

LAMPIRAN

Lampiran 1. Format Surat Pernyataan Bebas Plagiasi

SURAT PERNYATAAN

Yang bertanda tangan di bawah ini,

Nama : Ditha Octaviana

N P M : 11181067

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

Pemanfaatan Tepung Porang (*Amorphaphyllus oncophyllus*) dan Ekstrak Rimpang Kunyit (*Curcuma longa* L.) dalam Formulasi Pelet Beras Nasi Kuning Instan dengan Metode Ekstrusi Sferonisasi

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 , 05 Agustus 2022

Yang membuat pernyataan,



(Ditha Octaviana)

NPM 11181067

Lampiran 2. Format Surat Persetujuan untuk dipublikasikan di media on line**SURAT PERNYATAAN**

Yang bertanda tangan di bawah ini,

Nama : Ditha Octaviana

N P M : 11181067

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

Pemanfaatan Tepung Porang (*Amorphophyllus oncophyllus*) dan Ekstrak Rimpang Kunyit (*Curcuma longa* L.) dalam Formulasi Pelet Beras Nasi Kuning Instan dengan Metode Ekstrusi Sferonisasi

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

Bandung , 05 Agustus 2022

Yang membuat pernyataan,



(Ditha Octaviana)

NPM 11181067

Lampiran 3. Certifikat Of Analisis (CoA) Bahan

a. Tepung Porang (PT. Ambico)



CERTIFICATE OF ANALYSIS

Product : Konjac Powder 85%

Issued Date : 13-Jan-22

<u>No</u>	<u>Item</u>	<u>Analysis Data</u>	<u>Specification</u>
1	Moisture	6,4%	$\leq 10 \%$
2	SO ₂	473,6	≤ 500 ppm
3	Viscositas	37000 mPa S	≥ 20000 mPa S
4	Particle size	40 - 100 mesh	40 - 100 mesh

Note : Viscosity test is using Viscometer Brookfield RV with spindle 4 (speed : 2 rpm) at 4 hour (25°C)
Aplication Konjac Powder 1.0% Solution

Checked by,

Noris Dian
QC

HEAD OFFICE :
Jalan Dinoyo no. 29 Surabaya 60265 Jawa Timur - Indonesia
tel : (+62) 31 - 566 0347 fax : (+62) 31 - 566 0347

FACTORY :
Desa Carat, Gempol, Pasuruan 67155 Jawa Timur - Indonesia
tel : (+62) 343 - 852 201 fax : (+62) 343 - 853 653

www.ambico.co.id

 Dipindai dengan CamScanner

b. . Tepung Porang (PT. Sanindo)



PT. SANINDO PORANG BERKAH
 Jl. Cipagar No. 22, RT. 008 / RW 010, 40021, Desa Cilampert, Kec. Klatapang, Kab. Bandung - Indonesia
 Phone : +62011227358 / +6205671327302 Email : sanindo.porang@gmail.com

**Certificate Of Analysis**

No : 04 / COA / XI / 2021

Date : June 03 , 2021 **Validity** : March 28, 2021 – March 28, 2023
Purchase order : - **Best Before Date** : March 27, 2023
Container No. : - **Commodity** : Konjac Powder
Date of manufacture : March 27, 2021

Component	Method	Units	Min	Target	Max
Glucomannan		%	70	75	80
Moisture*	105°C for 4 hrs	%	9	9,87	12
Ash (% WB)			4,88	4,93	4,95
Protein Total, FK = 6,25 (% WB)			0,80	0,82	0,81
Oxalic Calcium (% WB)			0,003	0,003	0,003
Particle Size Distribution*:	BritishStandardN°410				
-on 500 micron screen		%	0	0	0,5
-on 355 micron screen		%	0	5	13
-on 250 micron screen		%	50	55	60
-on 150 micron screen		%	30	34	38
-on 106 micron screen		%	0	3	6
-pan		%	0	0,6	1,5

Sample No.	Viscosity (cps) 1 Hours	Viscosity (cps) 2 Hours	Viscosity (cps) 3 Hours	Viscosity (cps) 4 Hours	Viscosity (cps) 5 Hours	Average
Konjac Powder (Ex. Oven drying)	17.680	19.967	22.566	23.667	22.720	21.320

Shelf – life : 1-2 years
Storage : Store in well closed sealed bags in dry hygienic conditions.

Indonesia, August 31 2021
 PT. SANINDO PORANG BERKAH

AUSSIE DIMAS S.Ds.
 Vice President

c. Pati Sagu


CERTIFICATE OF ANALYSIS
 No. 138/CoA/ANJAP/2021

Manufacture : PT ANJ AGRI PAPUA
 Commodity : Sago Starch
 Brand : PATI ALAM
 Production Date : 05,16,29,30,31 August; 04,06,08,27,28 September ; 02,08,10,11,14 October 2021
 Expired Date : 05,16,29,30,31 August; 04,06,08,27,28 September ; 02,08,10,11,14 October 2022
 Packing : 50 kg PP Woven Bags
 Result of Analysis:

No	Production Date	Parameter						
		Starch Content (%)	Moisture Content (%)	Whiteness (wb)	Whiteness (L')	pH aqueous extrac 6%	Particle size 120 mesh (%)	Viscosity (dPa's)
1	05 Agustus 2021	81,19	9,60	79,37	91,49	4,93	99,71	5,40
2	16 Agustus 2021	84,89	10,01	83,13	92,81	5,03	99,55	6,40
3	29 Agustus 2021	86,63	9,86	82,20	92,29	5,91	99,92	6,30
4	30 Agustus 2021	86,36	9,26	80,19	91,72	5,10	99,84	6,53
5	31 Agustus 2021	83,15	9,75	80,58	91,58	5,43	99,68	5,70
6	04 September 2021	82,66	9,61	83,90	92,83	4,91	99,95	7,10
7	06 September 2021	84,83	9,03	84,03	92,82	5,43	99,83	6,57
8	08 September 2021	83,15	10,07	84,31	92,65	5,06	99,95	6,27
9	27 September 2021	82,28	8,61	82,08	92,72	4,64	99,91	6,20
10	28 September 2021	82,50	9,97	85,66	93,50	4,50	99,92	5,10
11	02 Oktober 2021	82,88	10,16	83,97	93,02	4,63	99,91	5,35
12	08 Oktober 2021	81,19	9,27	85,29	93,53	5,60	99,94	4,20
13	10 Oktober 2021	81,02	9,02	86,70	93,89	5,81	99,88	4,30
14	11 Oktober 2021	80,00	9,06	85,62	93,82	5,42	99,98	4,70
15	14 Oktober 2021	81,41	9,28	86,70	93,93	5,49	99,94	5,00

Awair, October 19, 2021

Mill Manager



Danang Kurniawan
Ass Head Laboratory & Process

PT ANJ Agri Papua
 Menara BTPN Lantai 40 | Jalan D. Idris Anak Agung Gde Agung Kav 5.5 - 5.6
 Kawasan Mega Kuningan Jakarta 12950
 T: (62 21) 2965 1777 | F: (62 21) 2965 1788
www.anj-group.com
 Member of ANJ Group

d. Glycerol Monostearate (GMS)



IOI Esterchem (M) Sdn Bhd
199201021590 (253094-T)

27/8/21

Certificate of Analysis

Page 1 of 2

Date : 10-Feb-2021 Sample Date : 21-Jan-2021
 Certificate No : 890000451517 Approved Date : 21-Jan-2021
 Product : PALMSURF GMS 40 SE GLYCERYL
 MONOSTEARATE 40% SELF-
 EMULSIFYING Manufacturing Date: 25-Aug-2020
 Batch No : GMS4S0018 Expiry Date : 25-Aug-2022
 SO No : 105027 :10
 Sample Type : BAGS
 Sampling Procedure : W1-QC-003/W1-QC-005/W1-QC-022
 Quantity : 5.600 MTS

ANALYSIS RESULTS

Test Parameters	Test Result	Specifications	Unit	Test Method
Appearance	Off white powder	Off white powder		Visual Inspection
Colour (5 1/4" Lovibond Cell)_Y	1.6	10.0 Max	Yellow	AOCS Cc 13b-45
Colour (5 1/4" Lovibond Cell)_R	0.4	1.5 Max	Red	AOCS Cc 13b-45
Melting Point	58.0	55.0 - 61.0	°C	AOCS Cc 1-25
Acid Value	1.14	5.00 Max	mg KOH/g	AOCS Cd 3d-63
Saponification Value	164.3	155.0 - 170.0	mg KOH/g	In-house method based on AOCS Cd 3-25
Iodine Value	0.13	2.00 Max	g I ₂ /100g	AOCS Cd 1b-87
Monooester	36.5	35.0 Min	%	AOCS Cd 11-57
Free Glycerol	1.78	6.00 Max	%	AOCS Ca 14-56
Soap	2.42	5.00 Max	%	AOCS Cc 17-95
Moisture	0.55	2.00 Max	%	Karl Fischer

This COA shall not be re-produced except in full, without written approval from Laboratory.



Issued by shipper/ Manufacturer
CERTIFIED BY
IOI Esterchem (M) Sdn Bhd

Chong Choy Yoke
B.APP.SC (Hons) LMIC
(L/1499/4781/05)
QC Manager

e. Polivinil Piroolidon (PVP)



安徽山河药用辅料股份有限公司检验报告单
ANHUI SUNHERE PHARMACEUTICAL EXCIPIENTS CO., LTD.
ADD: Economic and Technological Developing Zone, Hualnan, Anhui, China

CERTIFICATE OF ANALYSIS

Product: Povidone K30

Batch No.	211203	REP DATE	DEC.09,2021
Specifications	25kg/drum	MFG DATE	DEC.03,2021
Quantity	3000kg	EXP DATE	DEC.02,2023
Tests		Standard USP43	Examinations
Identification A-E		Positive	Complies
Appearance		White or yellowish-white powder	White powder
Solubility		Freely soluble in water, ethanol 96%, methanol, very slightly soluble in acetone.	Complies
Appearance of solution		Clear and NMT B _s , B _y , or B _z	Complies
pH (5% in water)		3.0~5.0	3.8
K-value		27-32	28.3
Aldehydes		≤500ppm	<500ppm
Peroxides(H ₂ O ₂)		≤400ppm	<400ppm
Formic acid		≤0.5%	0.35%
Hydrazine		≤1ppm	<1ppm
Vinylpyrrolidinone		≤0.001%	<10ppm
2-Pyrrolidone		≤3.0%	1.80%
Heavy metals (CP2010)		≤10ppm	<10ppm
Lead		≤10ppm	<10ppm
Water		≤5.0%	3.0%
Residue on Ignition		≤0.1%	0.08%
Nitrogen content		11.5~12.8%	12.1%
Total Aerobic Plate Count		≤100cfu/g	10cfu/g
Mold and Yeast Count		≤100cfu/g	10cfu/g
E.coli		Not detected	Complies
Staphylococcus Aureus		Not detected	Complies
Pseudomonas aeruginosa		Not detected	Complies
Salmonella Spp		Not detected	Complies

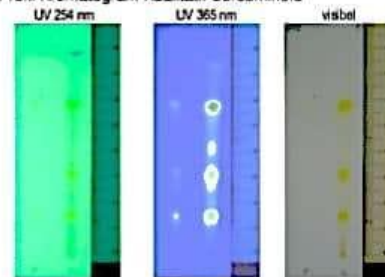
f. Ekstrak Kunyit

**SERTIFIKAT ANALISIS**

Nama Produk : Ekstrak Kunyit
 Nama Botani : *Curcuma longa* L.
 No. Batch : 2204/NI/93
 Sediaan : Ekstrak Kental

Parameter Uji	Hasil	Metode
Warna	Coklat Kekuningan	Organoleptik
Bau	Khas Kunyit	Organoleptik
Rasa	Agak Pahit	Organoleptik
Kadar Air	3,61 %	Gravimetri
Kadar Abu	0,36 %	Gravimetri
Kadar Abu Tidak Larut Asam	0,056 %	Gravimetri
Kualitatif Curcuminoid	Positif	TLC

Profil Kromatogram Kualitatif Curcuminoid



Kiri : Standar Curcuminoid
 Kanan : Ekstrak Kunyit

Fase Gerak : Chloroform – Metanol (98-2)
 Fase Diam : Silika gel 60 F₂₅₄
 Pereaksi : Tanpa pereaksi

Warna spot curcuminoid di visibel : kuning

Rf curcuminoid terdeteksi : Curcumin 0,68
 Demetoksi 0,36
 Bisdemetoksi 0,18

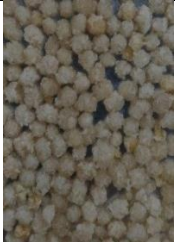
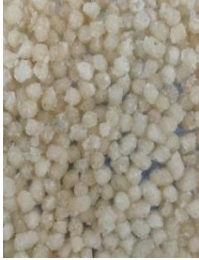
Lampiran 4. Alat dan Bahan

Alat	Gambar	Bahan	Gambar
Gilingan daging (ekstruder)		Tepung porang	
Disk 3mm		Pati Sagu	
Overhead stirrer		GMS	
Wadah Sferonizer		PVP K30	
Plat Sferonizer		Aquadest	
Steamer listrik		Ekstrak Kunyit	

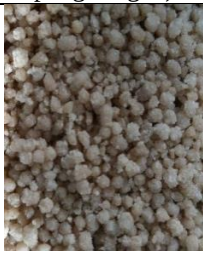
Oven		Opadry	
Moisture Balance		Etanol	
Flow Tester			
Shieve shaker			
Kompresor			
Pan coating			

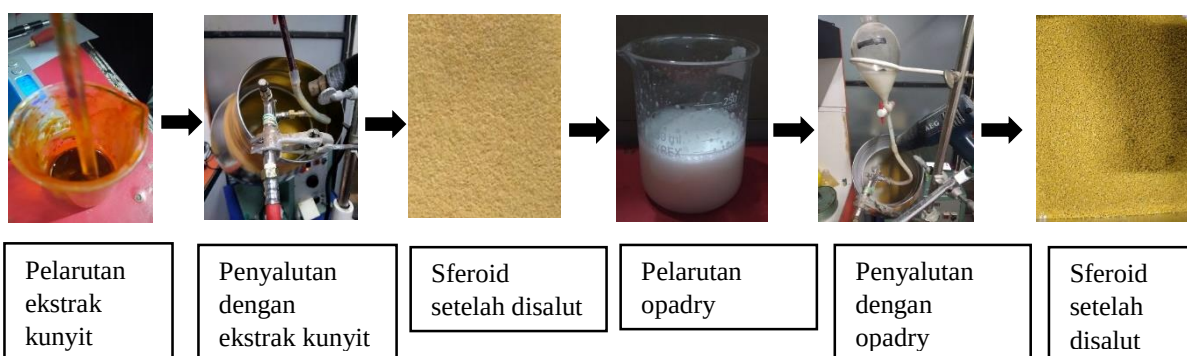
Spray gun			
Dryer			
Timbangan			
Steamer Listrik			
Objek Glass			

Lampiran 5. Optimasi Bahan Pengikat

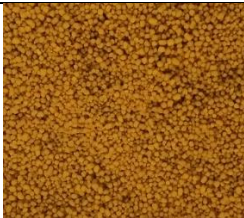
Formula	Ekstrudat	Sferoid (Sebelum pengeringan)	Sferoid (Setelah pengeringan)
F1			
F2			
F3			
F4			
F5			
F6			

Lampiran 6. Formula Pelet Terpilih

Formula	Ekstrudat	Sferoid (Sebelum pengeringan)	Sferoid (Setelah pengeringan)
3a			
3b			
3c			

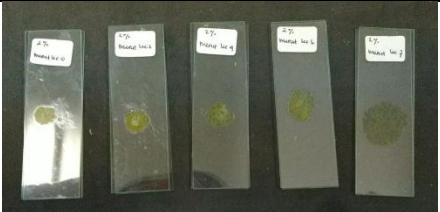
Lampiran 7. Proses Penyalutan Sferoid**Lampiran 8. Hasil Pelet Setelah Penyalutan**

Formula	Gambar
F3a	

F3b	
F3c	

Lampiran 9. Evaluasi Pelet

Evaluasi	Gambar
Organoleptik	
Kadar air (susut pengeringan)	
Laju alir	
Sudut Istirahat	

Distribusi Ukuran Partikel	
Waktu memasak	

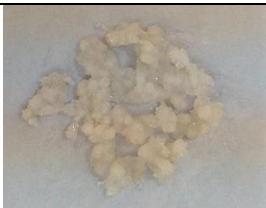
Lampiran 10. Pelet Beras yang Telah Dimasak

1. Optimasi bahan pengikat

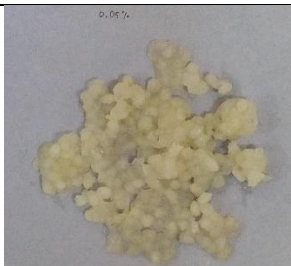
Formula	Gambar
F1	
F2	
F3	
F4	

F5	
F6	

2. Formula pelet terpilih

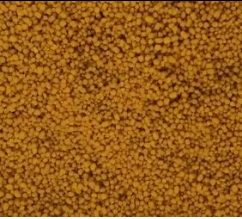
Formula	Gambar
F3a	
F3b	
F3c	

3. Formula setelah penyalutan

Formula	Gambar
F3a	

F3b	
F3c	

Lampiran 11. Beras dan Pelet Beras Setelah Penambahan Bumbu Nasi Kuning Instan

Formula	Sebelum Pemasakan	Setelah Pemasakan
Fukumi		
Troicana Slim		
F3a		
F3b		
F3c		

Lampiran 12. Data Evaluasi

1. Optimasi Pengikat

A. Organoleptik

Evaluasi		F1	F2	F3	F4	F5	F6
Organoleptik	Bentuk	Sferis	Sferis	Sferis	Sferis	Sferis	Sferis
	Warna	Cokelat muda	Cokelat muda	Cokelat muda	Cokelat muda	Cokelat muda	Cokelat muda
	Bau	Khas	Khas	Khas	Khas	Khas	Khas

B. Kadar air (Susut pengeringan)

Kadar air (susut pengeringan) (%)						
Replikasi ke	F1	F2	F3	F4	F5	F6
1	4,848	5,327	6,041	4,140	3,289	2,586
2	5,007	5,490	5,463	4,162	3,221	2,280
3	3,898	4,935	6,455	4,469	3,307	2,207
Rata-rata	4,584	5,251	5,986	4,257	3,272	2,358
Std.Dev	0,600	0,285	0,498	0,184	0,045	0,201

C. Sudut istirahat

Sudut istirahat (°)						
Replikasi Ke	F1	F2	F3	F4	F5	F6
1	27,564	27,203	26,519	27,021	26,519	26,519
2	27,203	26,885	26,885	26,885	26,702	26,656
3	26,656	27,021	26,702	26,519	26,519	27,203
Rata-rata	27,141	27,036	26,702	26,808	26,580	26,793
Std. Dev	0,457	0,160	0,183	0,260	0,106	0,362

D. Laju alir

Laju alir (gram/detik)						
Replikasi ke	F1	F2	F3	F4	F5	F6
1	8,757	8,945	9,074	8,489	8,666	8,741

2	8,726	8,913	8,945	8,621	8,726	8,666
3	8,591	8,881	8,913	8,576	8,772	8,651
Rata-rata	8,691	8,913	8,977	8,562	8,721	8,686
Std. Dev	0,088	0,032	0,086	0,067	0,053	0,049

E. Distribusi Ukuran Partikel

Replikasi ke	F1	F2	F3	F4	F5	F6
1	-0,44	-0,482	-0,471	-0,461	-0,50	-0,428
2	-0,472	-0,508	-0,461	-0,454	-0,461	-0,461
3	-0,461	-0,517	-0,491	-0,481	-0,472	-0,451
Rata-rata	-0,458	-0,502	-0,474	-0,465	-0,478	-0,447
Std.Dev	0,016	0,018	0,015	0,014	0,020	0,017

2. Formula Pelet Terpilih

A. Organoleptik

Evaluasi		F3a	F3b	F3c
Organoleptik	Bentuk	Sferis	Sferis	Sferis
	Warna	Coklat muda	Coklat muda	Coklat muda
	Bau	Khas	Khas	Khas

B. Kadar air (Susut pengeringan) (%)

Kadar air (susut pengeringan) (%)			
Replikasi ke	F3a	F3b	F3c
1	5,382	5,72	5,757
2	5,329	5,649	5,641
3	5,558	5,417	5,007
Rata-rata	5,423	5,595	5,468
Std. Dev	0,120	0,158	0,404

C. Sudut istirahat

Sudut Istirahat (°)			
Replikasi ke	F3a	F3b	F3c
1	26,519	26,519	26,519

2	26,519	26,702	27,021
3	27,021	26,885	26,885
Rata-rata	26,686	26,702	26,808
Std. Dev	0,290	0,183	0,260

D. Laju alir

Laju Alir (gram/detik)			
Replikasi ke	F3a	F3b	F3c
1	9,107	9,124	9,124
2	9,091	9,158	9,141
3	9,058	9,107	9,191
Rata-rata	9,085	9,130	9,152
Std. Dev	0,025	0,026	0,035

E. Distribusi Ukuran Partikel

Distribusi Ukuran Partikel			
Replikasi ke	3a	3b	3c
1	-0,314	-0,29	-0,267
2	-0,294	-0,2	-0,142
3	-0,257	-0,267	-0,214
Rata-rata	-0,288	-0,252	-0,208
Std.Dev	0,029	0,047	0,063

3. Formula Setelah Penyalutan

A. Organoleptik

Evaluasi		F3a	F3a	F3c
Organoleptik	Bentuk	Sferis	Sferis	Sferis
	Warna	Kuning muda	Kuning kehijauan	Jingga
	Bau	Khas kunyit	Khas kunyit	Khas kunyit

B. Kadar air (Susut pengeringan)

Kadar air (Susut pengeringan) (%)			
Replikasi ke	F3a	F3a	F3a
1	3,252	2,685	3,300

2	2,999	2,669	3,348
3	2,559	2,955	3,086
Rata-rata	2,937	2,770	3,245
Std.Dev	0,351	0,161	0,139

C. Sudut Istirahat

Sudut Istirahat (°)			
Replikasi Ke	F3a	F2b	F3c
1	26,702	26,335	27,021
2	26,335	26,519	26,519
3	26,519	26,012	26,885
Rata-rata	26,519	26,289	26,808
Std. Dev	0,184	0,257	0,260

D. Laju Alir

Laju alir (gram/detik)			
Replikasi ke	F3a	F3b	F3c
1	10,417	10,549	10,707
2	10,288	10,638	10,753
3	10,331	10,571	10,823
Rata-rata	10,345	10,586	10,761
Std. Dev	0,066	0,047	0,058

E. Distribusi Ukuran Partikel

Distribusi ukuran partikel			
Replikasi ke	F3a	F3b	F3c
1	-0,185	-0,111	-0,014
2	-0,120	-0,077	-0,185
3	-0,154	-0,154	-0,111
Rata-rata	-0,153	-0,114	-0,103
Std.Dev	0,033	0,039	0,086

F. Uji Penambahan Bobot

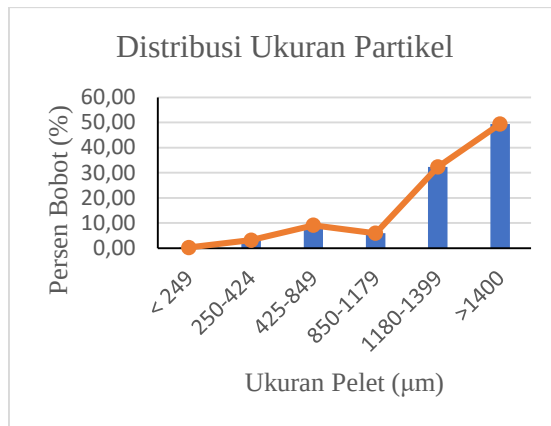
Penambahan bobot (g) bobot akhir yang dihasilkan		
F3a	F3b	F3c
319,9	326,3	376,2

Lampiran 13. Grafik Distribusi Ukuran Partikel

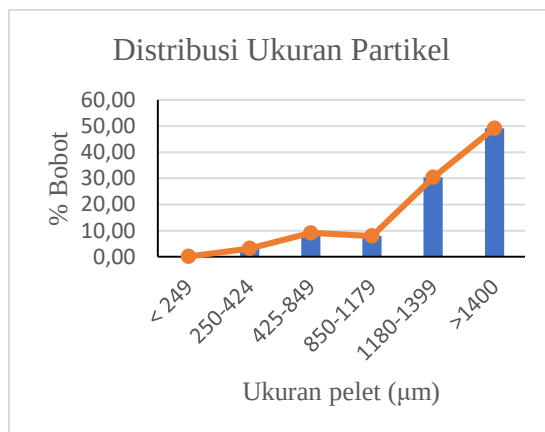
1. Optimasi Bahan Pengikat

A. Formula 1

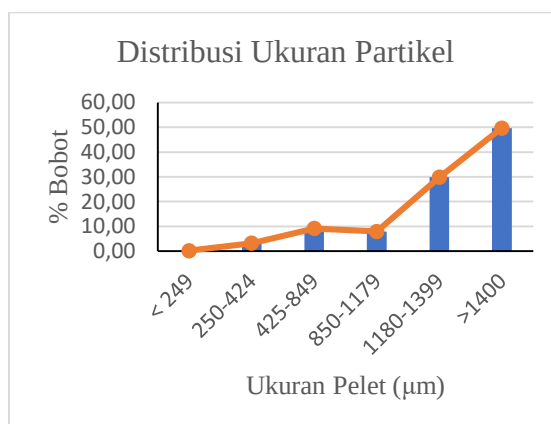
- Replikasi 1



- Replikasi 2

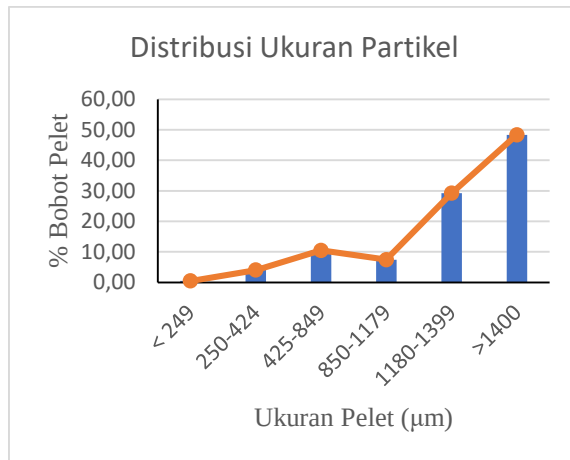


- Replikasi 3

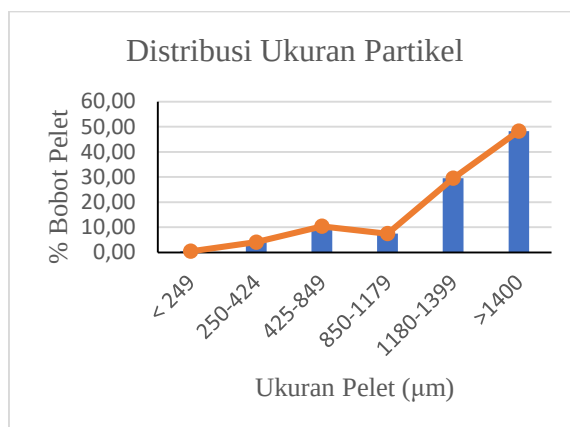


B. Formula 2

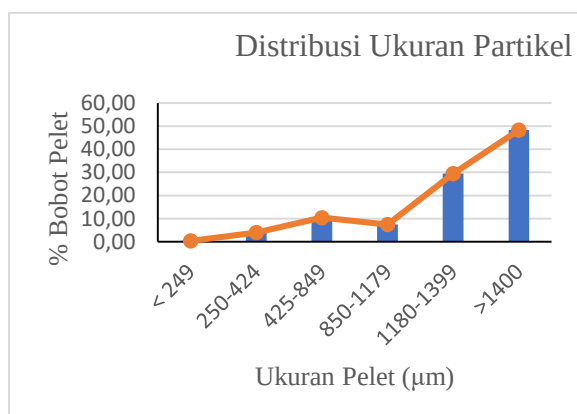
• Replikasi 1



• Replikasi 2

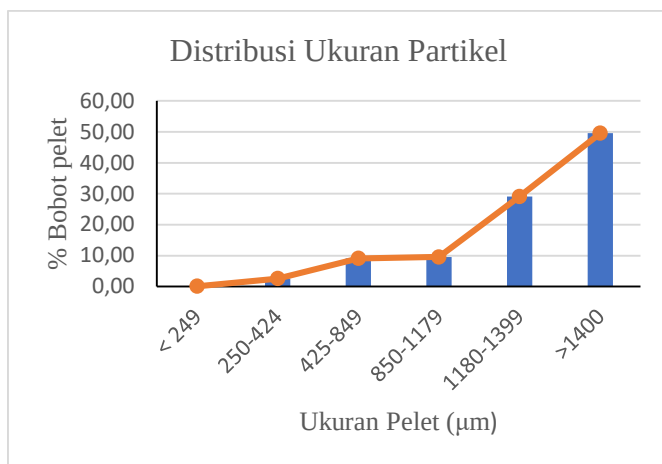


• Replikasi 3

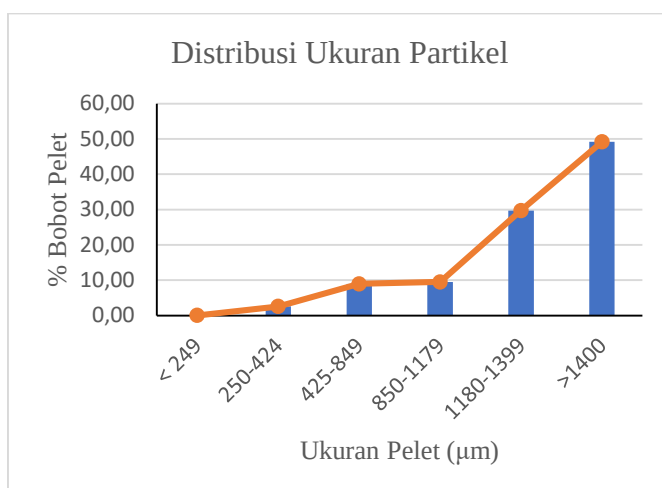


C. Formula 3

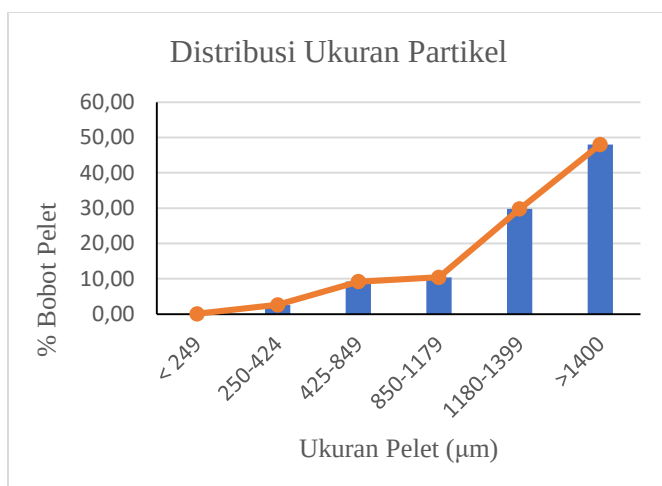
• Replikasi 1



• Replikasi 2

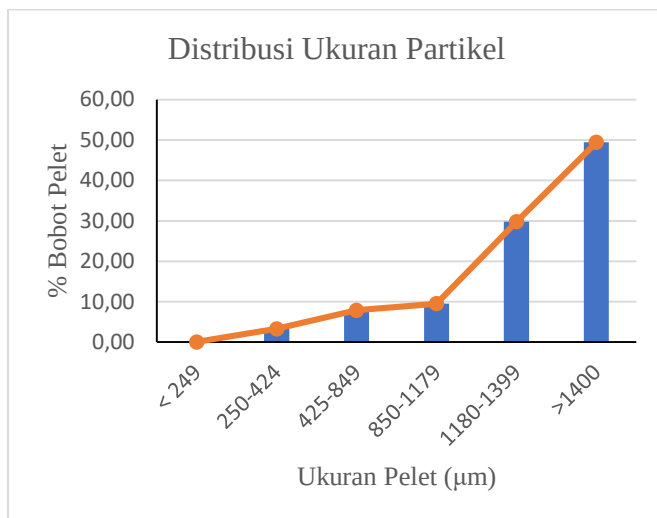


• Replikasi 3

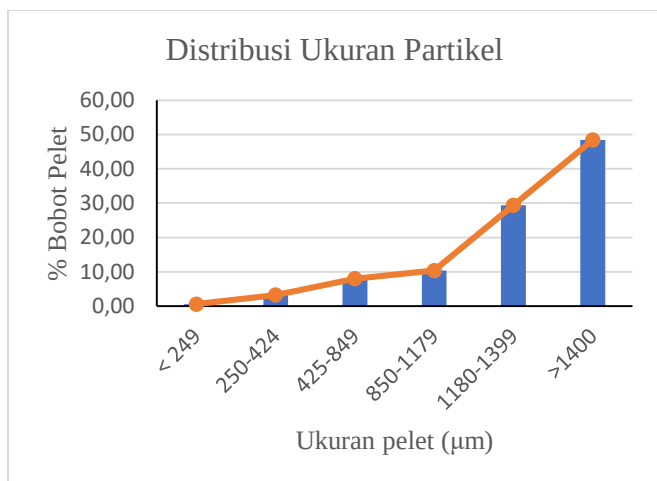


D. Formula 4

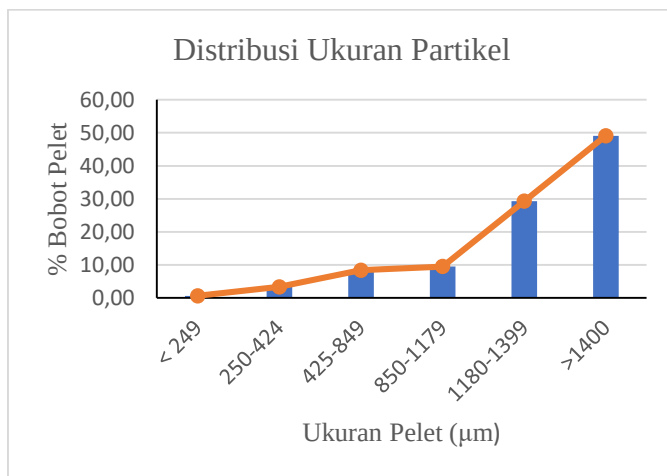
• Replikasi 1



• Replikasi 2

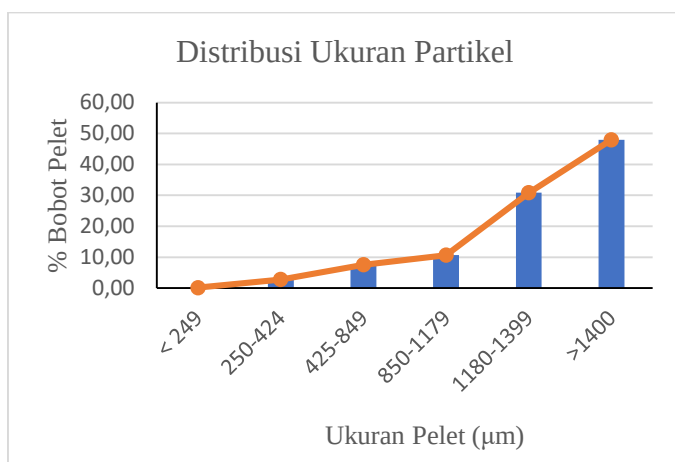


• Replikasi 3

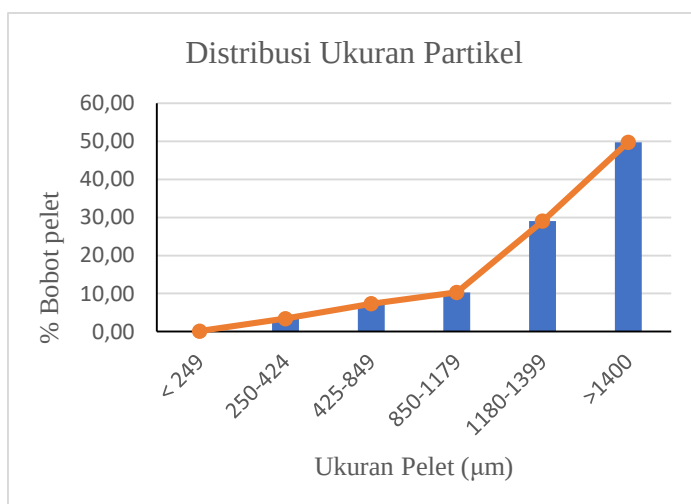


E. Formula 5

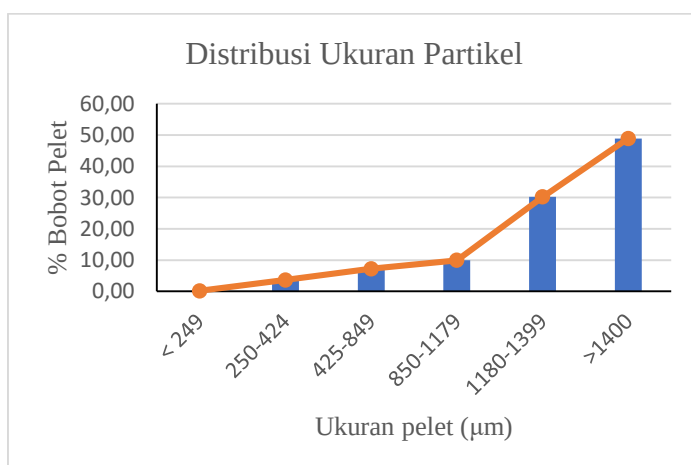
• Replikasi 1



• Replikasi 2

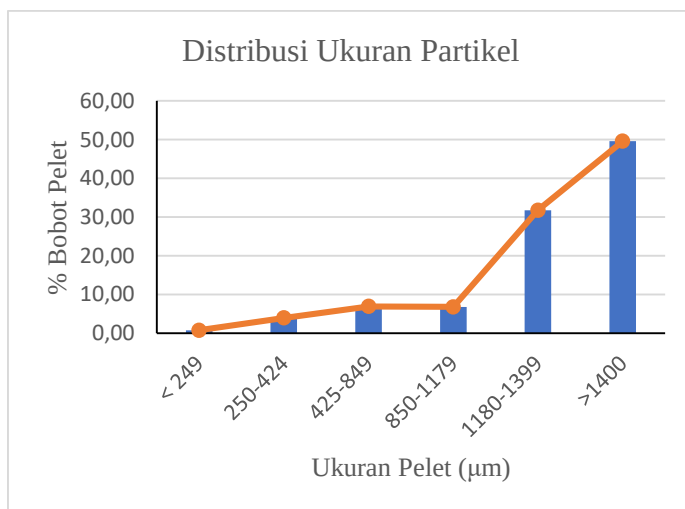


• Replikasi 3

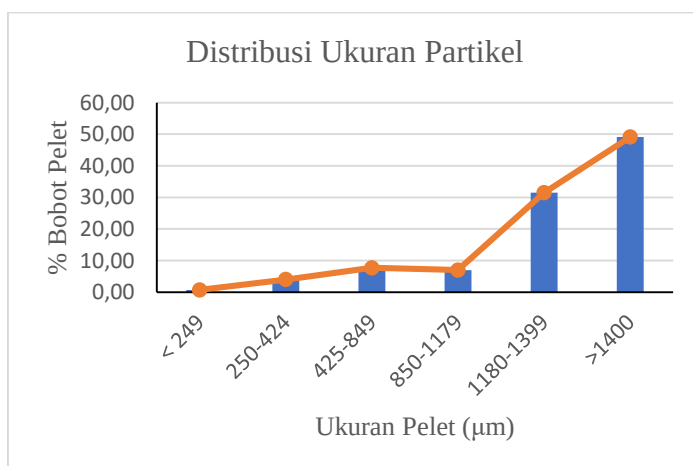


F. Formula 6

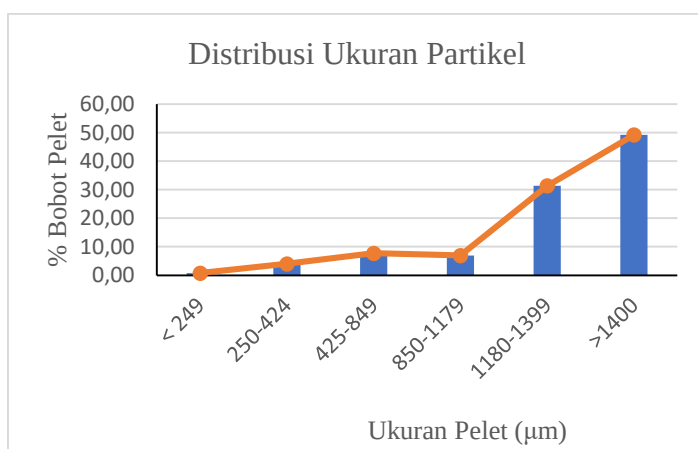
• Replikasi 1



• Replikasi 2



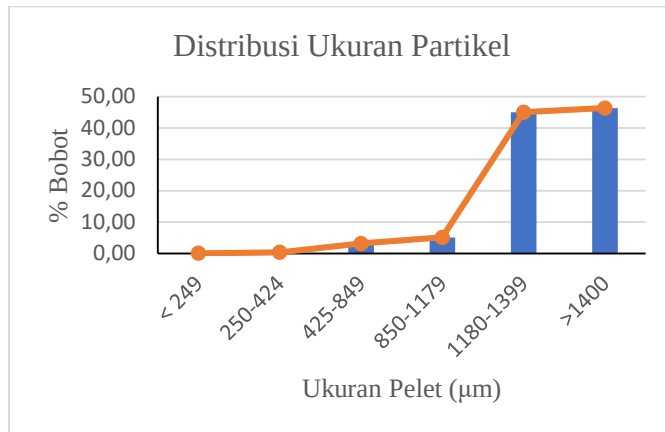
• Replikasi 3



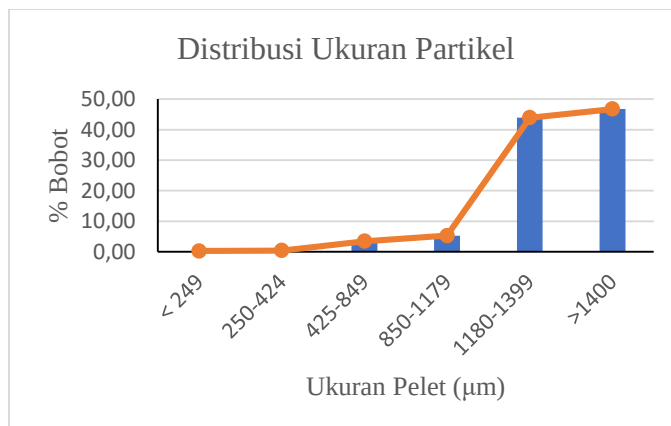
2. Formula Pelet Terpilih

A. Formula Pelet 3A

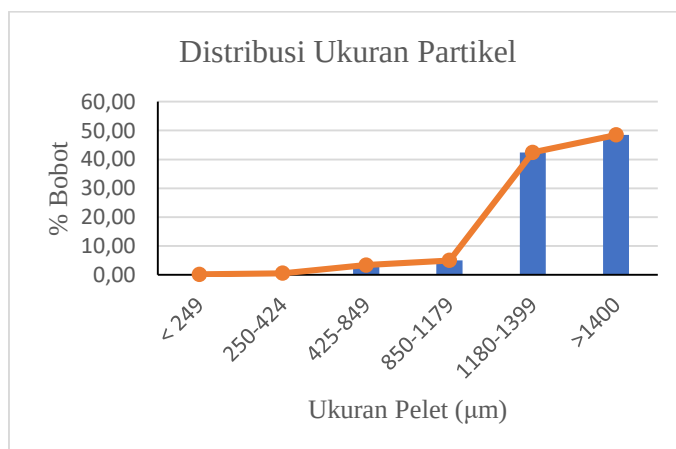
- Replikasi 1



- Replikasi 2

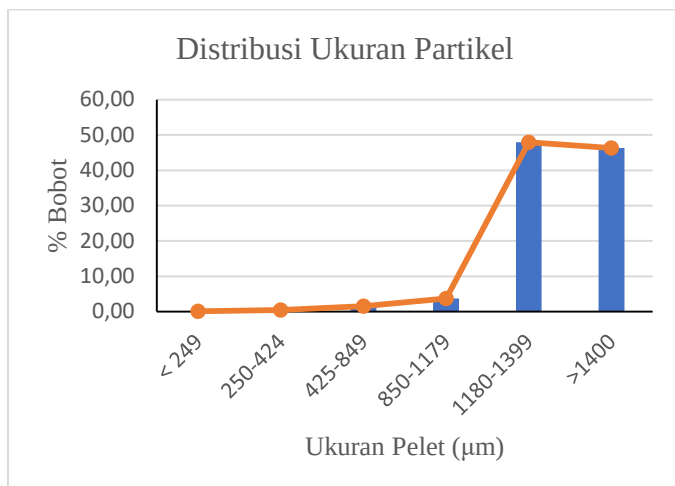


- Replikasi 3

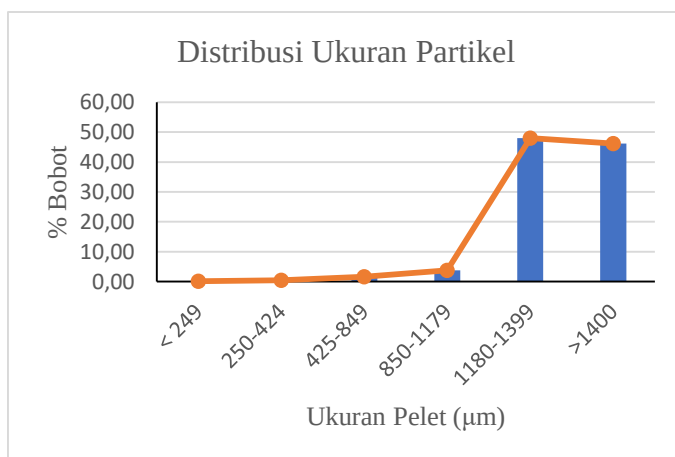


B. Formula Pelet 3B

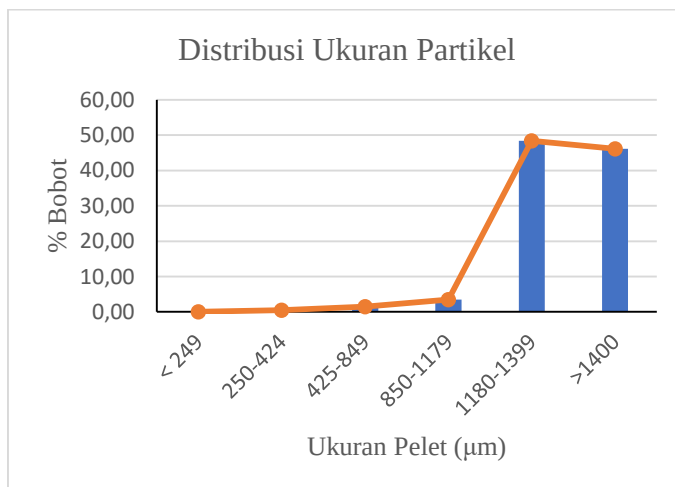
- Replikasi 1



- Replikasi 2

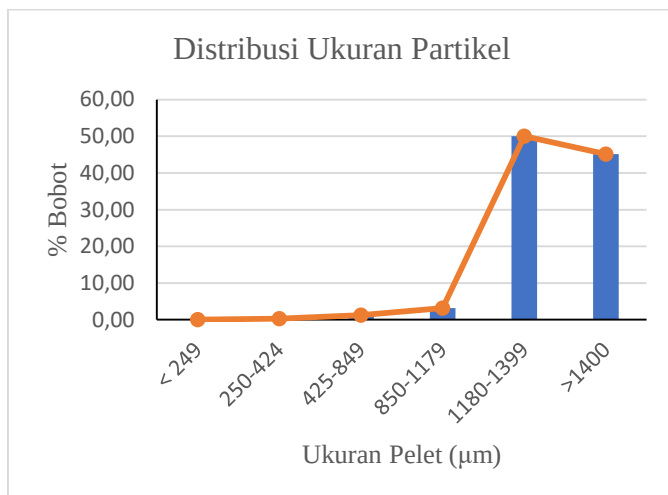


- Replikasi 3

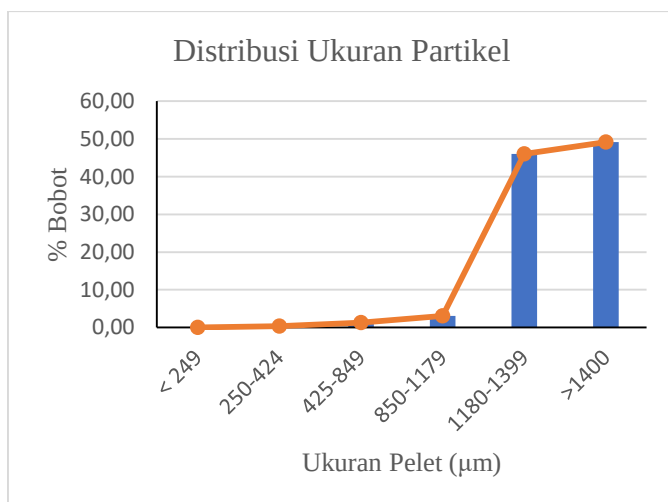


C. Formula Pelet 3C

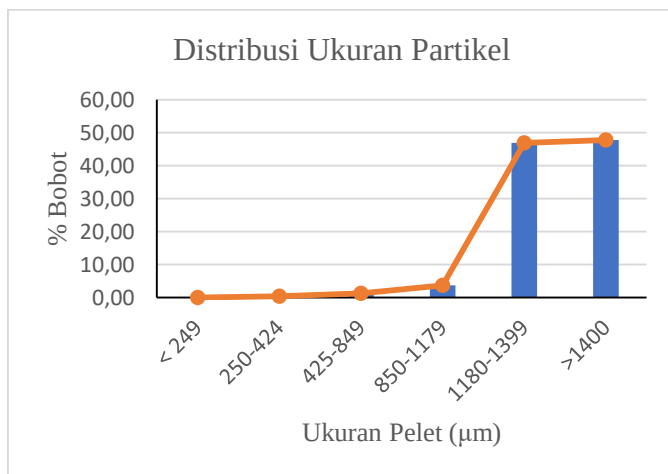
- Replikasi 1



- Replikasi 2



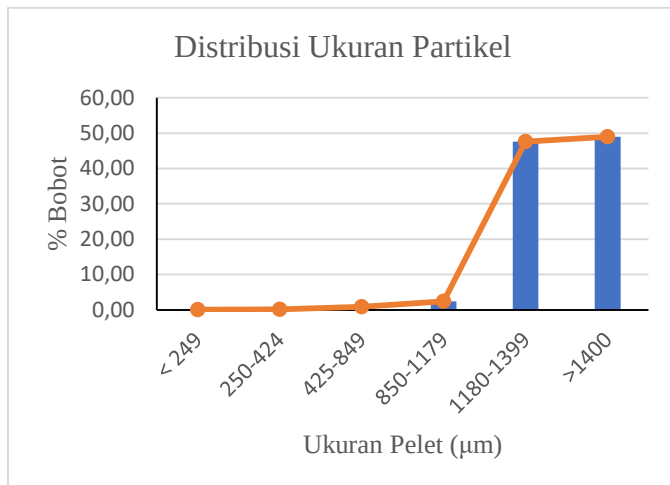
- Replikasi 3



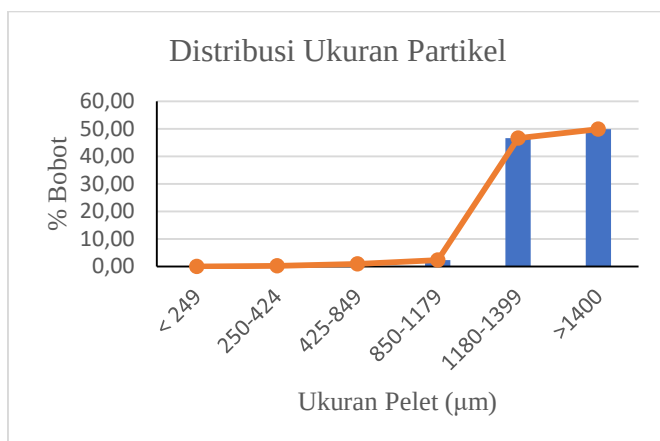
3. Formula Pelet Salut

A. Pelet Salut 3A

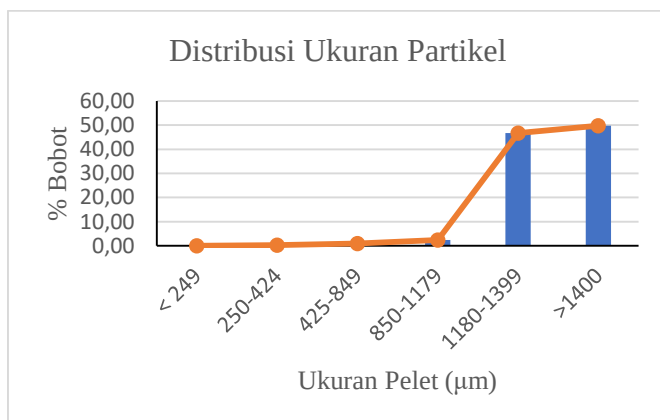
- Replikasi 1



- Replikasi 2

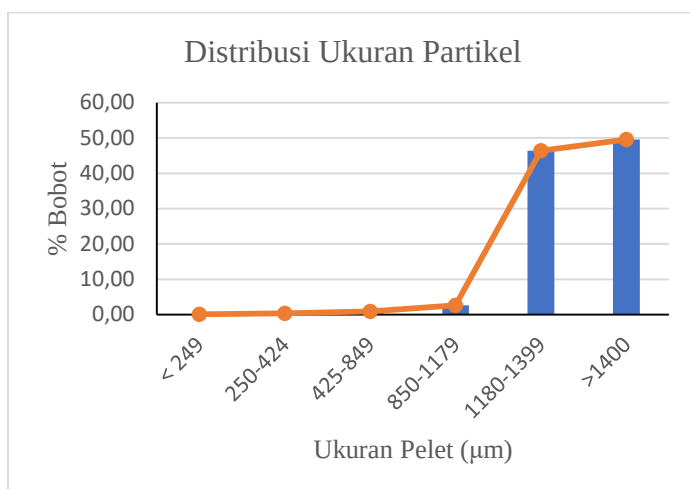


- Replikasi 3

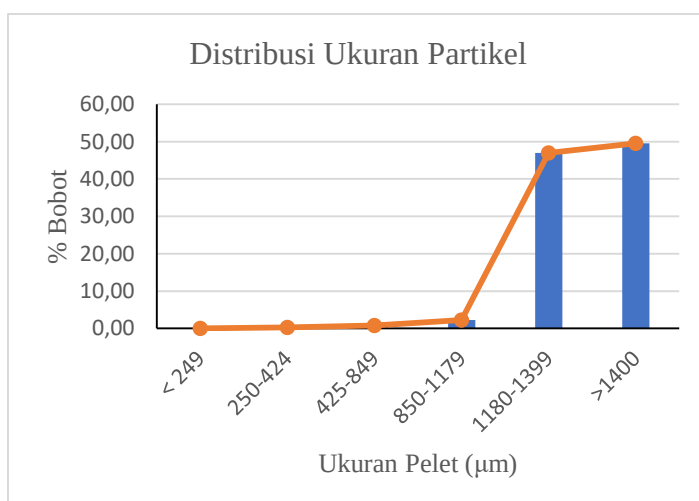


B. Pelet Salut 3B

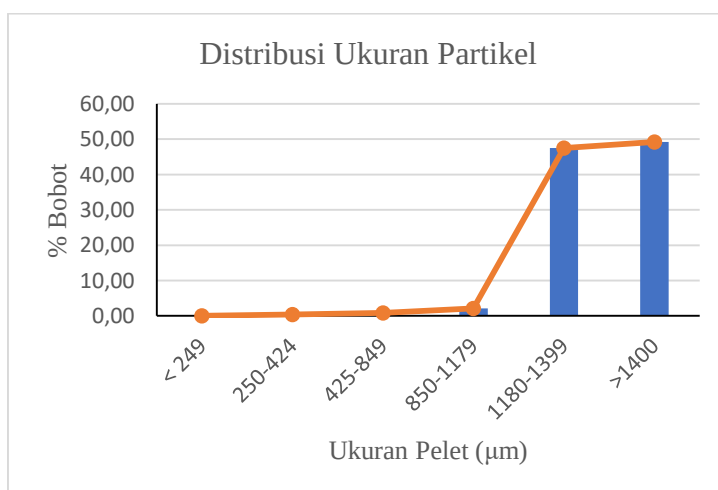
- Replikasi 1



- Replikasi 2

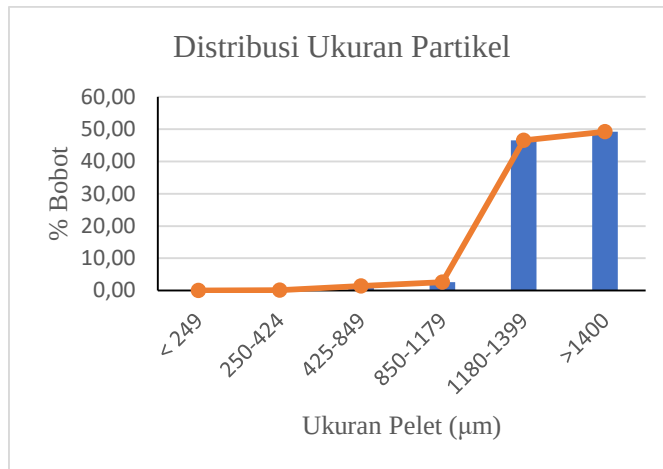


- Replikasi 3

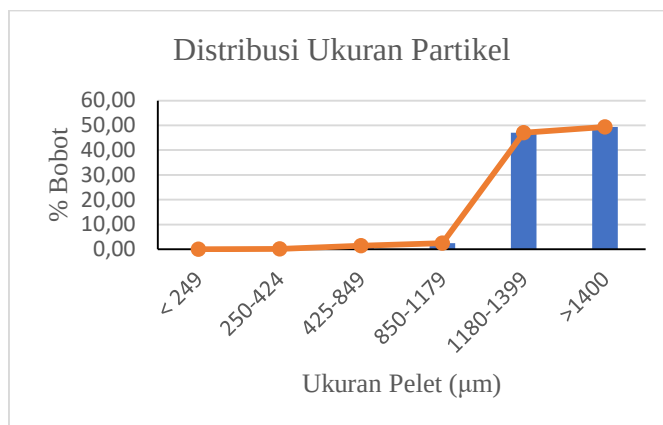


C. Pelet Salut 3C

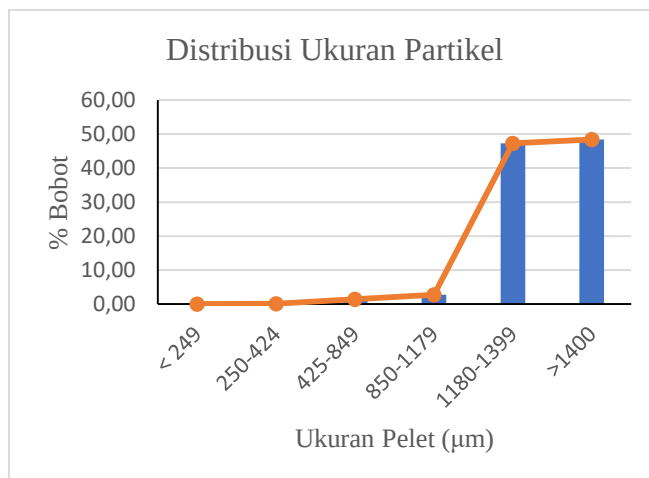
• Replikasi 1



• Replikasi 2



• Replikasi 3



Lampiran 14. Analisis Statistik Optimasi Bahan Pengikat

1. Kadar air (Susut pengeringan)

A. Gliserol monostearat (GMS)

Tests of Normality							
	Formula	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
		Statistic	df	Sig.	Statistic	df	Sig.
Kadar_air	Formula 1	.337	3	.	.855	3	.254
	Formula 2	.272	3	.	.946	3	.553
	Formula 3	.210	3	.	.991	3	.818

a. Lilliefors Significance Correction

Test of Homogeneity of Variances

Kadar_air

Levene Statistic	df1	df2	Sig.
1.094	2	6	.393

ANOVA

Kadar_air

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	2.951	2	1.475	6.422	.032
Within Groups	1.378	6	.230		
Total	4.329	8			

Multiple Comparisons

Dependent Variable: Kadar_air

LSD

(I) Formula	(J) Formula	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Formula 1	Formula 2	-.666333	.391363	.140	-1.62397	.29130
	Formula 3	-1.402000*	.391363	.012	-2.35963	-.44437
Formula 2	Formula 1	.666333	.391363	.140	-.29130	1.62397
	Formula 3	-.735667	.391363	.109	-1.69330	.22197
Formula 3	Formula 1	1.402000*	.391363	.012	.44437	2.35963
	Formula 2	.735667	.391363	.109	-.22197	1.69330

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

B. Polivinilpirolidon (PVP)

Tests of Normality							
	Formula	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
		Statistic	df	Sig.	Statistic	df	Sig.
kadar_air	Formula 4	.364	3	.	.800	3	.114
	Formula 5	.310	3	.	.899	3	.381
	Formula 6	.317	3	.	.888	3	.349

a. Lilliefors Significance Correction

Test of Homogeneity of Variances

kadar_air

Levene Statistic	df1	df2	Sig.
3.888	2	6	.083

ANOVA

kadar_air

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	5.414	2	2.707	106.399	.000
Within Groups	.153	6	.025		
Total	5.566	8			

Multiple Comparisons

Dependent Variable: kadar_air

LSD

(I) Formula	(J) Formula	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Formula 4	Formula 5	.984667 [*]	.130231	.000	.66600	1.30333
	Formula 6	1.899333 [*]	.130231	.000	1.58067	2.21800
Formula 5	Formula 4	-.984667 [*]	.130231	.000	-1.30333	-.66600
	Formula 6	.914667 [*]	.130231	.000	.59600	1.23333
Formula 6	Formula 4	-1.899333 [*]	.130231	.000	-2.21800	-1.58067
	Formula 5	-.914667 [*]	.130231	.000	-1.23333	-.59600

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

2. Sudut Istirahat

A. Gliserol monostearat (GMS)

Tests of Normality

	Formula	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
		Statistic	df	Sig.	Statistic	df	Sig.
sudut_istirahat	Formula 1	.221	3	.	.986	3	.775
	Formula 2	.205	3	.	.993	3	.841
	Formula 3	.175	3	.	1.000	3	1.000

a. Lilliefors Significance Correction

Test of Homogeneity of Variances

sudut_istirahat

Levene Statistic	df1	df2	Sig.
1.829	2	6	.240

1.1

ANOVA

sudut_istirahat

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	.315	2	.158	1.766	.249
Within Groups	.536	6	.089		
Total	.851	8			

B. Polivinilpirolidon (PVP)

Tests of Normality

	Formula	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
		Statistic	df	Sig.	Statistic	df	Sig.
sudut_istirahat	Formula 4	.283	3	.	.935	3	.506
	Formula 5	.385	3	.	.750	3	.000
	Formula 6	.314	3	.	.893	3	.364

a. Lilliefors Significance Correction

Ranks

	Formula	N	Mean Rank
sudut_istirahat	Formula 4	3	5.83
	Formula 5	3	3.67
	Formula 6	3	5.50
	Total	9	

Test Statistics^{a,b}

	sudut_istirahat
Chi-Square	1.188
Df	2
Asymp. Sig.	.552

a. Kruskal Wallis Test

b. Grouping Variable: Formula

3. Laju alir

A. Gliserol monostearat (GMS)

Tests of Normality

	Formula	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
		Statistic	df	Sig.	Statistic	df	Sig.
laju_alir	Formula 1	.319	3	.	.884	3	.337
	Formula 2	.175	3	.	1.000	3	1.000
	Formula 3	.314	3	.	.892	3	.361

a. Lilliefors Significance Correction

Test of Homogeneity of Variances

laju_alir

Levene Statistic	df1	df2	Sig.
2.407	2	6	.171

ANOVA

laju_alir

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	.135	2	.068	12.601	.007
Within Groups	.032	6	.005		
Total	.167	8			

Multiple Comparisons

Dependent Variable: laju_alir

LSD

(I) Formula	(J) Formula	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Formula 1	Formula 2	-.221667 [*]	.059775	.010	-.36793	-.07540
	Formula 3	-.286000 [*]	.059775	.003	-.43226	-.13974
Formula 2	Formula 1	.221667 [*]	.059775	.010	.07540	.36793
	Formula 3	-.064333	.059775	.323	-.21060	.08193
Formula 3	Formula 1	.286000 [*]	.059775	.003	.13974	.43226
	Formula 2	.064333	.059775	.323	-.08193	.21060

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

B. Polivinilpiridon (PVP)**Tests of Normality**

	Formula	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
		Statistic	df	Sig.	Statistic	df	Sig.
laju_alir	Formula 4	.249	3	.	.967	3	.653
	Formula 5	.202	3	.	.994	3	.855
	Formula 6	.328	3	.	.871	3	.298

a. Lilliefors Significance Correction

Test of Homogeneity of Variances

laju_alir

Levene Statistic	df1	df2	Sig.
.208	2	6	.818

ANOVA

laju_alir

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	.042	2	.021	6.528	.031
Within Groups	.019	6	.003		
Total	.061	8			

Multiple Comparisons

Dependent Variable: laju_alir

LSD

(I) Formula	(J) Formula	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Formula 4	Formula 5	-.159333*	.046316	.014	-.27266	-.04600
	Formula 6	-.124000*	.046316	.037	-.23733	-.01067
Formula 5	Formula 4	.159333*	.046316	.014	.04600	.27266
	Formula 6	.035333	.046316	.474	-.07800	.14866
Formula 6	Formula 4	.124000*	.046316	.037	.01067	.23733
	Formula 5	-.035333	.046316	.474	-.14866	.07800

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

4. Distribusi ukuran partikel

A. Gliserol monostearat

Tests of Normality

	Formula	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
		Statistic	df	Sig.	Statistic	df	Sig.
Distribusi_ukuran_partike	Formula 1	.248	3	.	.968	3	.659
	Formula 2	.289	3	.	.927	3	.478
	Formula 3	.217	3	.	.988	3	.792

a. Lilliefors Significance Correction

Test of Homogeneity of Variances

Distribusi_ukuran_partike

Levene Statistic	df1	df2	Sig.
1.201	2	6	.364

ANOVA

Distribusi_ukuran_partike

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	.004	2	.002	3.116	.118
Within Groups	.004	6	.001		
Total	.008	8			

B. Polivinilpirolidon (PVP)

Tests of Normality							
	Formula	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
		Statistic	df	Sig.	Statistic	df	Sig.
distribusi_ukuran_partikel	Formula 4	.288	3	.	.928	3	.482
	Formula 5	.278	3	.	.940	3	.529
	Formula 6	.268	3	.	.951	3	.573

a. Lilliefors Significance Correction

Test of Homogeneity of Variances

distribusi_ukuran_partikel

Levene Statistic	df1	df2	Sig.
.281	2	6	.764

ANOVA

distribusi_ukuran_partikel

	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	.001	2	.001	2.472	.165
Within Groups	.002	6	.000		
Total	.003	8			

Lampiran 15. Analisis Statistik Pelet Salut

1. Kadar air (Susut pengeringan)

Tests of Normality							
	Pelet_salut	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
		Statistic	df	Sig.	Statistic	df	Sig.
Kadar_air	Formula 3A	.237	3	.	.976	3	.705
	Formula 3B	.368	3	.	.792	3	.095
	Formula 3C	.321	3	.	.882	3	.330

a. Lilliefors Significance Correction

Test of Homogeneity of Variances

Kadar_air

Levene Statistic	df1	df2	Sig.
1.705	2	6	.259

ANOVA

Kadar_air

	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	.348	2	.174	3.106	.119
Within Groups	.337	6	.056		
Total	.685	8			

2. Sudut Istirahat

Tests of Normality

	Pelet_salut	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
		Statistic	df	Sig.	Statistic	Df	Sig.
Sudut_istirahat	Formula 3A	.175	3	.	1.000	3	.997
	Formula 3B	.238	3	.	.976	3	.700
	Formula 3C	.283	3	.	.935	3	.506

a. Lilliefors Significance Correction

Test of Homogeneity of Variances

Sudut_istirahat

Levene Statistic	df1	df2	Sig.
.354	2	6	.716

ANOVA

Sudut_istirahat

	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	.407	2	.203	3.655	.092
Within Groups	.334	6	.056		
Total	.741	8			

3. Laju alir

Tests of Normality

	Pelet_salut	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
		Statistic	df	Sig.	Statistic	df	Sig.
Laju_alir	Formula 3A	.253	3	.	.964	3	.637
	Formula 3B	.294	3	.	.921	3	.458
	Formula 3C	.221	3	.	.986	3	.773

a. Lilliefors Significance Correction

Test of Homogeneity of Variances

Laju_alir

Levene Statistic	df1	df2	Sig.
.185	2	6	.835

□

ANOVA

Laju_alir

	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	.261	2	.131	39.693	.000
Within Groups	.020	6	.003		
Total	.281	8			

Multiple Comparisons

Dependent Variable: Laju_alir

LSD

(I) Pelet_salut	(J) Pelet_salut	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Formula 3A	Formula 3B	-.240667 [*]	.046846	.002	-.35529	-.12604
	Formula 3C	-.415667 [*]	.046846	.000	-.53029	-.30104
Formula 3B	Formula 3A	.240667 [*]	.046846	.002	.12604	.35529
	Formula 3C	-.175000 [*]	.046846	.010	-.28963	-.06037
Formula 3C	Formula 3A	.415667 [*]	.046846	.000	.30104	.53029
	Formula 3B	.175000 [*]	.046846	.010	.06037	.28963

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

4. Distribusi ukuran partikel

Tests of Normality

	Pelet_salut	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
		Statistic	df	Sig.	Statistic	df	Sig.
distribusi_ukuran_partikel	Formula 3A	.179	3	.	.999	3	.949
	Formula 3B	.198	3	.	.995	3	.871
	Formula 3C	.202	3	.	.994	3	.852

a. Lilliefors Significance Correction

Test of Homogeneity of Variances

distribusi ukuran partikel

Levene Statistic	df1	df2	Sig.
1.353	2	6	.327

ANOVA

distribusi ukuran partikel

	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	.004	2	.002	.621	.568
Within Groups	.020	6	.003		
Total	.024	8			

Lampiran 16. Analisis Statistik Perbandingan Sebelum dan Setelah Penyalutan

1. Kadar air (Susut pengeringan)

A. Formula 3A

Tests of Normality

	Formula	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
		Statistic	df	Sig.	Statistic	df	Sig.
Kadar_air_sebelum	Formula 3A	.300	3	.	.912	3	.426
Kadar_air_setelah	Formula 3A	.237	3	.	.976	3	.705

a. Lilliefors Significance Correction

Paired Samples Test

	Paired Differences					T	df	Sig. (2-tailed)
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
				Lower	Upper			
Kadar_air_sebelum - Kadar_air_setelah	2.48633	.455105	.262755	1.355790	3.616876	9.463	2	.011

B. Formula 3B

□

Tests of Normality

	Formula	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
		Statistic	df	Sig.	Statistic	df	Sig.
Kadar_air_sebelum	Formula 3B	.299	3	.	.914	3	.432
Kadar_air_setelah	Formula 3B	.368	3	.	.792	3	.095

a. Lilliefors Significance Correction

Paired Samples Test

	Paired Differences					t	df	Sig. (2-tailed)
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
				Lower	Upper			
Kadar_air_sebelum - Kadar_air_setelah	2.825667	.316143	.182525	2.040324	3.611009	15.481	2	.004

C. Formula 3C

Tests of Normality

	Formula	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
		Statistic	df	Sig.	Statistic	df	Sig.
Kadar_air_sebelum	Formula 3C	.332	3	.	.863	3	.275
Kadar_air_setelah	Formula 3C	.321	3	.	.882	3	.330

a. Lilliefors Significance Correction

Paired Samples Test								
	Paired Differences					t	df	Sig. (2-tailed)
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
				Lower	Upper			
Kadar_air_sebel Pair um - 1 Kadar_air_setelah	2.223667	.274644	.158566	1.541413	2.905920	14.024	2	.005

2. Sudut istirahat

A. Formula 3A

Tests of Normality							
	Formula	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
		Statistic	df	Sig.	Statistic	df	Sig.
Sudut_istirahat_sebelum	Formula 3A	.385	3	.	.750	3	.000
Sudut_istirahat_sesudah	Formula 3A	.175	3	.	1.000	3	.997

a. Lilliefors Significance Correction

□

Ranks				
		N	Mean Rank	Sum of Ranks
Sudut_istirahat_sesudah - Sudut_istirahat_sebelum	Negative Ranks	2 ^a	2.50	5.00
	Positive Ranks	1 ^b	1.00	1.00
Ties		0 ^c		
Total		3		

a. Sudut_istirahat_sesudah < Sudut_istirahat_sebelum

b. Sudut_istirahat_sesudah > Sudut_istirahat_sebelum

c. Sudut_istirahat_sesudah = Sudut_istirahat_sebelum

Test Statistics ^a	
	Sudut_istirahat _sesudah - Sudut_istirahat _sebelum
Z	-1.069 ^b
Asymp. Sig. (2-tailed)	.285

a. Wilcoxon Signed Ranks Test

B. Formula 3B

Tests of Normality							
	Formula	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
		Statistic	df	Sig.	Statistic	df	Sig.
Sudut_istirahat_sebelum	Formula 3B	.175	3	.	1.000	3	1.000
Sudut_istirahat_setelah	Formula 3B	.238	3	.	.976	3	.700

a. Lilliefors Significance Correction

Paired Samples Test								
	Paired Differences					T	df	Sig. (2-tailed)
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
				Lower	Upper			
Sudut_istirahat_Pair 1 sebelum - Sudut_istirahat_setelah	.41333	.398083	.229834	-.575560	1.402227	1.798	2	.214

C. Formula 3C

Tests of Normality							
	Formula	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
		Statistic	df	Sig.	Statistic	df	Sig.
sudut_istirahat_sebelum	Formula 3C	.283	3	.	.935	3	.506
Sudut_istirahat_setelah	Formula 3C	.283	3	.	.935	3	.506

a. Lilliefors Significance Correction

Paired Samples Test									
		Paired Differences				T	df	Sig. (2-tailed)	
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower				Upper
Pair 1	sudut_istirahat_s ebelum - Sudut_istirahat_s etelah	.000000	.502000	.289830	-1.247037	1.247037	.000	2	1.000

3. Laju alir

A. Formula 3A

Tests of Normality							
	Formula	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
		Statistic	df	Sig.	Statistic	df	Sig.
Laju_alir_sebelum	Formula 3A	.256	3	.	.961	3	.622
Laju_alir_setelah	Formula 3A	.253	3	.	.964	3	.637

a. Lilliefors Significance Correction

Paired Samples Test								
	Paired Differences					T	df	Sig. (2-tailed)
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
				Lower	Upper			
Pair 1 Laju_alir_sebelum - Laju_alir_setelah	-1.260000	.057611	.033262	-1.403113	-1.116887	-37.882	2	.001

B. Formula 3B

Tests of Normality							
	Formula	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
		Statistic	df	Sig.	Statistic	df	Sig.
Laju_alir_sebelum	Formula 3B	.253	3	.	.964	3	.637
Laju_alir_setelah	Formula 3B	.294	3	.	.921	3	.458

a. Lilliefors Significance Correction

Paired Samples Test									
		Paired Differences				T	df	Sig. (2-tailed)	
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower				Upper
Pair 1	Laju_alir_sebelum - Laju_alir_setelah	-1.456333	.028290	.016333	-1.526610	-1.386057	-89.163	2	.000

C. Formula 3C

Tests of Normality							
	Formula	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
		Statistic	df	Sig.	Statistic	df	Sig.
Laju_alir_sebelum	Formula 3C	.291	3	.	.925	3	.471
Laju_alir_setelah	Formula 3C	.221	3	.	.986	3	.773

a. Lilliefors Significance Correction

Paired Samples Test									
		Paired Differences				t	df	Sig. (2-tailed)	
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower				Upper
Pair 1	Laju_alir_sebelum - Laju_alir_setelah	-1.609000	.024637	.014224	-1.670203	-1.547797	-113.116	2	.000

D. Distribusi ukuran partikel

A. Formula 3A

Tests of Normality							
	Formula	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
		Statistic	df	Sig.	Statistic	df	Sig.
Distribusi_ukuran_partikel_sebelum	Formula 3A	.244	3	.	.971	3	.674
Distribusi_ukuran_partikel_sesudah	Formula 3A	.179	3	.	.999	3	.949

a. Lilliefors Significance Correction

Paired Samples Test									
		Paired Differences				t	df	Sig. (2-tailed)	
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower				Upper
Pair 1	Distribusi_ukuran_partikel_sebelum - Distribusi_ukuran_partikel_sesudah	-.135333	.035921	.020739	-.224567	-.046100	-6.526	2	.023

B. Formula 3B

Tests of Normality							
	Formula	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
		Statistic	df	Sig.	Statistic	df	Sig.
Distribusi_ukuran_partikel_sebelum	Formula 3B	.290	3	.	.926	3	.475
Distribusi_ukuran_partikel_setelah	Formula 3B	.198	3	.	.995	3	.871

a. Lilliefors Significance Correction

Paired Samples Test									
		Paired Differences				t	df	Sig. (2-tailed)	
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower				Upper
Pair 1	Distribusi_ukuran_partikel_sebelum -	-							
	Distribusi_ukuran_partikel_setelah	.138333	.035572	.020537	-.226698	-.049969	6.736	.021	

C. Formula 3C

Tests of Normality							
	Formula	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
		Statistic	df	Sig.	Statistic	df	Sig.
Distribusi_ukuran_partikel_sebelum	Formula 3C	.207	3	.	.992	3	.833
Distribusi_ukuran_partikel_setelah	Formula 3C	.202	3	.	.994	3	.852

a. Lilliefors Significance Correction

Paired Samples Test									
		Paired Differences				t	df	Sig. (2-tailed)	
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower				Upper
Pair 1	Distribusi_ukuran_partikel_sebelum -	-.1043	.148005	.085450	-.471997	.263330	-1.221	2	.346
	Distribusi_ukuran_partikel_setelah	.33							