

## 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 ( <i>gel strength</i> )	<i>gel</i> ( <i>gel strength</i> ) g/cm <sup>2</sup>	Min. 600
CATATAN *	Bila diperlukan	
**	untuk ikan predator	
***	untuk ikan <i>scombroidae</i> ( <i>scombroid</i> ), <i>clupeidae</i> , <i>pomatomidae</i> , <i>coryphaenedae</i>	
****	untuk ikan hasil budidaya	
*****	untuk ikan karang	

Sumber: SNI 2694:2013 tentang Surimi

Lampiran 2. Perhitungan Kadar Air, Lemak, dan Protein

**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 Titrasi	%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

$$1) \text{ \%N} = \frac{68,5 \times 0,1 \times 14,008 \times 100}{1 \times 1000} = 9,595\%$$

$$\text{3\%P (dry basis)} = 9,595 \times 6,25 = 59,971\%$$

$$\text{1\%P (wet basis)} = \frac{(100 - 75,005)}{100} \times 59,97 = 14,990\%$$

$$2) \text{ \%N} = \frac{69 \times 0,1 \times 14,008 \times 100}{1 \times 1000} = 9,665\%$$

$$\text{3\%P (dry basis)} = 9,665 \times 6,25 = 60,409\%$$

$$\text{3\%P (wet basis)} = \frac{(100 - 75,005)}{100} \times 60,409 = 15,099\%$$

$$3) \text{ \%N} = \frac{68,5 \times 0,1 \times 14,008 \times 100}{1 \times 1000} = 9,595\%$$

$$\text{3\%P (dry basis)} = 9,595 \times 6,25 = 59,971\%$$

$$\text{1\%P (wet basis)} = \frac{(100 - 75,005)}{100} \times 59,97 = 14,990\%$$

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

#### 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

$$1) \text{ \%Lemak} = \frac{0,245}{5} \times 100 = 4,9\%$$

$$\text{4,9\% Lemak (wet basis)} = \frac{(100 - 75,005)}{100} \times 4,9 = 1,225\%$$

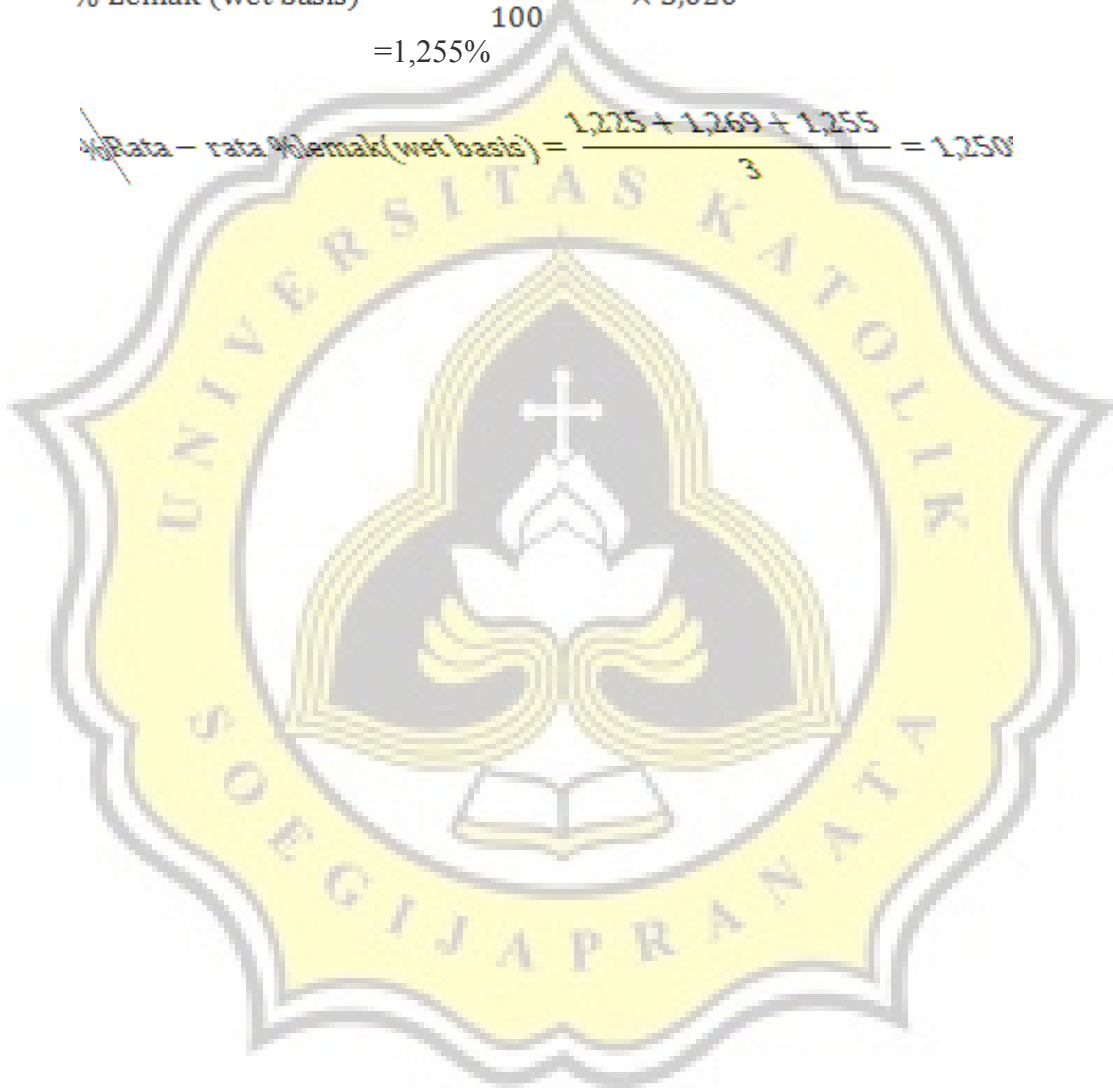
$$2) \text{ ~~0\% Lemak} = \frac{0,254}{5,001} \times 100~~ \\ = 5,08\%$$

$$\% \text{ Lemak (wet basis)} = \frac{(100 - 75,005)}{100} \times 5,079 \\ = 1,269\%$$

$$3) \text{ ~~0\% Lemak} = \frac{0,251}{5} \times 100~~ \\ = 5,02\%$$

$$\% \text{ Lemak (wet basis)} = \frac{(100 - 75,005)}{100} \times 5,020 \\ = 1,255\%$$

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



Lampiran 3. Analisis Data dengan SPSS

**1. Water Holding Capacity**

Tabel 1. ANOVA WHC

**Tests of Between-Subjects Effects**

Dependent Variable:WHC

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	1123.411 <sup>a</sup>	5	224.682	7.830	.000
Intercept	217633.480	1	217633.480	7.584E3	.000
Jenis	687.184	3	229.061	7.982	.000
Konsentrasi	436.227	2	218.113	7.601	.001
Error	1893.944	66	28.696		
Total	220650.835	72			
Corrected Total	3017.355	71			

a. R Squared = ,372 (Adjusted R Squared = ,325)

Tabel 2. WHC Jenis

**WHC**

Duncan

Jenis	N	Subset		
		1	2	3
EWP	18	50.2805		
Ubi	18		54.9117	
Singkong	18		55.8222	55.8222
Garut	18			58.9015
Sig.		1.000	.612	.089

Means for groups in homogeneous subsets are displayed.

Based on observed means.

The error term is Mean Square(Error) = 28,696.

Tabel 3. WHC Konsentrasi

**WHC**

Duncan

Konsent rasi	N	Subset	
		1	2
9%	24	52.7964	
6%	24	53.7217	
3%	24		58.4187
Sig.		.552	1.000

Means for groups in homogeneous subsets are displayed.

Based on observed means.

The error term is Mean Square(Error) = 28,696.

## 2. Expressible Moisture

Tabel 4. *Expressible Moisture*

### Tests of Between-Subjects Effects

Dependent Variable:EM

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.
Corrected Model	36.326 <sup>a</sup>	11	3.302	16.902	.000
Intercept	351.954	1	351.954	1.801E3	.000
Jenis	12.150	3	4.050	20.728	.000
Konsentrasi	23.376	2	11.688	59.820	.000
Jenis * Konsentrasi	.800	6	.133	.683	.664
Error	11.723	60	.195		
Total	400.002	72			
Corrected Total	48.049	71			

a. R Squared = ,756 (Adjusted R Squared = ,711)

Tabel 5. *Expressible Moisture Jenis*

EM

Duncan

Jenis	N	Subset		
		1	2	3
Singkong	18	1.784437E0		
Ubi	18	1.938277E0		
Garut	18		2.265276E0	
EWP	18			2.855763E0
Sig.		.301	1.000	1.000

Means for groups in homogeneous subsets are displayed.

Based on observed means.

The error term is Mean Square(Error) = ,195.

Tabel 6. *Expressible Moisture Konsentrasi*

EM

Duncan

Konsent rasi	N	Subset		
		1	2	3
9%	24	1.584870E0		
6%	24		2.084634E0	
3%	24			2.963312E0
Sig.		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) = ,195.

### 3. *Whiteness*

Tabel 7. ANOVA *Whiteness*

#### Tests of Between-Subjects Effects

Dependent Variable:Whiteness

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	467.282 <sup>a</sup>	11	42.480	5.010	.000
Intercept	174077.534	1	174077.534	2.053E4	.000
Jenis	376.349	3	125.450	14.795	.000
Konsentrasi	66.194	2	33.097	3.903	.025
Jenis * Konsentrasi	24.738	6	4.123	.486	.816
Error	508.739	60	8.479		
Total	175053.555	72			
Corrected Total	976.021	71			

a. R Squared = ,479 (Adjusted R Squared = ,383)

Tabel 8. *Whiteness* Jenis

#### Whiteness

Duncan

Jenis	N	Subset	
		1	2
EWP	18	4.540500E1	
Ubi	18		4.984167E1
Singkong	18		4.985444E1
Garut	18		5.158111E1
Sig.		1.000	.095

Means for groups in homogeneous subsets are displayed.  
Based on observed means.  
The error term is Mean Square(Error) = 8,479.

Tabel 9. *Whiteness* Konsentrasi

#### Whiteness

Duncan

Konsent rasi	N	Subset	
		1	2
9%	24	4.834792E1	
6%	24	4.864833E1	

3%	24	5.051542E1
Sig.	.722	1.000

Means for groups in homogeneous subsets are displayed.

Based on observed means.

The error term is Mean Square(Error) = 8,479.

#### 4. Kadar Air

Tabel 10. ANOVA Kadar Air

##### Tests of Between-Subjects Effects

Dependent Variable:Kadar\_air

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	196.843 <sup>a</sup>	11	17.895	25.370	.000
Intercept	383245.972	1	383245.972	5.433E5	.000
Jenis	17.897	3	5.966	8.457	.000
Konsentrasi	159.999	2	79.999	113.416	.000
Jenis * Konsentrasi	18.948	6	3.158	4.477	.001
Error	42.322	60	.705		
Total	383485.137	72			
Corrected Total	239.165	71			

a. R Squared = ,823 (Adjusted R Squared = ,791)

Tabel 11. Kadar Air Jenis

##### Kadar\_air

Duncan

Jenis	N	Subset	
		1	2
Singkong	18	7.255733E1	
EWP	18	7.262916E1	
Garut	18	7.284321E1	
Ubi	18		7.380205E1
Sig.		.342	1.000

Means for groups in homogeneous subsets are displayed.

Based on observed means.

The error term is Mean Square(Error) = ,705.

Tabel 12. Kadar Air Konsentrasi

##### Kadar\_air

Duncan

Konsent rasi	N	Subset		
		1	2	3
9%	24	7.118850E1		



6%	24		7.285013E1	
3%	24			7.483519E1
Sig.		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) = ,705.

### 5. Gel Strength

Tabel 13. ANOVA *Gel Strength*

#### Tests of Between-Subjects Effects

Dependent Variable:Gel\_strength

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	8.192E6 <sup>a</sup>	11	744767.521	40.604	.000
Intercept	1.257E8	1	1.257E8	6.854E3	.000
Jenis	976944.564	3	325648.188	17.754	.000
Konsentrasi	6872888.136	2	3436444.068	187.351	.000
Jenis * Konsentrasi	342610.032	6	57101.672	3.113	.010
Error	1100536.226	60	18342.270		
Total	1.350E8	72			
Corrected Total	9292978.958	71			

a. R Squared = ,882 (Adjusted R Squared = ,860)

Tabel 14. *Gel Strength* Jenis

#### Gel\_strength

Duncan

Jenis	N	Subset	
		1	2
Garut	18	1.224119E3	
Singkong	18	1.249771E3	
Ubi	18	1.293247E3	
EWP	18		1.518600E3
Sig.		.154	1.000

Means for groups in homogeneous subsets are displayed.

Based on observed means.

The error term is Mean Square(Error) = 18342,270.

Tabel 15. *Gel Strength* Konsentrasi

#### Gel\_strength

Duncan

Konsent rasi	N	Subset		
		1	2	3
3%	24	9.792033E2		

6%	24		1.257298E3	
9%	24			1.727802E3
Sig.		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) = 18342,270.

