

7. LAMPIRAN

Lampiran 1. Syarat Mutu dan Keamanan Surimi

Parameter uji	Satuan	Persyaratan
a. Sensori		Min. 7 (skor 1-9)
b. Kimia		
- Kadar air	%	Maks. 80
- Kadar protein	%	Min. 12
c. Cemaran mikroba		
- ALT	Koloni/g	Maks. $5,0 \times 10^4$
- <i>Escherichia coli</i>	APM/g	< 3
- <i>Salmonella</i> *		Negatif/25g
- <i>Vibrio cholera</i>	Koloni/g	Negatif/25g
d. Cemaran logam*		
- Arsen (As)	mg/kg	Maks. 1,0
- Kadmium (Cd)	mg/kg	Maks. 0,1
	mg/kg	Maks. 0,5**
- Merkuri (Hg)	mg/kg	Maks. 0,5
	mg/kg	Maks. 1,0**
- Timah (Sn)	mg/kg	Maks. 40,0
- Timbal (Pb)	mg/kg	Maks. 0,3
	mg/kg	Maks. 0,4**
e. Cemaran fisik		
- Filth		0
f. Fisik		
- Suhu pusat	°C	Maks. -18
- Kekuatan gel (gel strength)	(gel g/cm ²)	Min. 600
<p>CATATAN * Bila diperlukan</p> <p>** untuk ikan predator</p> <p>*** untuk ikan <i>scombroidae</i> (<i>scombroid</i>), <i>clupeidae</i>, <i>pomatomidae</i>, <i>coryphaenidae</i></p> <p>**** untuk ikan hasil budidaya</p> <p>***** untuk ikan karang</p>		

Sumber: SNI 2694:2013 tentang Surimi

Lampiran 2. Perhitungan Analisa Pendahuluan

1. Pengukuran rendemen ikan

Berat 3 ikan utuh = 187 gram

Berat total daging ikan = 83 gram

$$\text{Rendemen} = \frac{83 \text{ gram}}{187 \text{ gram}} \times 100\% = 44,38 \%$$

2. Pengukuran kadar air ikan

$$\text{Kadar air}(\%) = \frac{(\text{cawan kosong} + \text{sampel}) - (\text{cawan} + \text{sampel kering})}{\text{sampel}} \times 100$$

Ulangan	Cawan kosong (g)	Sampel (g)	Cawan + sampel kering (g)	Kadar Air (%)
1	24,766	5,007	26,018	74,995
2	21,139	5,004	22,390	75
3	22,681	5,008	23,932	75,020
			Rata – rata	75,005

$$1) \% \text{kadar air} = \frac{(24,766 + 5,007) - 26,018}{5,007} \times 100$$

$$= 74,995\%$$

$$2) \% \text{kadar air} = \frac{(21,139 + 5,004) - 22,390}{5,004} \times 100$$

$$= 75\%$$

$$3) \% \text{kadar air} = \frac{(22,681 + 5,008) - 23,932}{5,008} \times 100$$

$$= 75,020\%$$

$$\text{Rata – rata \%kadar air} = \frac{74,995 + 75 + 75,020}{3} = 75,005\%$$

3. Pengukuran kadar protein

$$\%N = \frac{(\text{ml HCl titrasi} - \text{ml HCl blanko}) \times 0,1N \text{ HCl} \times 14,008 \times 100}{\text{mg sampel}}$$

$$\%P (\text{dry basis}) = \%N \times \text{faktor konversi} (6,25)$$

$$\%P (\text{wet basis}) = \frac{(100 - \text{kadar air wet basis})}{100} \times \%P (\text{dry basis})$$

Ulangan	ml HCl Titiasi	%N	Kadar Protein Dry Basis (%)	Kadar Protein Wet Basis (%)
1	68,5	9,595	59,971	14,990
2	69	9,665	60,409	15,099
3	68,5	9,595	59,971	14,90
			Rata-rata	15,026

$$1) \%N = \frac{68,5 \times 0,1 \times 14,008 \times 100}{1 \times 1000}$$

$$= 9,595\%$$

$$\%P \text{ (dry basis)} = 9,595 \times 6,25$$

$$= 59,971\%$$

$$\%P \text{ (wet basis)} = \frac{(100 - 75,005)}{100} \times 59,971$$

$$= 14,990\%$$

$$2) \%N = \frac{69 \times 0,1 \times 14,008 \times 100}{1 \times 1000}$$

$$= 9,665\%$$

$$\%P \text{ (dry basis)} = 9,665 \times 6,25$$

$$= 60,409\%$$

$$\%P \text{ (wet basis)} = \frac{(100 - 75,005)}{100} \times 60,409$$

$$= 15,099\%$$

$$3) \%N = \frac{68,5 \times 0,1 \times 14,008 \times 100}{1 \times 1000}$$

$$= 9,595\%$$

$$\%P \text{ (dry basis)} = 9,595 \times 6,25$$

$$= 59,971\%$$

$$\%P \text{ (wet basis)} = \frac{(100 - 75,005)}{100} \times 59,971$$

$$= 14,990\%$$

$$\text{Rata - rata \%P wet basis} = \frac{14,990 + 15,099 + 14,990}{3} = 15,026\%$$

4. Kadar lemak

$$\text{Kadar lemak (\%)} = \frac{\text{berat lemak}}{\text{berat sampel}} \times 100$$

$$\% \text{ Lemak (wet basis)} = \frac{(100 - \text{kadar air wet basis})}{100} \times \% \text{ lemak (dry basis)}$$

Ulangan	Cawan kosong	Berat sampel	Cawan+ sampel kering	Berat lemak	Kadar lemak (%)	Kadar lemak wet basis (%)
1	62,772	5,000	63,017	0,245	4,9	1,225
2	69,002	5,001	69,256	0,254	5,079	1,269
3	38,866	5,000	39,117	0,251	5,020	1,255
Rata-rata						1,250

$$1) \% \text{ Lemak} = \frac{0,245}{5} \times 100$$

= 4,9%

$$\% \text{ Lemak (wet basis)} = \frac{(100 - 75,005)}{100} \times 4,9$$

= 1,225%

$$2) \% \text{ Lemak} = \frac{0,254}{5,001} \times 100$$

= 5,08%

$$\% \text{ Lemak (wet basis)} = \frac{(100 - 75,005)}{100} \times 5,079$$

= 1,269%

$$3) \% \text{ Lemak} = \frac{0,251}{5} \times 100$$

= 5,02%

$$\% \text{ Lemak (wet basis)} = \frac{(100 - 75,005)}{100} \times 5,020$$

= 1,255%

$$\text{Rata - rata \% lemak(wet basis)} = \frac{1,225 + 1,269 + 1,255}{3} = 1,250\%$$

Lampiran 3. Analisis Data

GEL STRENGTH

Tests of Between-Subjects Effects

Dependent Variable: Gell_Strength

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	7.268E6 ^a	9	807597.844	15.381	.000
Intercept	4.977E7	1	4.977E7	947.933	.000
Garam	4326275.059	2	2163137.529	41.198	.000
Konsentrasi	1206214.059	2	603107.030	11.486	.000
Garam * Konsentrasi	1067950.105	4	266987.526	5.085	.002
Error	2625306.434	50	52506.129		
Total	7.027E7	60			
Corrected Total	9893687.028	59			

a. R Squared = ,735 (Adjusted R Squared = ,687)

Gell_Strength

Duncan

Garam	N	Subset		
		1	2	3
NaCl	18	6.547497E2		
Kontrol	6	6.865619E2		
CaCl2	18		1.130704E3	
MgCl2	18			1.329331E3
Sig.		.735	1.000	1.000

Means for groups in homogeneous subsets are displayed.

Based on observed means.

The error term is Mean Square(Error) = 52506,129.

Gell_Strength

Duncan

Konsentrasi	N	Subset	
		1	2
Kontrol	6	6.865619E2	
0,1%	18	8.268998E2	
0,5%	18		1.143217E3
0,3%	18		1.144668E3
Sig.		.140	.988

Means for groups in homogeneous subsets are displayed.

Based on observed means.

The error term is Mean Square(Error) = 52506,129.

WHITENESS

Tests of Between-Subjects Effects

Dependent Variable:Whiteness

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	351.249 ^a	9	39.028	3.280	.003
Intercept	169272.448	1	169272.448	1.422E4	.000
Garam	224.579	2	112.290	9.436	.000
Konsentrasi	26.253	2	13.127	1.103	.340
Garam * Konsentrasi	57.304	4	14.326	1.204	.321
Error	594.994	50	11.900		
Total	189287.727	60			
Corrected Total	946.243	59			

a. R Squared = ,371 (Adjusted R Squared = ,258)

Whiteness

Duncan

Garam	N	Subset	
		1	2
CaCl ₂	18	5.292889E1	
NaCl	18		5.661111E1
MgCl ₂	18		5.769333E1
Kontrol	6		5.857000E1
Sig.		1.000	.196

Means for groups in homogeneous subsets are displayed.

Based on observed means.

The error term is Mean Square(Error) = 11,900.

Whiteness

Duncan

Konsentrasi	N	Subset	
		1	2
0,3%	18	5.505111E1	
0,5%	18	5.548389E1	
0,1%	18	5.669833E1	5.669833E1
Kontrol	6		5.857000E1
Sig.		.277	.190

Means for groups in homogeneous subsets are displayed.

Based on observed means.

The error term is Mean Square(Error) = 11,900.

KADAR AIR

Tests of Between-Subjects Effects

Dependent Variable:Kadar_air

Source	Type III Sum of Squares	Df	Mean Square	F
Corrected Model	286.962 ^a	9	31.885	212.820
Intercept	303860.826	1	303860.826	2.028E6
Garam	192.491	2	96.246	642.408
Konsentrasi	28.745	2	14.372	95.932
Garam * Konsentrasi	62.993	4	15.748	105.115
Error	7.491	50	.150	
Total	342688.870	60		
Corrected Total	294.453	59		

a. R Squared = ,975 (Adjusted R Squared = ,970)

Kadar_air

Duncan

Garam	N	Subset			
		1	2	3	4
CaCl2	18	7.306389E1			
Kontrol	6		7.490167E1		
MgCl2	18			7.619944E1	
NaCl	18				7.757567E1
Sig.		1.000	1.000	1.000	1.000

Means for groups in homogeneous subsets are displayed.

Based on observed means.

The error term is Mean Square(Error) = ,150.

Kadar_air

Duncan

Konsentrasi	N	Subset		
		1	2	3
Kontrol	6	7.490167E1		
0,1%	18	7.492444E1		
0,3%	18		7.529178E1	
0,5%	18			7.662278E1
Sig.		.886	1.000	1.000

Means for groups in homogeneous subsets are displayed.

Based on observed means.

The error term is Mean Square(Error) = ,150.

Derajat Keasaman (pH)

Tests of Between-Subjects Effects

Dependent Variable:pH

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.
Corrected Model	.879 ^a	9	.098	19.635	.000
Intercept	2503.317	1	2503.317	5.033E5	.000
Garam	.803	2	.402	80.729	.000
Konsentrasi	.021	2	.010	2.099	.133
Garam * Konsentrasi	.035	4	.009	1.770	.150
Error	.249	50	.005		
Total	2821.549	60			
Corrected Total	1.128	59			

a. R Squared = ,779 (Adjusted R Squared = ,740)

Derajat Keasaman

Duncan

Garam	N	Subset			
		1	2	3	4
CaCl ₂	18	6.697778E0			
Kontrol	6		6.801667E0		
MgCl ₂	18			6.899444E0	
NaCl	18				6.989444E0
Sig.		1.000	1.000	1.000	1.000

Means for groups in homogeneous subsets are displayed.

Based on observed means.

The error term is Mean Square(Error) = ,005.

pH

Duncan

Konsentrasi	N	Subset	
		1	2
Kontrol	6	6.801667E0	
0,3%	18	6.834444E0	6.834444E0
0,1%	18		6.875000E0
0,5%	18		6.877222E0
Sig.		.260	.167

Means for groups in homogeneous subsets are displayed.

Based on observed means.

The error term is Mean Square(Error) = ,005.

WATER HOLDING CAPACITY

Tests of Between-Subjects Effects

Dependent Variable:WHC

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	2320.969 ^a	5	464.194	4.025	.004
Intercept	164203.344	1	164203.344	1.424E3	.000
Garam	1496.784	2	748.392	6.489	.003
Konsentrasi	218.460	2	109.230	.947	.394
Error	6228.182	54	115.337		
Total	225104.989	60			
Corrected Total	8549.151	59			

a. R Squared = ,271 (Adjusted R Squared = ,204)

WHC

Duncan

Garam	N	Subset		
		1	2	3
Kontrol	6	5.054517E1		
MgCl ₂	18	5.452767E1	5.452767E1	
CaCl ₂	18		6.147033E1	6.147033E1
NaCl	18			6.741078E1
Sig.		.368	.119	.181

Means for groups in homogeneous subsets are displayed.

Based on observed means.

The error term is Mean Square(Error) = 115,337.

WHC

Duncan

Konsentrasi	N	Subset	
		1	2
Kontrol	6	5.054517E1	
0,5%	18	5.872700E1	5.872700E1
0,3%	18		6.103133E1
0,1%	18		6.365044E1
Sig.		.067	.296

Means for groups in homogeneous subsets are displayed.

Based on observed means.

The error term is Mean Square(Error) = 115,337.

EXPRESSIBLE MOISTURE

Tests of Between-Subjects Effects

Dependent Variable:EM

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	1741.068 ^a	9	193.452	274.848	.000
Intercept	4057.173	1	4057.173	5.764E3	.000
Garam	898.166	2	449.083	638.037	.000
Konsentrasi	182.085	2	91.042	129.349	.000
Garam * Konsentrasi	557.875	4	139.469	198.151	.000
Error	35.193	50	.704		
Total	6835.414	60			
Corrected Total	1776.261	59			

a. R Squared = ,980 (Adjusted R Squared = ,977)

EM

Duncan

Garam	N	Subset			
		1	2	3	4
NaCl	18	3.896593E0			
Kontrol	6		5.252997E0		
MgCl ₂	18			1.185743E1	
CaCl ₂	18				1.310348E1
Sig.		1.000	1.000	1.000	1.000

Means for groups in homogeneous subsets are displayed.

Based on observed means.

The error term is Mean Square(Error) = ,704.

EM

Duncan

Konsentrasi	N	Subset		
		1	2	3
Kontrol	6	5.252997E0		
0,3%	18		8.276410E0	
0,1%	18		8.365535E0	
0,5%	18			1.221555E1
Sig.		1.000	.796	1.000

Means for groups in homogeneous subsets are displayed.

Based on observed means.

The error term is Mean Square(Error) = ,704.