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LAMPIRAN 1

DATA PENGAMATAN DAN PERHITUNGAN

Pengamatan Hasil TPC

1. Perbandingan jumlah Koloni Bakteri *Lactobacillus sp* yang belum terenkapsulasi dan yang telah terenkapsulasi menggunakan Alginat 1% dan Kitosan 1,2%

Tabel I.1
Jumlah Koloni Bakteri pada Variasi Kitosan 1,2%

Pengenceran	Broth	Beads (K:1,2 %)	pH 3					
	Awal Cfu/nl	Awal cfu/g	Broth (cfu/mL)			Beads K:1,2% (cfu/gr)		
			1'	60'	120'	1'	60'	120'
10 ¹	∞	∞	∞	∞	∞	∞	62,7	53,7
10 ²	∞	∞	∞	233,5	79	∞	10	7,3
10 ³	∞	∞	∞	33	22	204,6	7,7	1
10 ⁴	∞	∞	∞	2	2	27,3	0,3	0
10 ⁵	∞	291	∞	1	0	3,6	0	0
10 ⁶	∞	23,6	267	0	0	0	0	0
10 ⁷	502	5,6	75	-	-	0	0	0
10 ⁸	105,3	0	7	-	-	0	-	-
10 ⁹	10	-	0	-	-	-	-	-
10 ¹⁰	5	-	-	-	-	-	-	-
Jumlah	5x10¹¹	5,6x10⁹	7x10⁹	1x10⁶	2x10⁵	3,6x10⁷	3x10⁵	1x10⁵

**LAMPIRAN 1
(LANJUTAN)**

2. Perbandingan jumlah Koloni Bakteri *Lactobacillus sp* yang belum terenkapsulasi dan yang telah terenkapsulasi menggunakan Alginat 1% dan Kitosan 1,6%

Tabel I.2
Jumlah Koloni Bakteri pada Variasi Kitosan 1,6%

Pengenceran	Broth	Beads (K:1,6 %)	pH 3					
	Awal Cfu/nl	Awal cfu/g	Broth (cfu/mL)			Beads K:1,6% (cfu/gr)		
			1'	60'	120'	1'	60'	120'
10 ¹	∞	∞	∞	∞	∞	∞	∞	∞
10 ²	∞	∞	∞	233,5	79	∞	∞	∞
10 ³	∞	∞	∞	33	22	∞	∞	109,7
10 ⁴	∞	∞	∞	2	2	∞	∞	14
10 ⁵	∞	∞	∞	1	0	∞	185,7	5
10 ⁶	∞	143	267	0	0	28	24	1
10 ⁷	502	17,7	75	-	-	4	2	0
10 ⁸	105,3	3	7	-	-	2	0	-
10 ⁹	10	-	0	-	-	-	-	-
10 ¹⁰	5	-	-	-	-	-	-	-
Jumlah	5x10¹¹	3x10¹⁰	7x10⁹	1x10⁶	2x10⁵	2x10¹⁰	2x10⁹	1x10⁸

**LAMPIRAN 1
(LANJUTAN)**

3. Perbandingan jumlah Koloni Bakteri *Lactobacillus sp* yang belum terenkapsulasi dan yang telah terenkapsulasi menggunakan Alginat 1% dan Kitosan 2%

Tabel I.3
Jumlah Koloni Bakteri pada Variasi Kitosan 2%

Pengenceran	Broth	Beads (K:2%)	pH 3					
	Awal Cfu/nl	Awal cfu/g	Broth (cfu/mL)			Beads K: 2% (cfu/gr)		
			1'	60'	120'	1'	60'	120'
10 ¹	∞	∞	∞	∞	∞	∞	∞	∞
10 ²	∞	∞	∞	233,5	79	∞	∞	∞
10 ³	∞	∞	∞	33	22	∞	∞	∞
10 ⁴	∞	∞	∞	2	2	∞	∞	∞
10 ⁵	∞	∞	∞	1	0	324,6	108,7	70,3
10 ⁶	∞	47	267	0	0	65	13	5
10 ⁷	502	6	75	-	-	4	3	1
10 ⁸	105,3	1	7	-	-	0	0	0
10 ⁹	10	-	0	-	-	-	-	-
10 ¹⁰	5	-	-	-	-	-	-	-
Jumlah	5x10¹⁰	1x10⁹	7x10¹⁰	1x10⁷	2x10⁶	4x10⁹	3x10⁹	1x10⁹

LAMPIRAN 1 (LANJUTAN)

Keterangan :

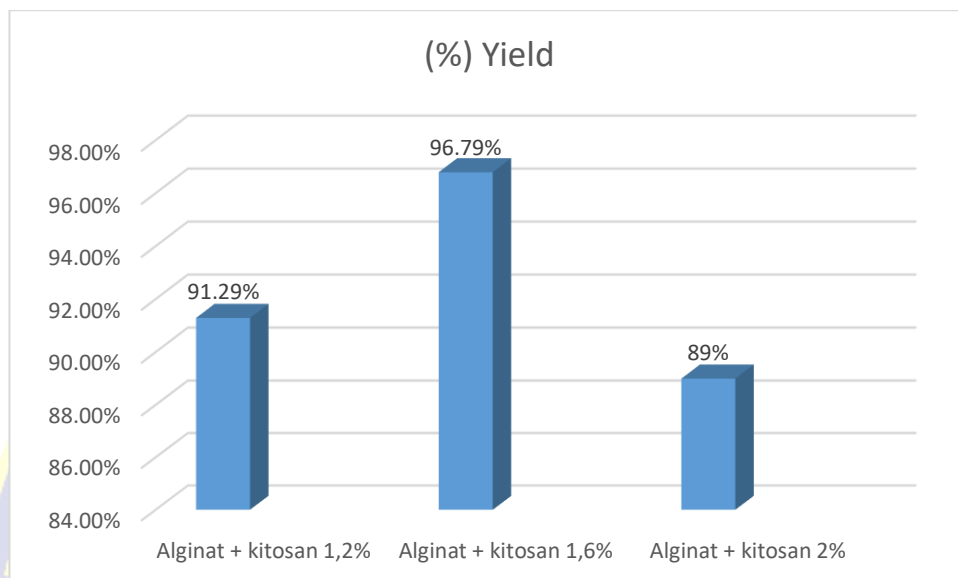
Hasil TPC dikalikan dengan jumlah pengenceran. Untuk broth *Lactobacillus sp* hanya sekali pengenceran dengan memasukkan 1 mL suspensi *Lactobacillus sp* ke dalam 9 mL larutan pepton 0,1% sehingga hasil perhitungan hanya dikalikan 10. Sementara, untuk beads dilakukan dua kali pengenceran. Pengenceran pertama dilakukan dengan melarutkan 1 gram beads ke dalam 9 mL Na-Sitrat dan pengenceran yang kedua yaitu dengan memasukkan 1 mL beads yang telah dilarutkan dengan Na-sitrat ke dalam larutan pepton 0,1% sehingga perhitungan dikalikan 100.



LAMPIRAN 2

GRAFIK YIELD DAN GRAFIK SURVIVABILITAS

a. Grafik Yield



Gambar II.1 Grafik Nilai Persen Yield dari Berbagai Variasi Konsentrasi Enkapsulasi *Lactobacillus sp*

Perhitungan nilai Yield :

$$\% \text{ Yield} = \frac{(\log A)}{(\log B)} \times 100$$

Ket : A = *Lactobacillus sp* yang telah dienkapsulasi (cfu).

B = *Free cell Lactobacillus sp* (cfu)

Contoh :

% Yield dari enkapsulasi Alginate 1% dengan kitosan 1,2%, karena A dan B memiliki satuan yang berbeda, maka satuannya di samakan terlebih dahulu.

- Viability *Lactobacillus sp* yang terenkapsulasi (A)
 Viability (cfu) = log jumlah bakteri x banyak beads yang diperoleh
 = log (5,6 x 10⁹) cfu/g x 37,3 g
 = log 2,08 x 10¹¹ cfu.
- Viability *free cell Lactobacillus sp* (B)
 Viability (cfu) = log jumlah bakteri x jumlah suspensi enkapsulasi
 = log (5 x 10¹¹) cfu/mL x 5 mL
 = log 2,5 x 10¹² cfu.

LAMPIRAN 2 (LANJUTAN)

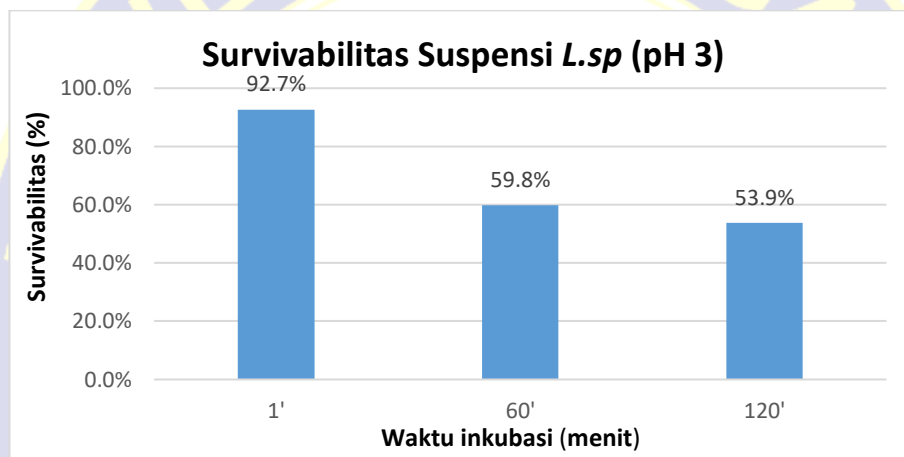
Setelah itu, hitung nilai persen Yield

$$\% \text{ Yield} = \frac{(\log A)}{(\log B)} \times 100$$

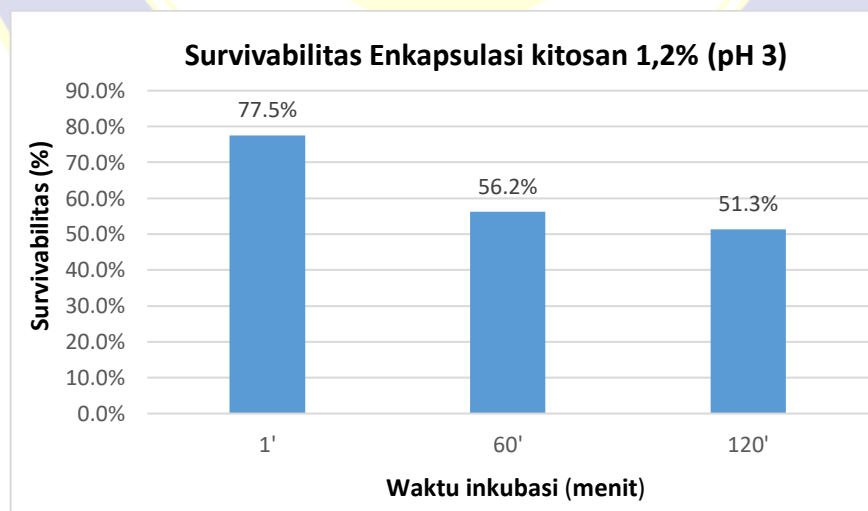
$$\% \text{ Yield} = \frac{\log 2,08 \times 10^{11}}{\log 2,5 \times 10^{12}} \times 100 = 91,29$$

b. Grafik Survivabilitas

- a. Grafik survivabilitas pH 3 untuk perbandingan survivabilitas enkapsulasi dengan alginat 1% pada variasi konsentrasi kitosan 1,2%; 1,6% dan 2% .

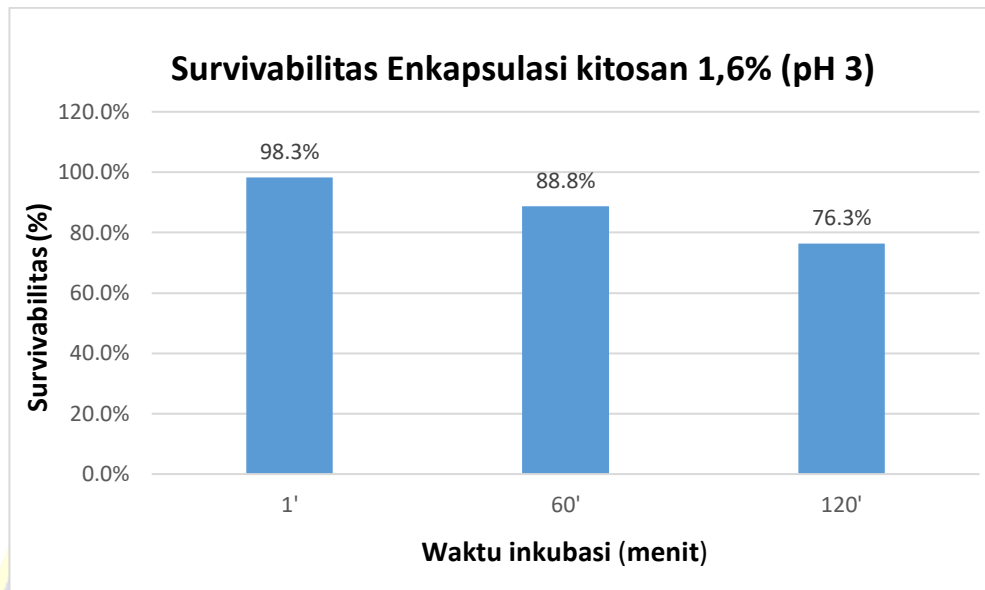


Gambar II.2 Grafik Survivabilitas suspensi *Lactobacillus sp* pada pH 3

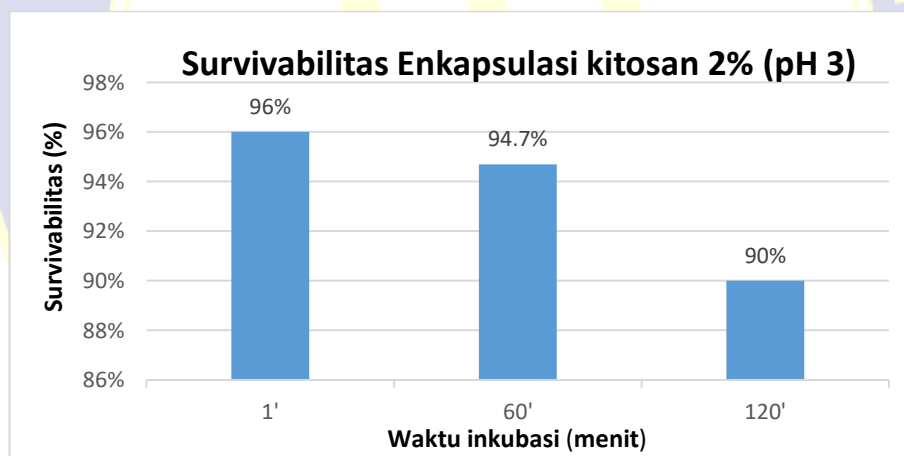


Gambar II.3 Grafik Survivabilitas enkapsulasi *Lactobacillus sp* dengan variasi kitosan 1,2% pada pH 3

**LAMPIRAN 2
(LANJUTAN)**



Gambar II.4 Grafik Survivabilitas enkapsulasi *Lactobacillus sp* dengan variasi kitosan 1,6% pada pH 3



Gambar II.5 Gambar Survivabilitas enkapsulasi *Lactobacillus sp* dengan variasi kitosan 2% pada pH 3

Perhitungan nilai survivabilitas :

$$\% \text{Survivabilitas} = \frac{(\log A_1)}{(\log A_0)} \times 100$$

Ket : A_1 = Jumlah bakteri enkapsulasi dengan simulasi asam lambung (cfu/mL).

A_0 = Jumlah bakteri enkapsulasi tanpa simulasi asam lambung (cfu/mL)

Contoh :

Survivabilitas kitosan 1,2% pada pH 3 dalam waktu inkubasi 1 menit :

$$\% \text{Survivabilitas} = \frac{(\log A_1)}{(\log A_0)} \times 100$$

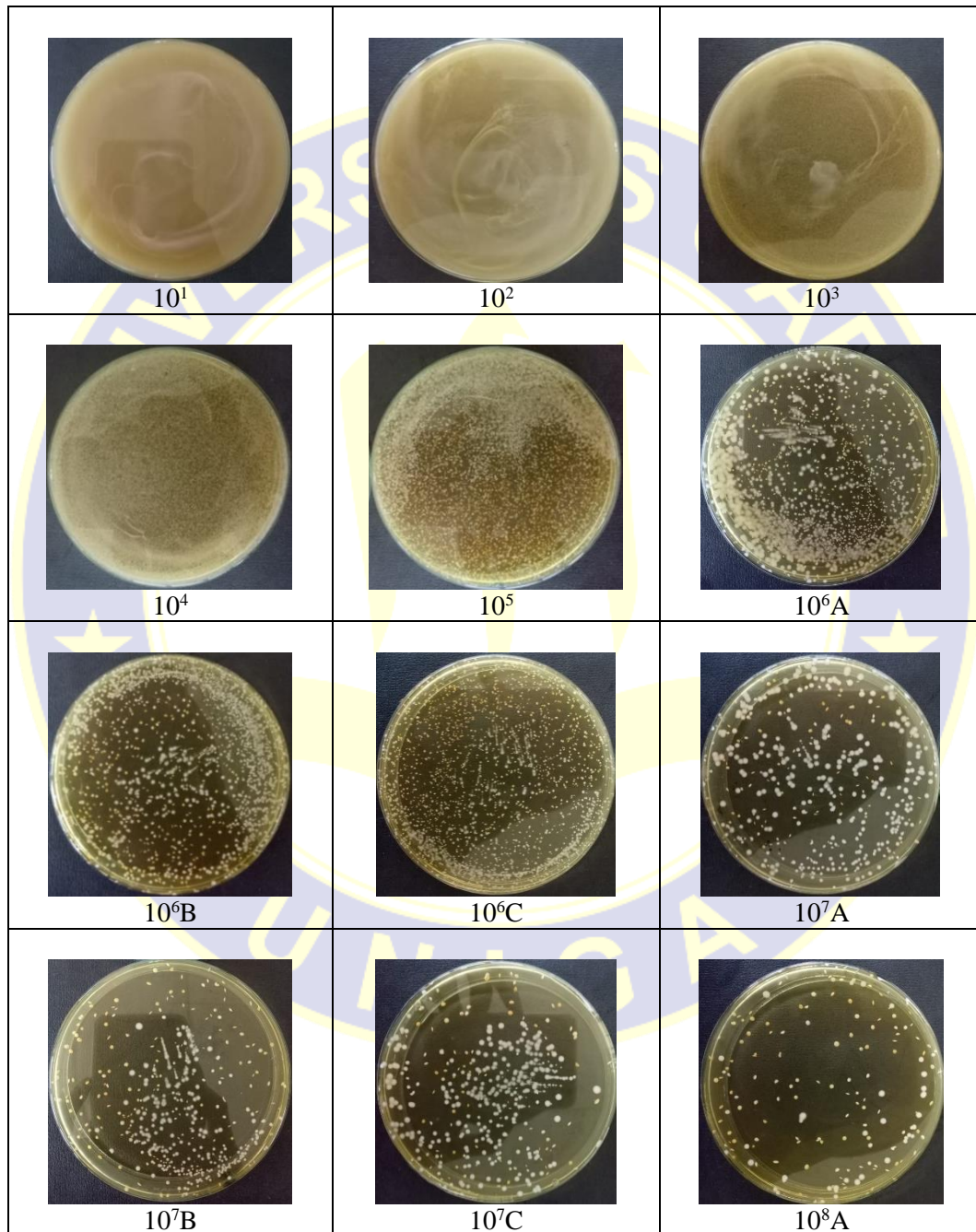
$$\% \text{Survivabilitas} = \frac{\log 3,6 \times 10^7 \text{ cfu/mL}}{\log 5,6 \times 10^9 \text{ cfu/mL}} \times 100$$

$$\% \text{Survivabilitas} = \frac{7,556 \text{ cfu/mL}}{9,748 \text{ cfu/mL}} \times 100 = 77,5\%$$

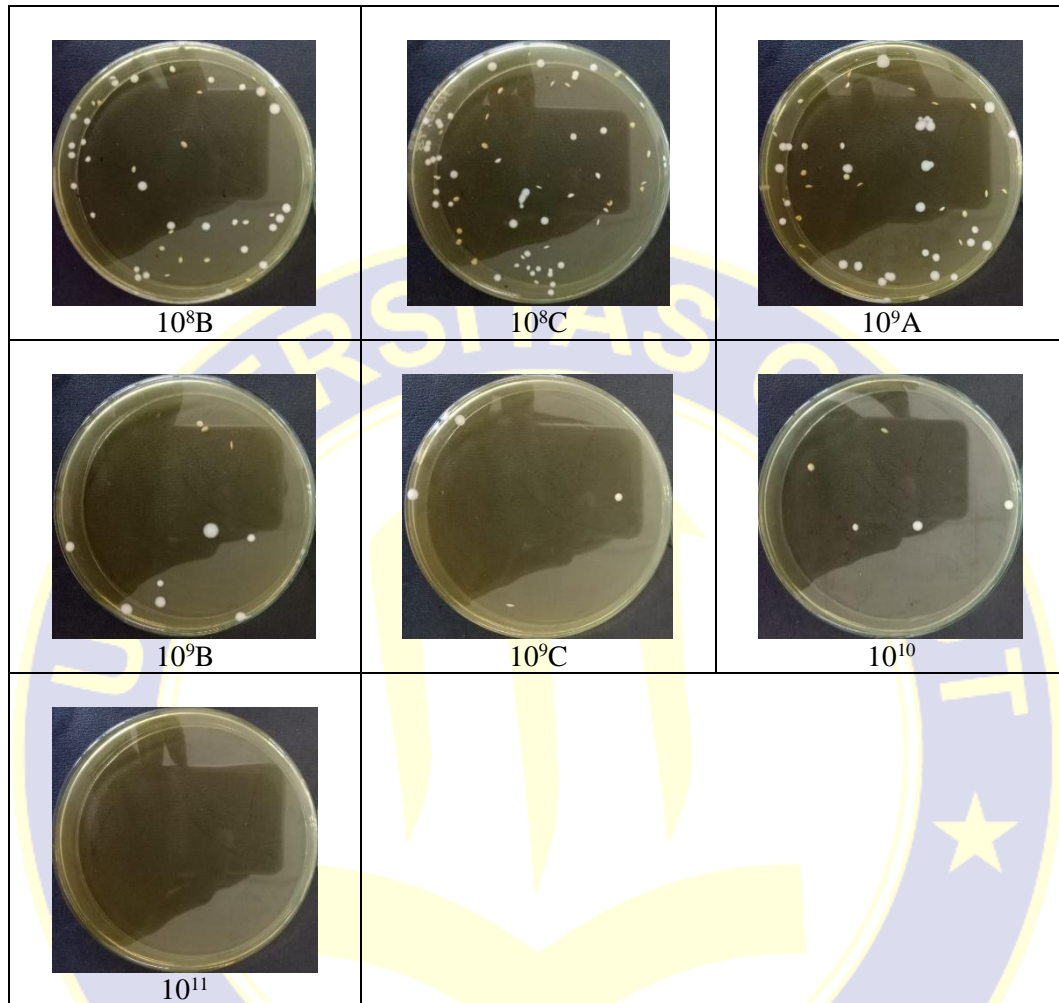


LAMPIRAN 3

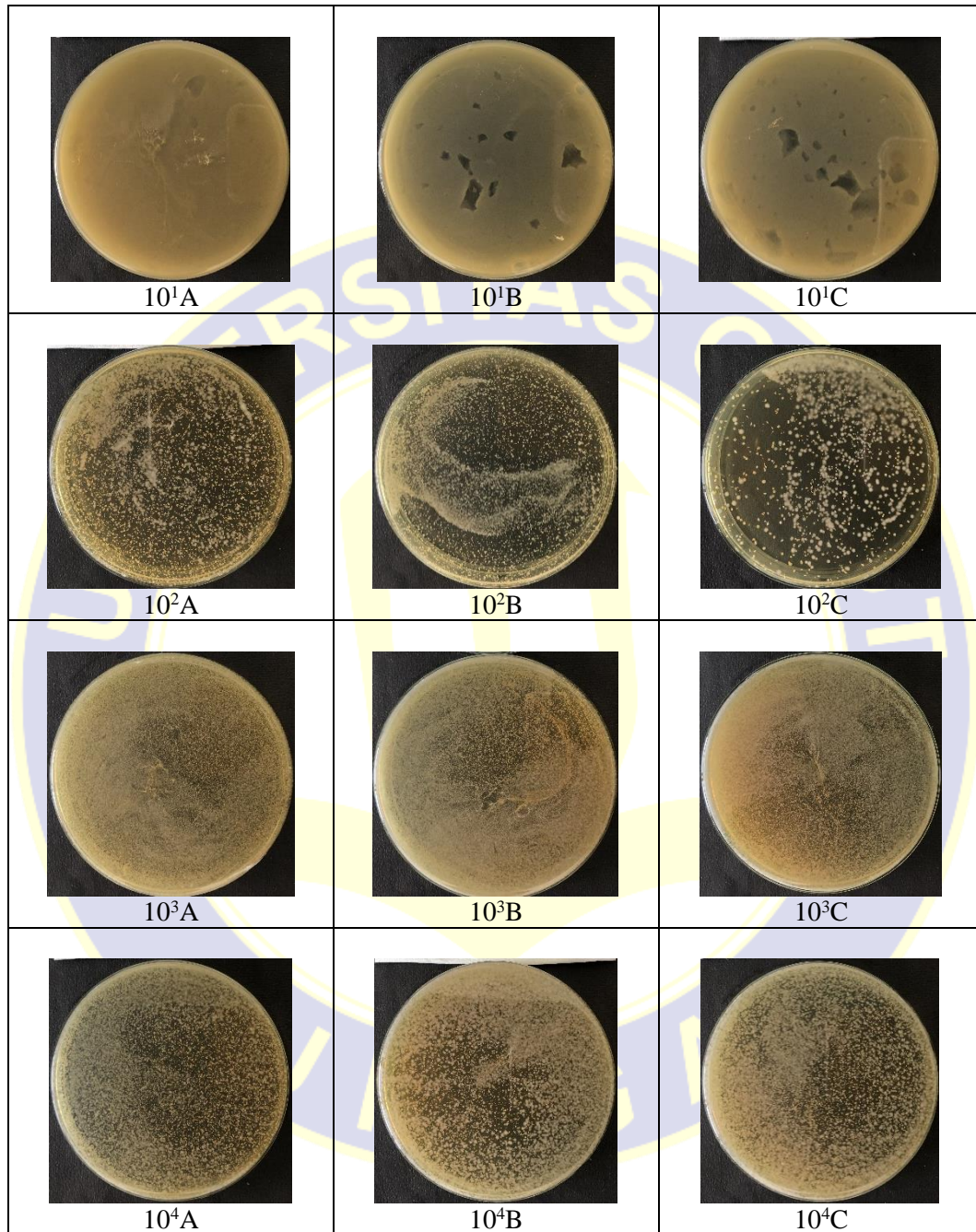
DOKUMENTASI HASIL TPC

1. *Lactobacillus sp* free cell

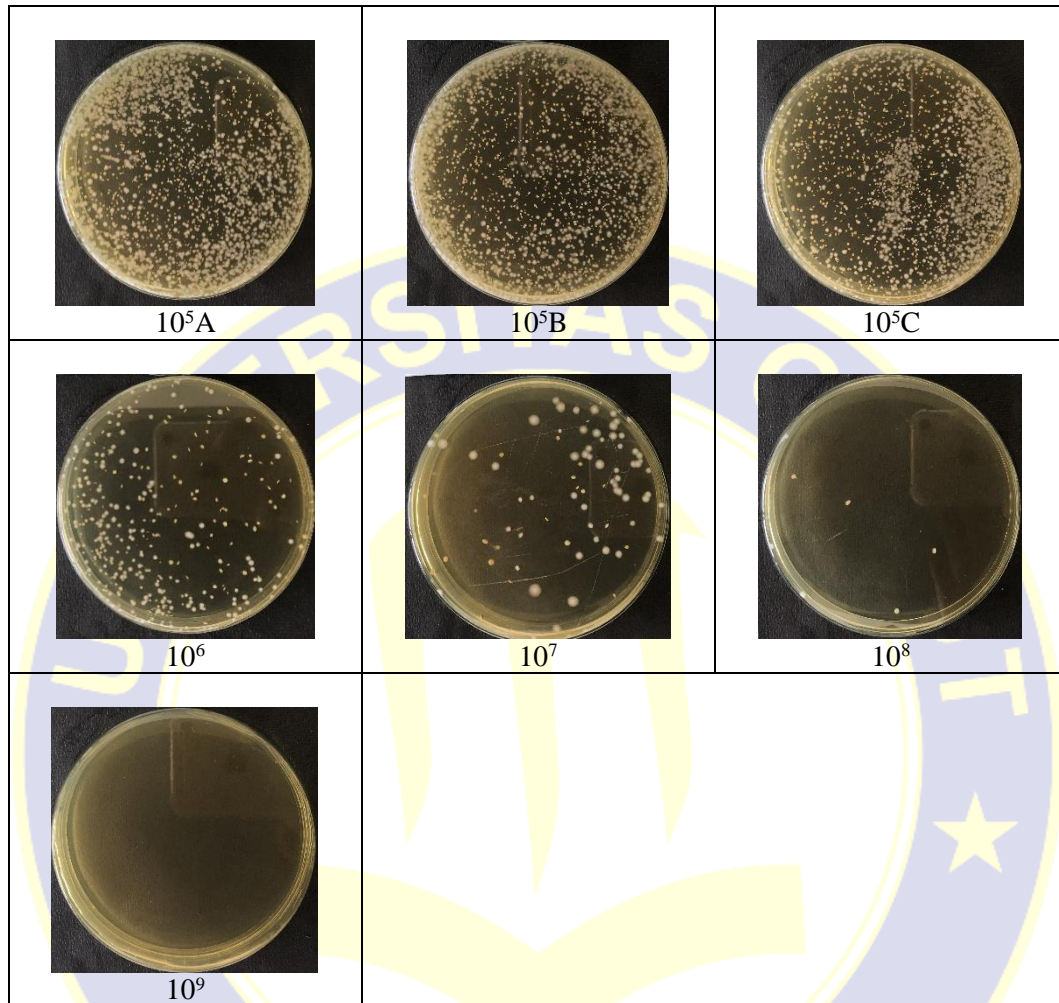
**LAMPIRAN 3
(LANJUTAN)**



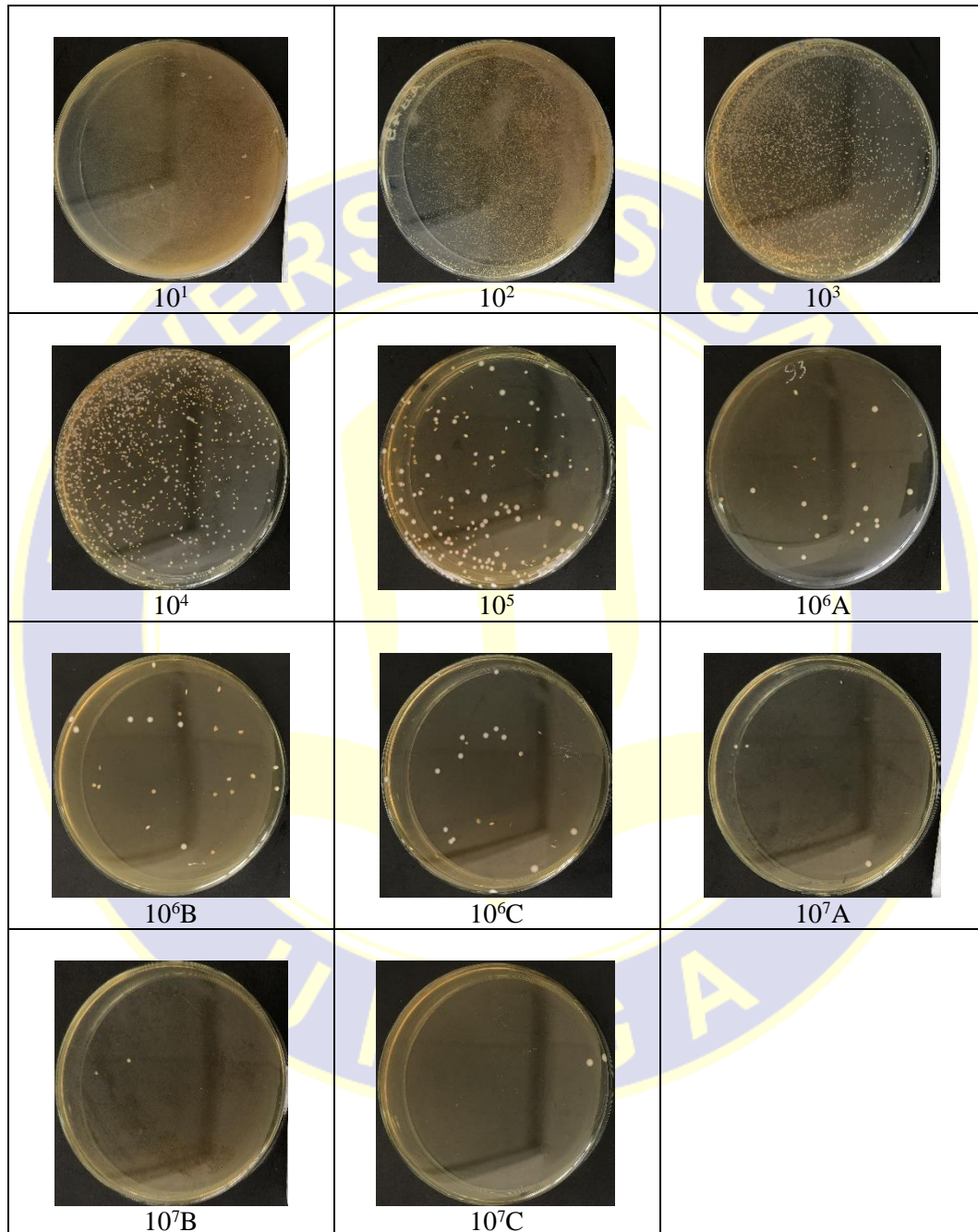
Gambar III.1 Dokumentasi hasil TPC terhadap suspensi bakteri *Lactobacillus sp* dalam larutan NaCl 0,9% tanpa enkapsulasi

**LAMPIRAN 3
(LANJUTAN)**

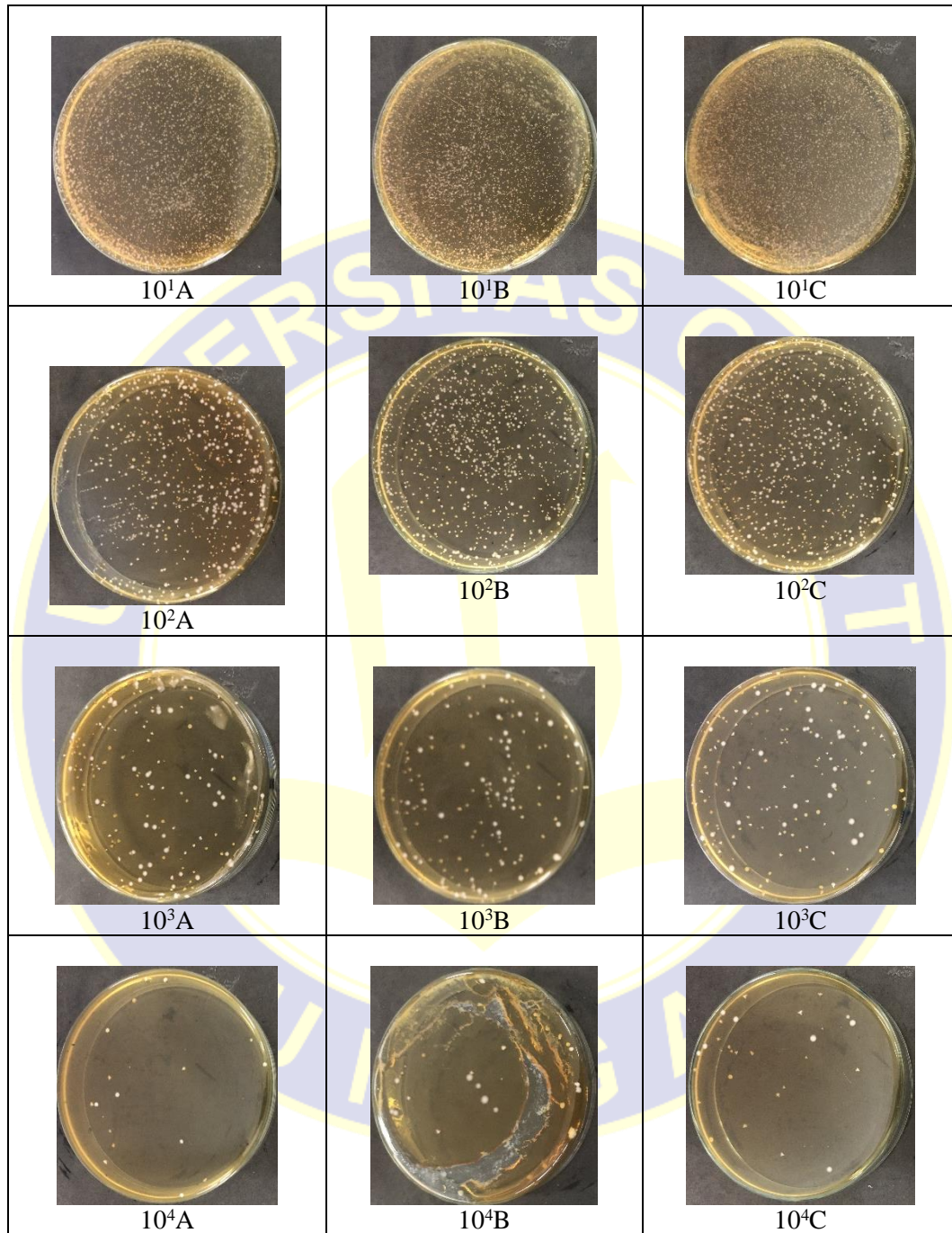
**LAMPIRAN 3
(LANJUTAN)**

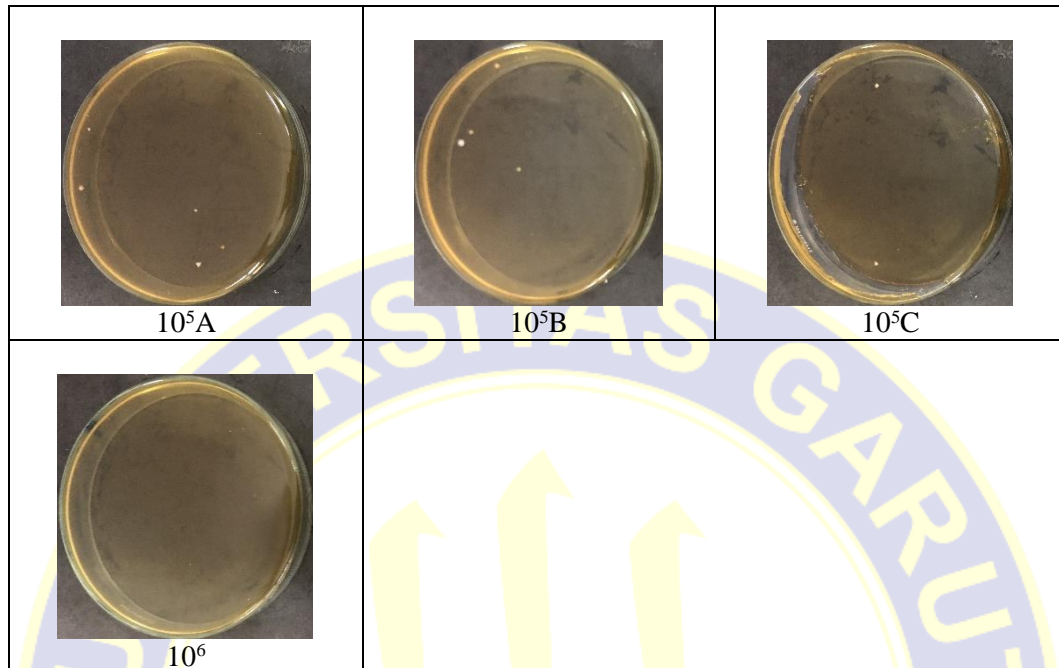


Gambar III.2 Dokumentasi hasil TPC terhadap suspensi bakteri *Lactobacillus sp* dalam larutan pH 3 selama 1 menit tanpa enkapsulasi

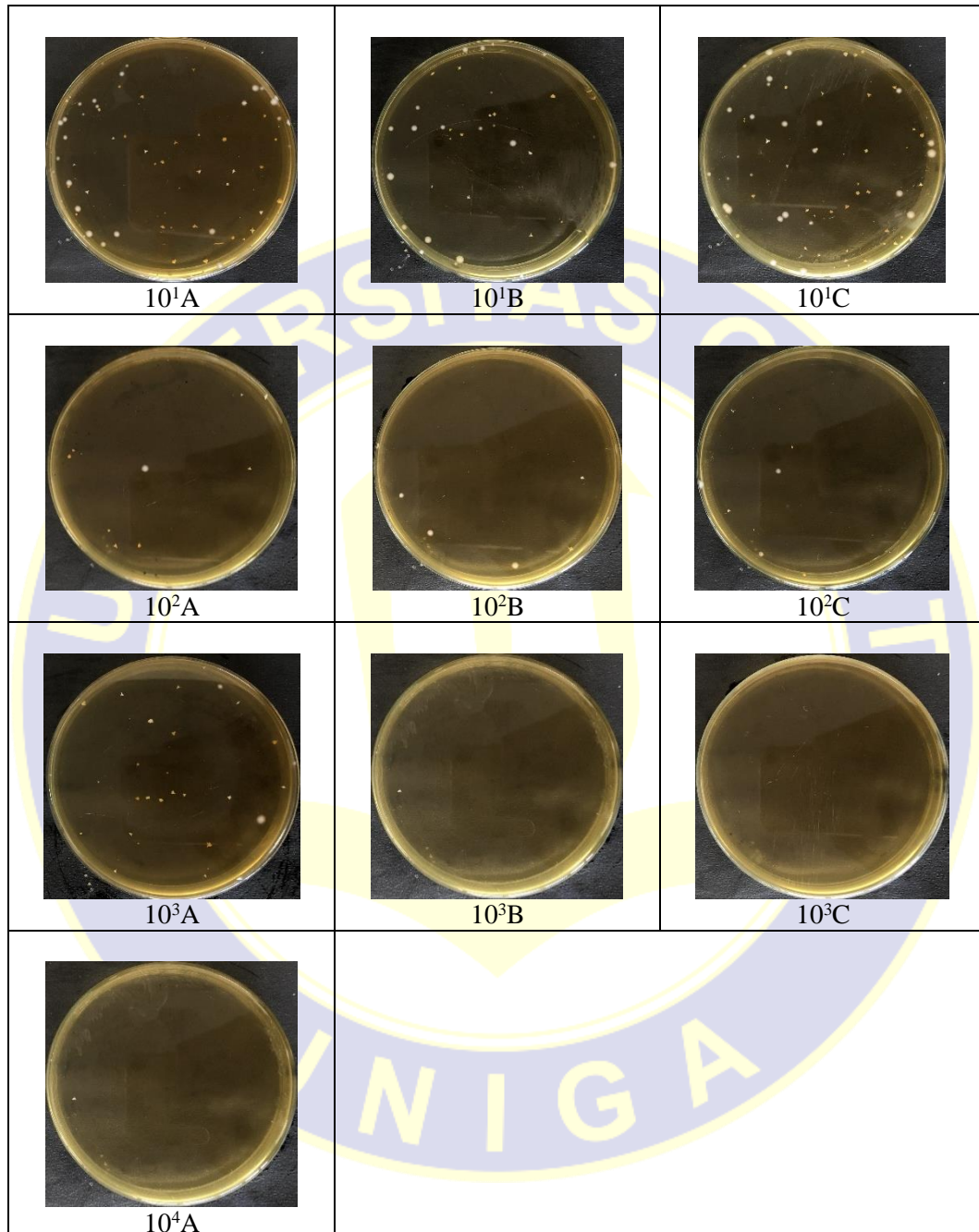
**LAMPIRAN 3
(LANJUTAN)****2. Kitosan 1,2%**

Gambar III.3 Hasil TPC terhadap mikrokapsul yang mengandung 5mL suspensi bakteri *Lactobacillus sp* + 45mL Na-Alginat + 50mL larutan kitosan 1,2% dengan metode 1 tahap tanpa dilakukan perendaman.

**LAMPIRAN 3
(LANJUTAN)**

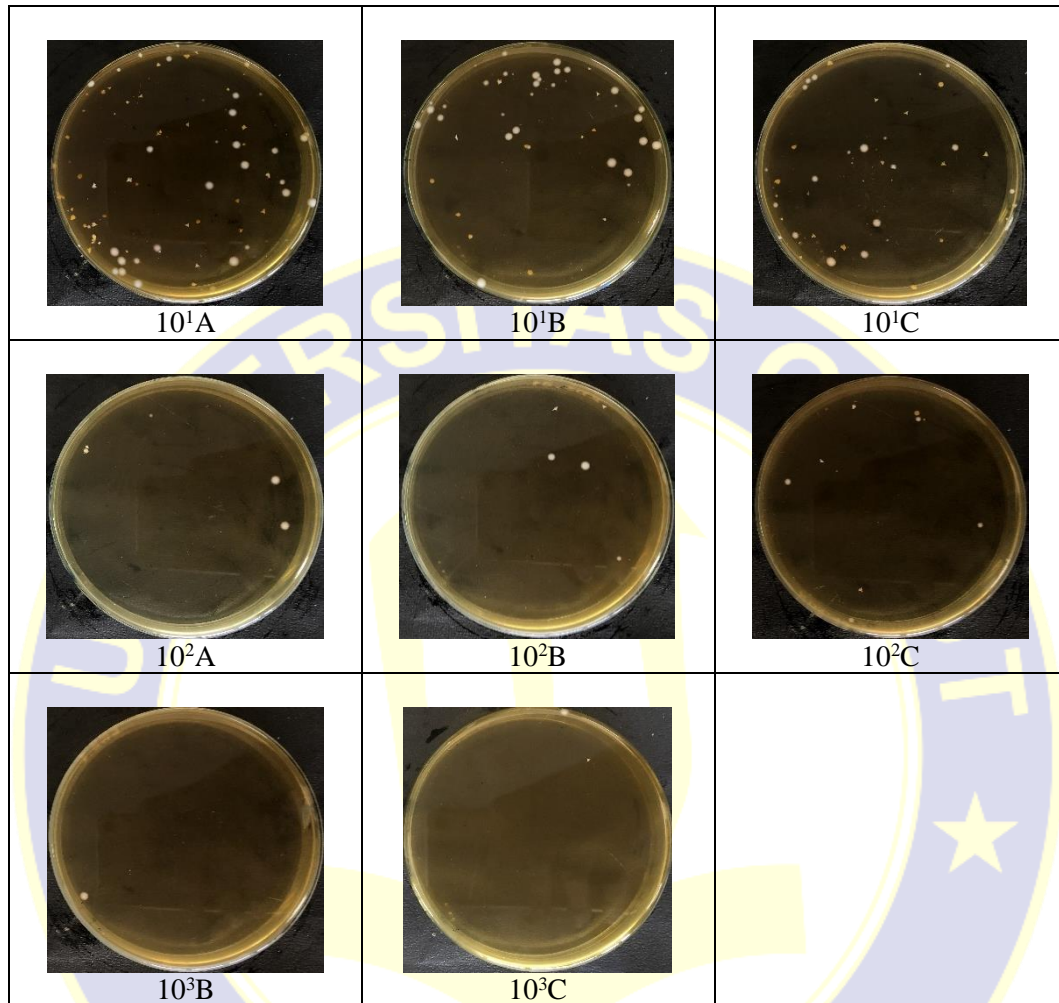
**LAMPIRAN 3
(LANJUTAN)**

Gambar III.4 Hasil TPC terhadap mikrokapsul yang mengandung 5mL suspensi bakteri *Lactobacillus sp* + 45mL Na-Alginat + 50mL larutan kitosan 1,2% dengan metode 1 tahap setelah dilakukan perendaman dalam pH 3 selama 1 menit

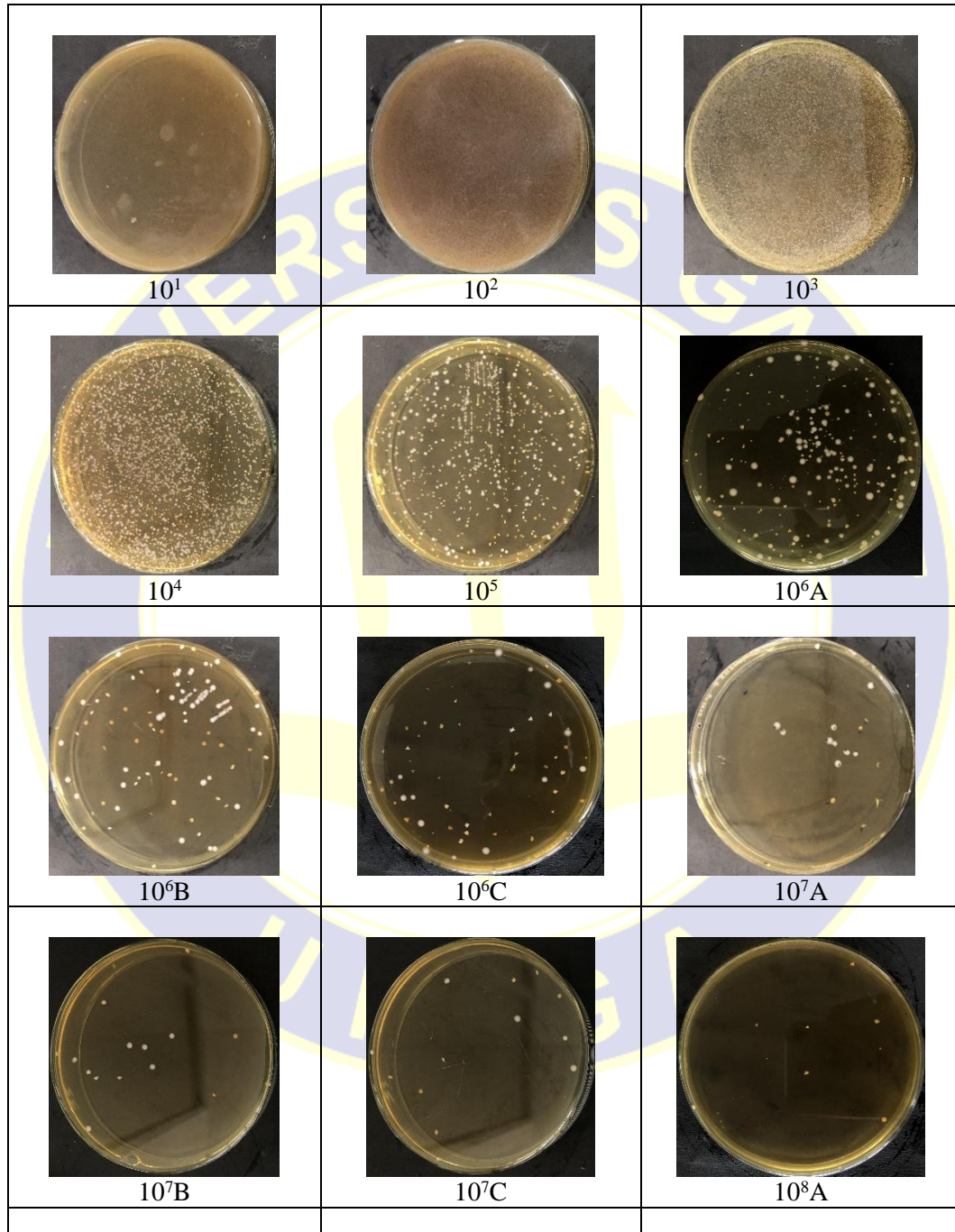
**LAMPIRAN 3
(LANJUTAN)**

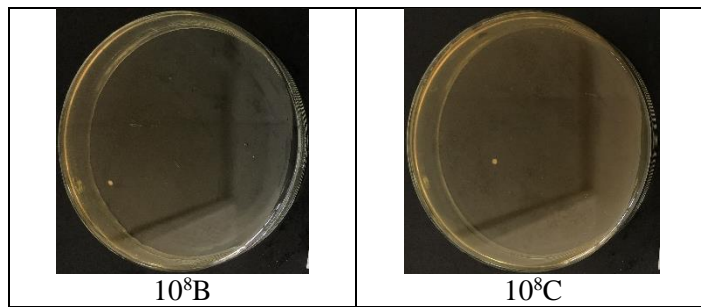
Gambar III.5 Hasil TPC terhadap mikrokapusl yang mengandung 5mL suspensi bakteri *Lactobacillus sp* + 45mL Na-Alginat + 50mL larutan kitosan 1,2% dengan metode 1 tahap setelah dilakukan perendaman dalam pH 3 selama 60 menit.

**LAMPIRAN 3
(LANJUTAN)**



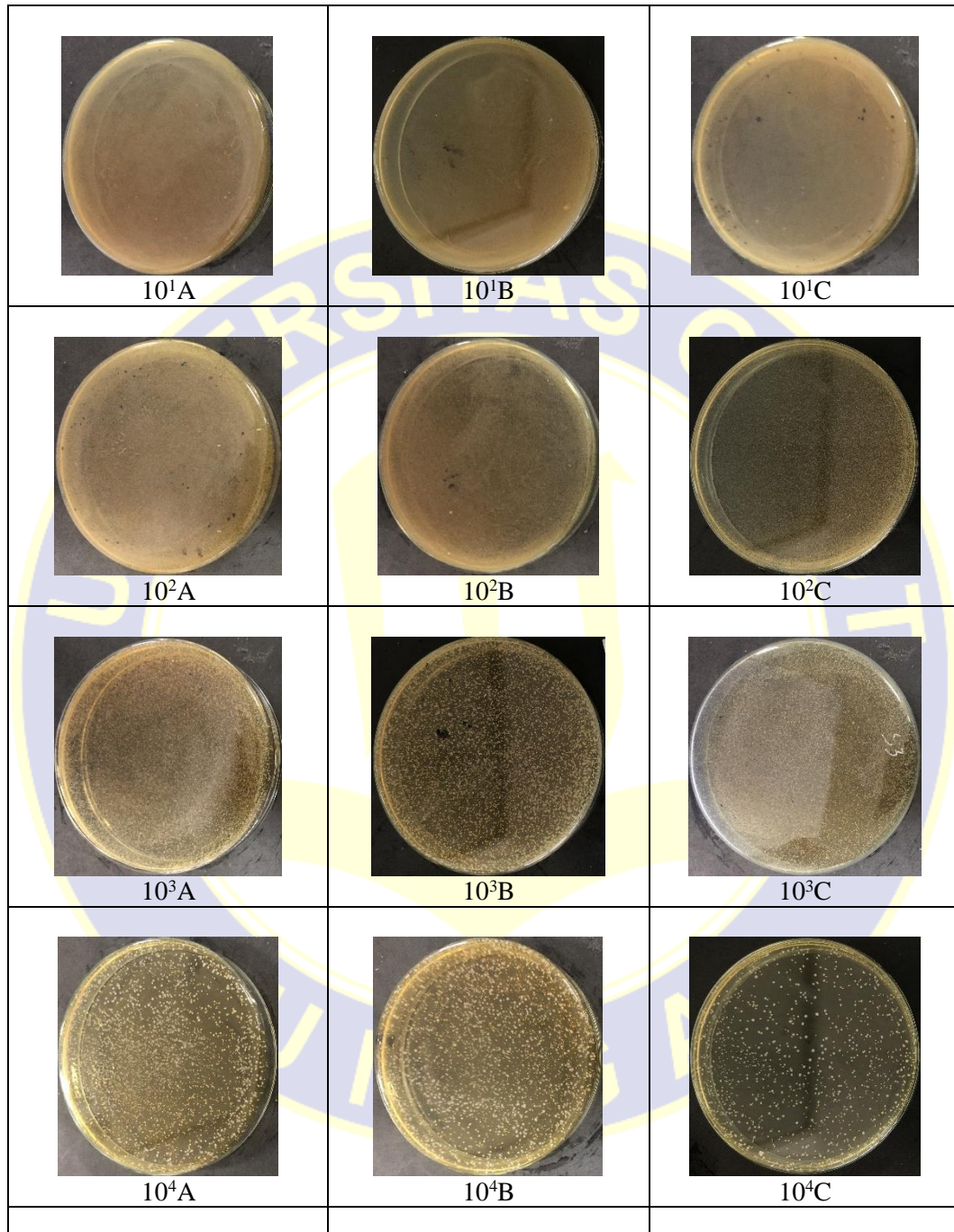
Gambar III.6 Hasil TPC terhadap mikrokapusl yang mengandung 5mL suspensi bakteri *Lactobacillus sp* + 45mL Na-Alginat + 50mL larutan kitosan 1,2% dengan metode 1 tahap setelah dilakukan perendaman dalam pH 3 selama 120 menit

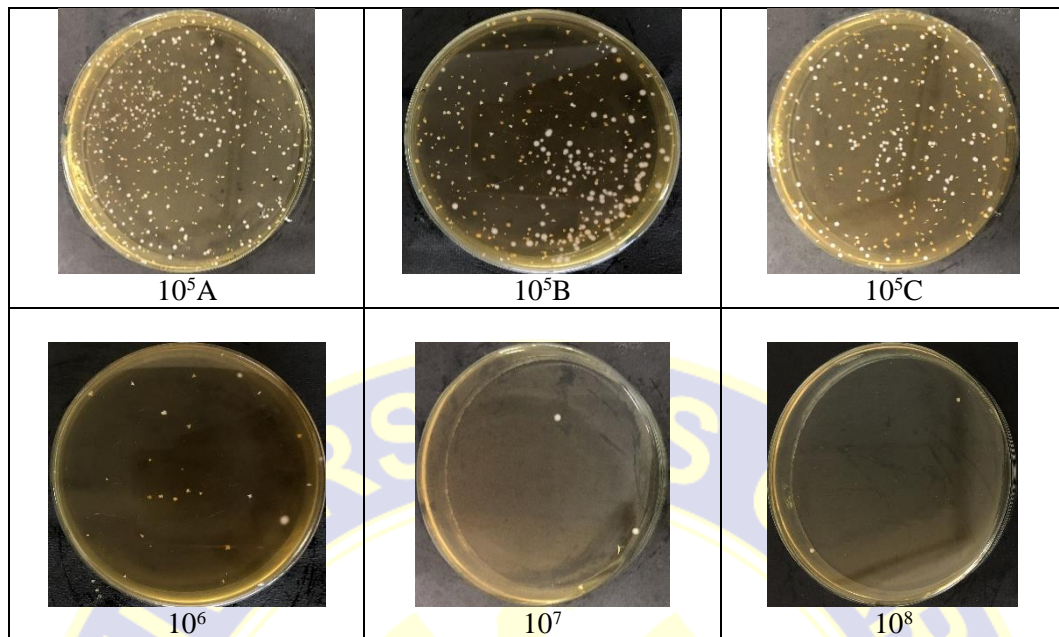
**LAMPIRAN 3
(LANJUTAN)****3. Kitosan 1,6%**



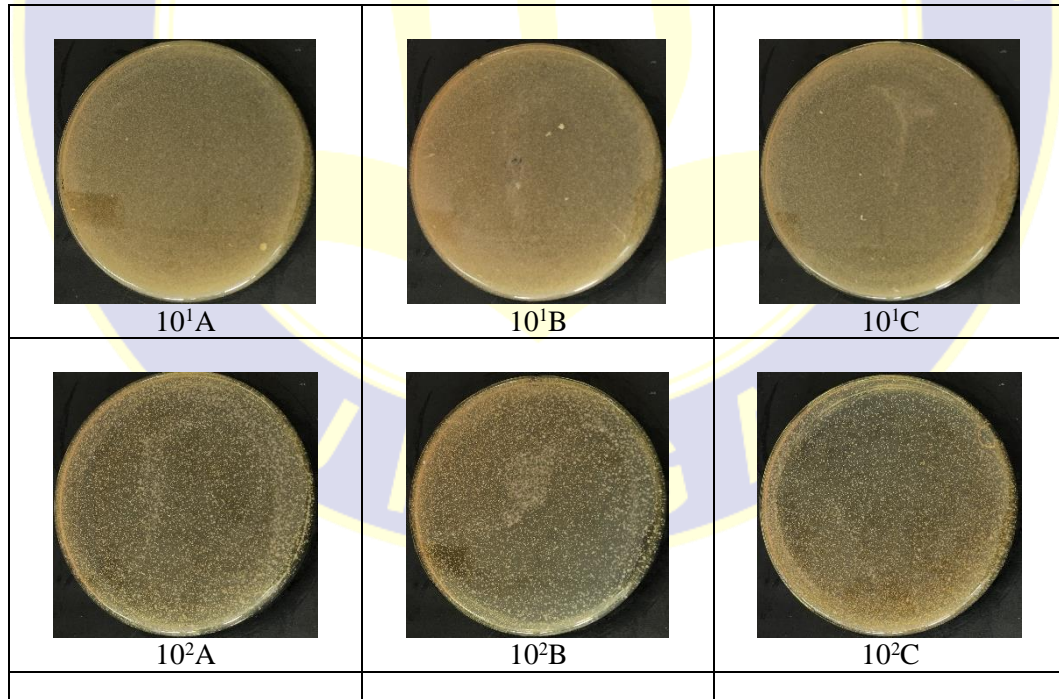
Gambar III.7 Hasil TPC terhadap mikrokapusl yang mengandung 5mL suspensi bakteri *Lactobacillus sp* + 45mL Na-Alginat + 50mL larutan kitosan 1,6% dengan metode 1 tahap tanpa dilakukan perendaman.

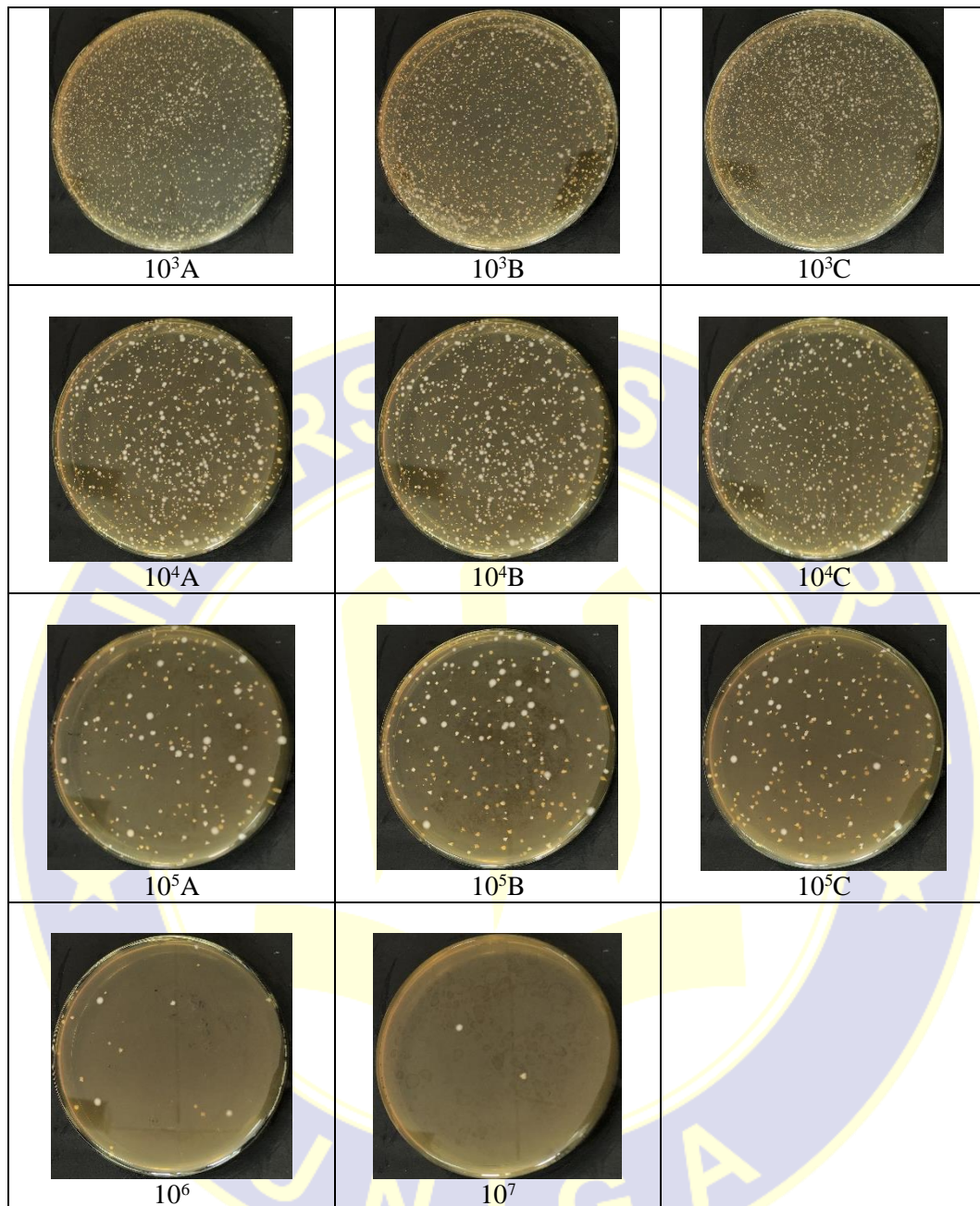


**LAMPIRAN 3
(LANJUTAN)**

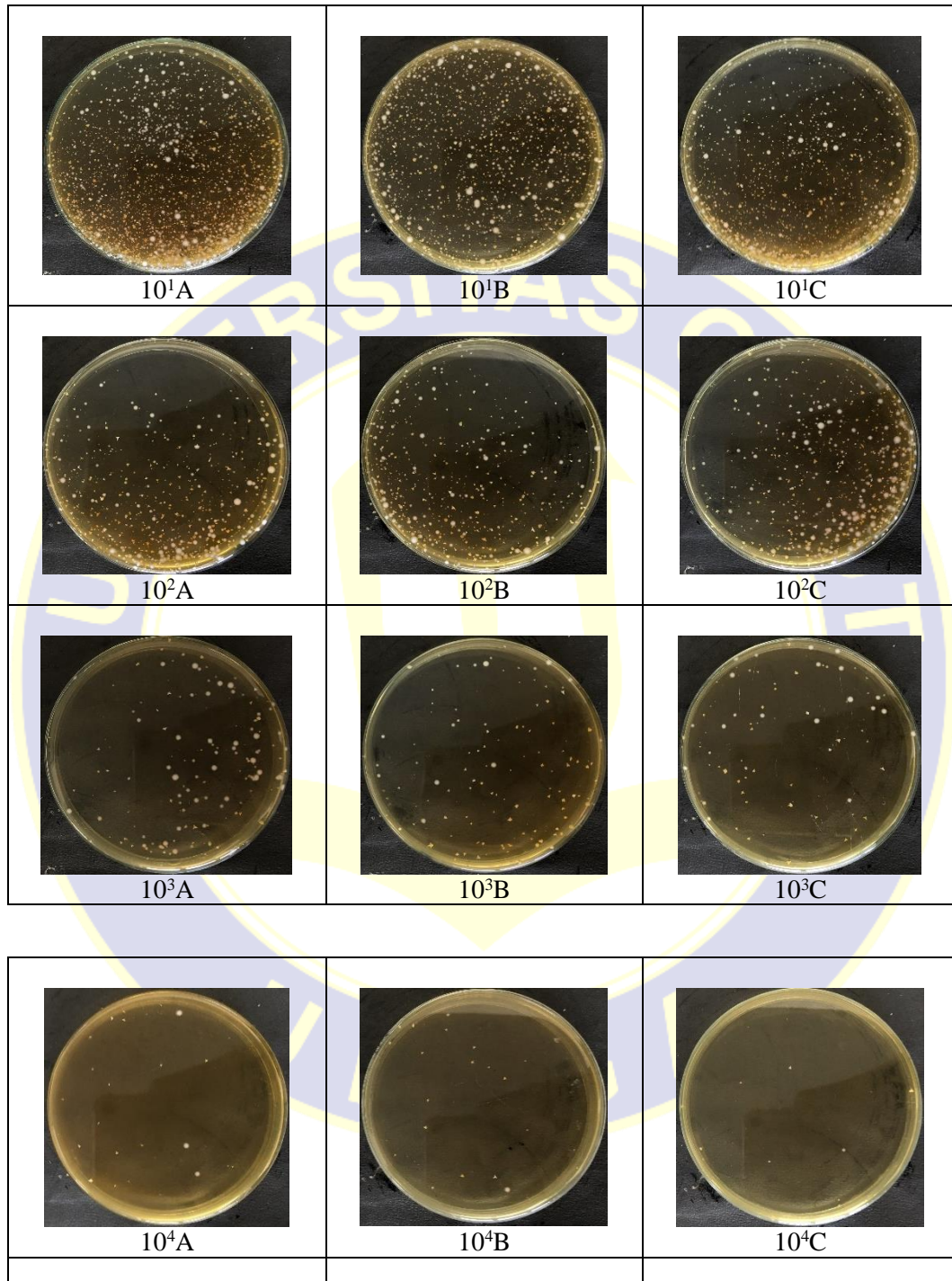


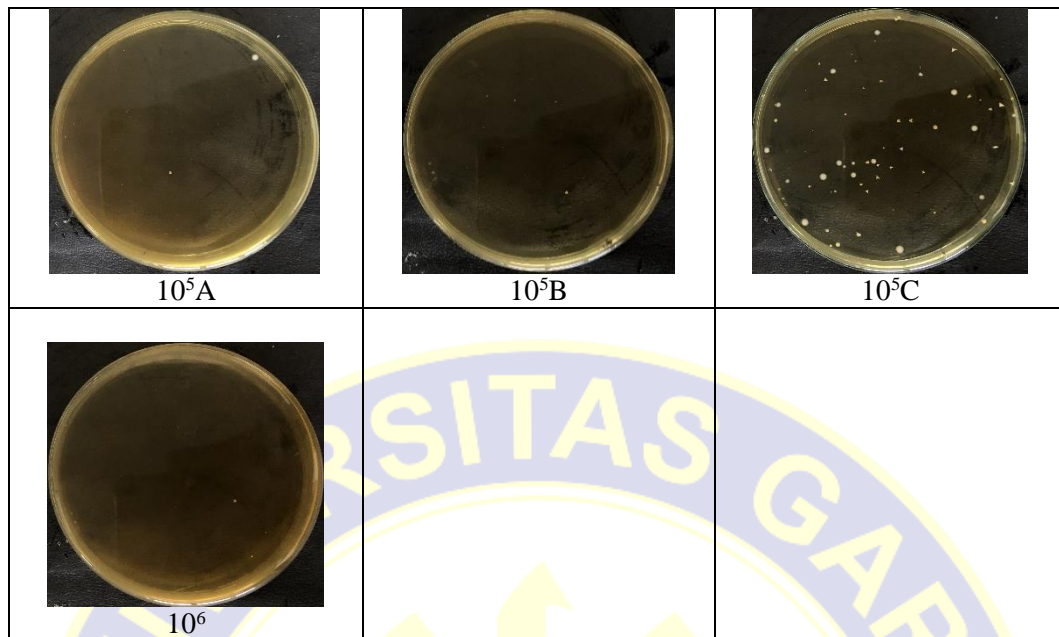
Gambar III.8 Hasil TPC terhadap mikrokapusl yang mengandung 5mL suspensi bakteri *Lactobacillus sp* + 45mL Na-Alginat + 50mL larutan kitosan 1,6% dengan metode 1 tahap setelah dilakukan perendaman dalam pH 3 selama 1 menit



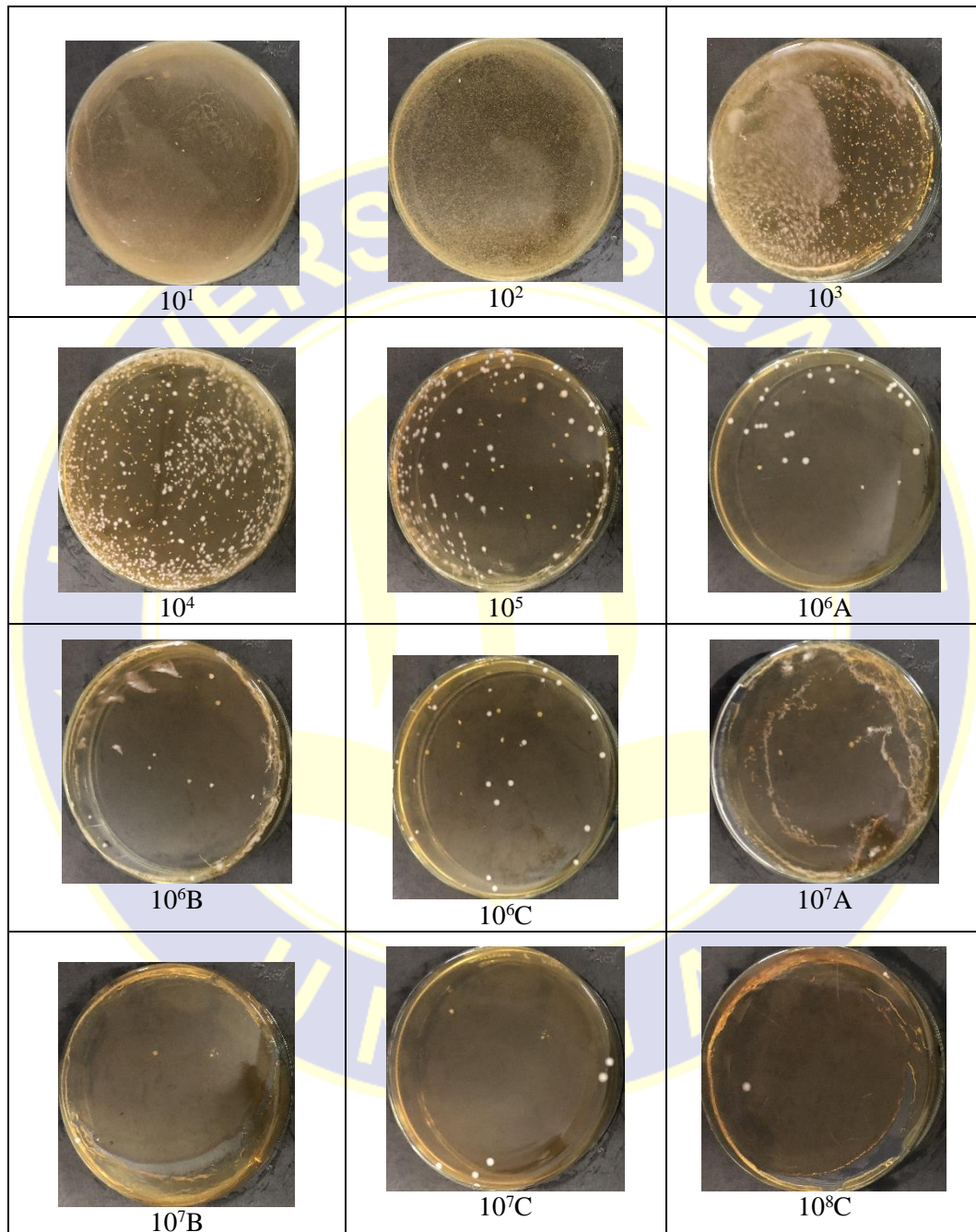


Gambar III.9 Hasil TPC terhadap mikrokapusl yang mengandung 5mL suspensi bakteri *Lactobacillus sp* + 45mL Na-Alginat + 50mL larutan kitosan 1,6% dengan metode 1 tahap setelah dilakukan perendaman dalam pH 3 selama 60 menit

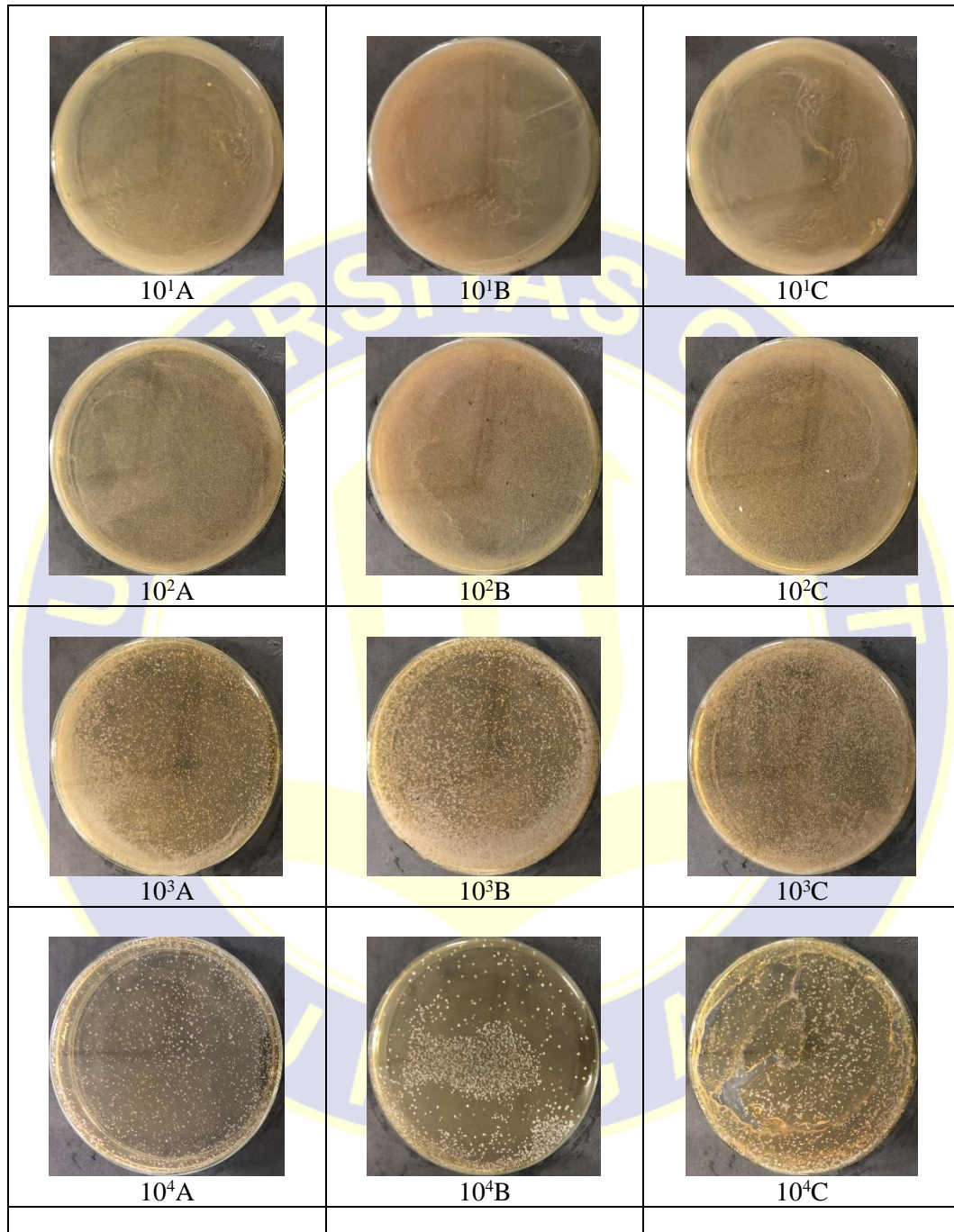
**LAMPIRAN 3
(LANJUTAN)**

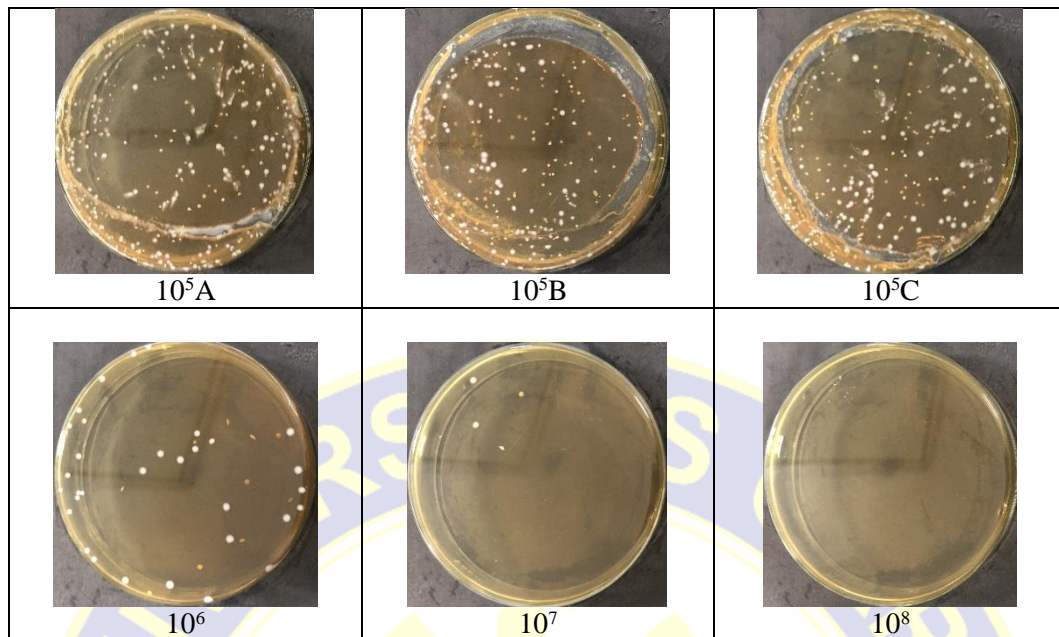


Gambar III.10 Hasil TPC terhadap mikrokapusl yang mengandung 5mL suspensi bakteri *Lactobacillus sp* + 45mL Na-Alginat + 50mL larutan kitosan 1,6% dengan metode 1 tahap setelah dilakukan perendaman dalam pH 3 selama 120 menit

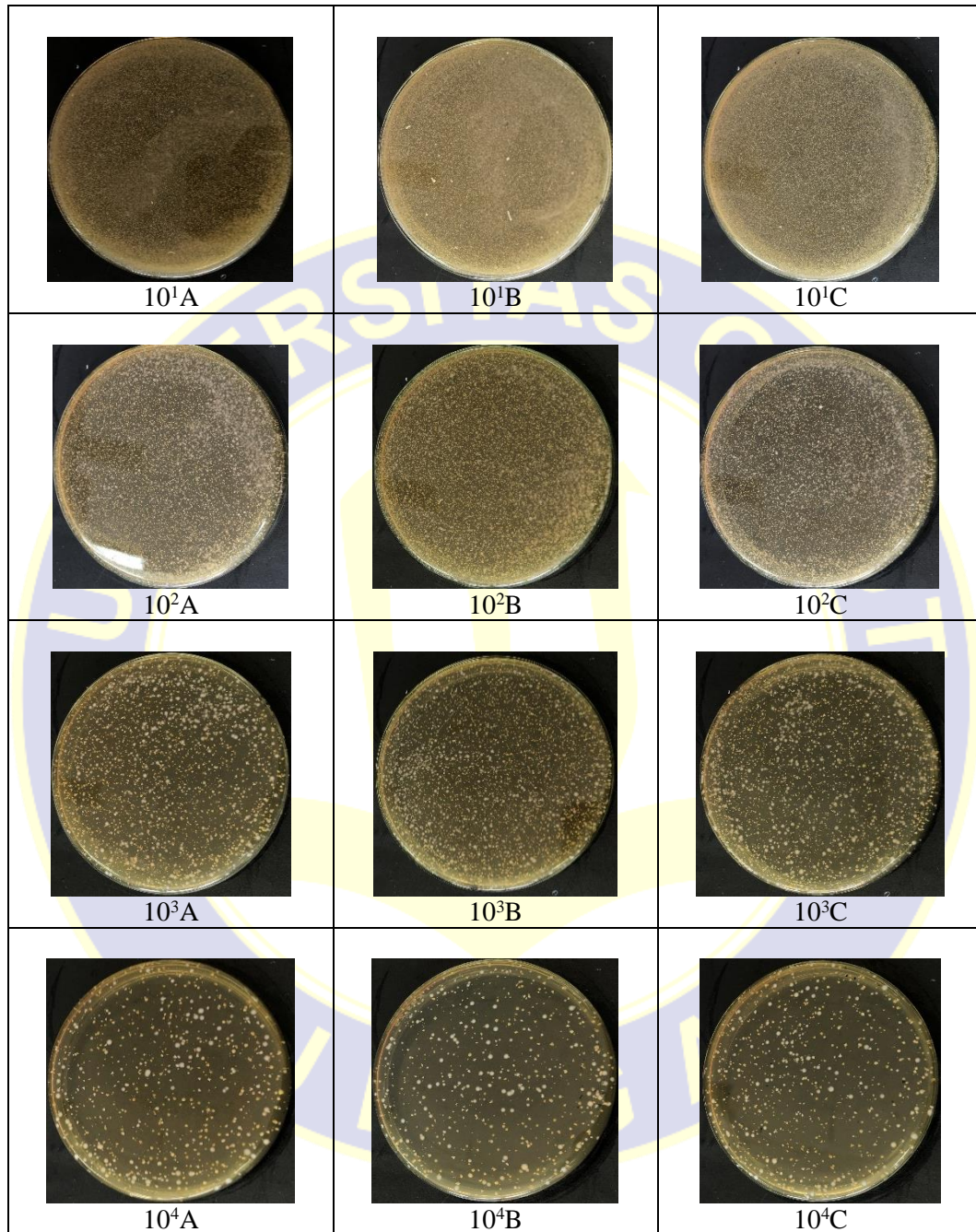
**LAMPIRAN 3
(LANJUTAN)****4. Kitosan 2%**

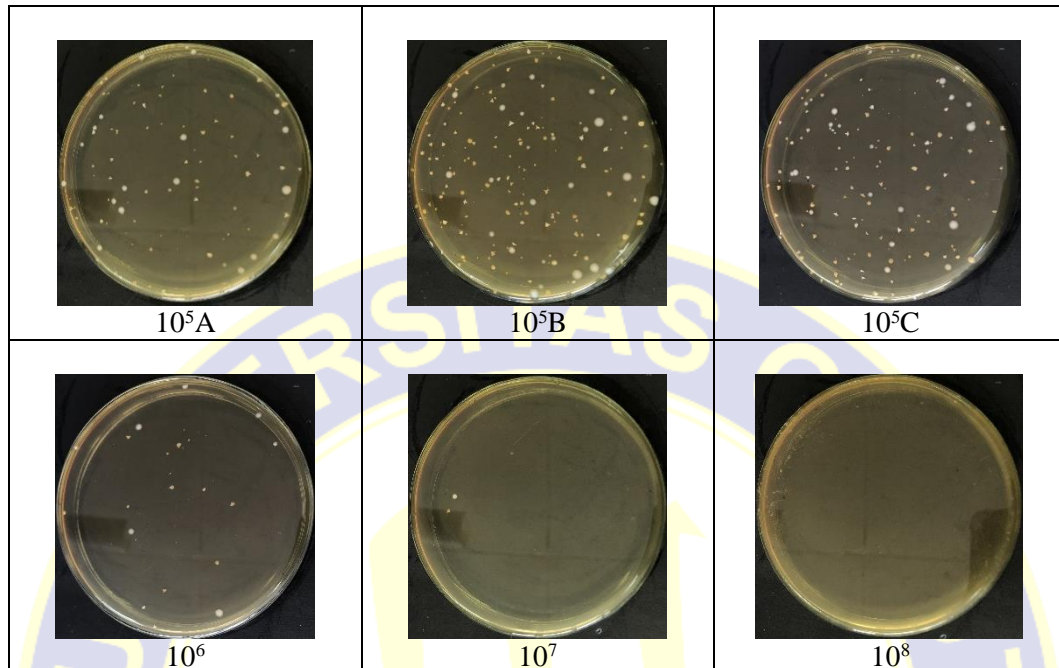
Gambar III.11 Hasil TPC terhadap mikrokapusl yang mengandung 5mL suspensi bakteri *Lactobacillus sp* + 45mL Na-Alginat + 50mL larutan kitosan 2% dengan metode 1 tahap dilakukan perendaman.

**LAMPIRAN 3
(LANJUTAN)**

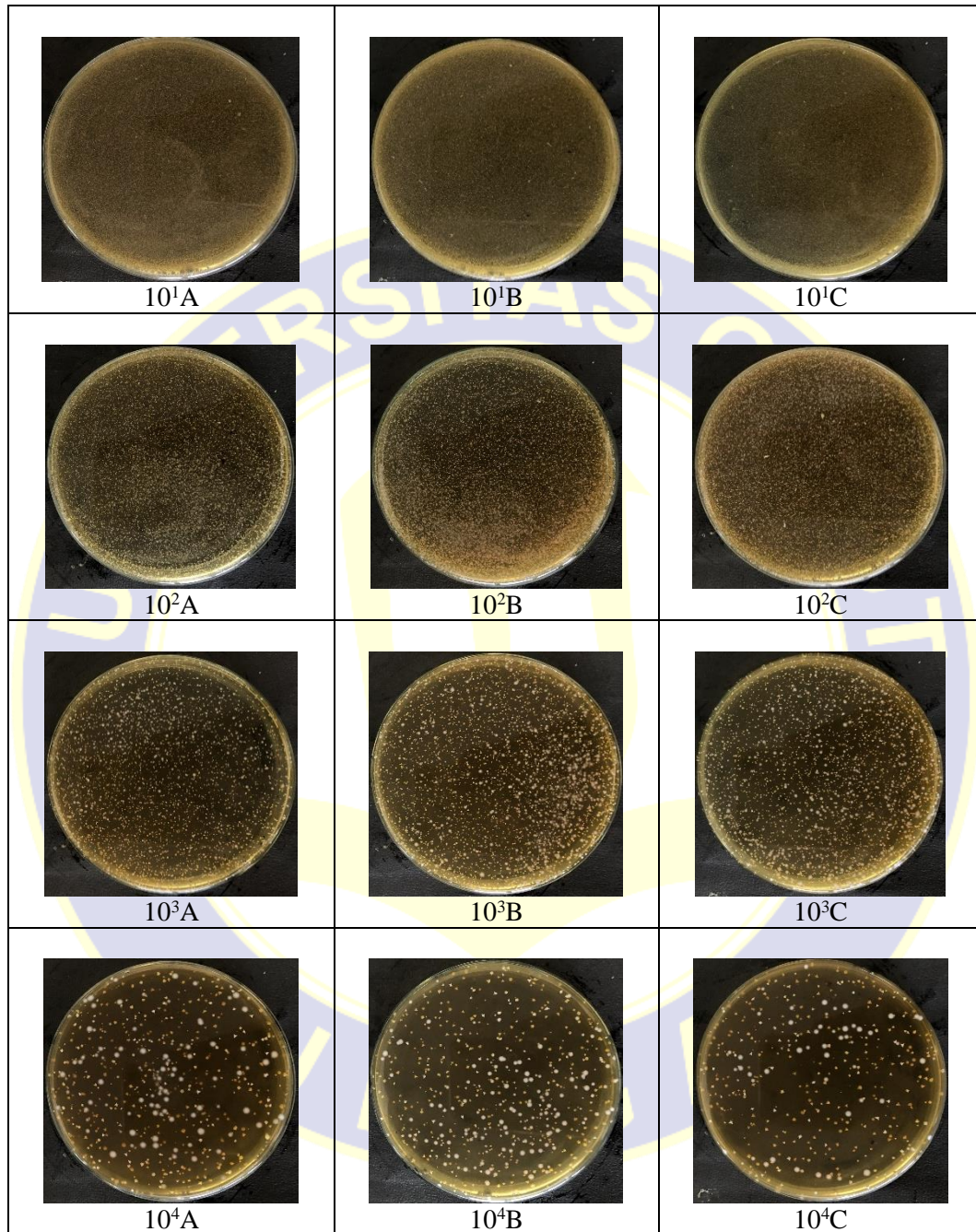


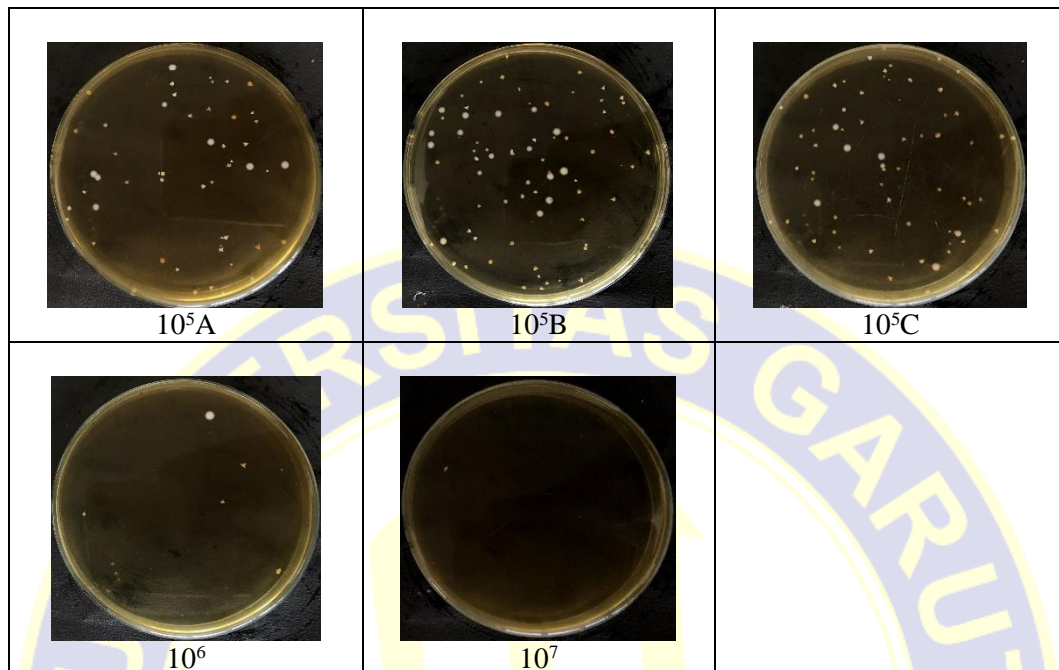
Gambar III.12 Hasil TPC terhadap mikrokapusl yang mengandung 5mL suspensi bakteri *Lactobacillus sp* + 45mL Na-Alginat + 50mL larutan kitosan 2% dengan metode 1 tahap setelah dilakukan perendaman dalam pH 3 selama 1 menit

**LAMPIRAN 3
(LANJUTAN)**

**LAMPIRAN 3
(LANJUTAN)**

Gambar III.13 Hasil TPC terhadap mikrokapusl yang mengandung 5mL suspensi bakteri *Lactobacillus sp* + 45mL Na-Alginat + 50mL larutan kitosan 2% dengan metode 1 tahap setelah dilakukan perendaman dalam pH 3 selama 60 menit.

**LAMPIRAN 3
(LANJUTAN)**

**LAMPIRAN 3
(LANJUTAN)**

Gambar III.14 Hasil TPC terhadap mikrokapusl yang mengandung 5mL suspensi bakteri *Lactobacillus sp* + 45mL Na-Alginat + 50mL larutan kitosan 2% dengan metode 1 tahap setelah dilakukan perendaman dalam pH 3 selama 120 menit

LAMPIRAN 4 ALAT DAN BAHAN

1. Alat



Electrospinning



Autoclave



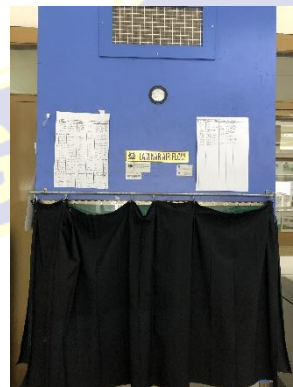
Alat Dekstruksi



Oven Pengering Alat



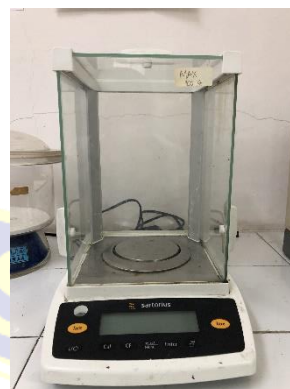
Oven Inkubator



Laminar Air Flow

**LAMPIRAN 4
(LANJUTAN)**

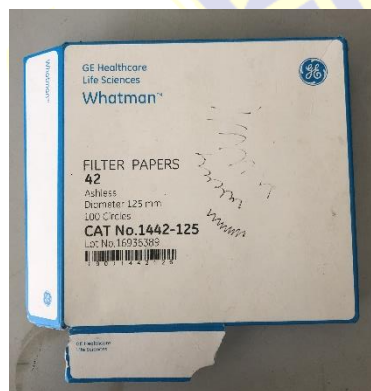
Kulkas Penyimpanan Mikrokapsul



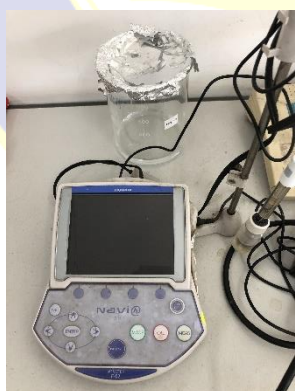
Neraca Analitik



Neraca Teknis



Kertas Saring



pH Meter



Vortex

**LAMPIRAN 4
(LANJUTAN)**

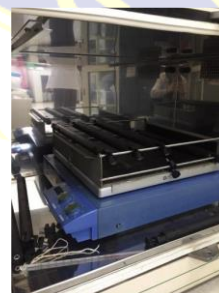
Pipet Eppendorf



Tabung Ulir



SEM



Shaker Inkubator



Tip 1mL



Viscometer Brookfield

LAMPIRAN 4 (LANJUTAN)

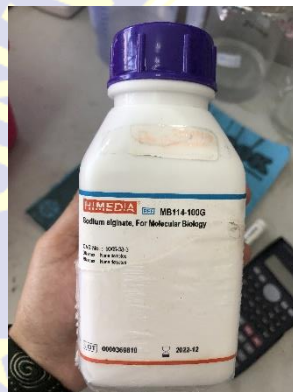
2. Bahan



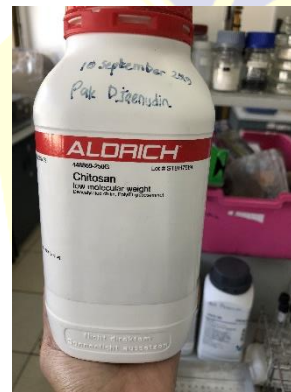
Spiritus



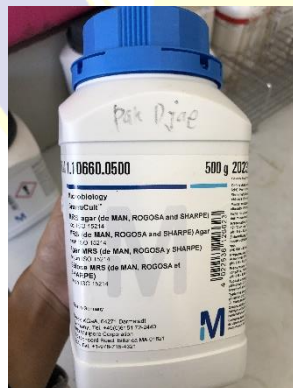
Alkohol



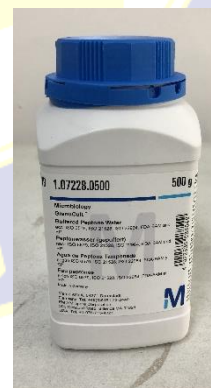
Alginat



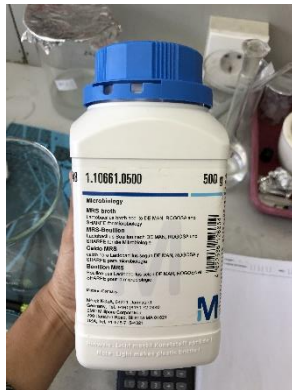
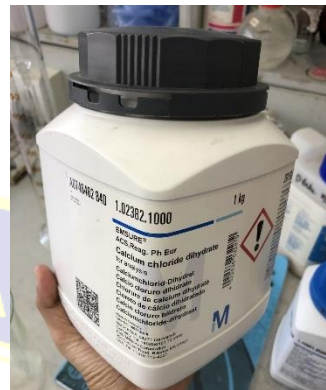
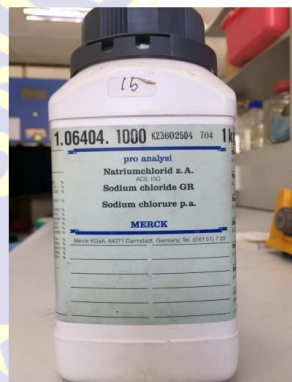
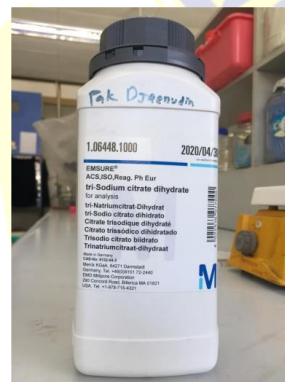
Kitosan



MRS Agar



Pepton

**LAMPIRAN 4
(LANJUTAN)****MRS Broth****Kalium klorida****Natrium klorida****Natrium Sitrat**

DAFTAR RIWAYAT HIDUP

Nama : Tazkia Nurhidayah
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 Agama : Islam
 Kewarganegaraan : WNI
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 Nomor Handphone : 0821-3092-1214
 Keahlian : Kimia Farmasi Analisis

RIWAYAT PENDIDIKAN

Jenjang Pendidikan	Nama Sekolah/ Perguruan Tinggi	Tahun Masuk	Tahun Lulus
SD	SDN Mekarwangi III	2004	2010
SMP	MTs Persis Tarogong	2010	2013
SMA	MA Persis Tarogong	2013	2016
Sarjana	Universitas Garut	2016	2020