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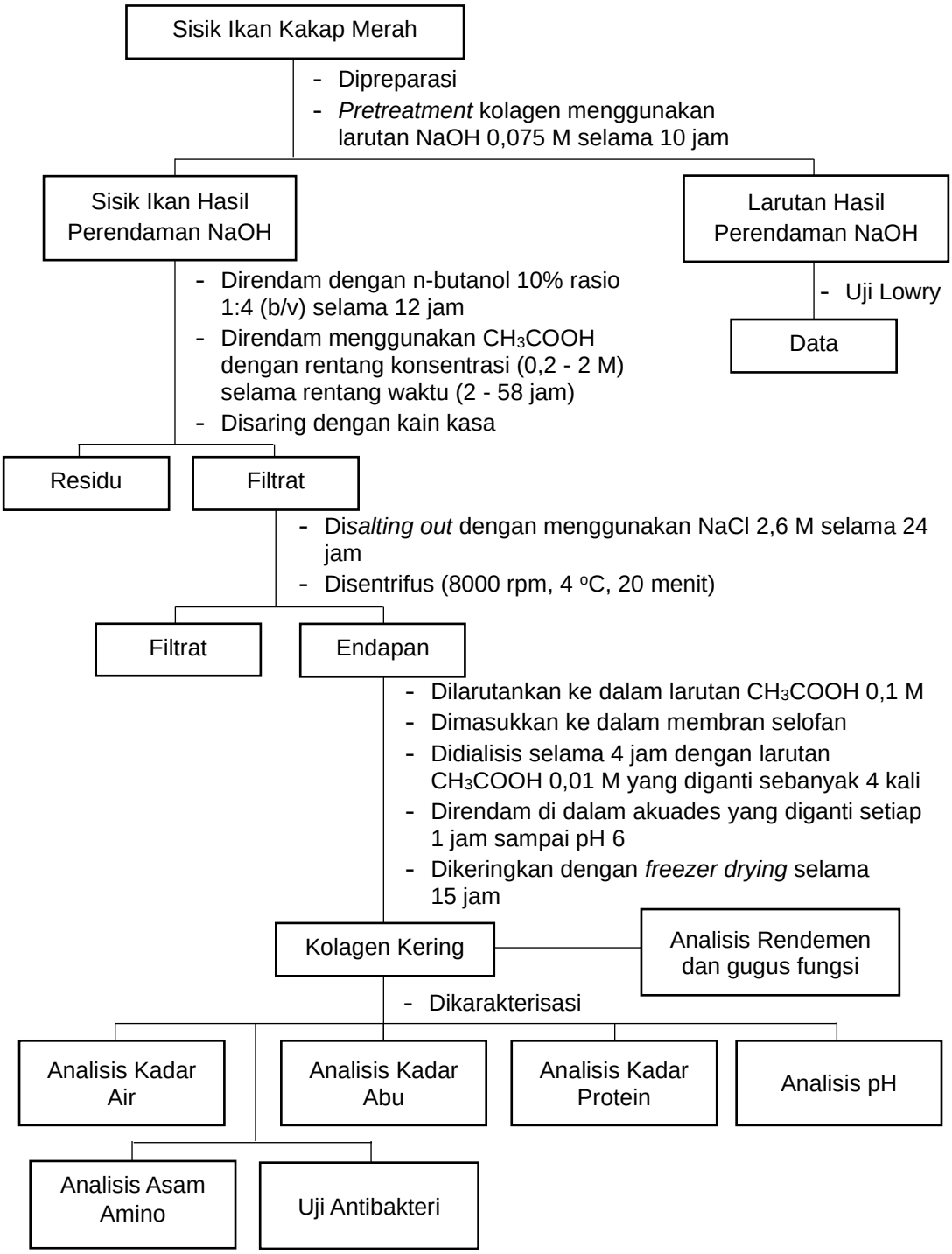
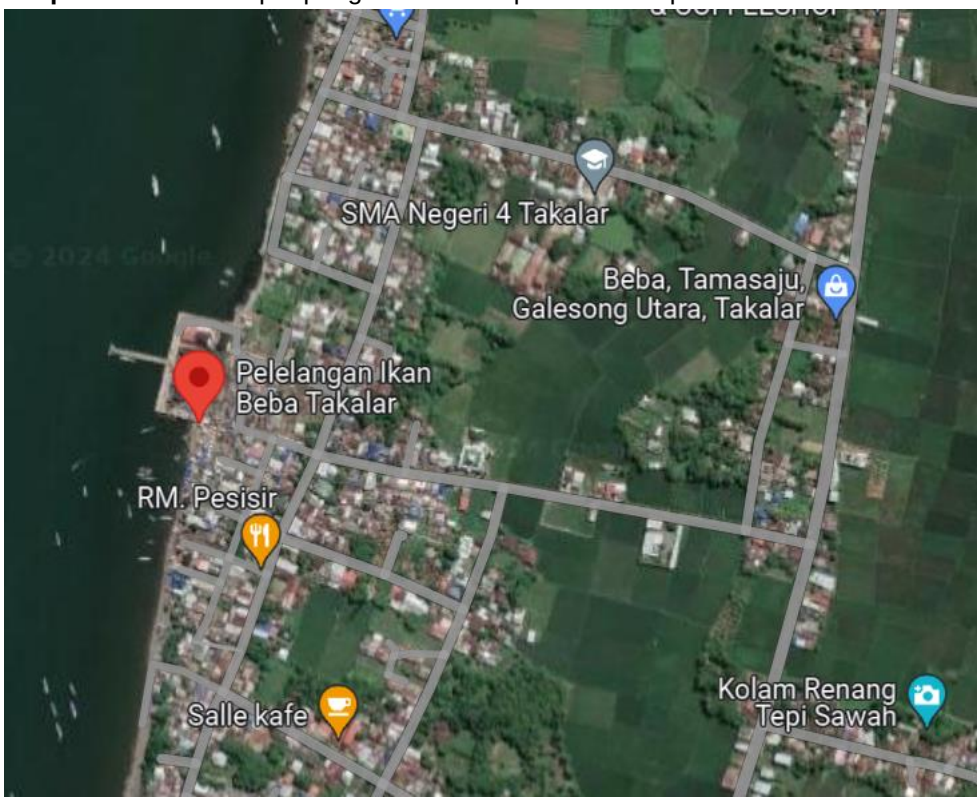
Lampiran 1. Bagan Alir Penelitian



Lampiran 1. Peta tempat pengambilan sampel ikan kakap merah



Lampiran 2. Pembuatan larutan

1. Pembuatan larutan NaOH 5000 mL 0,075 M

g = V × M × Mr
= 5 L × 0,075 M × 40 g/mol
= 15 g

2. Pembuatan larutan n-butanol 10%

$V_1 \times C_1 = V_2 \times C_2$
$V_1 \times 99{,}5\% = 100\ mL \times 10\%$
$V_1 = \frac{100\ mL \times 10\%}{99{,}5\%}$
$= 10{,}05\ mL$

3. Pembuatan larutan CH_3COOH

$M = \frac{\text{massa jenis} \times \% \times 10}{\text{berat molekul}}$
$= \frac{1{,}05\ g/cm^3 \times 100\% \times 10}{60\ g/mol}$
$= 17{,}5\ M$

- **Konsentrasi 5 M**

$V_1 \times M_1 = V_2 \times M_2$
$V1 \times 17{,}5\ M = 100\ mL \times 5\ M$
$V_1 = 28{,}5\ mL$

- **Konsentrasi 0,2 M**

$V_1 \times M_1 = V_2 \times M_2$
$V1 \times 5\ M = 100\ mL \times 0{,}2\ M$
$V_1 = 4\ mL$

- **Konsentrasi 0,5 M**

$V_1 \times M_1 = V_2 \times M_2$
$V1 \times 5\ M = 100\ mL \times 0{,}5\ M$
$V_1 = 10\ mL$

- **Konsentrasi 1,3 M**

$V_1 \times M_1 = V_2 \times M_2$
$V1 \times 5\ M = 100\ mL \times 1{,}3\ M$
$V_1 = 26\ mL$

- **Konsentrasi 2 M**

$V_1 \times M_1 = V_2 \times M_2$
$V1 \times 5\ M = 100\ mL \times 2\ M$
$V_1 = 40\ mL$

- **Konsentrasi 2,3 M**

$V_1 \times M_1 = V_2 \times M_2$
$V1 \times 5\ M = 100\ mL \times 2{,}3\ M$
$V_1 = 46\ mL$

4. Pembuatan larutan buffer asetat pH 6

Ka $CH_3COOH = 10^{-5}$

$[H^+] = \frac{Ka \times mol\ asam}{mol\ garam}$

$pH = 6$

$[H^+] = 10^{-6}$

$= \frac{Ka \times (V \times M)\ asam}{mol\ garam}$

$10^{-6} = \frac{10^{-5} \times 0{,}5\ L \times 0{,}01\ M}{mol\ garam}$

$= \frac{5 \times 10^{-8}}{mol\ garam}$

$Mol\ garam = \frac{5 \times 10^{-8}}{10^{-6}}$

$= 5 \times 10^{-2}$

$= 0{,}05\ mol$

g CH_3COONa = mol × Mr

= 0,05 mol × 82 g/mol

= 8,2 g

5. Pembuatan larutan deret standar BSA

- **Konsentrasi 0,01 mg/mL**

$V_1 \times M_1 = V_2 \times M_2$
$V1 \times 1\ mg/mL = 2\ mL \times 0{,}01\ mg/mL$
$V_1 = 0{,}02\ mL$
Vol. akuades = 2 mL - 0,02 mL
= 1,98 mL

- **Konsentrasi 0,05 mg/mL**

$V_1 \times M_1 = V_2 \times M_2$
$V1 \times 1\ mg/mL = 2\ mL \times 0{,}05\ mg/mL$
$V_1 = 0{,}1\ mL$
Vol. akuades = 2 mL - 0,1 mL
= 1,9 mL

- **Konsentrasi 0,1 mg/mL**

$V_1 \times M_1 = V_2 \times M_2$
$V1 \times 1\ mg/mL = 2\ mL \times 0{,}1\ mg/mL$
$V_1 = 0{,}2\ mL$
Vol. akuades = 2 mL - 0,2 mL

= 1,8 mL

- **Konsentrasi 0,15 mg/mL**

$V_1 \times M_1$ = $V_2 \times M_2$
V1 × 1 mg/mL = 2 mL × 0,15 mg/mL
V_1 = 0,3 mL
Vol. akuades = 2 mL - 0,3 mL
= 1,7 mL

- **Konsentrasi 0,2 mg/mL**

$V_1 \times M_1$ = $V_2 \times M_2$
V1 × 1 mg/mL = 2 mL × 0,2 mg/mL
V_1 = 0,4 mL
Vol. akuades = 2 mL - 0,4 mL
= 1,6 mL

Lampiran 3. Rendamen optimasi rendamen sisik ikan kakap merah

Run Order	Konsentrasi Asam Asetat (M)	Waktu Perendaman (Jam)	Rendamen (%)
1	1,3	8	0,51
2	2,3	25	0,07
3	2	2	0,13
4	1,3	25	2,26
5	0,5	2	0,33
6	1,3	25	0,98
7	1,3	58	2,81
8	0,2	25	4,66
9	0,5	48	7,57
10	1,3	25	0,96
11	1,3	25	3,33
12	2	48	0,07
13	1,3	25	0,36

Perhitungan rendamen

- **SIKM 1**

$$\% = \frac{\text{berat kolagen kering (g)}}{\text{berat awal sisik (g)}} \times 100\%$$

$$\% = \frac{0{,}0192}{5} \times 100\%$$

$$= 0{,}51$$

- **SIKM 2**

$$\% = \frac{\text{berat kolagen kering (g)}}{\text{berat awal sisik (g)}} \times 100\%$$

$$\% = \frac{0{,}0027}{5} \times 100\%$$

$$= 0{,}07$$

- **SIKM 3**

$$\% = \frac{\text{berat kolagen kering (g)}}{\text{berat awal sisik (g)}} \times 100\%$$

$$\% = \frac{0{,}0051}{5} \times 100\%$$

$$= 0{,}13$$

- **SIKM 4**

$$\% = \frac{\text{berat kolagen kering (g)}}{\text{berat awal sisik (g)}} \times 100\%$$

$$\% = \frac{0{,}0855}{5} \times 100\%$$

$$= 2{,}26$$

- **SIKM 5**

$$\% = \frac{\text{berat kolagen kering (g)}}{\text{berat awal sisik (g)}} \times 100\%$$

$$\% = \frac{0{,}0126}{5} \times 100\%$$

$$= 0{,}33$$

- **SIKM 6**

$$\% = \frac{\text{berat kolagen kering (g)}}{\text{berat awal sisik (g)}} \times 100\%$$

$$\% = \frac{0{,}0373}{5} \times 100\%$$

$$= 0{,}198$$

- **SIKM 7**

$$\% = \frac{\text{berat kolagen kering (g)}}{\text{berat awal sisik (g)}} \times 100\%$$

$$\% = \frac{0{,}1062}{5} \times 100\%$$

$$= 2{,}81$$

- **SIKM 8**

$$\% = \frac{\text{berat kolagen kering (g)}}{\text{berat awal sisik (g)}} \times 100\%$$

$$\% = \frac{0{,}1764}{5} \times 100\%$$

$$= 4{,}66$$

- **SIKM 9**

$$\% = \frac{\text{berat kolagen kering (g)}}{\text{berat awal sisik (g)}} \times 100\%$$

$$\% = \frac{0{,}2864}{5} \times 100\%$$

$$= 4{,}66$$

- **SIKM 10**

$$\% = \frac{\text{berat kolagen kering (g)}}{\text{berat awal sisik (g)}} \times 100\%$$

$$\% = \frac{0{,}0365}{5} \times 100\%$$

$$= 0{,}96$$

- **SIKM 11**

$$\% = \frac{\text{berat kolagen kering (g)}}{\text{berat awal sisik (g)}} \times 100\%$$

$$\% = \frac{0{,}1259}{5} \times 100\%$$

$$= 3{,}33$$

- **SIKM 12**

$$\% = \frac{\text{berat kolagen kering (g)}}{\text{berat awal sisik (g)}} \times 100\%$$

$$\% = \frac{0{,}0027}{5} \times 100\%$$

$= 0,07$

- **SIKM 13**

$$\% = \frac{\text{berat kolagen kering (g)}}{\text{berat awal sisik (g)}} \times 100\%$$

$$\% = \frac{0,0136}{5} \times 100\%$$

$$= 0,36$$

Lampiran 4. Perhitungan rendamen produksi kolagen

No.	Konsentrasi CH_3COOH (M)	Waktu Perendaman (Jam)	Berat Awal (g)	Berat Akhir (g)	Rendamen (%)
1	0,2	58	125,3	0,2046	0,16
2	0,2	58	120,2	0,1755	0,15
3	0,2	58	93,7	0,2307	0,25
4	0,2	58	126,7	0,1818	0,14
5	0,2	58	129,7	0,4505	0,35
Rata-rata					0,21

Perhitungan rendamen

- **SIKM 1**

$$\% = \frac{\text{berat kolagen kering (g)}}{\text{berat awal sisik (g)}} \times 100\%$$

$$\% = \frac{0,2046}{125,3} \times 100\%$$

$$= 0,16$$

- **SIKM 2**

$$\% = \frac{\text{berat kolagen kering (g)}}{\text{berat awal sisik (g)}} \times 100\%$$

$$\% = \frac{0,1755}{120,2} \times 100\%$$

$$= 0,15$$

- **SIKM 3**

$$\% = \frac{\text{berat kolagen kering (g)}}{\text{berat awal sisik (g)}} \times 100\%$$

$$\% = \frac{0,2307}{93,7} \times 100\%$$

$$= 0,25$$

- **SIKM 4**

$$\% = \frac{\text{berat kolagen kering (g)}}{\text{berat awal sisik (g)}} \times 100\%$$

$$\% = \frac{0,1818}{126,7} \times 100\%$$

$$= 0,14$$

- **SIKM 5**

$$\% = \frac{\text{berat kolagen kering (g)}}{\text{berat awal sisik (g)}} \times 100\%$$

$$\% = \frac{0,4505}{129,7} \times 100\%$$

$$= 0,35$$

Lampiran 5. Perhitungan kadar air

No.	Bobot cawan kosong (g) A	Bobot cawan + sampel (g) B	Bobot konstan (g) C	Bobot awal sampel (g) D	Kadar air (%)
1	30,9520	31,1023	31,0841	0,1503	12,11

$$\text{Kadar air (\%)} = \frac{B - C}{B - A} \times 100\%$$

$$\text{Kadar air (\%)} = \frac{31{,}1023 - 31{,}0841}{31{,}1023 - 30{,}9520} \times 100\%$$

$$= 12{,}11\%$$

Lampiran 6. Perhitungan kadar abu

No.	Bobot cawan kosong (g) A	Bobot cawan + sampel (g) B	Bobot konstan (g) C	Bobot awal sampel (g) D	Kadar abu (%)
1	42,2119	42,6086	42,2189	0,3967	1,76

$$\text{Kadar abu (\%)} = \frac{C - A}{B - A} \times 100\%$$

$$\text{Kadar abu (\%)} = \frac{42{,}2189 - 42{,}2119}{42{,}6086 - 42{,}2119} \times 100\%$$

$$= 1{,}76\%$$

Lampiran 7. Perhitungan kadar protein

No.	Berat Sampel (g)	Vol. Titrasi	N HCl	Berat Atom N	Faktor Protein	FP	Hasil (%)
1	0,1769	2	0,0105	14,0067	6,25	50	51,96

$$\text{N total (\%)} = \frac{\text{volume titrasi} \times \text{N HCl} \times \text{berat atom N} \times \text{FP}}{\text{W} \times 1000} \times 100\%$$

$$= \frac{2 \times 0{,}0105 \times 14{,}0067 \times 50}{0{,}1769 \times 1000} \times 100\%$$

$$= 8{,}31\%$$

$$\text{Protein} = \text{N total (\%)} \times \text{faktor koreksi}$$

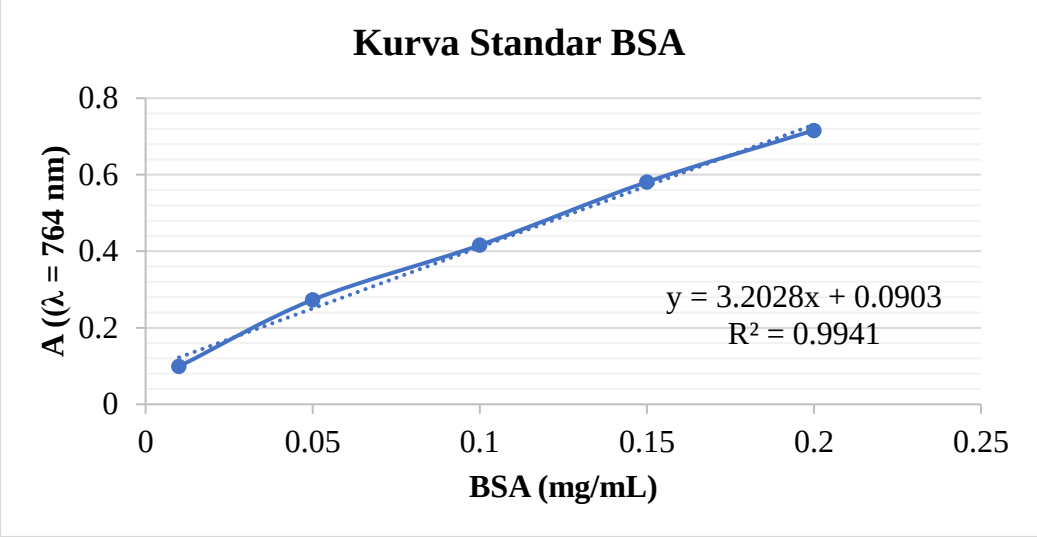
$$= 8{,}31\% \times 6{,}25$$

$$= 51{,}96\%$$

Lampiran 8. Data uji Lowry larutan NaOH hasil perendaman

1. Absorbansi larutan standar BSA

BSA (mg/mL)	Absorbansi
0,01	0,099
0,05	0,273
0,10	0,416
0,15	0,581
0,20	0,716



2. Perhitungan kadar protein terlarut

Kadar protein = $\frac{y - 0,0903}{3,2028} \times fp$

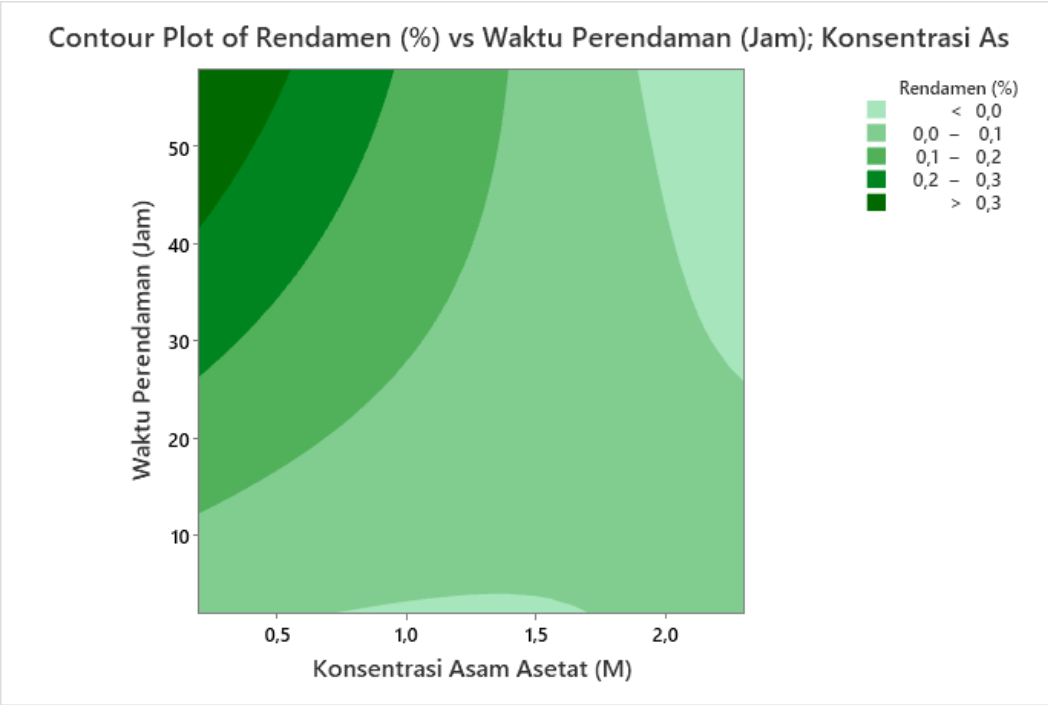
- **Larutan perendaman fp 100**

Kadar protein = $\frac{0,115 - 0,0903}{3,2028} \times 100$

= 0,771 mg/mL

No.	FP	A (λ = 764 nm)	Kadar protein (mg/mL)
1	100	0,115	0,771

Lampiran 9. Plot kontur optimasi produksi



Lampiran 10. Perhitungan kadar asam amino kolagen

Kadar asam amino (mg/kg) = $\frac{(A/B) \times (C\ std/10^9) \times BM \times Va \times FP \times 10^3}{Wx}$

Kadar asam amino (%) = $\frac{\text{kadar asam amino (mg/kg)}}{10^4}$

Kadar asam amino (mg/kg) =

= 289419,03

Kadar asam amino (%) = $\frac{(23{,}22/15{,}60) \times (100/10^9) \times 1985{,}25 \times 1000 \times 100 \times 10^3}{0{,}1021}$

=

= 28,94%

Keterangan:

A : rasio sampel
B : rasio standar
C std : konsentrasi larutan standar asam amino
BM : bobot molekul asam amino
Va : volume akhir sampel
FP : faktor pengenceran
Wx : bobot penimbangan sampel

No.: 18-5-17.1/F-MU
Revisi 5

SIG

REKAMAN PENGUJIAN UPLC

Paraf Supervisor
11/12/2023
Eka R.

Parameter Uji : Asam Amino
Tanggal Pengujian : 06.12.23
Tanggal Pelaporan : 11.12.23
Metode Acuan : IK No.18-5-17/MU/SMM-SIG
No. Instrumen : SIG/FNA/ALB/IN-0092

Standar Pembanding : **Amino Acid Standard (SIGMA-ALDRICH, AA518-10X1ML, Lot# SLCJ 4452)**
Tanggal Pembukaan Standar Induk : 10.11.23
Tanggal Pembuatan Standar Injeksi : 06.12.23

No. Sampel : 312.R.22 -2
Matriks : Kolagen

Bobot atau Volume Porsi Uji	Volume 1	Volume Pemipetan	Volume Akhir
(g; mL)	(µL)	(µL)	(µL)
0.1021	50000	500	1000

UKS	% RSD RT	% RSD Area	*Tailing Factor*	*Theoretical Plate*	Resolusi
Kriteria Keberterimaan	≤ 2	≤ 2	≤ 2	≥ 1000	≥ 1.5
AABA	0.24	0.70	0.00	1384363.13	91.24
Keterangan	OK	OK	OK	OK	OK
L-Histidine	0.72	0.33	1.01	38247.00	9.02
Keterangan	OK	OK	OK	OK	OK
L-Alanine	0.49	0.49	0.88	344409.71	51.99
Keterangan	OK	OK	OK	OK	OK
L-Phenylalanine	0.05	0.57	1.04	3406076.18	62.40
Keterangan	OK	OK	OK	OK	OK

Analit	C. Standar Induk (pmol/µL)	C. Standar Injeksi (pmol/µL)	BM (g/mol)	RT (menit)	Area Standar	Rasio Standar (terhadap AABA)	RT (menit)	Area Sampel	Rasio Sampel (terhadap AABA)	Verifikasi Rasio	C. Injeksi (pmol/µL)	Kadar Asam Amino (mg/Kg ; mg/L)	Kadar Asam Amino (%)	Keterangan
AMQ				2.77	7520688.98		2.67	6674752.95						
NH3				3.83	72463.11		3.65	123359.65						
L-Histidine	2500	100	155.16	4.76	68715.40	0.98	4.57	9971.97	0.14	OK	14.44	2194.17	0.22	-
L-Serine	2500	100	105.09	6.20	69173.91	0.99	6.08	70213.57	1.00	OK	100.99	10394.50	1.04	-
L-Arginine	2500	100	174.29	6.42	73203.86	1.05	6.33	91885.86	1.31	OK	124.88	21318.21	2.13	-
Glycine	2500	100	75.07	6.64	67648.17	0.97	6.53	547477.52	7.80	OK	805.19	59202.52	5.92	-
L-Aspartic Acid	2500	100	133.10	7.23	68423.85	0.98	7.17	88732.19	1.26	OK	129.02	16819.58	1.68	-
L-Glutamic Acid	2500	100	147.13	7.81	66802.68	0.96	7.79	138368.06	1.97	OK	206.08	29696.60	2.97	-
L-Treonine	2500	100	119.12	8.28	70039.59	1.00	8.28	49068.93	0.70	OK	69.70	8132.26	0.81	-
L-Alanine	2500	100	89.10	8.90	77108.95	1.10	8.91	223309.97	3.18	OK	288.13	25144.59	2.51	-
L-Proline	2500	100	115.13	9.56	64927.30	0.93	9.57	185381.22	2.64	OK	284.07	32032.47	3.20	-
AABA				10.14	69843.76		10.11	70200.20						
Derivated Peak				10.19	285490.72		10.15	168194.42						
L-Lysine	2500	100	146.19	10.37	114516.73	1.64	10.32	83557.98	1.19	OK	72.60	10394.42	1.04	-
L-Tyrosine	2500	100	181.19	10.64	71262.94	1.02	10.56	10088.48	0.14	OK	14.08	2499.54	0.25	-
L-Valine	2500	100	117.15	10.86	69824.12	1.00	10.76	36170.92	0.52	OK	51.54	5913.71	0.59	-
L-Isoleucine	2500	100	131.17	11.61	69938.88	1.00	11.38	19575.22	0.28	OK	27.85	3577.55	0.36	-
L-Leucine	2500	100	131.17	11.72	68873.52	0.99	11.47	48982.83	0.70	OK	70.76	9090.54	0.91	-
L-Phenylalanine	2500	100	165.19	11.88	69411.77	0.99	11.63	27572.79	0.39	OK	39.52	6394.33	0.64	-
TOTAL	41250				9165360.85			8666864.73			2298.86	242804.98	24.28	

Perhitungan:
C. Standar Injeksi (pmol/µL) = V. Standar Induk (µL) x C. Standar Induk (pmol/µL) / V. Akhir Standar (µL)
Rasio Standar atau Sampel = Area Analit / Area AABA
C. Injeksi Sampel (pmol/µL) = (Rasio Sampel/Rasio Standar) x C. Standar Injeksi (pmol/µL)
FP = Volume 1 / Volume Pemipetan
Kadar Asam Amino (mg/Kg ; mg/L) = ((Rasio Sampel / Rasio Standar) x (C. Standar Injeksi/1000000) x BM x FP x Volume Akhir) / Bobot Porsi Uji (g) atau Volume Sampel (mL)
Kadar Asam Amino (%) = Kadar Asam Amino (mg/Kg ; mg/L) / 10000
Kadar Asam Amino Total = Jumlah dari semua analit asam amino

39

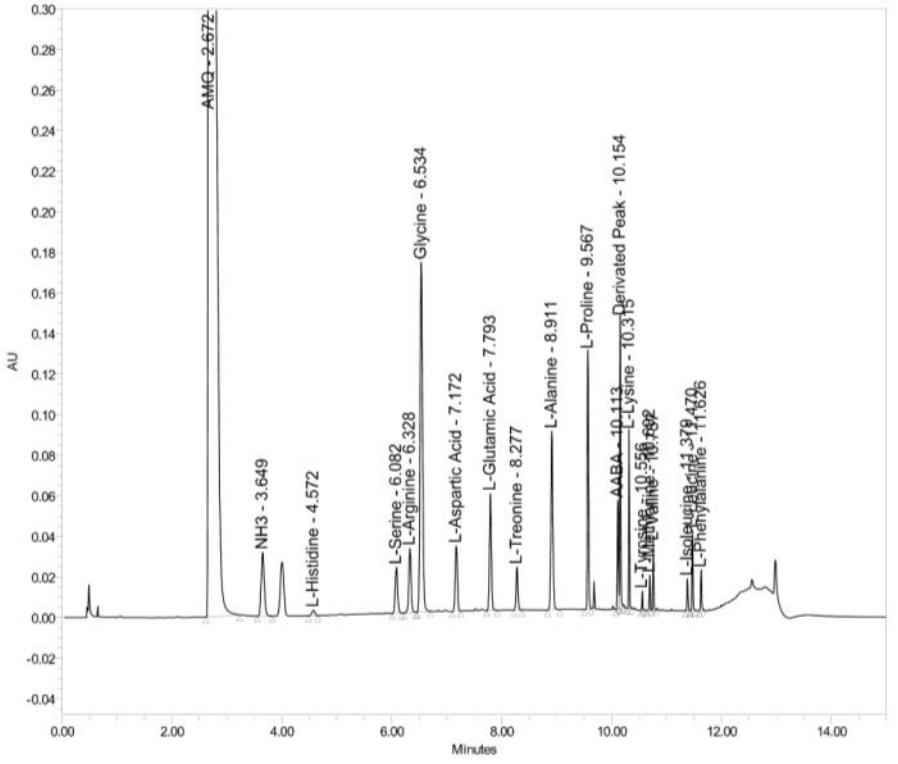
Lampiran 12. Kromatogram analisis asam amino kolagen

Empower 3

Default Individual Report SIG2

SAMPLE INFORMATION

Sample Name:	312.R.22-2	Acquired By:	Cintya
Sample Type:	Unknown	Sample Set Name	As amino 231206_Micowave
Injection #:	1	Acq. Method Set:	Asam Amino 2
Injection Volume:	1.00 ul	Processing Methoc	As amino 231207
Run Time:	15.0 Minutes	Channel Name:	PDA Ch1 260nm@4.8nm
Date Processed:	12/11/2023 9:09:12 AM WIT	Proc. Chnl. Descr.:	PDA Ch1 260nm@4.8nm



Reported by User: Cintya Anggreawati (Cintya)
Report Method: Default Individual Report SIG2
Report Method ID: 1366
Page: 1 of 2

Project Name: 2023 12 Desember\Asam Amino
Date Printed:
12/11/2023
12:39:17 PM Asia/Jakarta
Instrument Name: SIG/FNA/ALB/IN-0092

	Peak Name	RT	Area	% Area	Height
1	AMQ	2.672	6674752.95	76.84	950407
2	NH3	3.649	123359.65	1.42	31469
3	L-Histidine	4.572	9971.97	0.11	2606
4	L-Serine	6.082	70213.57	0.81	22590
5	L-Arginine	6.328	91885.86	1.06	31659
6	Glycine	6.534	547477.52	6.30	172456
7	L-Aspartic Acid	7.172	88732.19	1.02	32120
8	L-Glutamic Acid	7.793	138368.06	1.59	57578
9	L-Treonine	8.277	49068.93	0.56	21179
10	L-Alanine	8.911	223309.97	2.57	88013
11	L-Proline	9.567	185381.22	2.13	128061
12	AABA	10.113	70200.20	0.81	53538
13	Derivated Peak	10.154	168194.42	1.94	144985
14	L-Cystine	10.248			
15	L-Lysine	10.315	83557.98	0.96	88129
16	L-Tyrosine	10.556	10088.48	0.12	9615
17	L-Methionine	10.692	19361.24	0.22	17632
18	L-Valine	10.757	36170.92	0.42	33436
19	L-Isoleucine	11.379	19575.22	0.23	15855
20	L-Leucine	11.470	48982.83	0.56	39464
21	L-Phenylalanine	11.626	27572.79	0.32	20396
Sum			8686225.96		

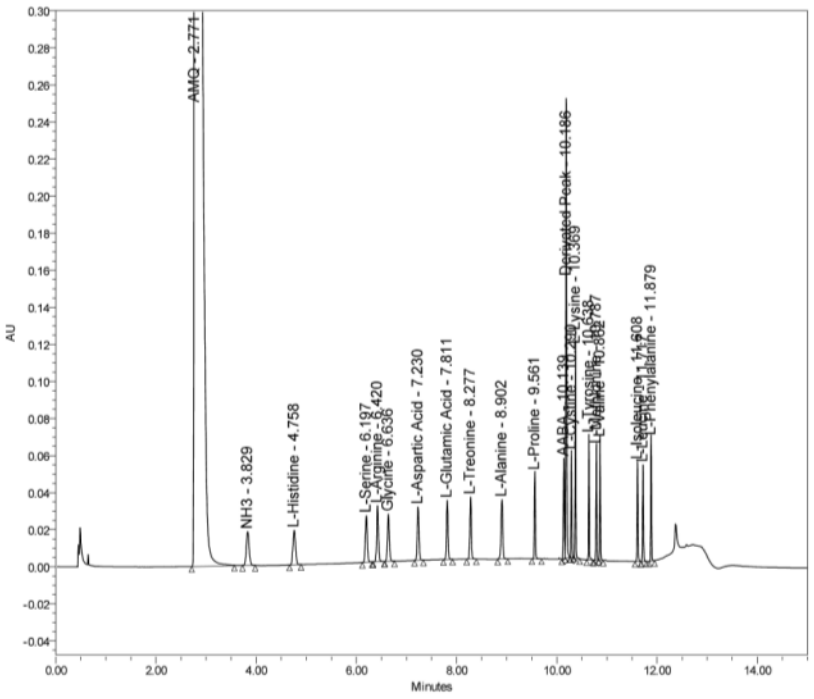
Lampiran 13. Kromatogram standar asam amino

Empower 3

Default Individual Report SIG2

SAMPLE INFORMATION

Sample Name:	Std Asam Amino 100 pmol	Acquired By:	Cintya
Sample Type:	Standard	Sample Set Name	As amino 231206
Injection #:	1	Acq. Method Set:	Asam Amino 2
Injection Volume:	1.00 ul	Processing Method	As amino 231207
Run Time:	15.0 Minutes	Channel Name:	PDA Ch1 260nm@4.8nm
Date Processed:	12/7/2023 8:05:18 AM WIT	Proc. Chnl. Descr.:	PDA Ch1 260nm@4.8nm

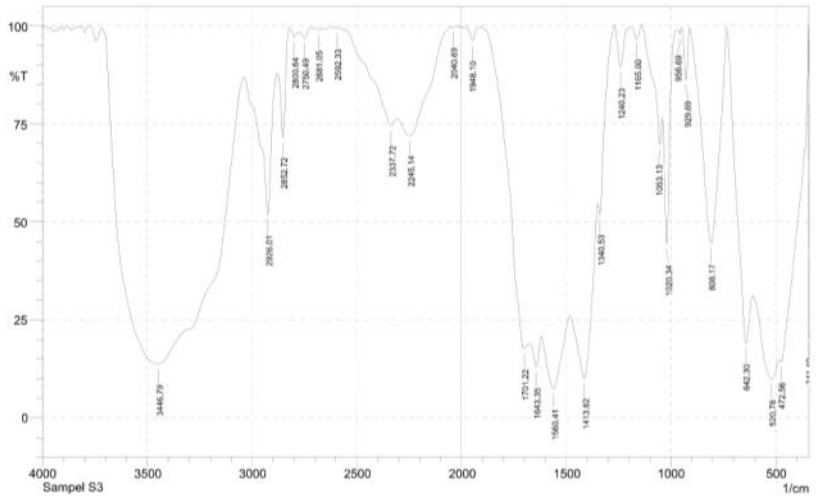


Reported by User: Cintya Anggreawati (Cintya)
Report Method: Default Individual Report SIG2
Report Method ID: 1366
Page: 1 of 2

Project Name: 2023 12 Desember\Asam Amino
Date Printed:
12/7/2023
9:19:42 AM Asia/Jakarta
Instrument Name: SIG/FNA/ALB/IN-0092

	Peak Name	RT	Area	% Area	Height	Amount
1	AMQ	2.771	7520688.98	82.06	934400	
2	NH3	3.829	72463.11	0.79	18239	
3	L-Histidine	4.758	68715.40	0.75	18703	100.000
4	L-Serine	6.197	69173.91	0.75	25242	100.000
5	L-Arginine	6.420	73203.86	0.80	30348	100.000
6	Glycine	6.636	67648.17	0.74	25501	100.000
7	L-Aspartic Acid	7.230	68423.85	0.75	28831	100.000
8	L-Glutamic Acid	7.811	66802.68	0.73	31926	100.000
9	L-Treonine	8.277	70039.59	0.76	33644	100.000
10	L-Alanine	8.902	77108.95	0.84	32203	100.000
11	L-Proline	9.561	64927.30	0.71	47367	100.000
12	AABA	10.139	69843.76	0.76	54265	100.000
13	Derivated Peak	10.186	285490.72	3.11	248467	
14	L-Cystine	10.290	57106.72	0.62	57736	50.000
15	L-Lysine	10.369	114516.73	1.25	118451	100.000
16	L-Tyrosine	10.638	71262.94	0.78	67857	100.000
17	L-Methionine	10.787	69895.89	0.76	63343	100.000
18	L-Valine	10.862	69824.12	0.76	65120	100.000
19	L-Isoleucine	11.608	69938.88	0.76	54073	100.000
20	L-Leucine	11.717	68873.52	0.75	52319	100.000
21	L-Phenylalanine	11.879	69411.77	0.76	68413	100.000
Sum			9165360.84			

Lampiran 14. Spektrum infra merah kolagen sisik ikan kakap merah



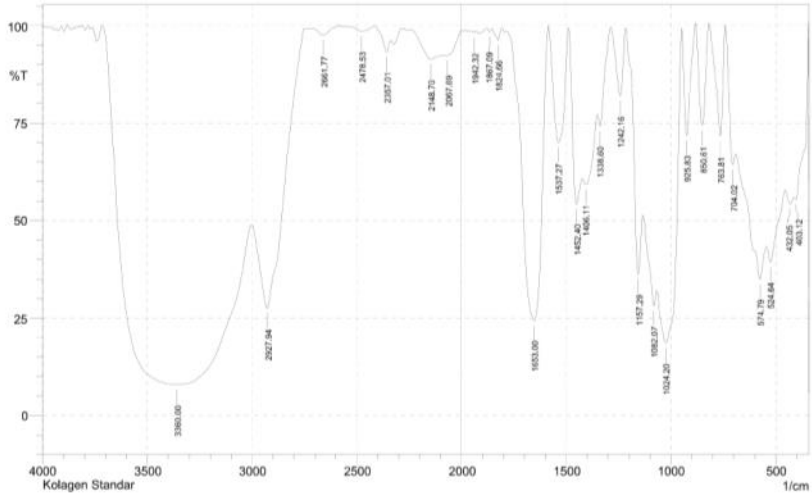
No.	Peak	Intensity	Corr. Intensity	Base (H)	Base (L)	Area	Corr. Area
1	341.4	20.492	40.138	343.33	339.47	2.622	0.681
2	472.56	14.263	6.161	482.2	345.26	58.89	2.698
3	520.78	9.868	9.786	607.58	484.13	99.022	16.302
4	642.3	18.939	30.154	734.88	609.51	46.386	14.399
5	808.17	44.637	54.801	908.47	736.81	28.482	28.064
6	929.69	86.219	13.349	948.98	910.4	1.174	1.101
7	956.69	97.955	1.41	970.19	948.98	0.109	0.043
8	1020.34	44.294	38.164	1039.63	970.19	9.155	5.318
9	1053.13	69.822	9.416	1138	1041.56	6.724	1.045
10	1165	96.747	3.158	1190.08	1139.93	0.355	0.335
11	1240.23	89.376	10.474	1269.16	1205.51	1.45	1.394
12	1340.53	51.894	7.137	1348.24	1271.09	8.49	0.655
13	1413.82	10.08	30.684	1481.33	1350.17	89.155	33.927
14	1560.41	7.556	15.435	1618.28	1483.26	115.167	29.639
15	1643.35	12.979	6.915	1674.21	1620.21	42.498	4.48
16	1701.22	17.693	10.06	1903.74	1676.14	63.925	3.253
17	1948.1	96.163	3.381	1980.89	1924.96	0.464	0.358
18	2040.69	99.634	0.128	2048.4	2027.19	0.024	0.005
19	2245.14	72.006	9.651	2304.94	2050.33	20.837	5.986
20	2337.72	74.604	4.101	2584.61	2306.86	16.539	1.03
21	2592.33	99.271	0.149	2609.69	2584.61	0.059	0.003
22	2681.05	98.875	0.573	2696.48	2665.62	0.112	0.038
23	2750.49	96.893	1.965	2773.64	2719.63	0.45	0.201
24	2800.64	97.029	1.947	2823.79	2773.64	0.39	0.155
25	2852.72	71.505	21.765	2877.79	2823.79	4.079	2.556
26	2926.01	51.867	35.721	3039.81	2879.72	21.493	12.108
27	3446.79	13.717	80.667	3718.76	3041.74	348.172	326.543

Comment;
Sampel S3

Date/Time; 9/27/2023 1:45:21 PM
No. of Scans;
Resolution;
Apodization;

Lampiran 15. Spektrum infra merah kolagen komersial

SHIMADZU



No.	Peak	Intensity	Corr. Intensity	Base (H)	Base (L)	Area	Corr. Area
1	403.12	55.426	6.1334	412.77	345.26	12.5281	3.5154
2	432.05	54.3058	2.4322	453.27	414.7	9.9045	0.4211
3	524.64	39.2867	7.1736	543.93	455.2	29.165	2.601
4	574.79	34.9297	13.1016	690.52	545.85	46.2806	7.2385
5	704.02	64.3641	10.5094	740.67	692.44	5.8487	1.5266
6	763.81	71.6664	28.5271	817.82	742.59	5.0259	5.1249
7	850.61	74.3635	26.0507	881.47	819.75	4.1761	4.2873
8	925.83	71.8487	27.8622	948.98	883.4	4.4369	4.4144
9	1024.2	18.6132	37.8681	1066.64	950.91	59.9828	31.4913
10	1082.07	28.0766	8.0524	1132.21	1068.56	27.6953	2.5615
11	1157.29	36.3209	28.7791	1215.15	1134.14	17.3091	5.8211
12	1242.16	81.9797	17.4322	1288.45	1217.08	3.1012	2.9265
13	1338.6	74.1907	7.2236	1350.17	1290.38	4.1307	0.8156
14	1406.11	59.2182	5.1078	1421.54	1352.1	13.1963	1.8575
15	1452.4	54.1811	23.9902	1487.12	1423.47	12.0777	4.8553
16	1537.27	70.0131	29.5429	1585.49	1489.05	8.7113	8.5229
17	1653	24.3273	75.0839	1782.23	1587.42	53.5187	52.8305
18	1824.66	96.2158	3.0584	1855.52	1807.3	0.4581	0.2972
19	1867.09	98.2936	0.8847	1880.6	1855.52	0.1311	0.042
20	1942.32	98.1431	0.431	1955.82	1930.74	0.1779	0.022
21	2067.69	92.359	0.1802	2069.62	2000.18	1.5716	0.2218
22	2148.7	91.3636	3.3734	2237.43	2096.62	3.9178	1.1091
23	2357.01	93.1638	3.8213	2412.95	2339.65	1.166	0.4885
24	2478.53	98.5184	1.2382	2528.68	2414.88	0.4528	0.3355
25	2661.77	97.5266	1.7714	2715.77	2613.55	0.7088	0.3939
26	2927.94	27.5093	36.3278	3001.24	2754.35	72.9947	34.5093
27	3360	7.9526	1.7731	3375.43	3003.17	297.1995	36.4779

Comment;
Kolagen Standar

Date/Time; 9/27/2023 2:03:01 PM
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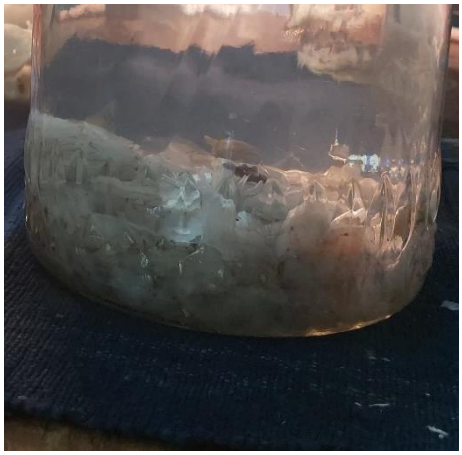
Resolution;
Apodization;

Lampiran 16. Dokumentasi penelitian

Proses *sampling*

Preparasi sampel

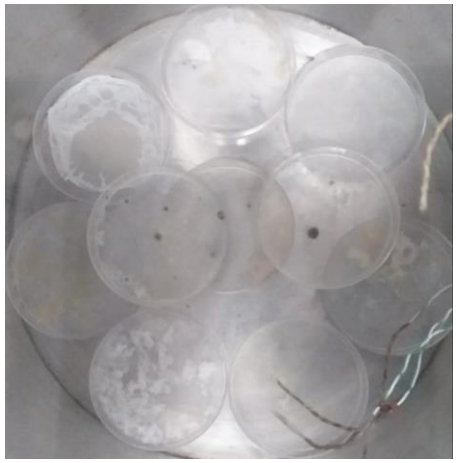
Hasil perendaman NaOH



Perendaman CH_3COOH

Salting out

Dialisis



Freeze drying

UPLC

Uji kadar air dan kadar abu