甜.White crystalline powder,odorless;taste,sweetish.			

	项目 (Item)	标准要求 (Standard)	检测结果 (Test Result)	检测依据 (Testing grounds)	单项判定 (Individual decision)
	鉴别(Identification)	Be consistent with the refer	Be consistent with the refer	USP41	qualified
	澄清度与颜色(Clarity&Colour)	Clear and Colorless	Clear and Colorless	USP41	qualified
	干燥失重(Loss On Drying),%	≤0.5	0.040	USP41	qualified
	镍（Nickel），ppm	≤1.0	未检出 (LOD=0.036）	USP41	qualified
	山梨糖醇（Sorbitol）,%	≤2.0	0.04	USP41	qualified
检测结果 Test Result	麦芽糖醇和异麦芽糖醇 （Maltitol and Isomalt）,%	≤2.0	0.02	USP41	qualified
	不确定杂质,% （Unspecifiedimpurities）	≤0.1	0.074	USP41	qualified
	总杂质（Total impurities）,%	≤2.0	0.13	USP41	qualified
	含量(Assay),%	97.0-102.0	99.80	USP41	qualified
	熔点(Melting Point),℃	165.0-170.0	166.5-167.5	USP41	qualified
	还原糖(Reducing Sugar),%	≤0.1	<0.1	USP41	qualified
	电导率（Conductivity），μS/cm	≤20	1.45	USP41	qualified
	需氧菌总数（Total aerobic bacteria），CFU/g	≤1000	≤10	USP41	qualified
	霉菌和酵母菌（Mold and yeast），CFU/g	≤100	≤10	USP41	qualified
	大肠杆菌（Escherichia coli)	Negative	Negative	USP41	qualified

日期　Date	检验报告出具日期：2019.01.04 签发日期(Issue date):2019.01.04　检验报告专用章(Seal)
备注 Remarks	

批(Approved by)：　　　　　审核(Checked by)：　　　　　编制(Edited by)：

Lampiran 5. Pemeriksaan sifat serbuk tablet

a. Waktu alir

Replikasi	Waktu alir		
	formula 1	formula 2	formula 3
1	0.71	0.75	0.79
2	0.72	0.75	0.8
3	0.71	0.76	0.78
rata-rata	0.71	0.75	0.79
SD	0.005774	0.005774	0.01

b. Sudut diam

Formula 1	Tinggi	Diameter	Sudut Diam
	2.15	8.5	26.83
	2.13	8.5	26.62
	2.1	8.3	26.84
Rata-rata	2.13	8.43	26.76
SD			0.13

Formula 2	Tinggi	Diameter	Sudut Diam
	2.21	8.15	28.47
	2.2	8.2	28.22
	2.18	8.18	28.06
Rata-rata	2.20	8.18	28.25
SD			0.21

Formula 3	Tinggi	Diameter	Sudut Diam
	2.28	7.8	30.31
	2.25	7.75	30.14
	2.3	7.85	30.37
Rata-rata	2.28	7.8	30.27
SD			0.12

- Contoh perhitungan (formula 1 replikasi 1) :

Tan Ө = h/r

Tan Ө = 2.15/4.25

Tan Ө = 0.5059

Ө = 26.83

Keterangan :

Ө : sudut diam

h : tinggi tumpukan serbuk

r : jari-jari serbuk

c. *Bulk density, tapperd density, hausner ratio,* dan *carr's index*

Formula 1				
Bobot Serbuk (mg)	bulk density (g/mL)	Tapped Density (g/mL)	hausner ratio (g/mL)	carr's index (%)
22.567	0.68	0.75	1.103	9.33
22.565	0.7	0.78	1.114	10.26
22.560	0.7	0.78	1.114	10.26
Rata-rata	0.69	0.77	1.111	9.95
SD	0.012	0.017	0.007	0.53

Formula 2				
Bobot Serbuk (mg)	Bulk density (g/mL)	Tapped density (g/mL)	Hausner ratio (g/mL)	Carr's index (%)
19.462	0.78	0.85	1.090	8.24
19.460	0.78	0.85	1.090	8.24
19.457	0.81	0.88	1.086	7.95
Rata-rata	0.79	0.86	1.089	8.14
SD	0.017	0.017	0.002	0.16

Formula 3				
Bobot Serbuk (mg)	Bulk density (g/mL)	Tapped density (g/mL)	Hausner ratio (g/mL)	Carr's index (%)
21.06	0.7	0.75	1.071	6.67
21.021	0.7	0.78	1.114	10.26
20.010	0.69	0.74	1.072	6.76
Rata-rata	0.70	0.76	1.086	7.89
SD	0.006	0.021	0.024	2.05

Contoh perhitungan (formula 1 replikasi 1) :

- Bulk density

Pb = M / Vb

Pb = 22.567 / 33

Pb = 0.68

Keterangan :

Pb : bulk density

M : bobot serbuk

Vb : Volume bulk

- Tapped density

$C = M / V_t$

$D_t = 22.567 / 30$

$D_t = 0.75$

Keterangan :

D_t : tapped density

M : massa

V_t : volume serbuk setelah tapped

- Hausner ratio

$Hausner\ ratio = \frac{Tapped\ Volume}{Bulk\ Density}$

$$= \frac{0.75}{0.68} = 1.103$$

- Carr's index

$Carr's\ index = 100\%\ \text{x}\ \dfrac{Tapped\ Volume-bulk\ density}{Tapped\ Density}$

$$= 100\%\ \text{x}\ \dfrac{0.75-0.68}{0.75}$$

$$= 9.33\%$$

Lampiran 6. Kekerasan tablet

a. Hasil data

Replikasi	Run	Formula		
		FI	FII	FIII
1	1	3.95	3.86	3.85
	2	3.87	3.99	3.81
	3	3.83	3.72	3.73
	4	3.71	3.81	3.79
	5	3.73	3.88	3.85
	6	3.78	3.92	3.9
	7	3.9	3.64	3.69
	8	4.08	3.72	3.71
	9	3.75	3.9	3.65
	10	4.15	3.73	3.7
2	1	3.87	3.77	3.68
	2	3.83	3.96	3.85
	3	3.76	3.69	3.67
	4	3.81	3.75	3.81
	5	3.76	3.82	3.8
	6	3.79	3.9	3.78
	7	3.85	3.7	3.89
	8	3.73	3.71	3.75
	9	3.77	3.96	3.65
	10	4.11	3.85	3.7
3	1	3.86	3.75	3.873
	2	4.02	3.9	3.81
	3	3.91	3.73	3.86
	4	3.83	3.79	3.79
	5	3.67	3.73	3.85
	6	3.81	3.88	3.9
	7	3.78	3.9	3.71
	8	3.82	3.75	3.71
	9	3.7	3.95	3.77
	10	4.11	3.84	3.7
	Rata-rata	3.851333	3.81666	3.774433
	SD	0.128459	0.09625	0.078635

b. Perhitungan *simplex lattice design*

- A = 0

  B = 1

  Y = a (A) + b (B) + ab (A) (B)

  3.85 = a (0) + b (1) + ab (0) (1)

  b = 3.85

- A = 1

  B = 0

  Y = a (A) + b (B) + ab (A) (B)

  3.77 = a (1) + b (0) + ab (1) (0)

  a = 3.77

- A = 0.5

  B = 0.5

  Y = a (0.5) + b (0.5) + ab (A) (B)

  3.82 = 3.85 (0.5) + 3.77 (0.5) + ab (0.5) (0.5)

  ab = 0.04

c. Hasil ANOVA *simplex lattice design*

ANOVA for Linear model

Response 1: Kekerasan

Source	Sum of Squares	df	Mean Square	F-value	p-value	
Block	0.0002	1	0.0002			
Model	0.0095	1	0.0095	47.16	0.0005	significant
⁽¹⁾Linear Mixture	0.0095	1	0.0095	47.16	0.0005	
Residual	0.0012	6	0.0002			
Lack of Fit	4.154E-06	1	4.154E-06	0.0173	0.9004	not significant
Pure Error	0.0012	5	0.0002			

Fit Statistics

Std. Dev.	0.0142	R²	0.8871
Mean	3.81	Adjusted R²	0.8683
C.V. %	0.3716	Predicted R²	NA⁽¹⁾
		Adeq Precision	10.7747

⁽¹⁾ Case(s) with leverage of 1.0000: Pred R² and PRESS statistic not defined.

Component Effects (Cox)

Component	Gradient in Reals	Component Effect	Gradient Std Error	Approx t for H₀ Gradient=0	Prob > |t|
A-Ludipress	0.8810	0.0881	0.1249	7.05	0.0004
B-SSG	-0.8810	-0.0881	0.1321	-6.67	0.0006

Coefficients in Terms of Coded Factors

Component	Coefficient Estimate	df	Standard Error	95% CI Low	95% CI High	VIF
Block 1	-0.0167	1				
Block 2	0.0167					
A-Ludipress	3.87	1	0.0119	3.84	3.90	2.64
B-SSG	3.78	1	0.0083	3.76	3.80	1.30

The coefficient estimate represents the expected change in response per unit change in factor value when all remaining factors are held constant. The intercept in an orthogonal design

Lampiran 7. Kerapuhan tablet

a. Hasil data

Replikasi	Formula **1**		
	Sebelum	Sesudah	% Kerapuhan
1	3.5575	3.5241	0.9388
2	3.5612	3.5272	0.9547
3	3.5891	3.555	0.9500
Rata-rata			0.9478
SD			0.008

Replikasi	Formula 2		
	Sebelum	Sesudah	% Kerapuhan
1	3.5574	3.5229	0.9698
2	3.5663	3.5319	0.9645
3	3.5942	3.5592	0.9737
Rata-rata			0.9693
SD			0.004

Replikasi	Formula 3		
	Sebelum	Sesudah	%kerapuhan
1	3.5571	3.5220	0.9867
2	3.5624	3.5270	0.9937
3	3.5888	3.5549	0.9446
Rata-rata			0.9750
SD			0.026

Contoh perhitungan % kerapuhan (formula 1 replikasi 1)

$$F = \frac{(Wo\ initial)-(wfinal)}{(wo\ initial)} \times 100$$

$$F = \frac{(3.5575)-(3.5241)}{(3.5575)} \times 100$$

$$F = 0.9388\ \%$$

Keterangan :

F = kerapuhan tablet

Wo initial = bobot mula-mula

Wo final = bobot setelah pengujian

b. Perhitungan *simplex lattice design*
- A = 0

  B = 1

  Y = a (A) + b (B) + ab (A) (B)

  0.943= a (0) + b (1) + ab (0) (1)

  b   = 0.948

- A = 1

  B = 0

  Y = a (A) + b (B) + ab (A) (B)

  0.970 = a (1) + b (0) + ab (1) (0)

  a   = 0.970

- A = 0.5

  B = 0.5

  Y = a (0.5) + b (0.5) + ab (A) (B)

  0.969 = 0.943 (0.5) + 0.970 (0.5) + ab (0.5) (0.5)

  ab   = 0.05

c. Hasi ANOVA

	Transform		Fit Summary		Model		ANOVA		Diagnostics		Model Graphs

Analysis of Variance

Response 2: Kerapuhan

Source	Sum of Squares	df	Mean Square	F-value	p-value	
Block	0.0005	1	0.0005			
Model	0.0018	1	0.0018	58.59	0.0003	significant
(1)Linear Mixture	0.0018	1	0.0018	58.59	0.0003	
Residual	0.0002	6	0.0000			
Lack of Fit	1.282E-06	1	1.282E-06	0.0350	0.8590	not significant
Pure Error	0.0002	5	0.0000			
Cor Total	0.0025	8				

Fit Statistics | Model Comparison Statistics

Fit Statistics

Std. Dev.	0.0055	**R²**	0.9071
Mean	0.9611	**Adjusted R²**	0.8916
C.V. %	0.5771	**Predicted R²**	NA(1)
		Adeq Precision	14.1713

(1) Case(s) with leverage of 1.0000: Pred R² and PRESS statistic not defined.

Component Effects (Cox) | Component Effects (Piepel) | Base Point

Component Effects (Cox)

Component	Gradient in Reals	Component Effect	Gradient Std Error	Approx t for H₀ Gradient=0	Prob > |t|
A-Ludipress	-0.3846	-0.0385	0.0489	-7.86	0.0002
B-SSG	0.3846	0.0385	0.0517	7.43	0.0003

β Coefficients | Coded Equation | Real Equation | Actual Equation

Coefficients in Terms of Coded Factors

Component	Coefficient Estimate	df	Standard Error	95% CI Low	95% CI High	VIF
Block 1	0.0227	1				
Block 2	-0.0227					
A-Ludipress	0.9242	1	0.0047	0.9128	0.9356	2.64
B-SSG	0.9627	1	0.0033	0.9547	0.9707	1.30

The coefficient estimate represents the expected change in response per unit change in factor value when all remaining factors are held constant. The intercept in an orthogonal design

Lampiran 8. Waktu hancur

a. Hasil data

Replikasi	Waktu hancur (detik)		
	F1	F2	F3
R1	32.16	38.55	46.04
R2	34.23	40.11	43.62
R3	30.46	36.3	48.19
Rata-rata	32.28	38.32	45.95
SD	1.888	1.915	2.286

b. Perhitungan *simplex lattice design*
- A = 0

  B = 1

  Y = a (A) + b (B) + ab (A) (B)

  32.28 = a (0) + b (1) + ab (0) (1)

  b   = 32.28

- A = 1

  B = 0

  Y = a (A) + b (B) + ab (A) (B)

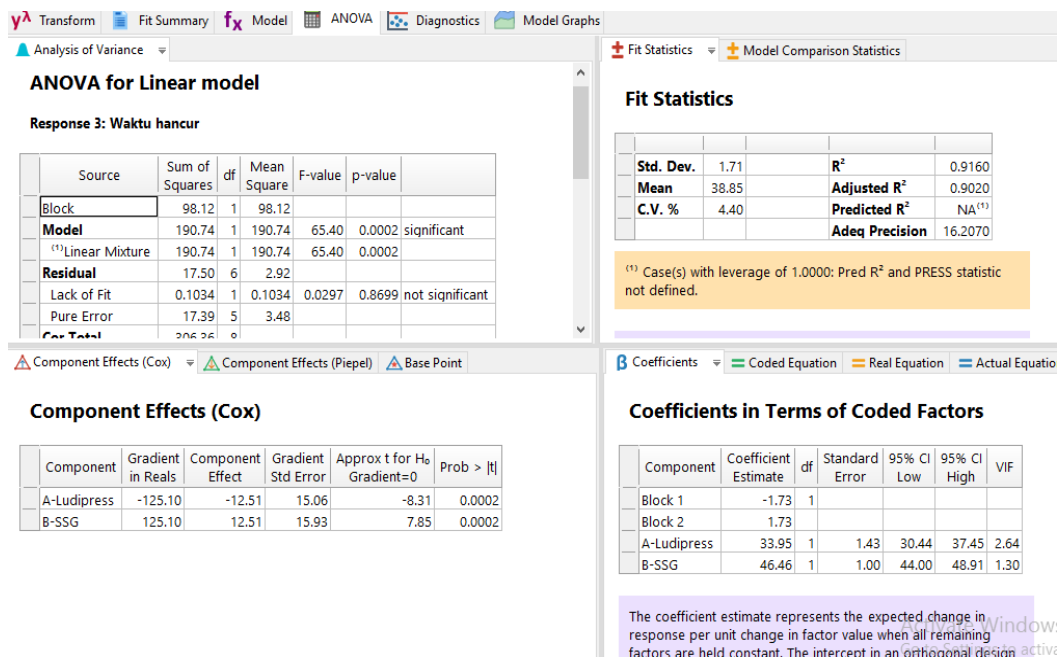 45.95   = a (1) + b (0) + ab (1) (0)

  a   = 45.95

- A = 0.5

  B = 0.5

  Y = a (0.5) + b (0.5) + ab (A) (B)

  38.32= 32.28 (0.5) + 45.92 (0.5) + ab (0.5) (0.5)

  ab   = 3.18

c. Hasil ANOVA

Analysis of Variance

ANOVA for Linear model

Response 3: Waktu hancur

Source	Sum of Squares	df	Mean Square	F-value	p-value	
Block	98.12	1	98.12			
Model	190.74	1	190.74	65.40	0.0002	significant
[1]Linear Mixture	190.74	1	190.74	65.40	0.0002	
Residual	17.50	6	2.92			
Lack of Fit	0.1034	1	0.1034	0.0297	0.8699	not significant
Pure Error	17.39	5	3.48			
Cor Total	306.36	8				

Fit Statistics

Std. Dev.	1.71		**R²**	0.9160
Mean	38.85		**Adjusted R²**	0.9020
C.V. %	4.40		**Predicted R²**	NA[1]
			Adeq Precision	16.2070

[1] Case(s) with leverage of 1.0000: Pred R² and PRESS statistic not defined.

Component Effects (Cox) | Component Effects (Piepel) | Base Point

Component Effects (Cox)

Component	Gradient in Reals	Component Effect	Gradient Std Error	Approx t for H₀ Gradient=0	Prob > |t|
A-Ludipress	-125.10	-12.51	15.06	-8.31	0.0002
B-SSG	125.10	12.51	15.93	7.85	0.0002

β Coefficients | Coded Equation | Real Equation | Actual Equation

Coefficients in Terms of Coded Factors

Component	Coefficient Estimate	df	Standard Error	95% CI Low	95% CI High	VIF
Block 1	-1.73	1				
Block 2	1.73					
A-Ludipress	33.95	1	1.43	30.44	37.45	2.64
B-SSG	46.46	1	1.00	44.00	48.91	1.30

The coefficient estimate represents the expected change in response per unit change in factor value when all remaining factors are held constant. The intercept in an orthogonal design

Lampiran 9. Waktu pembasahan

Replikasi	Waktu pembasahan (detik)		
	F1	F2	F3
R1	72.21	69.13	64.22
R2	72.96	68.94	65.53
R3	73.40	69.25	64.88
Rata-rata	72.85	69.106	64.87
SD	0.491	1.915	0.534

Lampiran 10. Tanggap rasa dan waktu hancur *in vivo*

    a. Lembar kuisioner

LEMBAR KUISIONER TANGGAP RASA *FAST DISINTEGRATING TABLET* METOKLOPRAMID HCl

Petunjuk pengisian :

1. Mengisi identitas diri pada tempat yang disediakan.
2. Cobalah satu formula *fast disintegrating tablet* yang sebelumnya berkumur terlebih dahulu dengan air putih, kemudian masukkan tablet ke dalam mulut dan biarkan tablet larut sendiri dan bercampur dengan saliva di dalam mulut, lalu coba formula berikutnya dengan cara yang sama.
3. Isilah penilaian anda pada kolom di bawah ini :

Identitas responden

  Nama   :

  Usia   :

Formula	Rasa tablet/detik		
	Manis	**Agak pahit**	**Pahit**
F1			
F2			
F3			

4. Berikan penilaian dengan memberi tanda centang (√) pada form.

b. Data kuisioner

No	Nama responden	Tablet formula 1		Tablet formula 2		Tablet formula 3	
		Rasa	Waktu hancur (detik)	Rasa	Waktu hancur (detik)	Rasa	Waktu hancur (detik)
1	Diah Ayu	2	35.26	2	40.17	2	46.73
2	Rizky Perdana	3	34.76	3	39.77	3	45.87
3	Ary Krisna	2	33.48	2	38.83	2	47.69
4	Ismin Yulianti	2	32.11	2	39.34	2	45.32
5	Yurita	3	34.24	3	41.79	3	47.18
6	Rintya	2	32.87	2	39.63	2	47,34
7	Siti	2	34.69	2	38.37	2	45.61
8	Hanifah	2	33.49	2	40.65	2	47.70
9	Yuli Edi	3	34.12	3	40.88	3	46.33
10	Annisa	2	31.28	2	38.21	2	47.59
11	Eli	2	34.95	2	39.42	2	49.21
12	Sonia	3	33.65	3	41.76	3	46.68
13	Asis	2	35.26	2	40.75	2	47.22
14	Echy	3	33.82	3	39.88	3	48.85
15	Fatma	2	34.08	2	40.74	2	47.24
16	Januariska	2	34.47	2	39.73	2	48.54
17	Melisa	2	35.50	2	40.92	2	48.66
18	Indah	2	35.72	2	39.69	2	47.39
19	Adel	3	34.63	3	40.21	3	48.27
20	Githa	2	35.15	2	41.65	2	46.11
Total dan rata-rata		0% manis 70% agak pahit 30% pahit	34.17 ± 1.13	0% manis 70% agak pahit 30% pahit	40.11 ± 1.03	0% manis 70% agak pahit 30% pahit	47.27 ± 1.09

Keterangan :

1 : Manis

2 : Agak pahit

3 : Pahit

Lampiran 11. Q_3 dan DE_3

a. Hasil disolusi

	Formula 1			
	Waktu (detik)			
	0.5	1	2	3
	40.6652	70.8022	81.8362	99.1177
	39.4054	72.0494	82.3401	97.6236
	38.3976	72.7952	83.8493	98.4021
Rata-rata	39.4894	71.8823	82.6752	98.3811
SD	1.1361313	1.006957007	1.04755043	0.747270636

	Formula 2			
	Waktu (detik)			
	0.5	1	2	3
	18.9972	24.7302	61.0048	93.9224
	18.4933	27.7486	61.7858	95.22
	19.5011	29.0184	62.5644	94.2323
Rata-rata	18.9972	27.1657	61.7850	94.4582
SD	0.5039	2.202717634	0.77980031	0.677662042

	Formula 3			
	Waktu (detik)			
	0.5	1	2	3
	11.9427	23.9038	51.6044	84.3474
	13.2023	24.9342	53.1388	83.2648
	12.9504	26.4334	51.6397	82.7609
Rata-rata	12.6985	25.0871	52.1276	83.4244
SD	0.6665	1.2726	0.8758	0.7559

b. Hasil DE_3

	DE_3 (%)		
	F1	F2	F3
	91.03525	60.44988	52.27877
	91.06296	61.97951	53.36245
	91.93136	62.75328	53.03127
Rata-rata	91.34319	61.72756	52.89083
SD	0.509559	1.172187	0.555323

c. Perhitungan *simplex lattice design* Q_3

- A = 0

  B = 1

  Y = a (A) + b (B) + ab (A) (B)

  98.38= a (0) + b (1) + ab (0) (1)

  b　　= 98.38

- A = 1

  B = 0

  Y = a (A) + b (B) + ab (A) (B)

  83. 42 = a (1) + b (0) + ab (1) (0)

  a　　= 83.42

- A = 0.5

  B = 0.5

  Y = a (0.5) + b (0.5) + ab (A) (B)

  94.45　 = 98.38 (0.5) + 83.42 (0.5) + ab (0.5) (0.5)

  ab　　= 14.2

d. Perhitungan *simplex lattice design* DE$_3$

- A = 0
  B = 1

  Y = a (A) + b (B) + ab (A) (B)

  91.34   = a (0) + b (1) + ab (0) (1)

   b   = 91.34

- A = 1

  B = 0

  Y = a (A) + b (B) + ab (A) (B)

  52.89 = a (1) + b (0) + ab (1) (0)

   a   = 52.89

- A = 0.5

  B = 0.5

  Y = a (0.5) + b (0.5) + ab (A) (B)

  61.72= 91.34 (0.5) + 52.89 (0.5) + ab (0.5) (0.5)

   ab   = 41.64

ANOVA for Quadratic model

Response 4: Q3

Source	Sum of Squares	df	Mean Square	F-value	p-value	
Block	97.87	1	97.87			
Model	263.63	2	131.82	261.75	< 0.0001	significant
(1) Linear Mixture	242.42	1	242.42	481.37	< 0.0001	
AB	21.21	1	21.21	42.12	0.0013	
Pure Error	2.52	5	0.5036			
Cor Total	364.02	8				

(1) Inference for linear mixtures uses Type I sums of squares.

Mixture Component coding is **L_Pseudo**.
Sum of squares is **Type III - Partial**

The **Model F-value** of 261.75 implies the model is significant. There is only a 0.01% chance that an F-value this large could occur due to noise.

P-values less than 0.0500 indicate model terms are significant. In this case A, B, 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.

Hasil ANOVA Q_3

Fit Statistics

Std. Dev.	0.7097	R²	0.9905
Mean	92.09	Adjusted R²	0.9868
C.V. %	0.7706	Predicted R²	NA(1)
		Adeq Precision	33.0167

(1) Case(s) with leverage of 1.0000: Pred R² and PRESS statistic not defined.

β Coefficients ▽ = Coded Equation = Real Equation = Actual Equation

Coefficients in Terms of Coded Factors

Component	Coefficient Estimate	df	Standard Error	95% CI Low	95% CI High	VIF
Block 1	0.4976	1				
Block 2	-0.4976					
A-Ludipress	97.88	1	0.5973	96.35	99.42	2.66
B-SSG	83.26	1	0.4346	82.14	84.38	1.41
AB	13.56	1	2.09	8.19	18.93	1.62

The coefficient estimate represents the expected change in

Activate Windows

e. Hasil ANOVA DE_3

ANOVA for Quadratic model

Response 5: DE3

Source	Sum of Squares	df	Mean Square	F-value	p-value	
Block	278.02	1	278.02			
Model	2168.03	2	1084.02	1304.53	< 0.0001	significant
(1) Linear Mixture	1972.45	1	1972.45	2373.70	< 0.0001	
AB	195.58	1	195.58	235.36	< 0.0001	
Pure Error	4.15	5	0.8310			
Cor Total	2450.20	8				

(1) Inference for linear mixtures uses Type I sums of squares.

Mixture Component coding is **L_Pseudo**.
Sum of squares is **Type III - Partial**

The **Model F-value** of 1304.53 implies the model is significant. There is only a 0.01% chance that an F-value this large could occur due to noise.

P-values less than 0.0500 indicate model terms are significant. In this case A, B, 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.

Fit Statistics

Std. Dev.	0.9116	R²	0.9981
Mean	68.61	Adjusted R²	0.9973
C.V. %	1.33	Predicted R²	NA(1)
		Adeq Precision	63.5927

(1) Case(s) with leverage of 1.0000: Pred R² and PRESS statistic not defined.

β Coefficients ▽ = Coded Equation = Real Equation = Actual Equation

Coefficients in Terms of Coded Factors

Component	Coefficient Estimate	df	Standard Error	95% CI Low	95% CI High	VIF
Block 1	-0.0967	1				
Block 2	0.0967					
A-Ludipress	91.44	1	0.7672	89.47	93.41	2.66
B-SSG	52.79	1	0.5582	51.36	54.23	1.41
AB	-41.17	1	2.68	-48.07	-34.27	1.62

Activate Windows

The coefficient estimate represents the expected change in

Lampiran 12. Kurva baku

a. Pembuatan larutan baku metoklopramid HCl

Larutan baku 113 ppm dibuat dengan menimbang sebanyak 11,3 mg dan dimasukkan dalam labu tentukur 100 mL dan tambahkan *aquadestillata* sampai tanda batas.

- Perhitungan bahan :

    Kertas kosong : 0,5695 gram

    Zat aktif   : 0,01 gram

    Kertas + zat aktif : 0,5814 gram

    Sisa pada kertas : 0,5701

    Zat aktif = (kertas + zat aktif) − (sisa pada kertas)

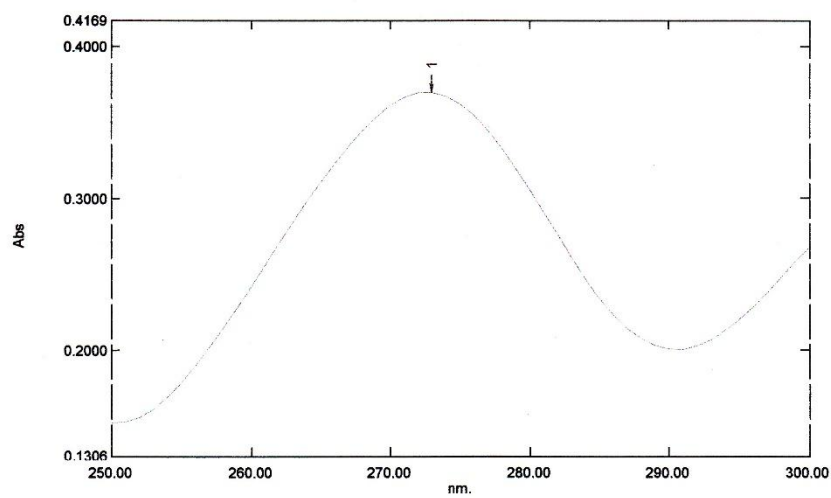 $= 0,5814 - 0,5701$

    $= 0.0113$ gram

    $= 11,3$ mg/100 mL

    $= 113$ ppm

b. Panjang gelombang maksimum

Spectrum Peak Pick Report

09/16/2019 11:25:10 AM

Data Set: File_190916_112250 - RawData

No.	P/V	Wavelength	Abs.	Description
1	●	273.00	0.3698	
2	⊕	291.00	0.2005	

[Measurement Properties]
Wavelength Range (nm.):   250.00 to 300.00
Scan Speed: Medium
Sampling Interval: 1 0
Auto Sampling Interval: Disabled
Scan Mode: Single

[Instrument Properties]
Instrument Type: UV-1800 Series
Measuring Mode: Absorbance
Slit Width: 1.0 nm
Light Source Change Wavelength: 340.0 nm
S/R Exchange: Normal

[Attachment Properties]
Attachment: None

[Operation]
Threshold: 0.0010000
Points: 4
InterPolate: Disabled
Average: Disabled

[Sample Preparation Properties]
Weight:
Volume:
Dilution:
Path Length:
Additional Information:

Page 1/1

c. Operating time

Kinetics Data Print Report

Time (Minute)	RawData ...	RawData ...
0.000	2.060	0.376
1.000	2.056	0.376
2.000	2.052	0.377
3.000	2.059	0.375
4.000	2.053	0.376
5.000	2.047	0.376
6.000	2.049	0.375
7.000	2.050	0.375
8.000	2.054	0.375
9.000	2.050	0.375
10.000	2.054	0.376
11.000	2.056	0.375
12.000	2.052	0.376
13.000	2.046	0.376
14.000	2.049	0.375
15.000	2.051	0.375
16.000	2.049	0.375
17.000	2.055	0.374
18.000	2.054	0.375
19.000	2.053	0.374
20.000	2.056	0.374
21.000	2.049	0.375
22.000	2.049	0.374
23.000	2.048	0.374
24.000	2.047	0.375
25.000	2.043	0.375
26.000	2.047	0.374
27.000	2.049	0.375
28.000	2.049	0.375
29.000	2.051	0.375
30.000	2.054	0.375

d. Kurva kalibrasi

Ambil 1 mL dari larutan baku metoklopramid HCl yang telah dibuat, dimasukkan ke dalam labu tentukur 25 mL dan tambahkan *aquadestillata* sampai tanda batas, ukur serapannya pada panjang gelombang maksimumnya 273 nm.

- Pengenceran

$V_1 . C_1 = V_2 . C_2$ $\qquad$ $V_1 . C_1 = V_2 . C_2$

$1 . 113 = 25 . C_2$ $\qquad$ $2 . 113 = 25 . C_2$

$C_2 = 4,52$ ppm $\qquad$ $C_2 = 9,04$ ppm

$V_1 . C_1 = V_2 . C_2$ $\qquad$ $V_1 . C_1 = V_2 . C_2$

$3 . 113 = 25 . C_2$ $\qquad$ $4 . 113 = 25 . C_2$

$C_2 = 13,56$ ppm $\qquad$ $C_2 = 18,08$ ppm

$V_1 . C_1 = V_2 . C_2$

$5 . 113 = 25 . C_2$

$C_2 = 22,6$ ppm

e. Persamaan regresi linier

X (ppm)	Y (abs)
4.52	0.221
9.04	0.372
13.56	0.563
18.08	0.738
22.6	0.935

Nilai a = 0.0276

b = 0.03969

r = 0.9991

f. Hasil uji disolusi

FORMULA 1

Tablet 1

Menit	Absorbansi	Fp	Kadar obat (ppm)	Kadar obat dalam 900 ml (mg)	Koreksi	Total koreksi	Q	% Disolusi	AUC	Total AUC	DE
0	0	0	0	0	0	0	0	0			
0.5	0.189	1	4.0665	3.6599	0.0000	0.0000	4.0665	40.6652	20.33258		
1	0.307	1	7.0396	6.3356	0.0407	0.0407	7.0802	70.8022	55.73369	409.6586	91.343
2	0.348	1	8.0726	7.2653	0.0704	0.1111	8.1836	81.8362	152.6384		
3	0.415	1	9.7606	8.7846	0.0807	0.1511	9.9118	99.1177	180.9539		

Keterangan :

Fp   = faktor pengenceran

Kadar obat (ppm)   = kadar zat aktif dalam 1 liter

Kadar obat dalam 900 mL (mg)   = kadar zat aktif dalam media disolusi

Koreksi   = koreksi pada saat sampling

Q   = jumlah zat aktif yang terdisolusi

% disolusi   = % zat aktif yang terdisolusi ke dalam media disolusi

AUC   = luas area dibawah kurva

DE (%)   = disolusi efisiensi

Contoh perhitungan Formula 1 replikasi 1 (menit ke-3 atau Q_3) :

- Kadar obat (ppm)   : y = a + bx

$$0.415 = 0.027 + 0.03969x$$

$$x = 9.7606$$

9.7606 x 1 (faktor pengenceran) = 9.7606

- Kadar obat dalam 900 mL (mg)   : Kadar = kadar obat (ppm) x 0,9

$$= 9.7606 \text{ x } 0.9$$

$$= 8.7846$$

- Koreksi   : Koreksi $= \dfrac{volume\ sampling}{volume\ medium\ disolusi}$ x kadar obat dalam 900 mL pada pengambilan sampling sebelumnya (mg)

$$= \dfrac{10}{900} \text{ x } 7.2653$$

$$= 0.0807$$

- Total koreksi : Total koreksi = koreksi pada pengambilan sampling sebelumnya + koreksi

$$= 0.0704 + 0.0807$$

$$= 0.1511$$

- Q_3 (jumlah zat aktif yang terdisolusi) : Q = total koreksi menit ke-3 + kadar obat (ppm) menit ke-3

$$= 0.1511 + 9.7606$$

$$= 9.9118$$

- % disolusi   : % $\text{disolusi}_3 = \frac{jumlah\ zat\ aktif\ terdisolusi\ menit\ ke-3}{kadar\ zat\ aktif}$ x 100 %

$$= \frac{9.9118}{10} \text{ x } 100\%$$

$$= 99.1177 \%$$

- AUC   : AUC = (Waktu ke-n – menit pada waktu sebelumnya) x (% disolusi + % disolusi sebelumnya)

$$= (3 - 2) \text{ x } (99.1177 + 81.8362)$$

$$= 180.9539$$

- DE   : DE $= \frac{AUC\ Total}{bobot\ tablet\ x\ waktu\ sampling} = \frac{409.6586}{150\ x\ 3}$

$$= 91.343$$

Tablet 2

Menit	Absorbansi	Fp	Kadar obat (ppm)	Kadar obat dalam 900 ml (mg)	Koreksi	Total koreksi	Q	% Disolusi	AUC	Total AUC	DE
0	0	0	0	0	0	0	0	0			
0.5	0.184	1	3.9405	3.5465	0.0000	0.0000	3.9405	39.4054	19.7027		
1	0.312	1	7.1655	6.4490	0.0394	0.0394	7.2049	72.0494	55.7273	409.7833	91.062
2	0.35	1	8.1230	7.3107	0.0717	0.1111	8.2340	82.3401	154.3895		
3	0.409	1	9.6095	8.6485	0.0812	0.1529	9.7624	97.6236	179.9637		

Tablet 3

Menit	Absorbansi	Fp	Kadar obat (ppm)	Kadar obat dalam 900 ml (mg)	Koreksi	Total koreksi	Q	% Disolusi	AUC	Total AUC	DE
0	0	0	0	0	0	0	0	0			
0.5	0.18	1	3.8398	3.4558	0.0000	0.0000	3.8398	38.3976	19.1987		
1	0.315	1	7.2411	6.5170	0.0384	0.0384	7.2795	72.7952	55.5963	413.6911	91.931
2	0.356	1	8.2741	7.4467	0.0724	0.1108	8.3849	83.8493	156.6445		
3	0.412	1	9.6851	8.7166	0.0827	0.1552	9.8402	98.4021	182.2514		

Tablet 4

Menit	Absorbansi	Fp	Kadar obat (ppm)	Kadar obat dalam 900 ml (mg)	Koreksi	Total koreksi	Q	% Disolusi	AUC	Total AUC	DE
0	0	0	0	0	0	0	0	0			
0.5	0.182	1	3.8901	3.5011	0.0000	0.0000	3.8901	38.9015	19.45074		
1	0.310	1	7.0899	6.4036	0.0389	0.0389	7.1540	71.5404	55.22096	406.974	90.438
2	0.348	1	8.1230	7.2653	0.0712	0.1101	8.1826	81.8262	153.3666		
3	0.407	1	9.8110	8.6032	0.0807	0.1519	9.7110	97.1096	178.9358		

Tablet 5

Menit	Absorbansi	Fp	Kadar obat (ppm)	Kadar obat dalam 900 ml (mg)	Koreksi	Total koreksi	Q	% Disolusi	AUC	Total AUC	DE
0	0	0	0	0	0	0	0	0			
0.5	0.191	1	4.1169	3.7052	0.0000	0.0000	4.1169	41.1691	20.58453		
1	0.309	1	7.0899	6.3810	0.0412	0.0412	7.1311	71.3112	56.24011	412.4679	91.659
2	0.350	1	8.1230	7.3107	0.0709	0.1121	8.2350	82.3502	153.6614		
3	0.417	1	9.8110	8.8299	0.0812	0.1521	9.9632	99.6316	181.9819		

Tablet 6

Menit	Absorbansi	Fp	Kadar obat (ppm)	Kadar obat dalam 900 ml (mg)	Koreksi	Total koreksi	Q	% Disolusi	AUC	Total AUC	DE
0	0	0	0	0	0	0	0	0			
0.5	0.18	1	3.8398	3.4558	0.0000	0.0000	3.8398	38.3976	19.1987		
1	0.315	1	7.2411	6.5170	0.0384	0.0384	7.2795	72.7952	55.5963	413.6911	91.931
2	0.356	1	8.2741	7.4467	0.0724	0.1108	8.3849	83.8493	156.6445		
3	0.412	1	9.6851	8.7166	0.0827	0.1552	9.8402	98.4021	182.2514		

FORMULA 2

Tablet 1

Menit	Absorbansi	Fp	Kadar obat (ppm)	Kadar obat dalam 900 ml	Koreksi	Total koreksi	Q	% Disolusi	AUC	Total AUC	DE
0	0	0	0	0	0	0	0	0			
0.5	0.103	1	1.8997	1.7098	0.0000	0.0000	1.8997	18.9972	9.4986		
1	0.205	1	2.4540	4.0227	0.0190	0.0190	4.4886	44.8864	31.9418	302.8634	67.303
2	0.268	1	6.0569	5.4512	0.0447	0.0637	6.1206	61.2063	106.0927		
3	0.397	1	9.3071	8.3764	0.0606	0.1053	9.4124	94.1240	155.3303		

Tablet 2

Menit	Absorbansi	Fp	Kadar obat (ppm)	Kadar obat dalam 900 ml	Koreksi	Total koreksi	Q	% Disolusi	AUC	Total AUC	DE
0	0	0	0	0	0	0	0	0			
0.5	0.101	1	1.8493	1.6644	0.0000	0.0000	1.8493	18.4933	9.2466		
1	0.208	1	4.5452	4.0907	0.0185	0.0185	4.5637	45.6372	32.0652	306.2774	68.061
2	0.271	1	6.1325	5.5193	0.0455	0.0639	6.1965	61.9647	107.6019		
3	0.402	1	9.4331	8.4898	0.0613	0.1068	9.5399	95.3988	157.3636		

Tablet 3

Menit	Absorbansi	Fp	Kadar obat (ppm)	Kadar obat dalam 900 ml	Koreksi	Total koreksi	Q	% Disolusi	AUC	Total AUC	DE
0	0	0	0	0	0	0	0	0			
0.5	0.105	1	1.9501	1.7551	0.0000	0.0000	1.9501	19.5011	9.7505		
1	0.204	1	4.4444	4.0000	0.0195	0.0195	4.4639	44.6395	32.07029	282.3898	68.064
2	0.274	1	6.2081	5.5873	0.0444	0.0639	6.2721	62.7206	107.36		
3	0.392	1	9.3323	8.3991	0.0621	0.1065	9.4389	94.3885	157.1091		

Tablet 4

Menit	Absorbansi	Fp	Kadar obat (ppm)	Kadar obat dalam 900 ml	Koreksi	Total koreksi	Q	% Disolusi	AUC	Total AUC	DE
0	0	0	0	0	0	0	0	0			
0.5	0.105	1	1.9501	1.7551	0.0000	0.0000	1.9501	19.5011	9.75056		
1	0.207	1	4.5200	4.0680	0.0190	0.0195	4.5395	45.3953	32.44822	305.6727	67.927
2	0.270	1	6.1073	5.4966	0.0447	0.0647	6.1720	61.7203	107.1156		
3	0.399	1	9.3575	8.4218	0.0606	0.1063	9.4638	94.6379	156.3583		

Tablet 5

Menit	Absorbansi	Fp	Kadar obat (ppm)	Kadar obat dalam 900 ml	Koreksi	Total koreksi	Q	% Disolusi	AUC	Total AUC	DE
0	0	0	0	0	0	0	0	0			
0.5	0.101	1	1.8493	1.6644	0.0000	0.0000	1.8493	18.4933	9.2466		
1	0.208	1	4.5452	4.0907	0.0185	0.0185	4.5637	45.6372	32.0652	306.2774	68.061
2	0.271	1	6.1325	5.5193	0.0455	0.0639	6.1965	61.9647	107.6019		
3	0.402	1	9.4331	8.4898	0.0613	0.1068	9.5399	95.3988	157.3636		

Tablet 6

Menit	Absorbansi	Fp	Kadar obat (ppm)	Kadar obat dalam 900 ml	Koreksi	Total koreksi	Q	% Disolusi	AUC	Total AUC	DE
0	0	0	0	0	0	0	0	0			
0.5	0.103	1	1.8997	1.7098	0.0000	0.0000	1.8997	18.9972	9.4986		
1	0.202	1	4.3941	3.9546	0.0190	0.0190	4.4131	44.1305	31.5638	303.4807	67.4401
2	0.272	1	6.1577	5.5420	0.0439	0.0629	6.2207	62.2066	106.3371		
3	0.396	1	9.2819	8.3537	0.0616	0.1055	9.3875	93.8745	156.0811		

FORMULA 3

Tablet 1

Menit	Absorbansi	Fp	Kadar obat (ppm)	Kadar obat dalam 900 ml	Koreksi	Total koreksi	Q	% Disolusi	AUC	Total AUC	DE
0	0	0	0	0	0	0	0	0			
0.5	0.075	1	1.1943	1.0748	0.0000	0.0000	1.1943	12.1739	6.086929		
1	0.122	1	2.3784	2.1406	0.0119	0.0119	2.3904	24.3667	18.27029	238.0131	52.278
2	0.231	1	5.1247	4.6122	0.0238	0.0357	5.1604	52.6039	76.97063		
3	0.352	1	8.1733	7.3560	0.0512	0.0750	8.2484	84.0813	136.6852		

Tablet 2

Menit	Absorbansi	Fp	Kadar obat (ppm)	Kadar obat dalam 900 ml	Koreksi	Total koreksi	Q	% Disolusi	AUC	Total AUC	DE
0	0	0	0	0	0	0	0	0			
0.5	0.08	1	1.3202	1.1882	0.0000	0.0000	1.3202	13.2023	6.6011		
1	0.126	1	2.4792	2.2313	0.0132	0.0132	2.4924	24.9242	19.0632	240.131	53.362
2	0.237	1	5.2759	4.7483	0.0248	0.0380	5.3139	53.1388	78.0629		
3	0.359	1	8.3497	7.5147	0.0528	0.0776	8.3265	83.2648	136.4036		

Tablet 3

Menit	Absorbansi	Fp	Kadar obat (ppm)	Kadar obat dalam 900 ml	Koreksi	Total koreksi	Q	% Disolusi	AUC	Total AUC	DE
0	0	0	0	0	0	0	0	0			
0.5	0.079	1	1.2950	1.1655	0.0000	0.0000	1.2950	13.2012	6.4751		
1	0.132	1	2.6304	2.3673	0.0130	0.0130	2.6433	26.9453	19.6918	238.6407	53.301
2	0.231	1	5.1247	4.6122	0.0263	0.0393	5.1640	52.6399	78.0730		
3	0.353	1	8.1985	7.3787	0.0512	0.0776	8.2761	82.7609	134.4006		

Tablet 4

Menit	Absorbansi	Fp	Kadar obat (ppm)	Kadar obat dalam 900 ml	Koreksi	Total koreksi	Q	% Disolusi	AUC	Total AUC	DE
0	0	0	0	0	0	0	0	0			
0.5	0.073	1	1.1439	1.0295	0.0000	0.0000	1.1439	11.4386	5.7193		
1	0.120	1	2.3280	2.0952	0.0114	0.0114	2.3395	23.3948	17.4167	232.4452	51.654
2	0.229	1	5.0743	4.5669	0.0233	0.0347	5.1090	51.0905	74.4852		
3	0.357	1	8.2993	7.4694	0.0507	0.0740	8.3733	83.7334	134.8239		

Tablet 5

Menit	Absorbansi	Fp	Kadar obat (ppm)	Kadar obat dalam 900 ml	Koreksi	Total koreksi	Q	% Disolusi	AUC	Total AUC	DE
0	0	0	0	0	0	0	0	0			
0.5	0.082	1	1.3706	1.2336	0.0000	0.0000	1.3706	13.7062	6.8531		
1	0.128	1	2.5296	2.2766	0.0137	0.0137	2.5433	25.4331	19.5696	242.940	53.986
2	0.239	1	5.3263	4.7937	0.0253	0.0390	5.3653	53.6528	79.0859		
3	0.357	1	8.2993	7.4694	0.0533	0.0786	8.3779	83.7788	137.431		

Tablet 6

Menit	Absorbansi	Fp	Kadar obat (ppm)	Kadar obat dalam 900 ml	Koreksi	Total koreksi	Q	% Disolusi	AUC	Total AUC	DE
0	0	0	0	0	0	0	0	0			
0.5	0.079	1	1.2950	1.1655	0.0000	0.0000	1.2950	13.2012	6.4751		
1	0.132	1	2.6304	2.3673	0.0130	0.0130	2.6433	26.9453	19.6918	238.6407	53.301
2	0.231	1	5.1247	4.6122	0.0263	0.0393	5.1640	52.6399	78.0730		
3	0.353	1	8.1985	7.3787	0.0512	0.0776	8.2761	82.7609	134.4006		

Lampiran 13. Nilai penerimaan keseragaman kandungan

Tablet	Berat	Volume	Fp	Absorbansi	Formula 1 Konsentrasi			Persentase (%)
	(mg)	(mL)		(ppm)	ppm	mg	tablet mg	
1	154	100	10	0.412	9.6851	9.9433	10.2085	102.0848
2	154	100	10	0.411	9.6599	9.9175	10.1819	101.8193
3	154	100	10	0.409	9.6095	9.8657	10.1288	101.2881
4	154	100	10	0.411	9.6599	9.9175	10.1819	101.8193
5	152	100	10	0.405	9.5087	9.6355	9.7639	97.6395
6	152	100	10	0.401	9.4079	9.5334	9.6605	96.6046
7	152	100	10	0.406	9.5339	9.6610	9.7898	97.8982
8	153	100	10	0.41	9.6347	9.8274	10.0239	100.2391
9	153	100	10	0.408	9.5843	9.7760	9.9715	99.7148
10	153	100	10	0.409	9.6095	9.8017	9.9977	99.9770
						Rata-rata	9.9908	99.9085
						SD		1.9493
						NP		4.6783

Contoh perhitungan :

FORMULA 1

NP = [M-$X_{rata-rata}$] + ks

Keterangan :

NP = Nilai penerimaan

$X_{rata-rata}$ = Rata-rata kandungan dari masing-masing kandungan

k = Konstanta penerimaan, jika n=10 maka k=2,4 dan n=30 maka k=2,0

s = Simpangan baku sampel

M = Jika 98,5% ≤ $X_{rata-rata}$ ≤ 101,5% maka M = $X_{rata-rata}$

   Jika $X_{rata-rata}$ < 98,5% maka M = 98,5%

   Jika $X_{rata-rata}$ < 101,5% maka M = 101,5%

T(rata-rata) = ≤101 %, maka M = 98.5 ≤ $X_{rata-rata}$ ≤101.5%

NP = [M-$X_{rata-rata}$] + ks

   = [99.9085 - 99.9085] + 2,4 x 1,9493

       = 4.678 %

Tablet	Berat	Volume	Fp	Absorbansi	Formula 2 Konsentrasi			Persentase (%)
	(mg)	(mL)		(ppm)	ppm	mg	tablet mg	
1	151	100	10	0.415	9.7606	9.8257	9.8912	98.9122
2	151	100	10	0.406	9.5339	9.5974	9.6614	96.6143
3	151	100	10	0.41	9.6347	9.6989	9.7636	97.6356
4	151	100	10	0.412	9.6851	9.7496	9.8146	98.1462
5	152	100	10	0.412	9.6851	9.8142	9.9450	99.4505
6	152	100	10	0.419	9.8614	9.9929	10.1262	101.2615
7	152	100	10	0.427	10.0630	10.1972	10.3331	103.3312
8	153	100	10	0.411	9.6599	9.8531	10.0501	100.5012
9	153	100	10	0.414	9.7354	9.9302	10.1288	101.2876
10	153	100	10	0.409	9.6095	9.8017	9.9977	99.9770
						Rata-rata	9.9712	99.7117
						SD		1.9928
						NP		4.7827

Tablet	Berat	Volume	Fp	Absorbansi	Formula 3 Konsentrasi			Persentase (%)
	(mg)	(mL)		(ppm)	ppm	mg	tablet mg	
1	151	100	10	0.421	9.9118	9.9118	9.9779	99.7790
2	151	100	10	0.419	9.8614	9.8614	9.9272	99.2717
3	151	100	10	0.415	9.7606	9.7606	9.8257	98.2572
4	151	100	10	0.413	9.7103	9.7103	9.7750	97.7499
5	153	100	10	0.417	9.8110	9.8110	10.0073	100.0726
6	153	100	10	0.42	9.8866	9.8866	10.0844	100.8435
7	153	100	10	0.422	9.9370	9.9370	10.1358	101.3575
8	155	100	10	0.408	9.5843	9.5843	9.9038	99.0375
9	155	100	10	0.405	9.5087	9.5087	9.8256	98.2565
10	155	100	10	0.407	9.5591	9.5591	9.8777	98.7772
						Rata-rata	9.9340	99.3403
						SD		1.1713
						NP		2.8112

Lampiran 14. Validasi metode analisis

a. Penentuan LOD dan LOQ

X (ppm)	Y (abs)	Y'	Y-Y'	(Y-Y')2
4.52	0.221	0.207	0.0140	0.00019600000000000
9.04	0.372	0.3864	-0.0144	0.00020736000000000
13.56	0.563	0.5658	-0.0028	0.00000784000000000
18.08	0.738	0.7452	-0.0072	0.00005184000000000
22.6	0.935	0.9246	0.0104	0.00010816000000000

			Total	0.00057
	a = 0.0276		$S_{y/x}$	0.01380
	b = 0.03969		LOD	1.147264
	r = 0.999114		LOQ	3.476558

Nilai y' diperoleh dari substitusi konsentrasi dalam persamaan y' = 0.0276 + 0.03969x demgam x adalah konsentrasi (ppm) dan y absorbansi (y')

$$S_{x/y} = \sqrt{\frac{\Sigma (y-y\prime)^2}{(N-2)}}$$

$S_{x/y}$ = simpangan baku residual

N = jumlah data

$\Sigma (y - y')^2$ = jumlah kuadrat total residual

$$S_{x/y} = \sqrt{\frac{\Sigma (y-y\prime)^2}{(N-2)}}$$

$$= \sqrt{\frac{0.00057}{(5-2)}} = 0.01380$$

- LOD = 3,3 X $\dfrac{Sx/y}{b}$

$$= 3,3 \text{ x } \frac{0.01380}{0.03969}$$

$$= 1.147264$$

- LOQ = 10 X $\dfrac{Sx/y}{b}$

$$= 10 \text{ x } \frac{0.01380}{0.03969}$$

$$= 3.476558$$

b. Penentuan perolehan kembali (*recovery)* akurasi

Konsentrasi	Replikasi	Absorbansi	Konsentrasi	Sebenarnya	%		% *Recovery*
80%	1	0.379	8.8536	9.04	98%	98.03%	
(9.04 ppm)	2	0.38	8.8788	9.04	98%		
	3	0.379	8.8536	9.04	98%		
100%	1	0.568	13.6154	13.56	100%	99.91%	
(13.56 ppm)	2	0.561	13.4391	13.56	99%		
	3	0.567	13.5902	13.56	100%		99.00%
120%	1	0.732	17.7474	18.08	98%	99.04%	
(18.08 ppm)	2	0.744	18.0498	18.08	100%		
	3	0.739	17.9238	18.08	99%		

c. Penentuan RSD (standar deviasi relatif)

Konsentrasi (ppm)	Replikasi	Absorbansi	Konsentrasi (ppm)
	1	0.574	13.7666
	2	0.577	13.8422
13.56	3	0.579	13.8926
	4	0.573	13.7414
	5	0.566	13.5650
	6	0.567	13.5902
		SD	0.132044
		Rata-rata	13.73301
		RSD	0.009615

$$\text{RSD} = \frac{100\% \; X \; SD}{\overline{x}}$$

$$= \frac{100\% \; X \; 0.132044}{13.73301}$$

$$= 0.009615$$

Keterangan :

RSD = standar deviasi relatif (%)

SD = Standar deviasi

$\overline{X}$ = rata-rata (mean)

Lampiran 15. *One sample t-test*

a. Prediksi formula optimum

Factors

	Component	Name	Level	Low Level	High Level	Std. Dev.	Coding
	A	Ludipress	87.00	78.00	87.00	0.0000	Actual
	B	SSG	3.00	3.00	12.00	0.0000	Actual
		Total =	90.00				

📍 Point Prediction ▾

Point Prediction

Two-sided   Confidence = 95%   Population = 99%

	Solution 1 of 1 Response	Predicted Mean	Predicted Median	Observed	Std Dev	SE Mean	95% CI low for Mean	95% CI high for Mean	95% TI low for 99% Pop	95% TI high for 99% Pop
	Kekerasan	3.86845	3.86845		0.0141627	0.0118927	3.83935	3.89755	3.77546	3.96143
	Kerapuhan	0.924231	0.924231		0.005547	0.00465792	0.912833	0.935628	0.887812	0.96065
	Waktu hancur	33.9451	33.9451		1.70774	1.43402	30.4362	37.4541	22.7329	45.1574
	Q3	97.8835	97.8835		0.709652	0.597261	96.3482	99.4188	92.861	102.906
	DE3	91.4394	91.4394		0.911572	0.767202	89.4673	93.4116	84.9878	97.8911

b. Kekerasan tablet

One-Sample Kolmogorov-Smirnov Test

		Kekerasan
N		3
Normal Parameters[a,b]	Mean	3.85267
	Std. Deviation	.024502
Most Extreme Differences	Absolute	.176
	Positive	.176
	Negative	-.173
Kolmogorov-Smirnov Z		.305
Asymp. Sig. (2-tailed)		1.000

a. Test distribution is Normal.

b. Calculated from data.

One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
Kekerasan	3	3.85267	.024502	.014146

One-Sample Test

	Test Value = 3.868					
	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
Kekerasan	-1.084	2	.392	-.015333	-.07620	.04553

c. Kerapuhan

One-Sample Kolmogorov-Smirnov Test

		Kerapuhan
N		3
Normal Parameters[a,b]	Mean	.93565
	Std. Deviation	.038592
Most Extreme Differences	Absolute	.240
	Positive	.240
	Negative	-.193
Kolmogorov-Smirnov Z		.416
Asymp. Sig. (2-tailed)		.995

a. Test distribution is Normal.

b. Calculated from data.

One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
Kerapuhan	3	.93565	.038592	.022281

One-Sample Test

	Test Value = 0.920					
	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
Kerapuhan	.702	2	.555	.015648	-.08022	.11152

d. Waktu hancur

One-Sample Kolmogorov-Smirnov Test

		Waktu hancur
N		3
Normal Parameters[a,b]	Mean	33.17000
	Std. Deviation	1.467072
Most Extreme Differences	Absolute	.191
	Positive	.191
	Negative	-.182
Kolmogorov-Smirnov Z		.331
Asymp. Sig. (2-tailed)		1.000

a. Test distribution is Normal.

b. Calculated from data.

One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
Waktu hancur	3	33.17000	1.467072	.847014

One-Sample Test

	Test Value = 33.945					
	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
Waktu hancur	-.915	2	.457	-.775000	-4.41941	2.86941

e. Q_3

One-Sample Kolmogorov-Smirnov Test

		Q3
N		3
Normal Parameters[a,b]	Mean	97.95273
	Std. Deviation	.861673
Most Extreme Differences	Absolute	.210
	Positive	.210
	Negative	-.187
Kolmogorov-Smirnov Z		.365
Asymp. Sig. (2-tailed)		.999

a. Test distribution is Normal.

b. Calculated from data.

One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
Q3	3	97.95273	.861673	.497487

One-Sample Test

	Test Value = 97.883					
	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
Q3	.140	2	.901	.069733	-2.07078	2.21025

f. DE$_3$

One-Sample Kolmogorov-Smirnov Test

		DE3
N		3
Normal Parameters[a,b]	Mean	91.19387
	Std. Deviation	.448351
Most Extreme Differences	Absolute	.184
	Positive	.184
	Negative	-.180
Kolmogorov-Smirnov Z		.318
Asymp. Sig. (2-tailed)		1.000

a. Test distribution is Normal.

b. Calculated from data.

One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
DE3	3	91.19387	.448351	.258856

One-Sample Test

	Test Value = 91.439					
	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
DE3	-.947	2	.444	-.245133	-1.35890	.86863

Lampiran 16. Alat-alat penelitian

Cube mixer

Mesin cetak tablet
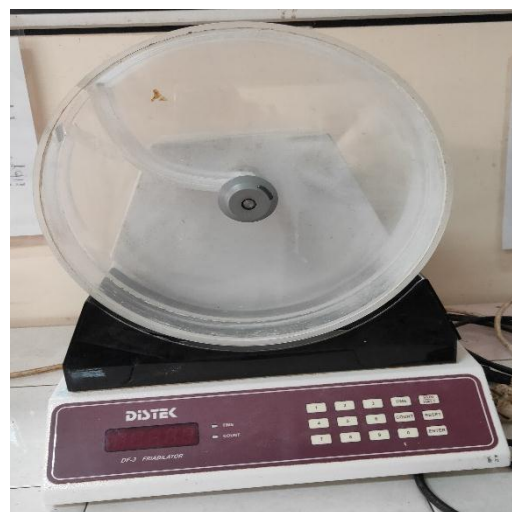
Friabilator

Disintegration tester
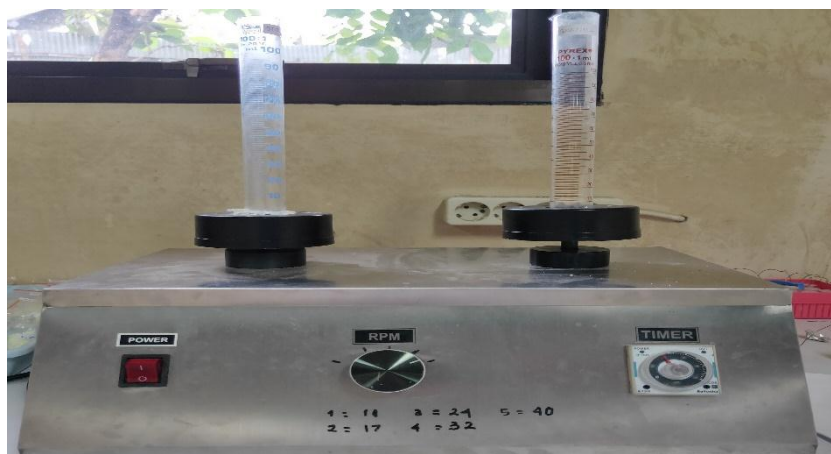
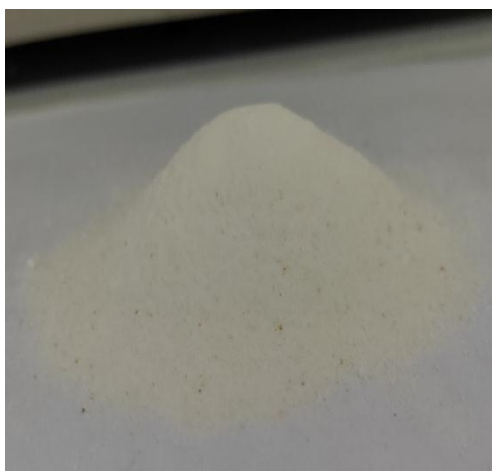*Tapped density*

Waktu alir

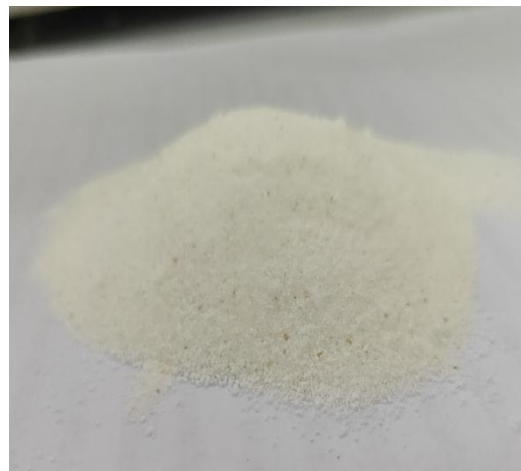

Dissolution tester

Hardness tester

Spektrofotometer Uv-Vis

Lampiran 17. Hasil tablet FDT metoklopramid HCl

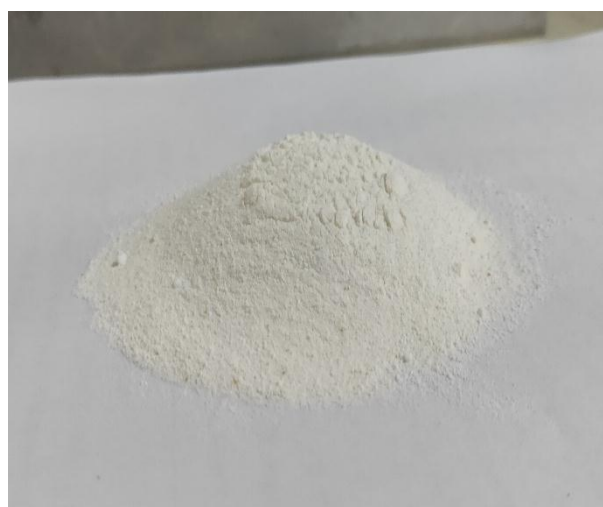**Lampiran 18. Pengujian waktu alir serbuk**

Formula 1

Formula 2

Formula 3

Lampiran 19. Pengujian waktu pembasahan

Formula 1

Formula 2

Formula 3

Perbandingan ke-3 formula