LAMPIRAN

Lampiran 1. Surat Pernyataan Bebas Plagiasi

SURAT PERNYATAAN

Yang bertanda tangan di bawah ini,

Nama : Nurul Qomariah Rasyidah Fitria Alghifari

N P M : 11181215

adalah mahasiswa Fakultas Farmasi, Universitas Bhakti Kencana, menyatakan dengan sesungguhnya bahwa Naskah Tugas Akhir/Skripsi yang saya tulis dengan judul:

Optimasi Formula Granul Instan Kombinasi Ekstrak Pegagan (*Centella aiatica* (L) Urb) dan Ekstrak Rimpang Kunyit (*Curcuma domestica* Vahl) dengan Metode Granulasi Basah sebagai Antioksidan

adalah benar-benar merupakan hasil karya saya sendiri. Apabila di kemudian hari diketahui bahwa isi Naskah Skripsi ini merupakan hasil plagiasi, maka saya bersedia menerima sanksi berupa pembatalan kelulusan dan atau pencabutan gelar yang saya peroleh.

Demikian surat pernyataan ini saya buat untuk dapat dipergunakan sebagaimana mestinya.

Bandung , 08 Agustus 2022

Yang membuat pernyataan,

(Nurul Qomariah Rasyidah Fitria Alghifari)

NPM 1118215

SURAT PERNYATAAN

Yang bertanda tangan di bawah ini,

Nama : Nurul Qomariah Rasyidah Fitria Alghifari

N P M : 11181215

Menyatakan bahwa demi kepentingan perkembangan ilmu pengetahuan, saya menyetujui abstrak Skripsi yang saya tulis dengan judul:

Optimasi Formula Granul Instan Kombinasi Ekstrak Pegagan (*Centella aiatica* (L) Urb) dan Ekstrak Rimpang Kunyit (*Curcuma domestica* Vahl) dengan Metode Granulasi Basah sebagai Antioksidan

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Demikian surat pernyataan ini saya buat untuk dapat dipergunakan sebagaimana mestinya.

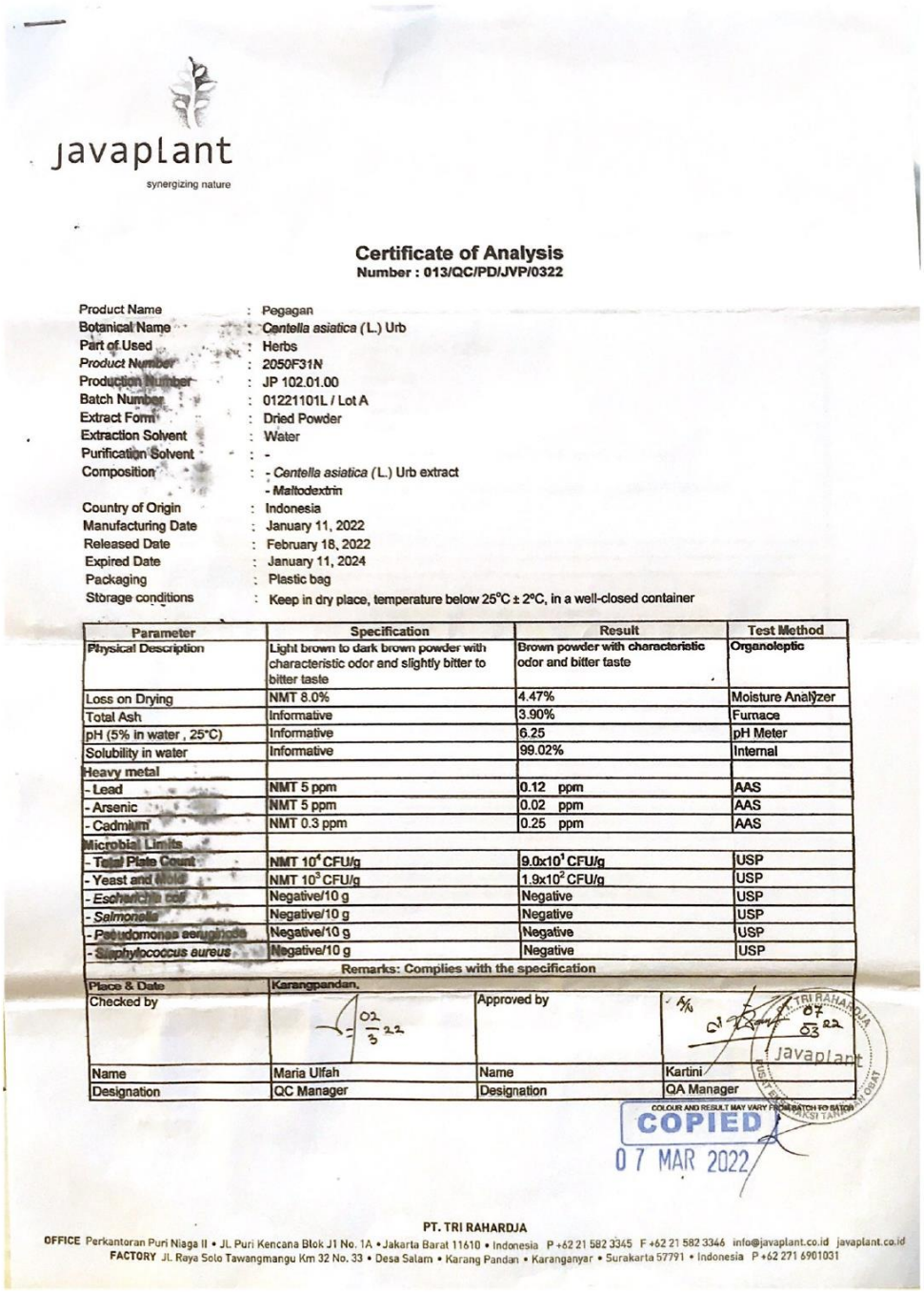
Bandung , 08 Agustus 2022

Yang membuat pernyataan,

(Nurul Qomariah Rasyidah Fitria Alghifari)

NPM 1118215

Lampiran 2. CoA Bahan Aktif dan Bahan Eksipien



javaplant
synergizing nature

Certificate of Analysis
Number : 013/QC/PD/JVP/0322

Product Name	:	Pegagan
Botanical Name	:	*Centella asiatica* (L.) Urb
Part of Used	:	Herbs
Product Number	:	2050F31N
Production Number	:	JP 102.01.00
Batch Number	:	01221101L / Lot A
Extract Form	:	Dried Powder
Extraction Solvent	:	Water
Purification Solvent	:	-
Composition	:	- *Centella asiatica* (L.) Urb extract - Maltodextrin
Country of Origin	:	Indonesia
Manufacturing Date	:	January 11, 2022
Released Date	:	February 18, 2022
Expired Date	:	January 11, 2024
Packaging	:	Plastic bag
Storage conditions	:	Keep in dry place, temperature below 25°C ± 2°C, in a well-closed container

Parameter	Specification	Result	Test Method
Physical Description	Light brown to dark brown powder with characteristic odor and slightly bitter to bitter taste	Brown powder with characteristic odor and bitter taste	Organoleptic
Loss on Drying	NMT 8.0%	4.47%	Moisture Analyzer
Total Ash	Informative	3.90%	Furnace
pH (5% in water , 25°C)	Informative	6.25	pH Meter
Solubility in water	Informative	99.02%	Internal
Heavy metal			
- Lead	NMT 5 ppm	0.12 ppm	AAS
- Arsenic	NMT 5 ppm	0.02 ppm	AAS
- Cadmium	NMT 0.3 ppm	0.25 ppm	AAS
Microbial Limits			
- Total Plate Count	NMT 10^4 CFU/g	$9.0x10^1$ CFU/g	USP
- Yeast and Mold	NMT 10^3 CFU/g	$1.9x10^2$ CFU/g	USP
- *Escherichia coli*	Negative/10 g	Negative	USP
- *Salmonella*	Negative/10 g	Negative	USP
- *Pseudomonas aeruginosa*	Negative/10 g	Negative	USP
- *Staphylococcus aureus*	Negative/10 g	Negative	USP
Remarks: Complies with the specification			

Place & Date	Karangpandan,		
Checked by	02/3/22	Approved by	07/03/22
Name	Maria Ulfah	Name	Kartini
Designation	QC Manager	Designation	QA Manager

PT. TRI RAHARDJA Javaplant

COLOUR AND RESULT MAY VARY FROM BATCH TO BATCH

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07 MAR 2022

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PT EBM Saintifik dan Teknologi
Jl. Bukit Raya 582, Cumbuleuit, Cidadap, Bandung, Jawa Barat, Indonesia 40142
Website: www.markherb.com
Email: info@markherb.com

For Laboratory Use Only

PROOF OF SERVICE

22-03/PoS-MH/4

1. **Quotation** : **22-01/Q-MH/19**
2. **Principal**
   - Customer name : Nida Nurfaizah
   - Institution/Address : Universitas Bhakti Kencana
   - Phone : +62 822 1728 1556
   - Email : 11181213@bku.ac.id
3. **Sample**
   - Sample name : Rimpang Kunyit (*Curcuma longa* L.)
   - Package/Size : 1098 g
   - Date of received : January 2022
   - Date of service : March 2022
   - Type of service : Extraction

Extraction result

Parameters	Description
Sample preparation	Dried, powdered, 1098 g
Extraction methods	Maceration, room temperature, 2 x 24h, solid-solvent ratio (1:5, w/v)
Solvent	Ethanol 96%
Solvent drying	Vacuum rotary evaporator
Yield	65,97 g
Extract appearance	Yellow, sticky
Storage	4 to 8°C

Ethical statement

This proof of service declares that the customer is not allowed to claim the product or method as his/her own work/research. On the contrary, the customer should mention that the product and service were provided by Markherb.

Bandung, 22 March 2022

apt. Nanda Putra, M.S.Farm.
Service Manager

QC :
Date : 22/3/22

QA :
Date : 22/3/22

CERTIFICATE OF ANALYSIS

AVICEL 102

Batch no: A0314 **Manufacturing date : July, 2018**
Manufacturing Site : Mehsana, India **Expiry Date : June, 2023 (5 years)**

Analysis	Specifications	Reference	Batch Results
Colour	white	Ph.Eur.	White
Identification A	have to correspond	NF, Ph.Eur.	Complies
Identification B	have to correspond	NF, Ph.Eur.	Complies
Degree of Polymerisation	Max. 350	NF, Ph.Eur.	Complies
Solutibility	Have to correspond	Ph.Eur.	Complies
pH	5.0 - 7.0	USP, Ph.Eur.	6.63
Residue on Ignition	Max. 0.05 %	USP, Ph.Eur	0.0384
Loss on Drying	Max. 6.0 %	USP, Ph.Eur	3.276
Heavy Metals	Max. 10 ppm	USP	Complies
Conductivity	Max. 75 µS	USP, Ph.Eur	50
Water Soluble Substances	Max. 0.24 %	USP, Ph.Eur	0.0984
Ether Soluble Substances	Max 0.05 %	USP, Ph.Eur	0.0242
Bulk Density	0.26 to 0.33 g/ml	NF	0.2802
Sieve Analysis (% Retention)			
60 Mesh (250 µm)	< 1.0 %	Inhouse Method	Nil
200 Mesh (75 µm)	< 30.0 %		26.7870

Microbial Analysis			
Total Aerobic Microbial Plate Count	Max. 100 CFU/g	USP, Ph.Eur	50
Total Yeast and Molds Cont	Max. 20 CFU/g	USP, Ph.Eur	Nil
Escherichia Coli	Should be Absent	USP, Ph.Eur	Absent
Staphylococcus Aureus	Should be Absent	USP, Ph.Eur	Absent
Salmonella Species	Should be Absent	USP, Ph.Eur	Absent
Pseudomonas Aeruginosa	Should be Absent	USP, Ph.Eur	Absent

The raw materials, manufacturing process and product do not contain any of the solvents listed in Residual Solvents (Ph.Eur.<5.4>, USP<467>

For GUJARAT MICROWAX PVT LTD

Chemist Quality Control

kanbo

Shandong Kanbo Biochemical Technology Co., Ltd

Add: No.1016,Libe Road, Lijin County, Dongying City, Shandong Province,257400,P.R.China

CERTIFICATE OF ANALYSIS

Product Name: Sucralose [56038-13-2] Test Date: October 7, 2021

Batch NO.: 202109066 Manu.Date: October 1, 2021

Quantity: 2000 kg Expiry Date: September 30, 2023

Item	FCC12, EP10, USP43 , E955,GB25531andGB4789	Result
Appearance	White or almost white powder	Complies
Ident IR	The IR absorption spectrum conform the reference spectrum	Pass
Ident HPLC	The retention time of the principal peak in the chromatogram of the Assay preparation corresponds to that in the chromatogram of the Standard preparation	Pass
Ident TLC	The Rf value of the major spot in the thin-layer chromatogram of the Sample solution is the same as that of the Standard solution obtained in the test for Related Substances.	Pass
Assay	98.0～102.0%	99.30%
Specific Rotation	+84.0～+87.5°	+85.83°
Clarity of solution	—	Clear
PH (10% aqueous solution)	5.0～7.0	6.72
Moisture	≤2.0%	0.14%
Methanol	≤0.1%	Not detected
Ignited Residue	≤0.7%	0.02%
Arsenic(As)	≤3ppm	<3ppm
Heavy metals	≤10ppm	<10ppm
Lead	≤1ppm	Not detected
Related substances （Other chlorinated	≤0.5%	<0.5%
Hydrolysis products （Chlorinated monosaccharides）	≤0.1%	Complies
Triphenylphosphine oxide	≤150ppm	<150ppm
Total aerobic count	≤250CFU/g	<20CFU/g
Yeast & Moulds	≤50CFU/g	<10CFU/g
Coliforms	Negative	Nf
E.coli	Negative	Nf
S.aureus	Negative	Nf
Salmonella	Negative	Nf

Particle size 95% pass through 100 mesh

Storage condition:Store in well closed container, dry and cool place

Shelf Life: 2 years while stored in original packing under above stated condition

Conclusion: The product complies with FCC12, EP10, USP43, E955,GB25531 andGB4789 standards.

Approved: Xu Songbo Inspector: Liu Shilong

BASF
The Chemical Company

Certificate of Analysis
BASF South East Asia Pte Ltd

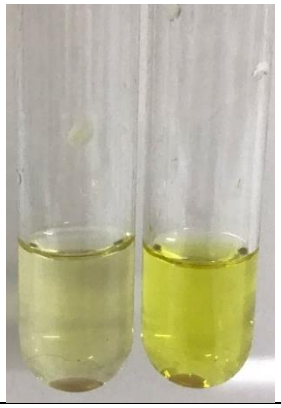
2020-12-07
GKA/M320
Fr. Nina Dominique Kaeppel
+4962160-51484
Certificate No. 1305

Certificate of Analysis according to DIN 55350-18-4.2.2

PVP K30

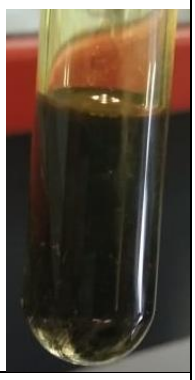
Test Parameter	Requirements	UoM	Result
Identification (IR)	Must conform		Conform
pH -value	Min 3.0 Max 7.0		3.6
Water	Max 5.00	g/100g	3.90
Residue on ignition / Sulphated ash	Max 5.00	g/100g	< 0.02
Lead	Max 10	mg/kg	<10
Aldehydes	Max 500	mg/kg	44
Hydrazine	Max 1	mg/kg	<1
Vynilpyrrolidone (impurity A)	Max 10	mg/kg	<2
K-value	Min 27.0 Max 32.4		31.0
Organic volatile impurities	Must conform		Conforms

Lampiran 3. Skrining Fitokimia

Pengujian	Ekstrak Pegagan	Keterangan	Hasil
Alkaloid	(-)	- Tidak terdapat endapan berwarna merah bata atau jingga (Mayer) - Tidak terdapat endapat berwarna putih (Dragendorf)	
Flavonoid	(+)	Terbentuknya warna jingga, kuning atau merah pada lapisan amil alkohol	
Saponin	(+)	Terdapat busa stabil dengan tinggi 2 cm	

Kuinon	(+)	Terjadi perubahan warna	
Tanin	(+)	Terjadi perubahan warna menjadi biru hitam	
Steroid/Triterpenoid	(+)	Positif Steroid. Terjadi perubahan warna menjadi hijau-kebiruan.	

Pengujian	Ekstrak Rimpang Kunyit	Keterangan	Hasil
Alkaloid Mayer	(+)	Terdapat endapan berwarna putih	
Alkaloid Dragendorf		Terdapat endapan berwarna merah bata atau jingga	
Flavonoid	(+)	Terbentuknya warna jingga, kuning atau merah pada lapisan amil alkohol	
Saponin	(-)	Tidak terdapat busa yang stabil	

Kuinon	(+)	Terjadi perubahan warna menjadi merah	
Tanin	(+)	Terjadi perubahan warna menjadi biru hitam	
Steroid/Triterpenoid	(+)	Positif Triterpenoid.Terjadi perubahan warna menjadi merah-ungu	

Lampiran 4. Perhitungan Aktivitas Antioksidan

Perhitungan dalam konsentrasi DPPH

1. Pembuatan larutan induk DPPH (1000 µg/mL)
   25 mg serbuk mg dilarutkan dalam metanol *pro analysis* sebanyak 50 mL

Perhitungan Sampel dan kontrol positif dalam Uji Aktivitas Antioksidan

1. Pembuatan larutan induk sampel
   Pembuatan konsentrasi 500 µg/mL dimulai dengan menimbang 25 mg ekstrak dalam 25 mL metanol p.a.
2. Pembuatan larutan induk pembanding (asam askorbat_
   Pembuatan konsentrasi 500 µg/mL dimulai dengan menimbang 25 mg asam askorbat dan ditambah dengan metanol p.a sampai 25 mL.
3. Perhitungan larutan uji
   a) Ekstrak pegagan, ekstrak rimpang, dan sediaan granul (20, 40, 60, 80, 100, 120 µg/mL)
      Larutan induk ekstrak katuk, ektrak rimpang kunyit dan sediaan granul instan 500 µg/mL, kemudian di pipet dan masukan dalam labu ukur 10 ml

- Konsentrasi 20 µg/mL
  V1.N1 = V2.N2
  V1. 500 = 10. 20
  V1 = $\frac{200}{500} = 0{,}4\ mL$

- Konsentrasi 40 µg/mL
  V1.N1 = V2.N2
  V1. 500 = 10. 40
  V1 = $\frac{400}{500} = 0{,}8\ mL$

- Konsentrasi 60 µg/mL
  V1.N1 = V2.N2
  V1. 500 = 10. 60
  V1 = $\frac{600}{500} = 1{,}2\ mL$

- Konsentrasi 80 µg/mL

  V1.N1 = V2. N2

  V1. 500 = 10. 80

  V1 = $\frac{800}{500} = 1{,}6\ mL$

- Konsentrasi 100 µg/mL

  V1.N1 = V2.N2

  V1. 500 = 10. 100

  V1 = $\frac{1000}{500} = 2\ mL$

b) Perhitungan perkombinasian antara ekstrak rimpang kunyit dan katuk, yang diambil dari setengah konsentrasi ekstrak tunggal.

- Konsentrasi 10 µg/mL

  N_1 x V_1 = N_2 x V_2

  500 x V_1 = 10 x 10

  V_1 = 0,2 ml atau 200 µL

- Konsentrasi 20 µg/mL

  N_1 x V_1 = N_2 x V_2

  500 x V_1 = 20 x 10

  V_1 = 0,4 ml atau 400 µL

- Konsentrasi 30 µg/mL

  N_1 x V_1 = N_2 x V_2

  500 x V_1 = 30 x 10

  V_1 = 0,6 ml atau 600 µL

- Konsentrasi 40 µg/mL

  N_1 x V_1 = N_2 x V_2

  500 x V_1 = 40 x 10

  V_1 = 0,8 ml atau 800 µL

- Konsentrasi 50 µg/mL

  N_1 x V_1 = N_2 x V_2

  500 x V_1 = 50 x 10

  V_1 = 1 ml atau 1000 µL

c) Perhitungan larutan kontrol positif Vit-C (1,2,3,4,5,6 µg/mL)

Larutan induk pembanding (Vit-C) adalah 500 µg/mL, kemudian di pipet dan masukkan ke dalam labu ukur 10 ml

- Konsentrasi 1 µg/mL.

  $N_1 \times V_1 = N_2 \times V_2$

  $500 \times V_1 = 1 \times 10$

  $V_1 = 0{,}02$ml atau 20 µL

- Konsentrasi 2 µg/mL

  $N_1 \times V_1 = N_2 \times V_2$

  $500 \times V_1 = 2 \times 10$

  $V_1 = 0{,}04$ ml atau 40 µL

- Konsentrasi 3

  $N_1 \times V_1 = N_2 \times V_2$

  $500 \times V_1 = 3 \times 10$

  $V_1 = 0{,}06$ ml atau 60 µL

- Konsentrasi 4

  $N_1 \times V_1 = N_2 \times V_2$

  $500 \times V_1 = 4 \times 10$

  $V_1 = 0{,}08$ ml atau 80 µL

- Konsentrasi 5

  $N_1 \times V_1 = N_2 \times V_2$

  $500 \times V_1 = 5 \times 10$

  $V_1 = 0{,}1$ml atau 100 µL

- Konsentrasi 6

  $N_1 \times V_1 = N_2 \times V_2$

  $500 \times V_1 = 6 \times 10$

  $V_1 = 0{,}12$ ml atau 120 µL

Lampiran 5. Data Hasil Antioksidan

Sampel	Konsentrasi	Abs Kontrol	Abs Sampel			%Inhibisi			IC50			Rata-rata IC50	SD
			1	2	3	1	2	3	1	2	3		
DPPH	**70**	**0,842**										**0.842**	
	20	0,842	0,689	0,672	0,653	18,171	20,190	22,447					
	40	0,842	0,531	0,530	0,530	36,936	37,055	37,055					
PEGAGAN	60	0,842	0,472	0,473	0,474	43,943	43,824	43,705	5,100	4,400	3,852	4,451	0,63
	80	0,842	0,363	0,362	0,359	56,888	57,007	57,363					
	100	0,842	0,286	0,284	0,281	66,033	66,271	66,627					
	20	0,842	0,697	0,692	0,693	17,221	17,815	17,696					
	40	0,842	0,569	0,559	0,557	32,423	33,610	33,848					
KUNYIT	60	0,842	0,467	0,466	0,463	44,537	44,656	45,012	6,886	6,038	5,986	6,303	0,51
	80	0,842	0,371	0,368	0,366	55,938	56,295	56,532					
	100	0,842	0,292	0,291	0,291	65,321	65,439	65,439					
	10	0,866	0,665	0,640	0,636	23,210	26,097	26,559					
	20	0,866	0,566	0,568	0,562	34,642	34,411	35,104					
KOMBINASI	30	0,866	0,534	0,532	0,531	38,337	38,568	38,684	3,544	3,060	2,921	3,175	0,33
	40	0,866	0,425	0,418	0,417	50,924	51,732	51,848					
	50	0,866	0,333	0,334	0,335	61,547	61,432	61,316					
	20	0,824	0,750	0,750	0,750	8,981	8,981	8,981					
	40	0,824	0,695	0,695	0,693	15,655	15,655	15,898					
GRANUL	60	0,824	0,663	0,662	0,662	19,539	19,660	19,660	7,018	7,054	6,993	7,022	0,03
	80	0,824	0,658	0,657	0,656	20,146	20,267	20,388					
	100	0,824	0,622	0,621	0,620	24,515	24,636	24,757					

Perhitungan %Inhibisi

$$\%\text{Inhibisi} = \frac{Absorbansi\ Kontrol}{Absorbansi\ Sampel} \times 100\%$$

$$= \frac{0,842}{0,689} \times 100\% = 18,171\%$$

Nilai IC_{50}

y = bx + a

x = y – a + b

x = $\frac{50-a}{b}$

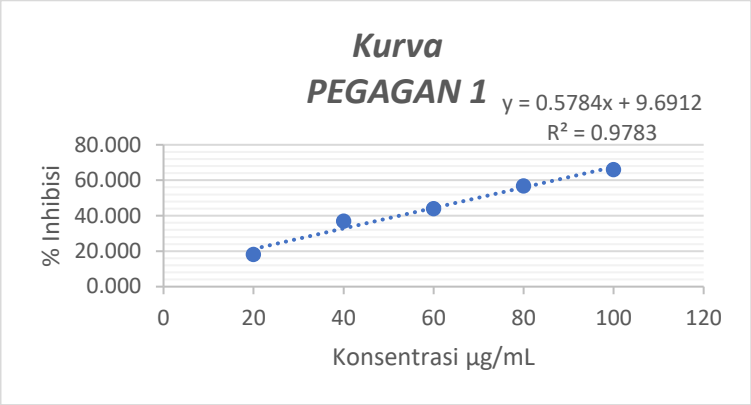
x = $\frac{(50-0,5784)}{9,6912}$ = 5,100

Rata-rata nilai $\mathbf{IC_{50}}$ = $\frac{(rec\ 1+rec\ 2\ +rec\ 3)}{3}$ = $\frac{5,100+4,400+3,852)}{3}$ = 4,451 µg/mL

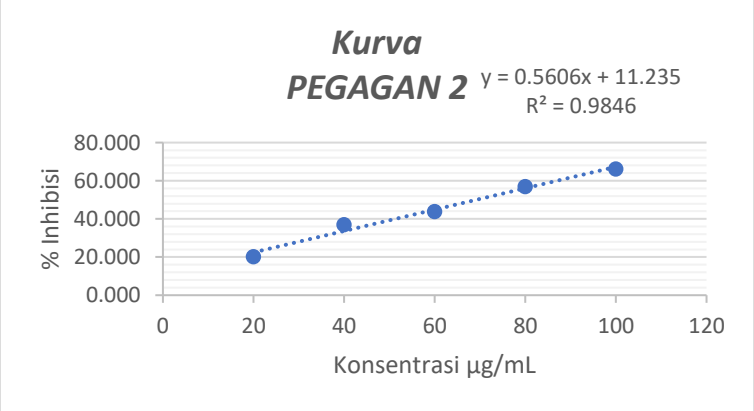
Lampiran 6. Kurva hubungan konsentrasi dengan % inhibisi ekstrak pegagan, ekstrak rimpang kunyit, kombinasi ekstrak dan sediaan granul instan.

1. Ekstrak tunggal pegagan

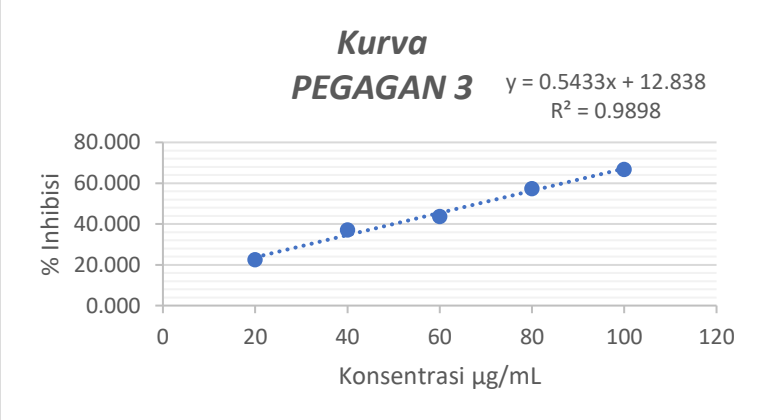
- Percobaan 1



- Pengulangan 2

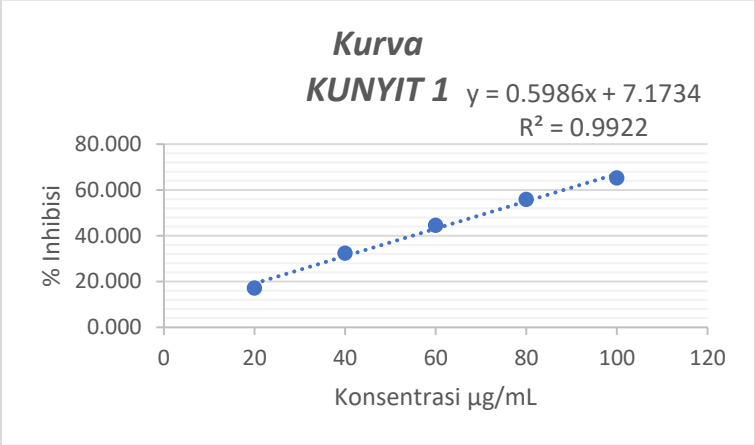


- Pengulangan 3

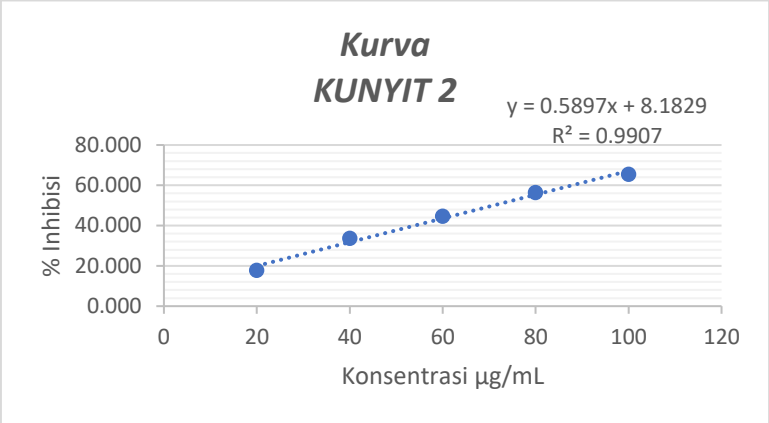


2. Ekstrak tunggal rimpang kunyit

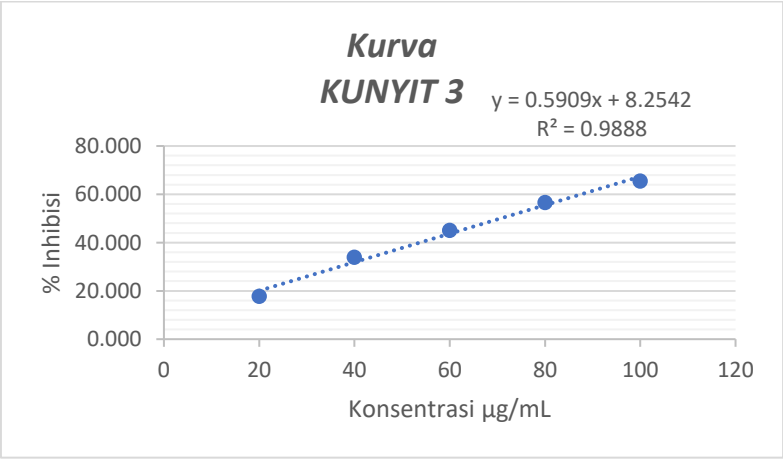
- Percobaan 1



- Pengulangan 2

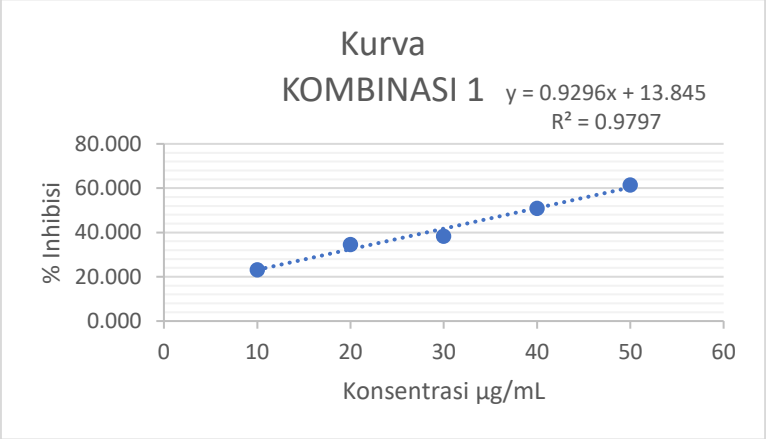


- Pengulangan 3

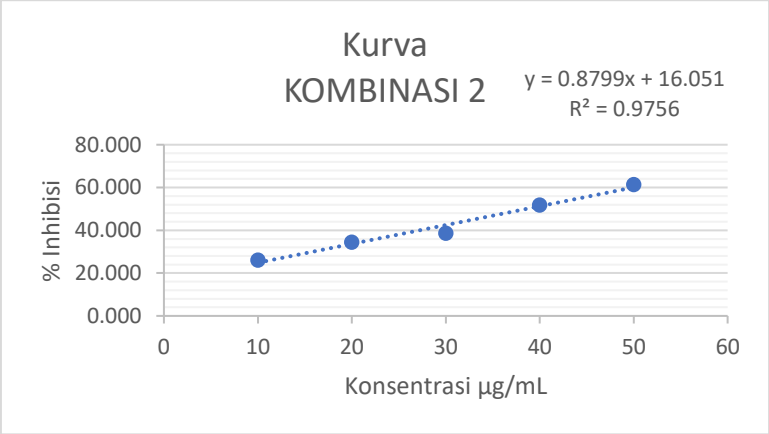


3. Kombinasi ekstrak pegagan dan ekstrak rimpang kunyir

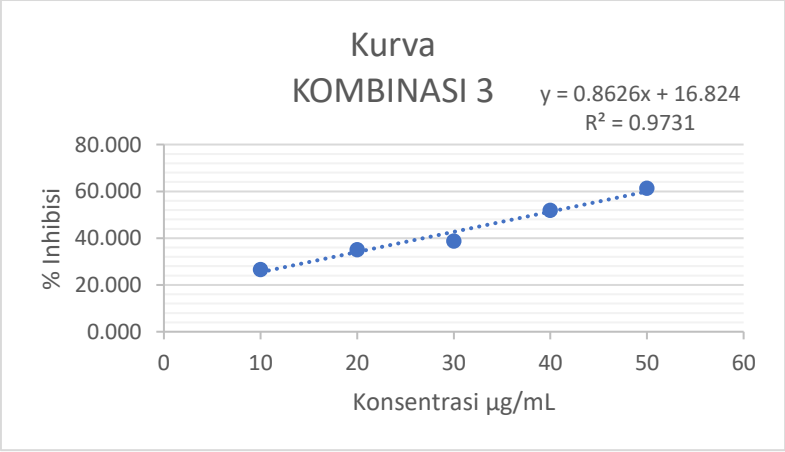
- Percobaan 1



- Pengulangan 2

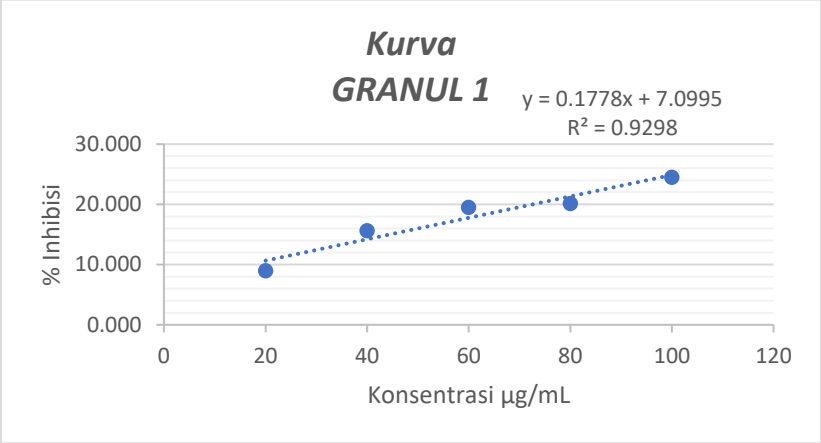


- Pengulangan 3

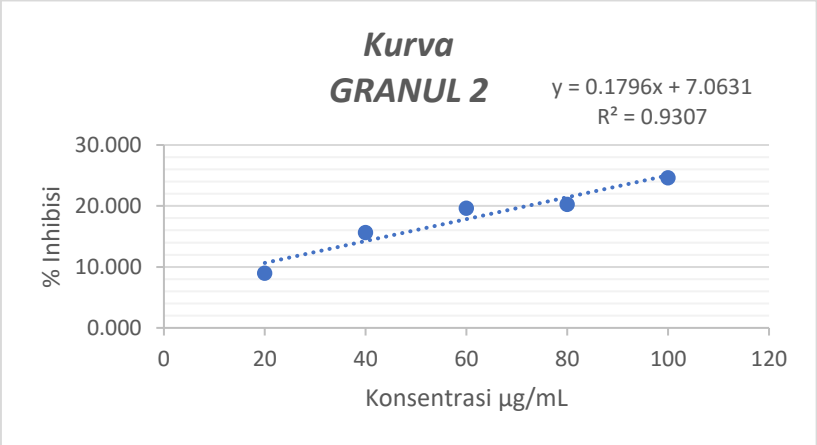


4. Sediaan granul instan

- Percobaan 1



- Pengulangan 2



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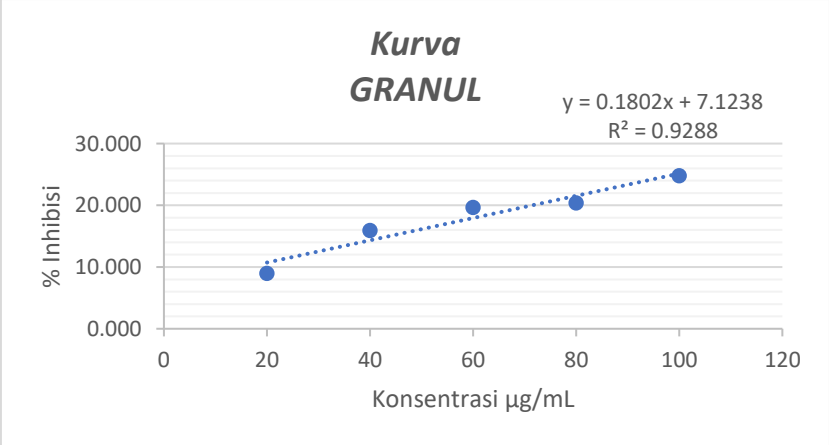


Lampiran 7. Dokumentasi hasil evaluasi sediaan granul

Uji Evaluasi	Gambar
Kadar Air	
Waktu Alir	
Sudut Diam	
Kerapatan Nyata, Mampat dan Kompresibilitas	
Distribusi Ukuran Partikel	

Waktu Melarut	
pH	
Sedimentasi	
Hedonik	

Lampiran 8. Lembar Persetujuan dan Form Penilaian Kesukaan

LEMBAR PERSETUJUAN PANELIS (*INFORMED CONSENT*)

Saya Nurul Qomariah Rasyidah Fitria Alghifari adalah mahasiswa jurusan farmasi Universitas Bhakti Kencana, saat ini sedang melakukan pengambilan data untuk uji hedonik pada produk minuman kesehatan granul instan dari ekstrak herba pegagan. Penelitian ini digunakan untuk menyusun laporan tugas akhir dengan judul "**Optimasi Formula Granul Instan Kombinasi Ekstrak Pegagan (*Centella aiatica* (L) Urb) dan Ekstrak Rimpang Kunyit (*Curcuma domestica* Vahl) dengan Metode Granulasi Basah sebagai Antioksidan"** yang mana menjadi salah satu syarat dalam memperoleh gelar Sarjana Farmasi. Perlu saya informasikan bahwa keikutsertaan rekan-rekan sebagai panelis agak terlatih bersifat sukarela. Oleh karena itu, saya memohon kesediaan waktu rekan-rekan untuk mengisi formulir penilaian kesukaan terhadap produk yang disajikan. Saya akan merahasiakan seluruh informasi yang rekan-rekan berikan. Atas kerja samanya saya ucapkan terimakasih.

Informed Consent

Setelah mendapat penjelasan mengenai tujuan dan manfaat pengambilan data tersebut, dengan ini saya

Nama :

Umur :

Jenis Kelamin :

Jurusan :

Dengan ini menyatakan bersedia menjadi panelis penelitian dari:

Nama : Nurul Qomariah Rasyidah Fitria Alghifari

NIM : 11181215

Produk : Granul Instan Ekstrak Pegagan dan Ekstrak Rimpang Kunyit

Bandung, 2022

Panelis

( )

Lampiran 9. Perhitungan Evaluasi

1. Laju alir

Rumus: Bobot (g)/waktu (s)

a. Formula 1

Percobaan 1	**Percobaan 2**	**Percobaan 3**
$\frac{50}{11,49}$ = 4,35	$\frac{50}{11,65}$ = 4,29	$\frac{50}{11,52}$ = 4,34
		Rata-rata= 4,32 ± 0,032

b. Formula 2

Percobaan 1	**Percobaan 2**	**Percobaan 3**
$\frac{50}{10,68}$ = 4,68	$\frac{50}{10,57}$ = 4,73	$\frac{50}{10,52}$ = 4,75
		Rata-rata= 4,72 ± 0,036

c. Formula 3

Percobaan 1	**Percobaan 2**	**Percobaan 3**
$\frac{50}{10,70}$ = 4,67	$\frac{50}{10,59}$ = 4,72	$\frac{50}{10,52}$ = 4,75
		Rata-rata= 4,71 ± 0,040

d. Formula 4

Percobaan 1	**Percobaan 2**	**Percobaan 3**
$\frac{50}{11,62}$ = 4,30	$\frac{50}{11,44}$ = 4,37	$\frac{50}{11,65}$ = 4,29
		Rata-rata = 4,32 ± 0,044

e. Formula 5

Percobaan 1	**Percobaan 2**	**Percobaan 3**
$\frac{50}{10,57}$ = 4,73	$\frac{50}{10,50}$ = 4,76	$\frac{50}{10,70}$ = 4,67
		Rata-rata = 4,72 ± 0,046

2. Uji Sudut Istirahat

Rumus: Tan α = $\frac{h}{r}$

Keterangan:

h = Tinggi kerucut (cm)

r = Jari-jari kerucut (cm) α = Sudut diam

a. Formula 1

Percobaan 1	Percobaan 2	Percobaan 3
Tan α= $\frac{2,069}{2,625}$ = 0,788 Tan α= 38,23	Tan α= $\frac{2,038}{2,625}$ = 0,7763 Tan α= 37,82	Tan α= $\frac{2,015}{2,625}$ = 0,7676 Tan α= 37,50
Rata-rata= 37,85 ± 0,366		

b. Formula 2

Percobaan 1	Percobaan 2	Percobaan 3
Tan α= $\frac{2,025}{2,625}$ = 0,7714 Tan α= 37,64	Tan α= $\frac{1,973}{2,625}$ = 0,7516 Tan α= 36,92	Tan α= $\frac{1,96}{2,625}$ = 0,7924 Tan α= 36,74
Rata-rata= 36,48 ± 0,476		

c. Formula 3

Percobaan 1	Percobaan 2	Percobaan 3
Tan α= $\frac{1,972}{2,625}$ = 0,7512 Tan α= 36,93	Tan α= $\frac{2,0157}{2,625}$ = 0,7678 Tan α= 36,51	Tan α= $\frac{1,91}{2,625}$ = 0,7276 Tan α= 36,00
Rata-rata = 36,48 ± 0,466		

d. Formula 4

Percobaan 1	Percobaan 2	Percobaan 3
Tan α= $\frac{1,929}{2,625}$ = 0,7348 Tan α= 36,31	Tan α= $\frac{1,927}{2,625}$ = 0,7340 Tan α= 36,27	Tan α= $\frac{1,977}{2,625}$ = 0,7531 Tan α= 36,98
Rata-rata = 36,52 ± 0,399		

e. Formula 5

Percobaan 1	Percobaan 2	Percobaan 3
Tan α= $\frac{1,971}{2,625}$ = 0,7508	Tan α= $\frac{1,953}{2,625}$ = 0,744	Tan α= $\frac{2,045}{2,625}$ = 0,7790

Tan α= 36,89	Tan α= 36,64	Tan α= 37,91
		Rata-rata = 37,15 ± 0,673

3. Uji Kompresibilitas

Kerapatan Nyata = $\frac{Bobot\ granul\ (gram)}{Volume\ granul\ (mL)}$

Kerapatan Mampat = $\frac{Bobot\ granul\ (gram)}{Volume\ mampat\ granul\ (mL)}$

Indeks Kompresibilitas = $\frac{Kerapatan\ mampat\ (Df) - Kerapatan\ nyata\ (Do)}{Kerapatan\ Mampat\ (Df)}$ x 100%

a. Formula 1

1. Kerapatan Jenis Nyata Bobot (g)/Volume (ml)

No	W (g)	V (ml)	BJ (g/ml)
1	76,28	250	0,3051
2	82,16	250	0,3230
3	75,28	250	0,3011
Rata-rata			0,3116 ± 0,0149

2. Kerapatan jenis mampat

Interval Pengetukan	Volume (ml) 1	Volume (ml) 2	Volume (ml) 3
10	248	248	249
500	240	236	238
1250	238	234	236
Kerapatan (g/ml)	$\frac{76,28\ g}{238\ mL}$ = 0,3205	$\frac{82,16\ g}{234\ mL}$ = 0,3468	$\frac{75,28\ g}{236\ mL}$ = 0,3190
Rata-rata (g/ml)	0,3288 ± 0,0157		

3. % Kompresibilitas

Percobaan 1	Percobaan 2	Percobaan 3
= $\frac{0,3205-0,3051}{0,3205}$ x 100%	= $\frac{0,3468-0,3286}{0,3468}$ x 100%	$\frac{0,3190-0,3011}{0,3190}$ x 100%
= 4,8049%	= 5,2479%	= 5,6112 %
		Rata-rata = 5,228 ± 0,401

b. Formula 1I

2. Kerapatan Jenis Nyata Bobot (g)/Volume (ml)

No	W (g)	V (ml)	BJ (g/ml)
1	85,89	250	0,3436
2	83,51	250	0,3340
3	80,25	250	0,3210
Rata-rata			0,3329 ± 0,0113

3. Kerapatan jenis mampat

Interval Pengetukan	Volume (ml) 1	Volume (ml) 2	Volume (ml) 3
10	248	249	248
500	230	237	236
1250	228	235	234
Kerapatan (g/ml)	$\frac{85,89\ g}{228\ mL}$ = 0,3767	$\frac{83,51\ g}{235\ mL}$ = 0,3554	$\frac{80,25 g}{234\ mL}$ = 0,3429
Rata-rata (g/ml)	0,3583 ± 0,0171		

2. % Kompresibilitas

Percobaan 1	Percobaan 2	Percobaan 3
= $\frac{0,3767-0,3436}{0,3767}$ x 100% = 8,7868%	= $\frac{0,3554-0,3340}{0,3554}$ x 100% = 6,0213%	=$\frac{0,3429-0,3210}{0,3429}$ x 100% = 6,3867%
Rata-rata = 7,0649 ± 1,514		

c. Formula 1II

1. Kerapatan Jenis Nyata Bobot (g)/Volume (ml)

No	W (g)	V (ml)	BJ (g/ml)
1	83,12	250	0,3325
2	82,08	250	0,3283
3	80,91	250	0,3236
Rata-rata			0,3281 ± 0,0044

2. Kerapatan jenis mampat

Interval Pengetukan	Volume (ml) 1	Volume (ml) 2	Volume (ml) 3
10	250	250	249
500	233	232	236
1250	231	230	234
Kerapatan (g/ml)	$\frac{83,12\ g}{231\ mL}$ = 0,3598	$\frac{82,08\ g}{230 mL}$ = 0,3569	$\frac{80,91\ g}{234\ mL}$ = 0,3458
Rata-rata (g/ml)	0,3542 ± 0,0074		

3. % Kompresibilitas

Percobaan 1	Percobaan 2	Percobaan 3
= $\frac{0,3598-0,3325}{0,3598}$ x 100% = 7,5875%	= $\frac{0,3569-0,3283}{0,3569}$ x 100% = 8,0134 %	$\frac{0,3458-0,3236}{0,3458}$ x 100% = 6,4198 %
Rata-rata = 7,3402 ± 0,833		

d. Formula 1V

1. Kerapatan Jenis Nyata Bobot (g)/Volume (ml)

No	W (g)	V (ml)	BJ (g/ml)
1	83,33	250	0,3333
2	86,33	250	0,3453
3	84,84	250	0,3394
Rata-rata			0,3393 ± 0,0060

2. Kerapatan jenis mampat

Interval Pengetukan	Volume (ml) 1	Volume (ml) 2	Volume (ml) 3
10	250	248	248
500	238	234	233
1250	236	232	231
Kerapatan (g/ml)	$\frac{83,33g}{236\ mL}$ = 0,3531	$\frac{82,84g}{232\ mL}$ = 0,3721	$\frac{86,33g}{231\ mL}$ = 0,3673
Rata-rata (g/ml)	0,3642 ± 0,0099		

3. % Kompresibilitas

Percobaan 1	**Percobaan 2**	**Percobaan 3**
$= \frac{0,3531-0,3333}{0,3531}$ x 100% = 5,6074%	$= \frac{0,3721-0,3453}{0,3721}$ x 100% = 7,2023%	$\frac{0,3673-0,3394}{0,3673}$ x 100% = 7,5959 %
		Rata-rata = 6,8018 ± 1,058

e. Formula V

1. Kerapatan Jenis Nyata Bobot (g)/Volume (ml)

No	**W (g)**	**V (ml)**	**BJ (g/ml)**
1	84,28	250	0,3371
2	81,16	250	0,3286
3	77,51	250	0,3100
Rata-rata			0,3252 ± 0,0139

2. Kerapatan jenis mampat

Interval Pengetukan	**Volume (ml) 1**	**Volume (ml) 2**	**Volume (ml) 3**
10	250	250	248
500	241	239	240
1250	239	237	238
Kerapatan (g/ml)	$\frac{84,28g}{239\ mL}$ = 0,3526	$\frac{81,16g}{237mL}$ = 0,3424	$\frac{77,51g}{238\ mL}$ = 0,3256
Rata-rata (g/ml)	0,3402 ± 0,0136		

3. % Kompresibilitas

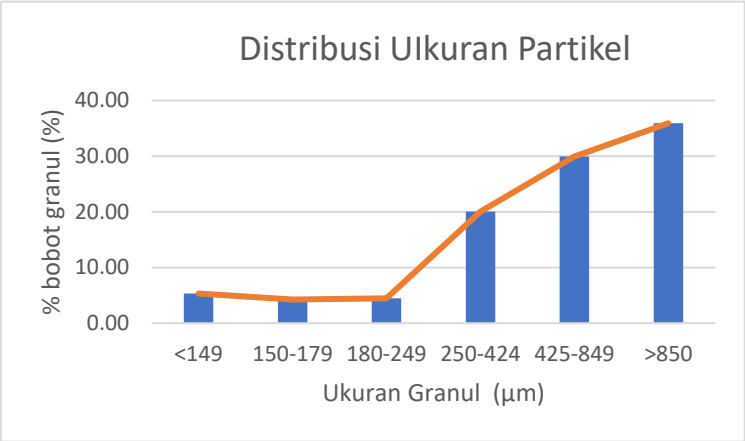
Percobaan 1	**Percobaan 2**	**Percobaan 3**
$= \frac{0,3526-0,3371}{0,3526}$ x 100% = 4,3959%	$= \frac{0,3424-0,3286}{0,3424}$ x 100% = 4,0303%	$\frac{0,3256-0,3100}{0,3256}$ x 100% = 4,7911%
		Rata-rata = 4,4057 ± 0,384

4. Uji Distribusi Ukuran Partikel

a. Formula 1

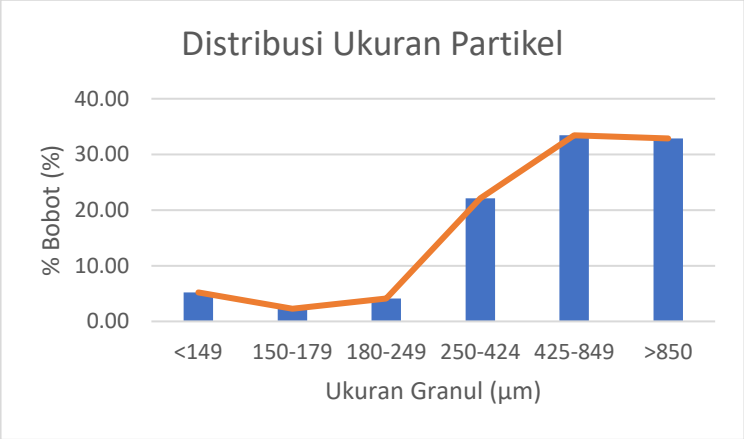
- Percobaan 1

Pengayakan			Bobot Pengayakan+Granul (gram)	Bobot Granul (gram)
No. Mesh	Diameter Lubang	Bobot (gram)		
Pan (>100)		345,58	350,97	5,39
100	150	290,83	295,11	4,28
80	180	363,89	368,41	4,52
60	250	410,47	430,65	20,18
40	425	410,45	440,65	30,20
20	850	424,02	460,21	36,19
Total				100,76



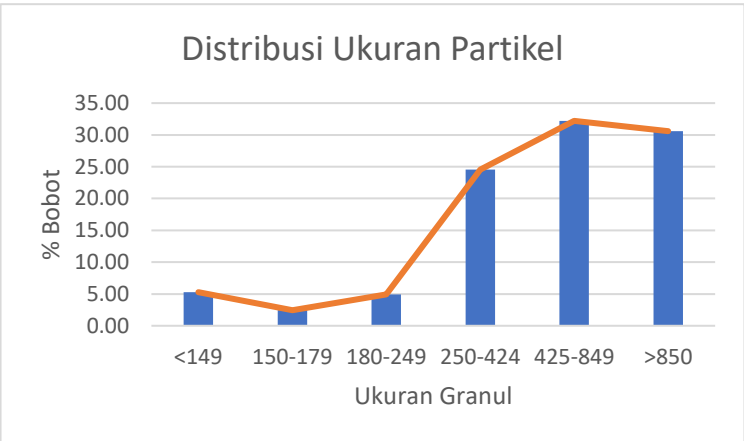
- Percobaan 2

Pengayakan			Bobot Pengayakan+Granul (gram)	Bobot Granul (gram)
No. Mesh	Diameter Lubang	Bobot (gram)		
Pan (>100)		345,51	350,61	5,10
100	150	290,94	295,39	4,45
80	180	363,79	367,82	4,03
60	250	410,4	432,06	21,66
40	425	410,41	443,16	32,75
20	850	423,96	456,14	32,18
Total				100,17



- Percobaan 3

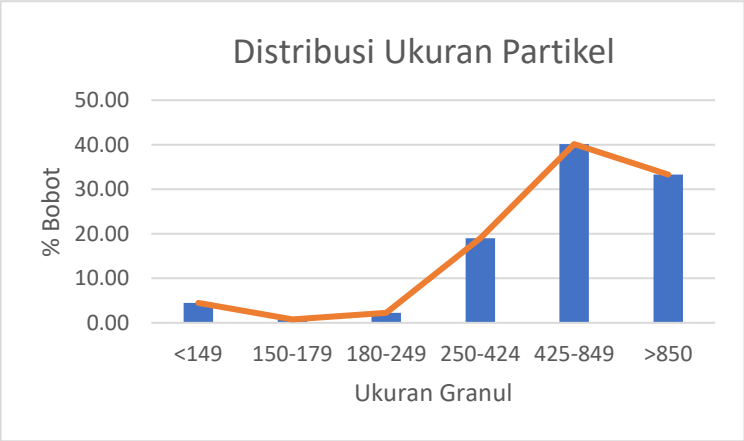
Pengayakan			Bobot Pengayakan+Granul (gram)	Bobot Granul (gram)
No. Mesh	Diameter Lubang	Bobot (gram)		
Pan (>100)		345,52	350,42	4,9
100	150	290,96	295,23	4,27
80	180	363,85	368,43	4,58
60	250	410,42	434,3	23,88
40	425	410,4	444,34	33,94
20	850	423,97	452,4	28,43
Total				100,00



b. Formula 2

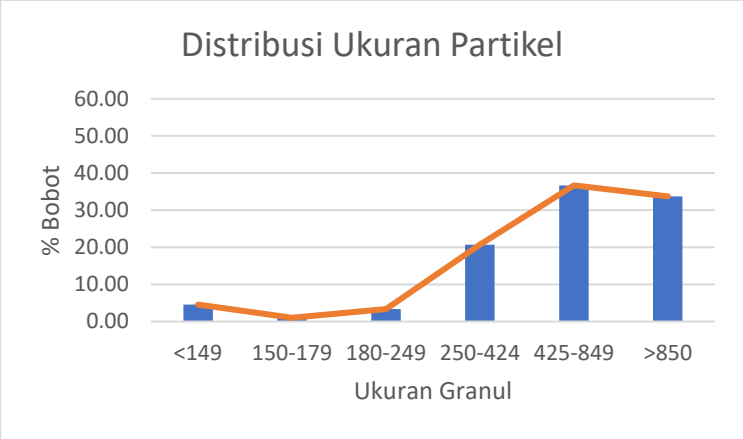
- Percobaan 1

Pengayakan			Bobot Pengayakan+Granul (gram)	Bobot Granul (gram)
No. Mesh	Diameter Lubang	Bobot (gram)		
Pan (>100)		345,38	349,87	4,49
100	150	291,9	292,67	0,77
80	180	363,87	366,14	2,27
60	250	410,33	429,37	19,04
40	425	410,36	450,55	40,19
20	850	423,94	457,29	33,35
Total				100,11



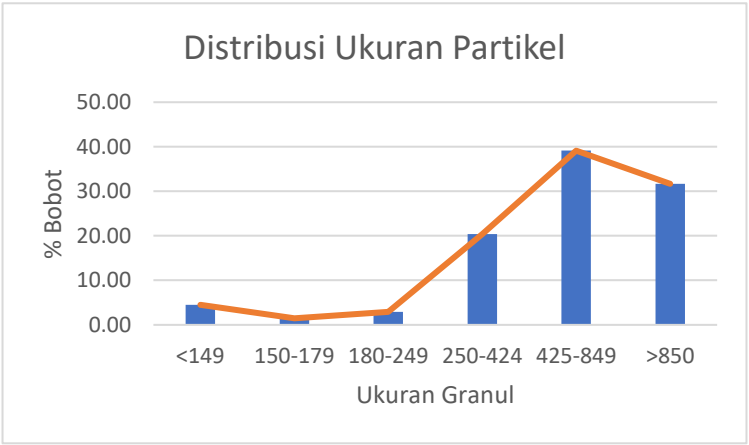
- Percobaan 2

Pengayakan			Bobot Pengayakan+Granul (gram)	Bobot Granul (gram)
No. Mesh	Diameter Lubang	Bobot (gram)		
Pan (>100)		345,36	349,95	4,59
100	150	291,46	292,48	1,02
80	180	363,8	367,13	3,33
60	250	410,38	431,08	20,7
40	425	410,34	447,05	36,71
20	850	423,93	457,63	33,7
Total				100,05



- Percobaan 3

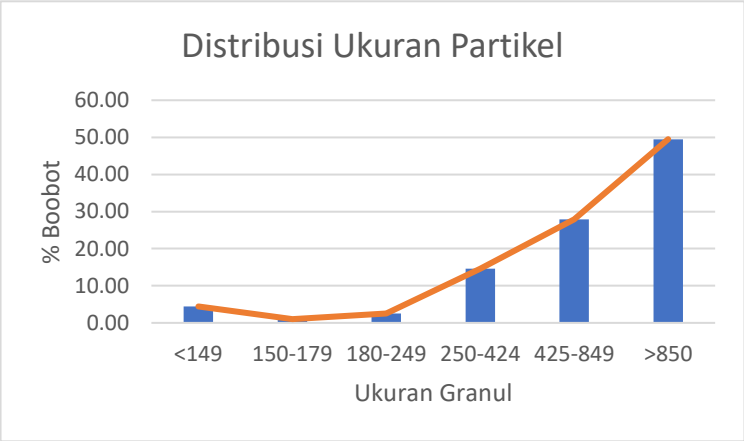
Pengayakan			Bobot Pengayakan+Granul (gram)	Bobot Granul (gram)
No. Mesh	Diameter Lubang	Bobot (gram)		
Pan (>100)		345,39	349,89	4,5
100	150	291,33	292,80	1,47
80	180	363,81	366,73	2,92
60	250	410,41	430,76	20,35
40	425	410,41	449,53	39,12
20	850	423,93	455,57	31,64
Total				100,00



c. Formula 3

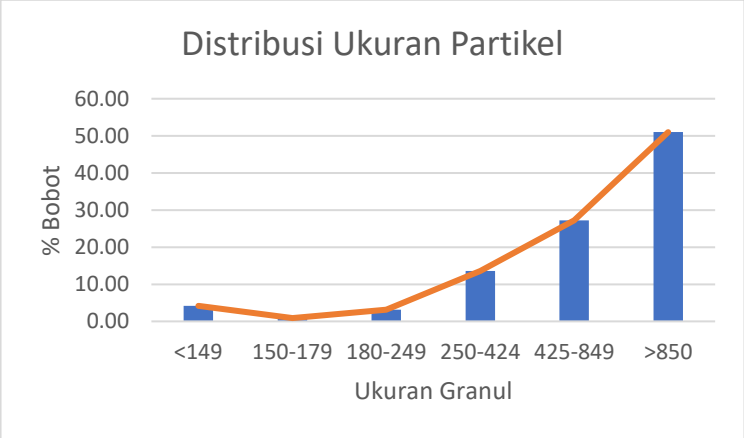
- Percobaan 1

Pengayakan			Bobot Pengayakan+Granul (gram)	Bobot Granul (gram)
No. Mesh	Diameter Lubang	Bobot (gram)		
Pan (>100)		345,36	349,79	4,43
100	150	292,54	293,55	1,01
80	180	363,82	366,36	2,54
60	250	410,4	424,99	14,59
40	425	410,37	438,30	27,93
20	850	423,91	473,41	49,5
Total				100,00



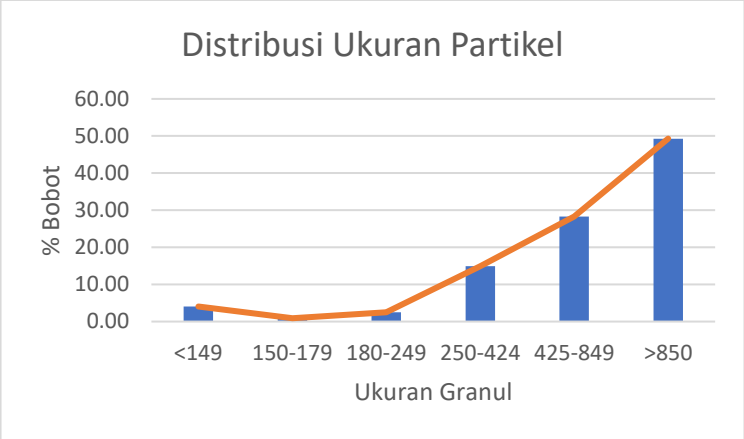
- Percobaan 2

Pengayakan			Bobot Pengayakan+Granul (gram)	Bobot Granul (gram)
No. Mesh	Diameter Lubang	Bobot (gram)		
Pan (>100)		345,32	349,51	4,19
100	150	292,37	293,26	0,89
80	180	363,77	366,9	3,13
60	250	410,31	423,94	13,63
40	425	410,34	437,57	27,23
20	850	423,89	474,95	51,06
Total				100,13



- Percobaan 3

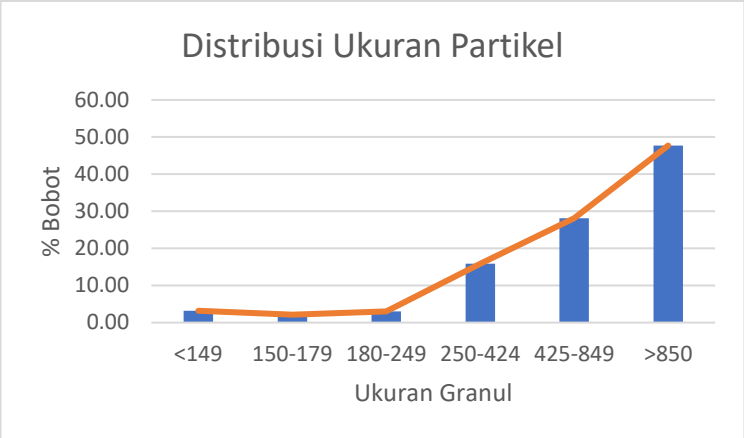
Pengayakan			Bobot Pengayakan + Granul (gram)	Bobot Granul (gram)
No. Mesh	Diameter Lubang	Bobot (gram)		
Pan (>100)		345,35	349,43	4,08
100	150	292,13	293,03	0,90
80	180	363,81	366,36	2,55
60	250	410,38	425,37	14,99
40	425	410,37	438,76	28,39
20	850	423,97	473,46	49,49
Total				100,40



d. Formula 4

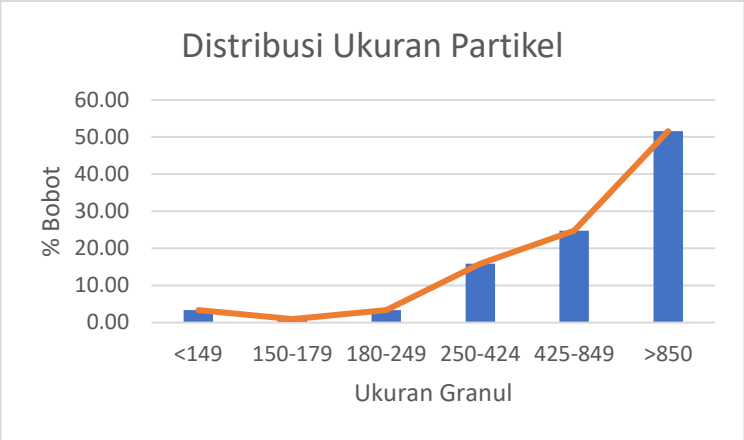
- Percobaan 1

Pengayakan			Bobot Pengayakan+Granul (gram)	Bobot Granul (gram)
No. Mesh	Diameter Lubang	Bobot (gram)		
Pan (>100)		345,37	348,58	3,21
100	150	291,11	293,25	2,14
80	180	363,82	366,82	3
60	250	410,36	426,38	16,02
40	425	410,35	438,66	28,31
20	850	423,9	471,95	48,05
Total				100,73



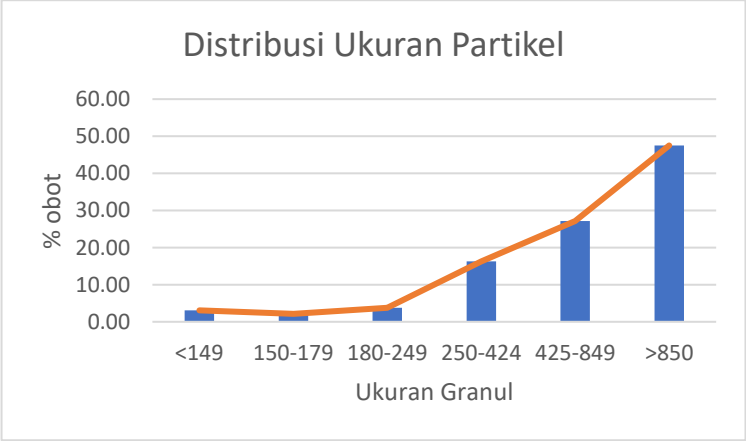
- Percobaan 2

Pengayakan			Bobot Pengayakan+Granul (gram)	Bobot Granul (gram)
No. Mesh	Diameter Lubang	Bobot (gram)		
Pan (>100)		345,35	348,75	3,4
100	150	291,27	292,20	0,93
80	180	368,82	372,21	3,39
60	250	410,39	426,28	15,89
40	425	410,36	435,12	24,76
20	850	423,95	475,48	51,53
Total				99,90



- Percobaan 3

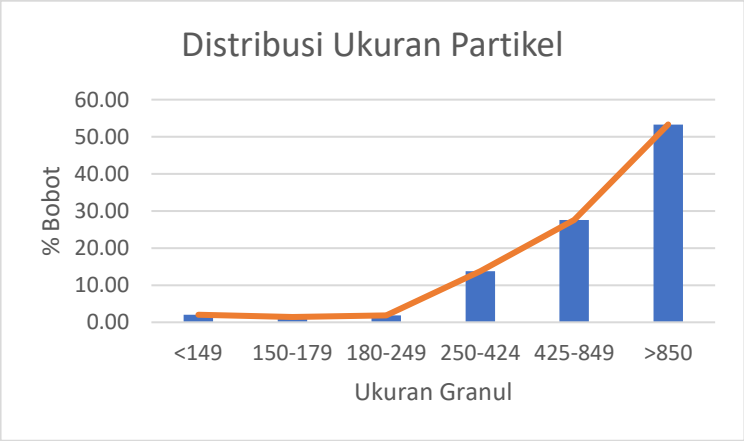
Pengayakan			Bobot Pengayakan+Granul (gram)	Bobot Granul (gram)
No. Mesh	Diameter Lubang	Bobot (gram)		
Pan (>100)		345,36	348,46	3,1
100	150	291,09	293,23	2,14
80	180	363,76	367,53	3,77
60	250	410,36	426,68	16,32
40	425	410,39	437,56	27,17
20	850	423,94	471,48	47,54
Total				100,04



e. Formula 5

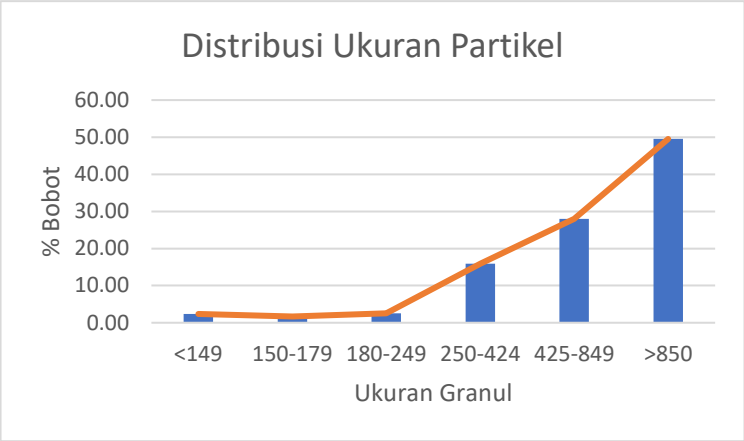
- Percobaan 1

Pengayakan			Bobot Pengayakan+Granul (gram)	Bobot Granul (gram)
No. Mesh	Diameter Lubang	Bobot (gram)		
Pan (>100)		345,41	347,44	2,03
100	150	291,23	292,64	1,41
80	180	363,79	366,69	2,9
60	250	410,39	423,98	13,59
40	425	410,39	437,88	27,49
20	850	424,01	476,59	52,58
Total				100,00



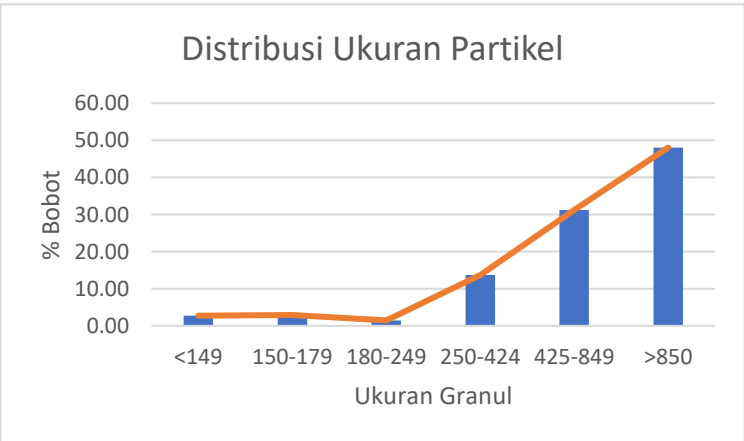
- Percobaan 2

Pengayakan			Bobot Pengayakan+Granul (gram)	Bobot Granul (gram)
No. Mesh	Diameter Lubang	Bobot (gram)		
Pan (>100)		345,33	347,68	2,35
100	150	291,14	292,82	1,68
80	180	363,75	366,32	2,57
60	250	410,32	426,22	15,9
40	425	410,33	438,32	27,99
20	850	423,92	473,46	49,54
Total				100,03



- Percobaan 3

Pengayakan			Bobot Pengayakan+Granul (gram)	Bobot Granul (gram)
No. Mesh	Diameter Lubang	Bobot (gram)		
Pan (>100)		345,35	348,05	2,7
100	150	291,33	294,27	2,94
80	180	363,79	365,25	1,46
60	250	410,34	424,02	13,68
40	425	410,36	441,54	31,18
20	850	424,01	472,07	48,06
Total				100,02



Lampiran 10. Hasil Uji One Way Anova

1. UJI LOD

Tests of Normality

		Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Formula	Statistic	df	Sig.	Statistic	df	Sig.
Uji_LOD	Formula 1	.181	3	.	.999	3	.942
	Formula 2	.295	3	.	.919	3	.450
	Formula 3	.236	3	.	.977	3	.712
	Formula 4	.177	3	.	1.000	3	.972
	Formula 5	.358	3	.	.814	3	.148

a. Lilliefors Significance Correction

Test of Homogeneity of Variances

		Levene Statistic	df1	df2	Sig.
Uji_LOD	Based on Mean	.026	4	10	.998
	Based on Median	.004	4	10	1.000
	Based on Median and with adjusted df	.004	4	8.665	1.000
	Based on trimmed mean	.021	4	10	.999

ANOVA

Uji_LOD

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	.359	4	.090	2.413	.118
Within Groups	.372	10	.037		
Total	.731	14			

2. Uji Laju Alir

Tests of Normality

		Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Formula	Statistic	df	Sig.	Statistic	df	Sig.
Uji_Laju_Alir	Formula 1	.328	3	.	.871	3	.298
	Formula 2	.276	3	.	.942	3	.537
	Formula 3	.232	3	.	.980	3	.726
	Formula 4	.343	3	.	.842	3	.220
	Formula 5	.253	3	.	.964	3	.637

a. Lilliefors Significance Correction

Test of Homogeneity of Variances

		Levene Statistic	df1	df2	Sig.
Uji_Laju_Alir	Based on Mean	.167	4	10	.950
	Based on Median	.050	4	10	.994
	Based on Median and with adjusted df	.050	4	8.897	.994
	Based on trimmed mean	.154	4	10	.957

ANOVA

Uji_Laju_Alir

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	.560	4	.140	87.908	.000
Within Groups	.016	10	.002		
Total	.576	14			

Multiple Comparisons

Dependent Variable: Uji_Laju_Alir

LSD

		Mean Difference			95% Confidence Interval	
(I) Formula	(J) Formula	(I-J)	Std. Error	Sig.	Lower Bound	Upper Bound
Formula 1	Formula 2	-.39333*	.03259	.000	-.4660	-.3207
	Formula 3	-.38667*	.03259	.000	-.4593	-.3140
	Formula 4	.00667	.03259	.842	-.0660	.0793
	Formula 5	-.39333*	.03259	.000	-.4660	-.3207
Formula 2	Formula 1	.39333*	.03259	.000	.3207	.4660
	Formula 3	.00667	.03259	.842	-.0660	.0793
	Formula 4	.40000*	.03259	.000	.3274	.4726
	Formula 5	.00000	.03259	1.000	-.0726	.0726
Formula 3	Formula 1	.38667*	.03259	.000	.3140	.4593
	Formula 2	-.00667	.03259	.842	-.0793	.0660
	Formula 4	.39333*	.03259	.000	.3207	.4660
	Formula 5	-.00667	.03259	.842	-.0793	.0660
Formula 4	Formula 1	-.00667	.03259	.842	-.0793	.0660
	Formula 2	-.40000*	.03259	.000	-.4726	-.3274
	Formula 3	-.39333*	.03259	.000	-.4660	-.3207
	Formula 5	-.40000*	.03259	.000	-.4726	-.3274
Formula 5	Formula 1	.39333*	.03259	.000	.3207	.4660
	Formula 2	.00000	.03259	1.000	-.0726	.0726
	Formula 3	.00667	.03259	.842	-.0660	.0793
	Formula 4	.40000*	.03259	.000	.3274	.4726

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

3. Sudut Istirahat

Tests of Normality

		Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Formula	Statistic	df	Sig.	Statistic	df	Sig.
Uji_Sudut_Istirahat	Formula 1	.199	3	.	.995	3	.864
	Formula 2	.314	3	.	.893	3	.363
	Formula 3	.192	3	.	.997	3	.893
	Formula 4	.367	3	.	.792	3	.096
	Formula 5	.315	3	.	.891	3	.357

a. Lilliefors Significance Correction

Test of Homogeneity of Variances

		Levene Statistic	df1	df2	Sig.
Uji_Sudut_Istirahat	Based on Mean	.652	4	10	.639
	Based on Median	.123	4	10	.971
	Based on Median and with adjusted df	.123	4	7.374	.970
	Based on trimmed mean	.589	4	10	.678

ANOVA

Uji_Sudut_Istirahat

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	3.759	4	.940	3.951	.036
Within Groups	2.379	10	.238		
Total	6.137	14			

Multiple Comparisons

Dependent Variable: Uji_Sudut_Istirahat

LSD

		Mean Difference			95% Confidence Interval	
(I) Formula	(J) Formula	(I-J)	Std. Error	Sig.	Lower Bound	Upper Bound
Formula 1	Formula 2	.75000	.39822	.089	-.1373	1.6373
	Formula 3	1.37000*	.39822	.006	.4827	2.2573
	Formula 4	1.33000*	.39822	.007	.4427	2.2173
	Formula 5	.70333	.39822	.108	-.1840	1.5906
Formula 2	Formula 1	-.75000	.39822	.089	-1.6373	.1373
	Formula 3	.62000	.39822	.151	-.2673	1.5073
	Formula 4	.58000	.39822	.176	-.3073	1.4673
	Formula 5	-.04667	.39822	.909	-.9340	.8406

Formula 3	Formula 1	-1.37000*	.39822	.006	-2.2573	-.4827
	Formula 2	-.62000	.39822	.151	-1.5073	.2673
	Formula 4	-.04000	.39822	.922	-.9273	.8473
	Formula 5	-.66667	.39822	.125	-1.5540	.2206
Formula 4	Formula 1	-1.33000*	.39822	.007	-2.2173	-.4427
	Formula 2	-.58000	.39822	.176	-1.4673	.3073
	Formula 3	.04000	.39822	.922	-.8473	.9273
	Formula 5	-.62667	.39822	.147	-1.5140	.2606
Formula 5	Formula 1	-.70333	.39822	.108	-1.5906	.1840
	Formula 2	.04667	.39822	.909	-.8406	.9340
	Formula 3	.66667	.39822	.125	-.2206	1.5540
	Formula 4	.62667	.39822	.147	-.2606	1.5140

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

4. Indeks Kompresibilitas

Tests of Normality

		Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Formula	Statistic	df	Sig.	Statistic	df	Sig.
Uji_Kompresibilitas	Formula 1	.193	3	.	.997	3	.891
	Formula 2	.336	3	.	.856	3	.256
	Formula 3	.285	3	.	.932	3	.498
	Formula 4	.315	3	.	.892	3	.359
	Formula 5	.178	3	.	1.000	3	.958

a. Lilliefors Significance Correction

Test of Homogeneity of Variances

		Levene Statistic	df1	df2	Sig.
Uji_Kompresibilitas	Based on Mean	3.178	4	10	.063
	Based on Median	.431	4	10	.783
	Based on Median and with adjusted df	.431	4	4.751	.782
	Based on trimmed mean	2.789	4	10	.086

ANOVA

Uji_Kompresibilitas

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	19.807	4	4.952	5.714	.012
Within Groups	8.666	10	.867		
Total	28.473	14			

Multiple Comparisons

Dependent Variable: Uji_Kompresibilitas

LSD

(I) Formula	(J) Formula	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval Lower Bound	95% Confidence Interval Upper Bound
Formula 1	Formula 2	-1.85467*	.76008	.035	-3.5482	-.1611
	Formula 3	-2.11900*	.76008	.019	-3.8126	-.4254
	Formula 4	-1.58033	.76008	.064	-3.2739	.1132
	Formula 5	.81567	.76008	.308	-.8779	2.5092
Formula 2	Formula 1	1.85467*	.76008	.035	.1611	3.5482
	Formula 3	-.26433	.76008	.735	-1.9579	1.4292
	Formula 4	.27433	.76008	.726	-1.4192	1.9679
	Formula 5	2.67033*	.76008	.006	.9768	4.3639
Formula 3	Formula 1	2.11900*	.76008	.019	.4254	3.8126
	Formula 2	.26433	.76008	.735	-1.4292	1.9579
	Formula 4	.53867	.76008	.495	-1.1549	2.2322
	Formula 5	2.93467*	.76008	.003	1.2411	4.6282
Formula 4	Formula 1	1.58033	.76008	.064	-.1132	3.2739
	Formula 2	-.27433	.76008	.726	-1.9679	1.4192
	Formula 3	-.53867	.76008	.495	-2.2322	1.1549
	Formula 5	2.39600*	.76008	.010	.7024	4.0896
Formula 5	Formula 1	-.81567	.76008	.308	-2.5092	.8779
	Formula 2	-2.67033*	.76008	.006	-4.3639	-.9768
	Formula 3	-2.93467*	.76008	.003	-4.6282	-1.2411
	Formula 4	-2.39600*	.76008	.010	-4.0896	-.7024

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

5. Uji Distribusi Ukuran Partikel

Tests of Normality

		Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Formula	Statistic	df	Sig.	Statistic	df	Sig.
Uji_Distribusi_Ukuran_Partikel	Formula 1	.204	3	.	.993	3	.843
	Formula 2	.353	3	.	.824	3	.174
	Formula 3	.257	3	.	.960	3	.618
	Formula 4	.269	3	.	.949	3	.567
	Formula 5	.192	3	.	.997	3	.897

a. Lilliefors Significance Correction

ANOVA

Uji_Distribusi_Ukuran_Partikel

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	15.537	4	3.884	114.244	.000
Within Groups	.340	10	.034		
Total	15.877	14			

Multiple Comparisons

Dependent Variable: Uji_Distribusi_Ukuran_Partikel

LSD

		Mean Difference			95% Confidence Interval	
(I) Formula	(J) Formula	(I-J)	Std. Error	Sig.	Lower Bound	Upper Bound
Formula 1	Formula 2	.7500*	.1506	.001	.415	1.085
	Formula 3	1.0533*	.1506	.000	.718	1.389
	Formula 4	2.0467*	.1506	.000	1.711	2.382
	Formula 5	2.9067*	.1506	.000	2.571	3.242
Formula 2	Formula 1	-.7500*	.1506	.001	-1.085	-.415
	Formula 3	.3033	.1506	.072	-.032	.639
	Formula 4	1.2967*	.1506	.000	.961	1.632
	Formula 5	2.1567*	.1506	.000	1.821	2.492
Formula 3	Formula 1	-1.0533*	.1506	.000	-1.389	-.718
	Formula 2	-.3033	.1506	.072	-.639	.032
	Formula 4	.9933*	.1506	.000	.658	1.329
	Formula 5	1.8533*	.1506	.000	1.518	2.189
Formula 4	Formula 1	-2.0467*	.1506	.000	-2.382	-1.711
	Formula 2	-1.2967*	.1506	.000	-1.632	-.961
	Formula 3	-.9933*	.1506	.000	-1.329	-.658
	Formula 5	.8600*	.1506	.000	.525	1.195
Formula 5	Formula 1	-2.9067*	.1506	.000	-3.242	-2.571
	Formula 2	-2.1567*	.1506	.000	-2.492	-1.821
	Formula 3	-1.8533*	.1506	.000	-2.189	-1.518
	Formula 4	-.8600*	.1506	.000	-1.195	-.525

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

6. Uji Waktu Melarut

Tests of Normality

		Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Formula	Statistic	df	Sig.	Statistic	df	Sig.
Uji_Kelarutan	Formula 1	.310	3	.	.898	3	.380
	Formula 2	.253	3	.	.964	3	.637
	Formula 3	.187	3	.	.998	3	.915
	Formula 4	.198	3	.	.995	3	.868
	Formula 5	.196	3	.	.996	3	.878

a. Lilliefors Significance Correction

Test of Homogeneity of Variances

		Levene Statistic	df1	df2	Sig.
Uji_Kelarutan	Based on Mean	.010	4	10	1.000
	Based on Median	.008	4	10	1.000
	Based on Median and with adjusted df	.008	4	9.503	1.000
	Based on trimmed mean	.009	4	10	1.000

ANOVA

Uji_Kelarutan

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	.220	4	.055	3.358	.055
Within Groups	.164	10	.016		
Total	.384	14			

7. Uji pH

Tests of Normality

		Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Formula	Statistic	df	Sig.	Statistic	df	Sig.
Uji_pH	Formula 1	.310	3	.	.900	3	.384
	Formula 2	.204	3	.	.993	3	.843
	Formula 3	.215	3	.	.989	3	.800
	Formula 4	.224	3	.	.984	3	.762
	Formula 5	.310	3	.	.898	3	.380

a. Lilliefors Significance Correction

Test of Homogeneity of Variances

		Levene Statistic	df1	df2	Sig.
Uji_pH	Based on Mean	.088	4	10	.984
	Based on Median	.021	4	10	.999
	Based on Median and with adjusted df	.021	4	8.882	.999
	Based on trimmed mean	.080	4	10	.987

ANOVA

Uji_pH

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	.114	4	.029	2.269	.134
Within Groups	.126	10	.013		
Total	.240	14			

8. Uji Sedimentasi

Tests of Normality

		Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Formula	Statistic	df	Sig.	Statistic	df	Sig.
Uji_Sedimentasi	Formula 1	.175	3	.	1.000	3	1.000
	Formula 2	.175	3	.	1.000	3	1.000
	Formula 3	.299	3	.	.915	3	.433
	Formula 4	.253	3	.	.964	3	.637
	Formula 5	.227	3	.	.983	3	.747

a. Lilliefors Significance Correction

Test of Homogeneity of Variances

		Levene Statistic	df1	df2	Sig.
Uji_Sedimentasi	Based on Mean	3.038	4	10	.070
	Based on Median	.859	4	10	.520
	Based on Median and with adjusted df	.859	4	4.027	.556
	Based on trimmed mean	2.827	4	10	.083

ANOVA

Uji_Sedimentasi

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	.000	4	.000	2.970	.074
Within Groups	.000	10	.000		
Total	.001	14			

9. Uji hedonik

Tests of Between-Subjects Effects

Dependent Variable: Warna

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	33.730[a]	23	1.467	11.538	.000
Intercept	1361.610	1	1361.610	10712.460	.000
Sampel	.340	4	.085	.669	.616
Panelis	33.390	19	1.757	13.826	.000
Error	9.660	76	.127		
Total	1405.000	100			
Corrected Total	43.390	99			

a. R Squared = .777 (Adjusted R Squared = .710)

Tests of Between-Subjects Effects

Dependent Variable: Aroma

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	18.400[a]	23	.800	3.455	.000
Intercept	1296.000	1	1296.000	5596.364	.000
Sampel	.000	4	.000	.000	1.000
Panelis	18.400	19	.968	4.182	.000
Error	17.600	76	.232		
Total	1332.000	100			
Corrected Total	36.000	99			

a. R Squared = .511 (Adjusted R Squared = .363)

Tests of Between-Subjects Effects

Dependent Variable: Rasa

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	37.380[a]	23	1.625	4.193	.000
Intercept	1197.160	1	1197.160	3088.396	.000
Sampel	10.140	4	2.535	6.540	.000
Panelis	27.240	19	1.434	3.699	.000
Error	29.460	76	.388		
Total	1264.000	100			
Corrected Total	66.840	99			

a. R Squared = .559 (Adjusted R Squared = .426)

Rasa

Duncan[a,b]

Sampel	N	Subset 1	Subset 2
Formula 1	20	3.05	
Formula 2	20	3.20	
Formula 3	20	3.40	
Formula 4	20		3.80
Formula 5	20		3.85
Sig.		.097	.800

Means for groups in homogeneous subsets are displayed.

Based on observed means.

The error term is Mean Square(Error) = .388.

a. Uses Harmonic Mean Sample Size = 20.000.

b. Alpha = 0.05.

Lampiran 11. Uji Hedonik/Kesukaan Granul

Keterangan Nilai Tingkat Kesukaan

5 = Sangat Tidak Suka

4 = Tidak Suka

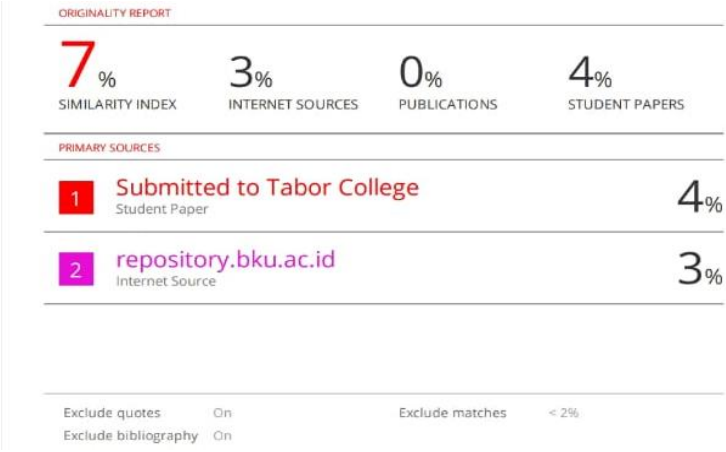
3 = Cukup

2 = Suka

1 = Sangat Suka

Pengamatan	Formula	Skor Nilai (Jumlah responden x nilai tingkat kesukaan)	Total Nilai
Warna	F1	(10 x 4) + (3x7) + (5x2) + (2x1)	73
	F2	(11x4) + (3x8) + (5x1)	73
	F3	(3x9) + (4x9) + (5x2)	73
	F4	(3x8) + (4x10) + (5x2)	74
	F5	(3x7) + (4x10) + (5x3)	76
Aroma	F1	(3x10) + (4x8) + (5x2)	72
	F2	(5x1) + (4x10) + (3x9)	72
	F3	(5x1) + (4x10) + (3x9)	72
	F4	(5x2) + (4x8) + (3x10)	72
	F5	(4x12) + (3x8)	72
Rasa	F1	(2x5) + (3x9) + (4x6)	61
	F2	(2x2) + (3x12) + (4x6)	64
	F3	(3x12) + (4x8)	68
	F4	(2x2) + (3x4) + (4x10) + (5x4)	76
	F5	(2x3) + (3x2) + (4x10) + (5x5)	77

Lampiran 12. Hasil Cek Plagiarisme



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