7. LAMPIRAN

Lampiran 1. Syarat Mutu Es Krim

Tabel 9. Syarat mutu es krim

No.	Kriteria Uji	Satuan	Persyaratan
1.	Keadaan		
	1.1 Penampakan	-	Normal
	1.2 Bau	-	Normal
	1.3 Rasa	-	Normal
2.	Lemak	% b/b	Minimum 5,0
3.	Gula dihitung sebagai sukrosa	% b/b	Minimum 8,0
4.	Protein	% b/b	Minimum 2,7
5.	Jumlah Padatan	% b/b	Minimum 34,0
6.	Bahan tambahan makanan		
	- Pewarna tambahan	Sesuai SNI 01-0222-1995	
	- Pemanis buatan	-	Negatif
	- Pemantap dan Pengemulsi	Sesuai SNI 01-0222-1995	
7.	*Overrun*	Skala industri (70 % – 80 %) Skala rumah tangga (30 % – 50 %)	
8.	Cemaran Logam		
	- Timbal (Pb)	mg/kg	Maks 1,0
	- Tembaga (Cu)	mg/kg	Maks 20,0
9.	Cemaran Arsen (As)	mg/kg	Maks 0,5

Sumber: Standar Nasional Indonesia (1995)

Lampiran 2. Uji Statistik *Hedonic Test* Secara Ranking Aroma Es Krim Talas Belitung

Ranks

	Mean Rank
AROMAA	3,38
AROMAB	3,63
AROMAC	3,08
AROMAD	2,54
AROMAE	2,37

Test Statistics[a]

N	50
Chi-Square	23,194
df	4
Asymp. Sig.	,000

a. Friedman Test

Berdasarkan analisis data dengan *friedman rest*, tabel 9 di atas menunjukkan bahwa pada aroma antar keempat formulasi es krim talas Belitung saling berbeda nyata. Hal ini diketahui dengan adanya nilai signifikansi sebesar 0,000 (Asymp. Sig. = 0,000) dimana nilai tersebut ≤ 0,05.

Analisis Data Menggunakan LSD (*Least Significant Difference*)

Untuk memastikan hasil analisis data aroma dengan *friedman test* benar maka uji LSD harus dilakukan. Perhitungan secara manual metode LSD dilakukan dengan rumus:

$$\text{Nilai LSD} = t_{\alpha/2,\infty}\sqrt{p.t.(t+1)/6}$$, dengan:

t $\alpha/2,\infty$ untuk α = 10%, 5%, 1% nilainya 1.645, 1.960, 2.576

p = jumlah panelis

t = jumlah perlakuan

$$\text{Nilai LSD} = t_{\alpha/2,\infty}\sqrt{p.t.(t+1)/6}$$

Dari rumus tersebut diperoleh nilai LSD sebagai berikut:

$$\text{Nilai LSD} = 1{,}960\sqrt{50.4(4+1)/6} = 25{,}30$$ → Nilai *LSD rank* = 25,30

R_1 =170; R_2= 182; R_3 = 153; R_4 = 127; R_5 = 119

$R_2 - R_1$ = 182-170 = 12 LSD *rank* → 1=2

$R_1 - R_3$ = 170-153 = 17 LSD *rank* → 1=3

$R_1 - R_4$ = 170-127 = 43 LSD *rank* → 1≠4

$R_1 - R_5$ = 170-119 = 51 LSD *rank* → 1≠5

$R_2 - R_3$ = 182-153 = 29 LSD *rank* → 2≠3

$R_2 - R_4$ = 182-127 = 55 LSD *rank* → 2≠4

$R_2 - R_5$ = 182-119 = 63 LSD *rank* → 2≠5

$R_3 - R_4$ = 153-127 = 26 LSD *rank* → 3≠4

$R_3 - R_5$ = 153-119 = 34 LSD *rank* → 3≠5

$R_4 - R_5$ = 127-119 = 8 LSD *rank* → 4=5

Lampiran 3. Uji Statistik *Hedonic Test* Secara Ranking Tekstur Es Krim Talas Belitung

Ranks

	Mean Rank
TEKSTURA	4,40
TEKSTURB	3,72
TEKSTURC	3,08
TEKSTURD	2,02
TEKSTURE	1,78

Test Statistics[a]

N	50
Chi-Square	98,672
df	4
Asymp. Sig.	,000

a. Friedman Test

Berdasarkan analisis data dengan *friedman rest*, tabel di atas menunjukkan bahwa pada atribut tekstur antar keempat formulasi es krim talas Belitung saling berbeda nyata. Hal ini diketahui dengan adanya nilai signifikansi sebesar 0,000 (Asymp. Sig. = 0,000) dimana nilai tersebut ≤ 0,05.

Analisis Data Menggunakan LSD (*Least Significant Difference*)

Untuk memastikan hasil analisis data tekstur dengan *friedman test* benar maka uji LSD harus dilakukan. Perhitungan secara manual metode LSD dilakukan dengan rumus:

$$\text{Nilai LSD} = t_{\alpha/2,\infty}\sqrt{p.t.(t+1)/6}$$, dengan:

t $\alpha/2,\infty$ untuk α = 10%, 5%, 1% nilainya 1.645, 1.960, 2.576

p = jumlah panelis

t = jumlah perlakuan

$$\text{Nilai LSD} = t_{\alpha/2,\infty}\sqrt{p.t.(t+1)/6}$$

Dari rumus tersebut diperoleh nilai LSD sebagai berikut:

$$\text{Nilai LSD} = 1{,}960\sqrt{50.4(4+1)/6} = 25{,}30$$ → Nilai *LSD rank* = 25,30

R_1 =220; R_2= 186; R_3 = 154; R_4 = 101; R_5 = 89

$R_1 - R_2$ = 220-186 = 34 LSD *rank* → 1≠2

$R_1 - R_3$ = 220-154 = 66 LSD *rank* → 1≠3

$R_1 - R_4$ = 220-101 = 119 LSD *rank* → 1≠4

$R_1 - R_5$ = 220-89 = 131 LSD *rank* → 1≠5

$R_2 - R_3$ = 186-154 = 32 LSD *rank* → 2≠3

$R_2 - R_4$ = 186-101 = 85 LSD *rank* → 2≠4

$R_2 - R_5$ = 186-89 = 97 LSD *rank* → 2≠5

$R_3 - R_4$ = 154-101 = 53 LSD *rank* → 3≠4

$R_3 - R_5$ = 154-89 = 65 LSD *rank* → 3≠5

$R_4 - R_5$ = 101-89 = 12 LSD *rank* → 4=5

Lampiran 4. Uji Statistik *Hedonic Test* Secara Ranking Rasa Es Krim Talas Belitung

Ranks

	Mean Rank
FLAVORA	2,26
FLAVORB	3,28
FLAVORC	3,23
FLAVORD	3,40
FLAVORE	2,83

Test Statistics[a]

N	50
Chi-Square	17,373
df	4
Asymp. Sig.	,002

a. Friedman Test

Berdasarkan analisis data dengan *friedman rest*, tabel di atas menunjukkan bahwa pada atribut rasa antar keempat formulasi es krim talas Belitung saling berbeda nyata. Hal ini diketahui dengan adanya nilai signifikansi sebesar 0,002 (Asymp. Sig. = 0,002) dimana nilai tersebut ≤ 0,05.

Analisis Data Menggunakan LSD (*Least Significant Difference*)

Untuk memastikan hasil analisis data rasa dengan *friedman test* benar maka uji LSD harus dilakukan. Perhitungan secara manual metode LSD dilakukan dengan rumus:

$$\text{Nilai LSD} = t_{\alpha/2,\infty}\sqrt{p.t.(t+1)/6}$$, dengan:

t $\alpha/2,\infty$ untuk α = 10%, 5%, 1% nilainya 1.645, 1.960, 2.576

p = jumlah panelis

t = jumlah perlakuan

$$\text{Nilai LSD} = t_{\alpha/2,\infty}\sqrt{p.t.(t+1)/6}$$

Dari rumus tersebut diperoleh nilai LSD sebagai berikut:

$$\text{Nilai LSD} = 1{,}960\sqrt{50.4(4+1)/6} = 25{,}30$$ → Nilai *LSD rank* = 25,30

R_1 =113; R_2= 164; R_3 = 162; R_4 = 170; R_5 = 142

$R_2 - R_1$ = 164-113 = 51 LSD *rank* → 1≠2

$R_3 - R_1$ = 162-113 = 49 LSD *rank* → 1≠3

$R_4 - R_1$ = 170-113 = 57 LSD *rank* → 1≠4

$R_5 - R_1$ = 142-113 = 29 LSD *rank* → 1≠5

$R_2 - R_3$ = 164-162 = 2 LSD *rank* → 2=3

$R_4 - R_2$ = 170-164 = 6 LSD *rank* → 2=4

$R_2 - R_5$ = 164-142 = 22 LSD *rank* → 2=5

$R_4 - R_3$ = 170-162 = 8 LSD *rank* → 3=4

$R_3 - R_5$ = 162-142 = 20 LSD *rank* → 3=5

$R_4 - R_5$ = 170-142 = 28 LSD *rank* → 4≠5

Lampiran 5. Uji Statistik *Hedonic Test* Secara Ranking *Overall* Es Krim Talas Belitung

Ranks

	Mean Rank
OVERALLA	4,08
OVERALLB	3,78
OVERALLC	3,16
OVERALLD	2,46
OVERALLE	1,52

Test Statistics[a]

N	50
Chi-Square	85,648
df	4
Asymp. Sig.	,000

a. Friedman Test

Berdasarkan analisis data dengan *friedman rest*, tabel di atas menunjukkan bahwa pada atribut *overall* antar keempat formulasi es krim talas Belitung saling berbeda nyata. Hal ini diketahui dengan adanya nilai signifikansi sebesar 0,002 (Asymp. Sig. = 0,000) dimana nilai tersebut ≤ 0,05.

Analisis Data Menggunakan LSD (*Least Significant Difference*)

Untuk memastikan hasil analisis data *overall* dengan *friedman test* benar maka uji LSD harus dilakukan. Perhitungan secara manual metode LSD dilakukan dengan rumus:

$$\text{Nilai LSD} = t_{\alpha/2,\infty}\sqrt{p.t.(t+1)/6}$$, dengan:

t $\alpha/2,\infty$ untuk α = 10%, 5%, 1% nilainya 1.645, 1.960, 2.576

p = jumlah panelis

t = jumlah perlakuan

$$\text{Nilai LSD} = t_{\alpha/2,\infty}\sqrt{p.t.(t+1)/6}$$

Dari rumus tersebut diperoleh nilai LSD sebagai berikut:

$$\text{Nilai LSD} = 1{,}960\sqrt{50.4(4+1)/6} = 25{,}30 \rightarrow$$ Nilai *LSD rank* = 25,30

R_1 =204; R_2= 189; R_3 = 158; R_4 = 123; R_5 = 176

$R_1 - R_2$ = 204-189 = 15 LSD *rank* → 1=2

$R_1 - R_3$ = 204-158 = 46 LSD *rank* → 1≠3

$R_1 - R_4$ = 204-123 =81 LSD *rank* → 1≠4

$R_1 - R_5$ = 204-76 = 128 LSD *rank* → 1≠5

$R_2 - R_3$ = 189-158 = 31 LSD *rank* → 2≠3

$R_2 - R_4$ = 189-123 = 35 LSD *rank* → 2≠4

$R_2 - R_5$ = 189-76 = 113 LSD *rank* → 2≠5

$R_3 - R_4$ = 158-123 = 35 LSD *rank* → 3≠4

$R_3 - R_5$ = 158-76 = 82 LSD *rank* → 3≠5

$R_4 - R_5$ = 123-76 = 47 LSD *rank* → 4≠5

Lampiran 6. Es Krim Talas Belitung 0% dengan 20%

Test Statistics[a]

	TINGKATKE MANISAN
Mann-Whitney U	1029,500
Wilcoxon W	2304,500
Z	-1,576
Asymp. Sig. (2-tailed)	,115

a. Grouping Variable: ESKRIMTALAS

Lampiran 7. Es Krim Talas Belitung 0% dengan 30%

Test Statistics[a]

	TINGKATKE MANISAN
Mann-Whitney U	658,500
Wilcoxon W	1933,500
Z	-4,171
Asymp. Sig. (2-tailed)	,000

a. Grouping Variable: ESKRIMTALAS

Lampiran 8. Es Krim Talas Belitung 0% dengan 40%

Test Statistics[a]

	TINGKATKE MANISAN
Mann-Whitney U	424,500
Wilcoxon W	1699,500
Z	-5,777
Asymp. Sig. (2-tailed)	,000

a. Grouping Variable: ESKRIMTALAS

Lampiran 9. Es Krim Talas Belitung 0% dengan 50%

Test Statistics[a]

	TINGKATKE MANISAN
Mann-Whitney U	354,500
Wilcoxon W	1629,500
Z	-6,262
Asymp. Sig. (2-tailed)	,000

a. Grouping Variable: ESKRIMTALAS

Lampiran 10. Es Krim Talas Belitung 20% dengan 30%

Test Statistics[a]

	TINGKATKE MANISAN
Mann-Whitney U	834,500
Wilcoxon W	2109,500
Z	-2,947
Asymp. Sig. (2-tailed)	,003

a. Grouping Variable: ESKRIMTALAS

Lampiran 11. Es Krim Talas Belitung 20% dengan 40%

Test Statistics[a]

	TINGKATKE MANISAN
Mann-Whitney U	428,000
Wilcoxon W	1703,000
Z	-5,755
Asymp. Sig. (2-tailed)	,000

a. Grouping Variable: ESKRIMTALAS

Lampiran 12. Es Krim Talas Belitung 20% dengan 50%

Test Statistics[a]

	TINGKATKE MANISAN
Mann-Whitney U	347,000
Wilcoxon W	1622,000
Z	-6,314
Asymp. Sig. (2-tailed)	,000

a. Grouping Variable: ESKRIMTALAS

Lampiran 13. Es Krim Talas Belitung 30% dengan 40%

Test Statistics[a]

	TINGKATKE MANISAN
Mann-Whitney U	691,500
Wilcoxon W	1966,500
Z	-3,926
Asymp. Sig. (2-tailed)	,000

a. Grouping Variable: ESKRIMTALAS

Lampiran 14. Es Krim Talas Belitung 30% dengan 50%

Test Statistics[a]

	TINGKATKE MANISAN
Mann-Whitney U	565,000
Wilcoxon W	1840,000
Z	-4,807
Asymp. Sig. (2-tailed)	,000

a. Grouping Variable: ESKRIMTALAS

Lampiran 15. Es Krim Talas Belitung 40% dengan 50%

Test Statistics[a]

	TINGKATKE MANISAN
Mann-Whitney U	1059,000
Wilcoxon W	2334,000
Z	-1,341
Asymp. Sig. (2-tailed)	,180

a. Grouping Variable: ESKRIMTALAS

Lampiran 16. Analisa *One Way Anova* Es Krim Talas Belitung

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
MT	Between Groups	,810	2	,405	48,269	,000
	Within Groups	,126	15	,008		
	Total	,936	17			
VISKOS	Between Groups	1112747	2	556373,309	79,938	,000
	Within Groups	104401,2	15	6960,078		
	Total	1217148	17			
HARDNESS	Between Groups	8064618	2	4032309,212	123,598	,000
	Within Groups	489364,2	15	32624,278		
	Total	8553983	17			
OVERRUN	Between Groups	1225,926	2	612,963	14,865	,000
	Within Groups	618,519	15	41,235		
	Total	1844,444	17			
AIR	Between Groups	4,622	2	2,311	7,353	,006
	Within Groups	4,714	15	,314		
	Total	9,336	17			
PROTEIN	Between Groups	22,223	2	11,111	172,413	,000
	Within Groups	,967	15	,064		
	Total	23,189	17			
LEMAK	Between Groups	19,263	2	9,631	102,020	,000
	Within Groups	1,416	15	,094		
	Total	20,679	17			
PATI	Between Groups	,000	2	,000	39,179	,000
	Within Groups	,000	15	,000		
	Total	,000	17			

Lampiran 17. Analisa *One Way Anova* Metode Duncan

TTM

Duncan[a]

Perlakuan	N	Subset for alpha = .05		
		1	2	3
Talas Kontrol	6	52,3800		
Talas 20%\	6		58,8617	
Talas 30%	6			63,7100
Sig.		1,000	1,000	1,000

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 6,000.

VISKOS

Duncan[a]

Perlakuan	N	Subset for alpha = .05	
		1	2
Talas 30%	6	1618,5000	
Talas Kontrol	6		2141,0000
Talas 20%\	6		2150,7333
Sig.		1,000	,843

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 6,000.

HARDNESS

Duncan[a]

Perlakuan	N	Subset for alpha = .05		
		1	2	3
Talas Kontrol	6	2427,0450		
Talas 20%\	6		3333,3217	
Talas 30%	6			4063,4633
Sig.		1,000	1,000	1,000

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 6,000.

OVERRUN

Duncan[a]

Perlakuan	N	Subset for alpha = .05	
		1	2
Talas 30%	6	22,7778	
Talas 20%\	6	23,3333	
Talas Kontrol	6		40,5556
Sig.		,883	1,000

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 6,000.

AIR

Duncan[a]

Perlakuan	N	Subset for alpha = .05	
		1	2
Talas 20%\	6	61,7519	
Talas 30%	6	62,1537	
Talas Kontrol	6		62,9699
Sig.		,234	1,000

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 6,000.

PROTEIN

Duncan[a]

Perlakuan	N	Subset for alpha = .05		
		1	2	3
Talas 30%	6	8,3710		
Talas 20%\	6		9,2613	
Talas Kontrol	6			11,0435
Sig.		1,000	1,000	1,000

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 6,000.

LEMAK

Duncan[a]

Perlakuan	N	Subset for alpha = .05		
		1	2	3
Talas 30%	6	6,8383		
Talas 20%\	6		7,2580	
Talas Kontrol	6			9,2123
Sig.		1,000	1,000	1,000

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 6,000.

MT

Duncan[a]

Perlakuan	N	Subset for alpha = .05		
		1	2	3
Talas Kontrol	6	,6056		
Talas 20%\	6		,9528	
Talas 30%	6			1,1139
Sig.		1,000	1,000	1,000

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 6,000.

PATI

Duncan[a]

Perlakuan	N	Subset for alpha = .05		
		1	2	3
Talas Kontrol	6	,0322		
Talas 20%\	6		,0365	
Talas 30%	6			,0389
Sig.		1,000	1,000	1,000

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 6,000.

Lampiran 18. Analisa Korelasi

Correlations

		AIR	PROTEIN	LEMAK	PATI	HARDNESS	VISKOSITAS	OVERRUN	MELT_RATE	TTM
AIR	Pearson Correlation									
	Sig. (2-tailed)									
	N									
PROTEIN	Pearson Correlation	,477*								
	Sig. (2-tailed)	,045								
	N	18								
LEMAK	Pearson Correlation	,633**	,918**							
	Sig. (2-tailed)	,005	,000							
	N	18	18							
PATI	Pearson Correlation	-,512*	-,897**	-,870**						
	Sig. (2-tailed)	,030	,000	,000						
	N	18	18	18						
HARDNESS	Pearson Correlation	-,557*	-,932**	-,917**	,879**					
	Sig. (2-tailed)	,016	,000	,000	,000					
	N	18	18	18	18					
VISKOSITAS	Pearson Correlation	-,008	,714**	,560*	-,669**	-,751**				
	Sig. (2-tailed)	,973	,001	,016	,002	,000				
	N	18	18	18	18	18				
OVERRUN	Pearson Correlation	,592**	,753**	,708**	-,590**	-,732**	,457			
	Sig. (2-tailed)	,010	,000	,001	,010	,001	,057			
	N	18	18	18	18	18	18			
MELT_RATE	Pearson Correlation	-,580*	-,867**	-,897**	,826**	,920**	-,645**	-,820**		
	Sig. (2-tailed)	,012	,000	,000	,000	,000	,004	,000		
	N	18	18	18	18	18	18	18		
TTM	Pearson Correlation	-,460	-,911**	-,810**	,839**	,846**	-,697**	-,670**	,827**	
	Sig. (2-tailed)	,055	,000	,000	,000	,000	,001	,002	,000	
	N	18	18	18	18	18	18	18	18	

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).