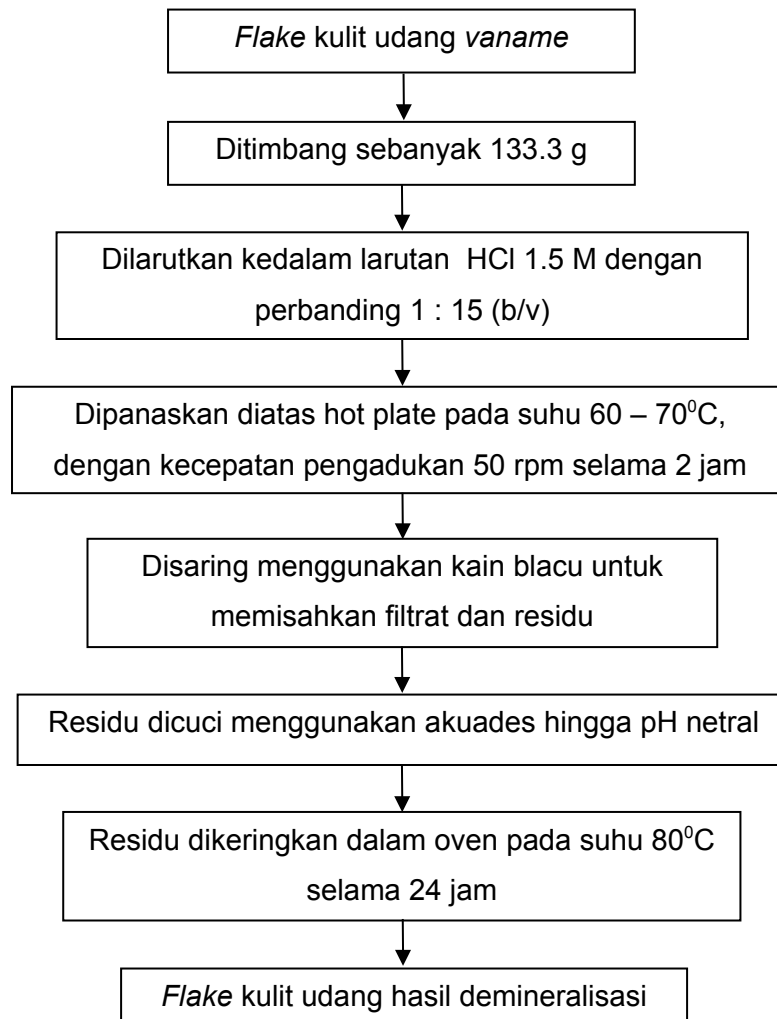
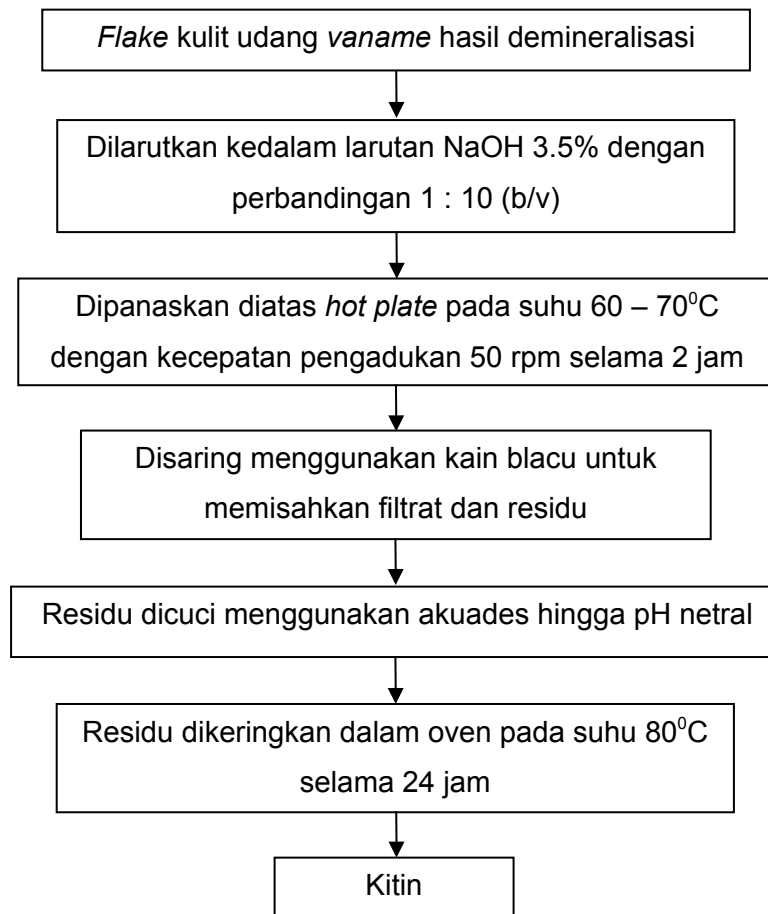


LAMPIRAN

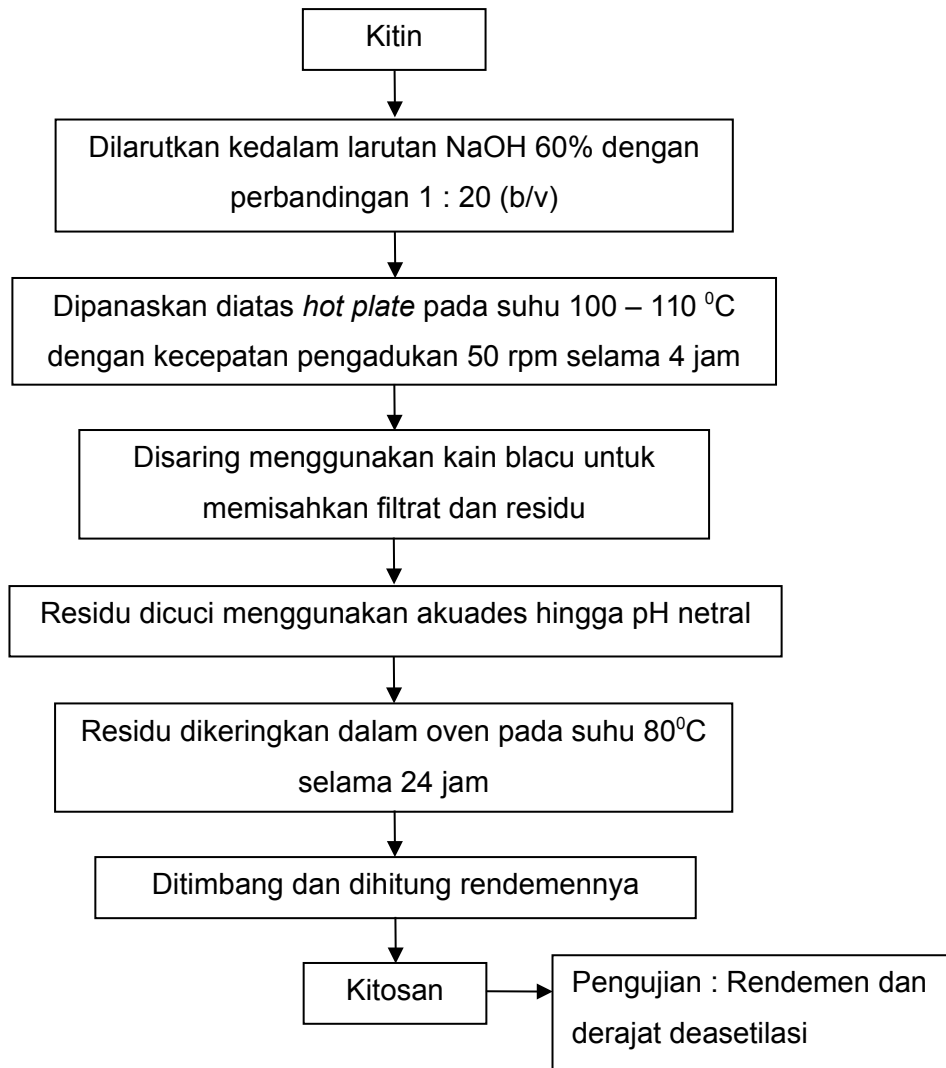
Lampiran 1. Skema Kerja Proses Demineralisasi



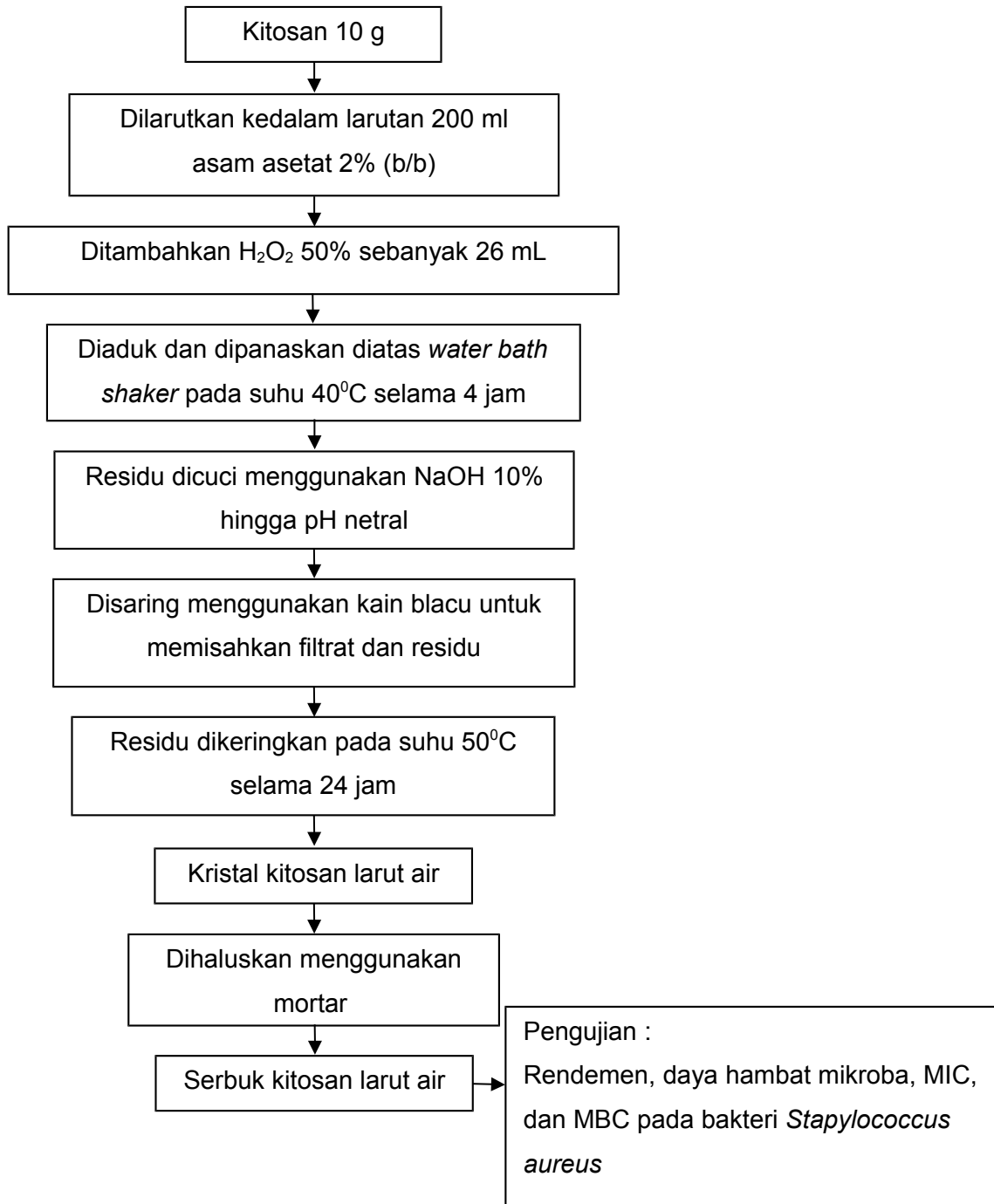
Lampiran 2. Skema Kerja Proses Deproteinase



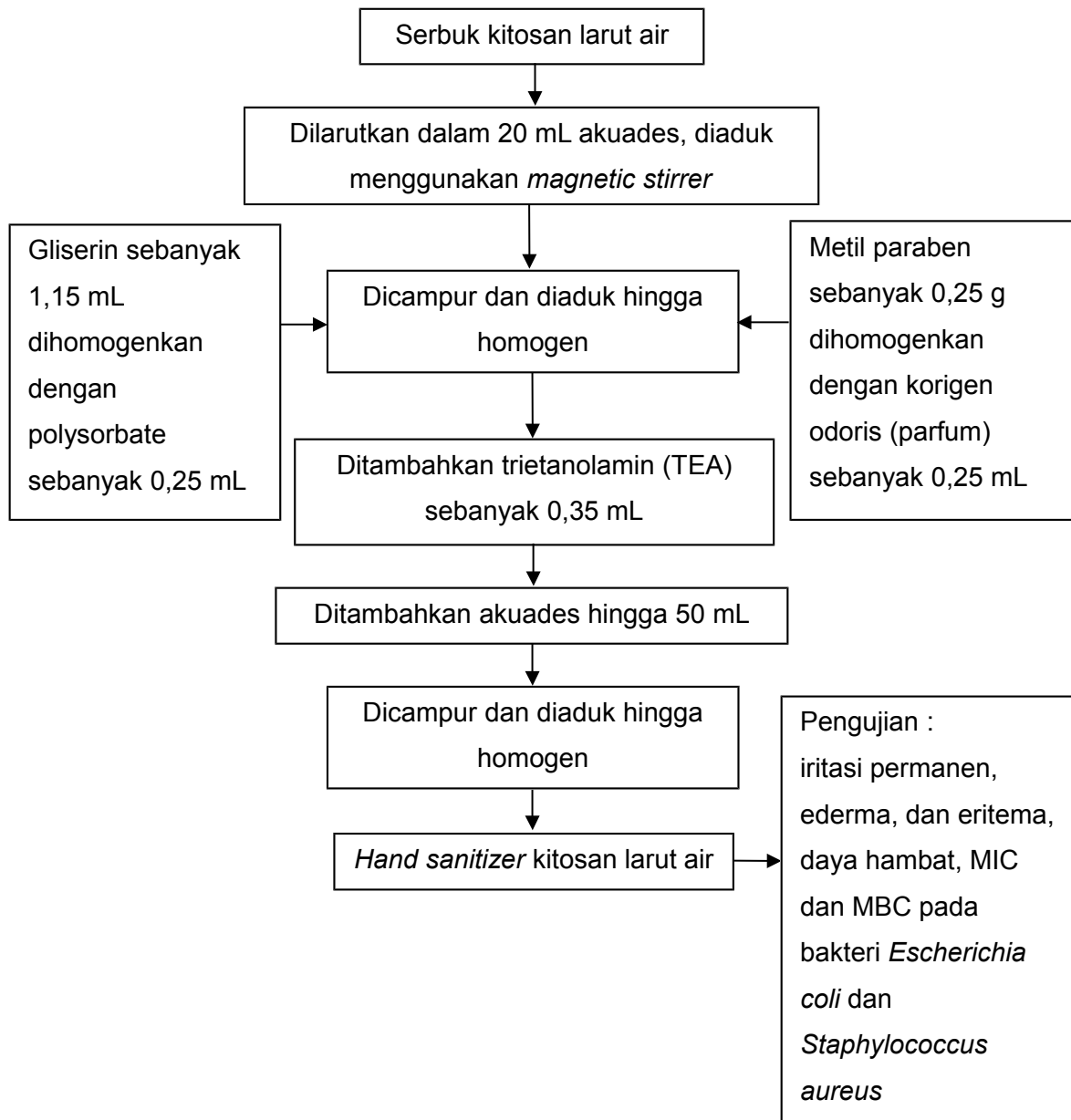
Lampiran 3. Skema Kerja Proses Deasetilasi



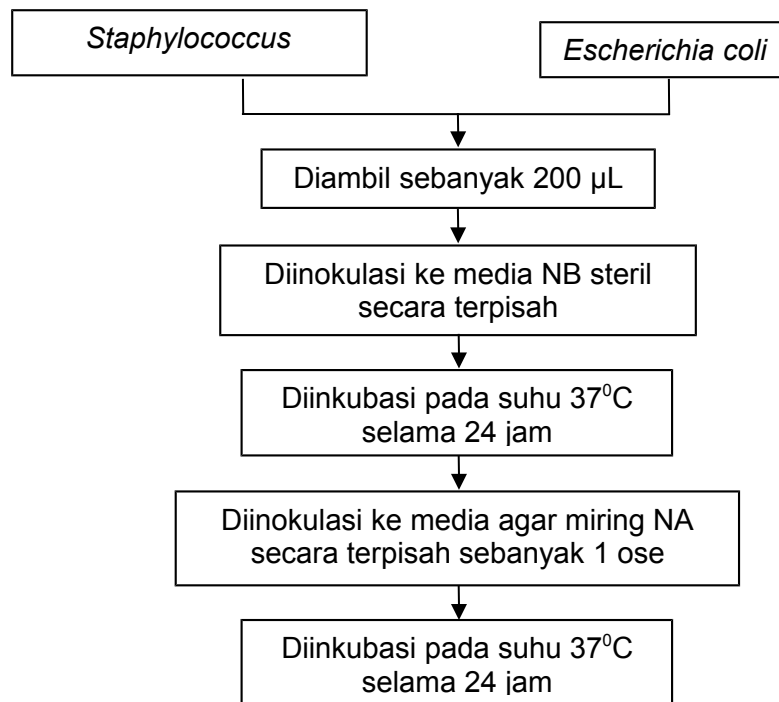
Lampiran 4. Skema Kerja Pembuatan Kitosan Larut Air



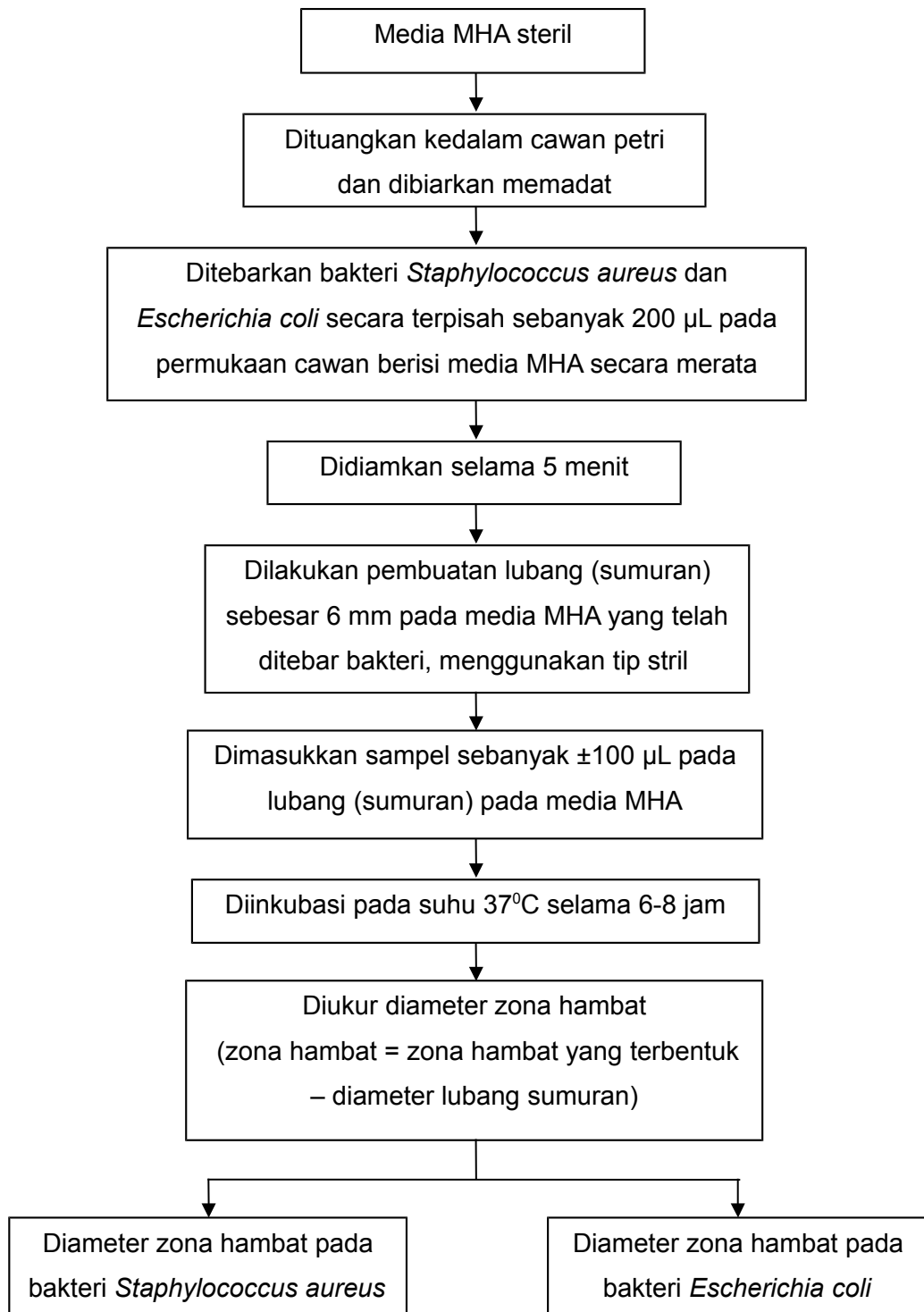
Lampiran 5. Skema Kerja Pembuatan *Hand Sanitizer* Kitosan Larut Air



Lampiran 6. Peremajaan Bakteri



Lampiran 7. Pengujian Antibakteri Metode Difusi Sumuran

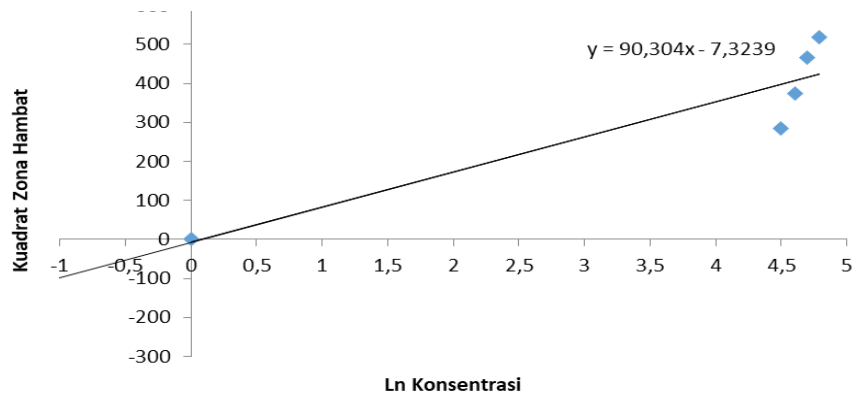


Lampiran 8. Data Penentuan Konsentrasi Kitosan Larut Air Terhadap Bakteri *Staphylococcus aureus* Uji Difusi Sumuran

Konsentrasi (mg/mL)	Zona Hambat (mm)		
	1	2	3
10	8	8.9	9.2
20	9.4	9	9.8
30	10.2	9.7	9.8
40	11.7	12	11.4
50	12.4	12.5	12.5
60	12.7	12.4	11.9
70	13.7	14.6	12.5
80	15.3	14.8	16
90	16	16.7	17.4

Lampiran 9. Penentuan dan Perhitungan Nilai MIC dan MBC Kitosan
Larutan Air Terhadap Bakteri *Staphylococcus aureus*

Konsentrasi	Zona Hambat (mm)						Rata-Rata Zona Hambat (mm)	Ln Konsentrasi (X)	Kuadrat Zona Hambat (Y)
	1	2	3	4	5	6			
0	0	0	0	0	0	0	0	0	0
90	16	17.7	16.6	17.2	17	16.6	16.87	4.50	284.77
100	20.1	19.5	19	18.7	18.5	20.3	19.32	4.60	373.46
110	21.5	21	22.1	21.7	21.4	21.9	21.57	4.70	465.48
120	22.7	22.3	22.9	23.2	23.5	22.7	22.77	4.79	518.70



$$Y = 90.30x - 7.323$$

Jika $Y = 0$, maka $X = 0.081$ (Mt)

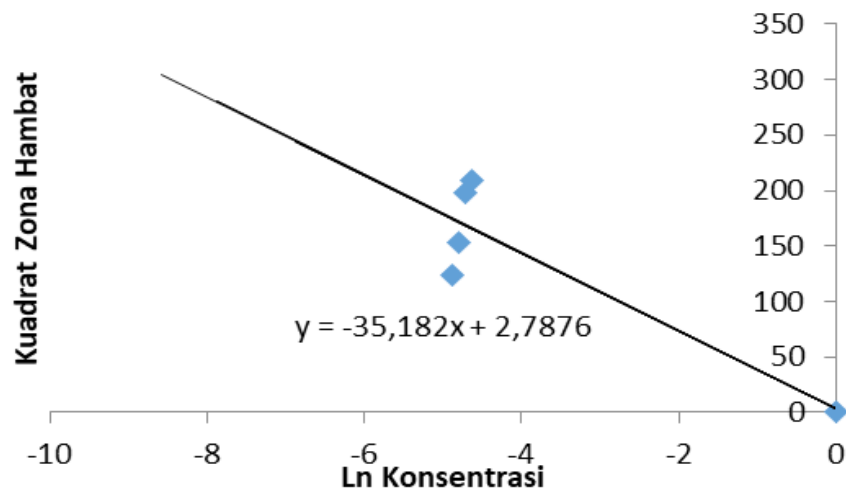
Nilai konsentrasi ekstrak = $\text{EXP}(0.081) = 1.08437$ (eMt)

$$\begin{aligned} \text{MIC} &= \text{eMt} \times 0.25 \\ &= 1.08437 \times 0.25 \\ &= 0.27109 \text{ mg/mL} \end{aligned}$$

$$\begin{aligned} \text{MBC} &= \text{MIC} \times 4 \\ &= 0.27109 \times 4 \\ &= 1.08437 \text{ mg/mL} \end{aligned}$$

Lampiran 10. Penentuan dan Perhitungan nilai MIC dan MBC *Hand Sanitizer* Kitosan Larutan Air Terhadap Bakteri *Staphylococcus aureus*

Konsentrasi	Zona Hambat (mm)				Rata-Rata Zona Hambat (mm)	Ln Konsentrasi (X)	Kuadrat Zona Hambat (Y)
	1	2	3	4			
0	0	0	0	0	0	0	0
110	11.5	10.5	11	11.5	11.12	4.70	123.77
120	12.6	12	11.8	13	12.35	4.79	152.52
130	13.7	13.9	14.6	14	14.05	4.87	197.40
140	14.5	14	14.1	15.2	14.45	4.94	208.80



$$Y = -35.182x + 2,7876$$

Jika $Y = 0$, maka $X = 00.078$ (Mt)

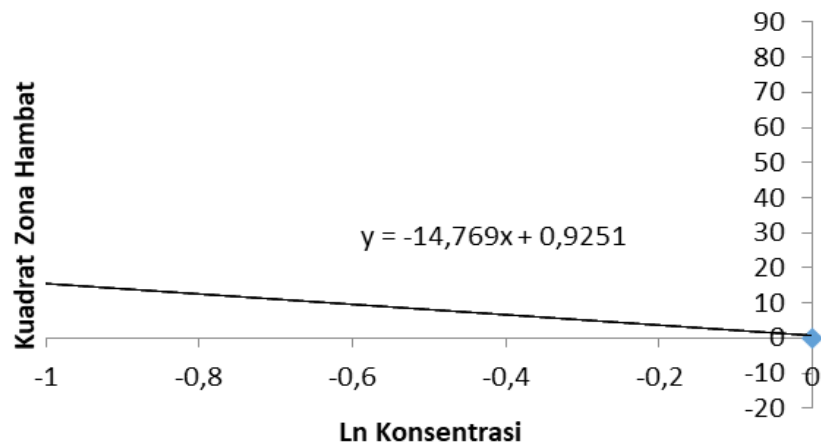
Nilai konsentrasi ekstrak = $EXP(0.078) = 1(eMt)$

$$\begin{aligned} MIC &= eMt \times 0.25 \\ &= 1 \times 0.25 \\ &= 0.25 \text{ g/mL} \end{aligned}$$

$$\begin{aligned} MBC &= MIC \times 4 \\ &= 0.25 \times 4 \\ &= 1 \text{ g/mL} \end{aligned}$$

Lampiran 11. Penentuan dan Perhitungan nilai MIC dan MBC *Hand Sanitizer* Kitosan Larutan Air Terhadap Bakteri *Escherichia coli*

Konsentrasi	Zona Hambat (mm)				Rata-Rata Zona Hambat (mm)	Ln Konsentrasi (X)	Kuadrat Zona Hambat (Y)
	1	2	3	4			
0	0	0	0	0	0	0	0
110	7.5	7	8	8.4	7.73	4.70	59.68
120	8.1	7.8	8	7.6	7.88	4.79	62.02
130	8.6	8.4	9	8.8	8.70	4.87	75.69
140	9.4	8.8	9.3	10	9.38	4.94	87.89



$$Y = -14.769 + 0,9251$$

Jika $Y = 0$, maka $X = 0.0626$ (Mt)

Nilai konsentrasi ekstrak = $\text{EXP}(0.0626) = 1.064$ (eMt)

$$\begin{aligned} \text{MIC} &= \text{eMt} \times 0.25 \\ &= 1.064 \times 0.25 \\ &= 0.26 \text{ g/mL} \end{aligned}$$

$$\begin{aligned} \text{MBC} &= \text{MIC} \times 4 \\ &= 0.26 \times 4 \\ &= 1.064 \text{ g/mL} \end{aligned}$$

**Lampiran 12. Data Pengamatan dan Analisa Uji Antibakteri Kitosan Larut
Air Terhadap Bakteri *Staphylococcus aureus***

Konsentrasi	Zona Hambat (mm)						Total	Rata-Rata Zona Hambat (mm)	SD
	1	2	3	4	5	6			
90	16	17.7	16.6	17.2	17	16.6	101.1	16.9	0.59
100	20.1	19.5	19	18.7	18.5	20.3	116.1	19.4	0.74
110	21.5	21	22.1	21.7	21.4	21.9	129.6	21.6	0.39
120	22.7	22.3	22.9	23.2	23.5	22.7	137.3	22.9	0.42
Kontrol +	27	27.8	26.7	27.9	28.2	28	165.6	27.6	0.60
Kontrol -	0	0	0	0	0	0	0.0	0.0	0
Total							649.7		

Tabel Data Pengamatan

Tabel ANOVA

SK	Db	JK	KT	F hitung	F 5%	F1%
Perlakuan	5	2736.59	547.32	2068.39	2.53	3.69
Galat	30	7.94	0.26			
Total	35	2744.53				

*Fhitung > F tabel (5%), sangat maka berbeda nyata

Perhitungan Uji Lanjut Tukey

$$Uji Tukey = q_{0.05(perlakuan, db galat)} \cdot \sqrt{\frac{KT Galat}{ulangan}}$$

$$= q_{0.05(6,30)} \cdot \sqrt{\frac{0.2646}{6}}$$

$$= 4.3 (0.21)$$

$$= 0.903$$

Tests of Between-Subjects Effects

Dependent Variable: Daya Hambat Kitosan Larut Air pada *S. aureus*

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	2739.336 ^a	5	547.867	1600.131	.000
Intercept	11761.402	1	11761.402	34351.005	.000
Perlakuan	2739.336	5	547.867	1600.131	.000
Error	10.272	30	.342		
Total	14511.010	36			
Corrected Total	2749.608	35			

a. R Squared = .996 (Adjusted R Squared = .996)

Tukey HSD^{a,b}

Konsentrasi	N	Subset					
		1	2	3	4	5	6
0	6	.0000					
90 %	6		16.8500				
100 %	6			19.5167			
110%	6				21.6000		
120%	6					22.8833	
Kontrol +	6						27.6000
Sig.		1.000	1.000	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) = .342.

a. Uses Harmonic Mean Sample Size = 6.000.

b. Alpha = 0.05.

Lampiran 13. Data Pengamatan dan Analisa Uji Antibakteri *Hand Sanitizer* Terhadap *Staphylococcus aureus*

Tabel Data Pengamatan

Konsentrasi	Zona Hambat (mm)				Total	Rata-Rata Zona Hambat (mm)	SD
	1	2	3	4			
0	0	0	0	0	0.0	0.00	0
110	11.5	10.5	11	11.5	44.5	11.13	0.48
120	12.6	12	11.8	13	49.4	12.35	0.55
130	13.7	13.9	14.6	14	56.2	14.05	0.39
140	14.5	14	14.1	15.2	57.8	14.45	0.54
Kontrol +	16	15.8	15.5	16.3	63.6	15.90	0.34
Total					271.5		

Tabel ANOVA

SK	db	JK	KT	F hitung	F 5%	F1%
Perlakuan	5	669.87	133.97	735.78	2.77	4.25
Galat	18	3.28	0.18			
Total	23	673.15				

*Fhitung > F tabel (5%), sangat maka berbeda nyata

Perhitungan Uji Lanjut Tukey

$$\begin{aligned}
 \text{Uji Tukey} &= q_{0.05(\text{perlakuan}, \text{db galat})} \cdot \sqrt{\frac{KT \text{ Galat}}{\text{ulangan}}} \\
 &= q_{0.05(6,18)} \cdot \sqrt{\frac{0.18208}{4}} \\
 &= 4.49 (0.21335) \\
 &= 0.9579
 \end{aligned}$$

Tests of Between-Subjects Effects

Dependent Variable: Hasil

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	669.063 ^a	5	133.813	681.366	.000
Intercept	3069.082	1	3069.082	15627.573	.000
Perlakuan	669.063	5	133.813	681.366	.000
Error	3.535	18	.196		
Total	3741.680	24			
Corrected Total	672.598	23			

a. R Squared = .995 (Adjusted R Squared = .993)

Hasil

Tukey HSD^{a,b}

Perlakuan	N	Subset				
		1	2	3	4	5
0	4	.0000				
110 %	4		11.1250			
120 %	4			12.3500		
140 %	4				14.1250	
130 %	4				14.3500	
Kontrol +	4					15.9000
Sig.		1.000	1.000	1.000	.977	1.000

Means for groups in homogeneous subsets are displayed.

Based on observed means.

The error term is Mean Square(Error) = .196.

a. Uses Harmonic Mean Sample Size = 4.000.

b. Alpha = 0.05.

Lampiran 14. Data Pengamatan dan Analisa Uji Antibakteri Hand
Sanitizer Terhadap *Escherichia coli*

Tabel Data Pengamatan

Konsentrasi	Zona Hambat (mm)				Total	Rata-Rata Zona Hambat (mm)	SD
	1	2	3	4			
0	0	0	0	0	0.0	0.00	0
110	7.5	7	8	8.4	30.9	7.73	0.61
120	8.1	7.8	8	7.6	31.5	7.88	0.22
130	8.6	8.4	9	8.8	34.8	8.70	0.26
140	9.4	8.8	9.3	10	37.5	9.38	0.49
Kontrol +	12	12.5	13	12.4	49.9	12.48	0.41
Total					183.8		

Tabel ANOVA

SK	db	JK	KT	F hitung	F 5%	F1%
Perlakuan	5	343.71	68.75	459.98	2.77	4.25
Galat	18	2.69	0.15			
Total	23	346.39				

*Fhitung > F tabel (5%), maka sangat berbeda nyata

Perhitungan Uji Lanjut Tukey

$$\begin{aligned}
 \text{Uji Tukey} &= q_{0.05(\text{perlakuan}, \text{db galat})} \cdot \sqrt{\frac{KT \text{ Galat}}{\text{ulangan}}} \\
 &= q_{0.05(6,18)} \cdot \sqrt{\frac{0.14944}{4}} \\
 &= 4.49 (0.19329) \\
 &= 0.8678
 \end{aligned}$$

Tests of Between-Subjects Effects

Dependent Variable: Hasil

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	343.708 ^a	5	68.742	459.981	.000
Intercept	1419.882	1	1419.882	9501.067	.000
Perlakuan	343.708	5	68.742	459.981	.000
Error	2.690	18	.149		
Total	1766.280	24			
Corrected Total	346.398	23			

a. R Squared = .992 (Adjusted R Squared = .990)

Hasil

Tukey HSD^{a,b}

Perlakuan	N	Subset				
		1	2	3	4	5
0	4	.0000				
110 %	4		7.7250			
120 %	4		7.8750	7.8750		
130 %	4			8.7000	8.7000	
140 %	4				9.3750	
Kontrol +	4					12.4750
Sig.		1.000	.993	.068	.185	1.000

Means for groups in homogeneous subsets are displayed.

Based on observed means.

The error term is Mean Square(Error) = .149.

a. Uses Harmonic Mean Sample Size = 4.000.

b. Alpha = 0.05.

Lampiran 15. Hasil Uji Iritasi *In vivo*

Tabel Hasil Pengamatan Uji Iritasi *Hand Sanitizer* Kitosan Larut Air

Sampel Uji	Perlakuan						Indeks Iritasi Primer
	24 Jam		48 Jam		72 Jam		
	Eritema	Edema	Eritema	Edema	Eritema	Edema	
Kontrol +	0	0	0	0	0	0	0
Formula 0	0	0	0	0	0	0	0
Formula 1	0	0	0	0	0	0	0
Formula 2	0	0	0	0	0	0	0
Formula 3	0	0	0	0	0	0	0
Formula 4	0	0	0	0	0	0	0
Primary Iritation Indeks (PII)	0						

Keterangan :

Kontrol + = produk komersial

F0 = *hand sanitizer* formula 0 (0 g/mL)

F1 = *hand sanitizer* formula 1 (0,11 g/mL)

F2 = *hand sanitizer* formula 2 (0,12 g/mL)

F3 = *hand sanitizer* formula 3 (0,13 g/mL)

F4 = *hand sanitizer* formula 4 (0,14 g/mL)

Perhitungan PII (*Primer Iritation Indeks*)

$$PII = \frac{\text{jumlah semua nilai eritema dan edema pada waktu pengamatan}}{\text{jumlah tikus} \times \text{jumlah waktu pengamatan}}$$

$$= \frac{0}{24 \times 144}$$

$$= 0$$

Lampiran 16. Gambar Pengamatan Efek Iritasi Kulit Tikus Wistar Jantan



Pengamatan Jam Ke 24



Pengamatan Jam Ke 48



Pengamatan Jam Ke 72