

## **BAB V**

### **PENUTUP**

#### **A. Kesimpulan**

Pertama, Pada hasil pengujian cemaran mikrobiologi pada sampel sosis daging sapi ketiga sampel yang diambil dari seluruh penjual sosis daging sapi di Pasar Kartasura, Sukoharjo Jawa Tengah secara mikrobiologi memenuhi standar yang ditetapkan oleh BPOM dalam Peraturan Kepala No. 16 Tahun 2016 Tentang Kriteria Mikrobiologi Dalam Pangan.

Kedua, Berdasarkan hasil pengujian sampel sosis daging sapi yang beredar di Pasar Kartasura , Sukoharjo secara mikrobiologi dapat dinyatakan aman dan layak untuk dikonsumsi.

#### **B. Saran**

Pertama, sebaiknya perlu dilakukan pengujian sosis daging sapi bakar atau sosis daging sapi yang sudah terbuka di Pasar Kartasura, Sukoharjo Jawa Tengah.

Kedua, sebaiknya dapat dilakukan pengujian ulang dan pengujian lebih lanjut karena masih penulis sadari mungkin masih adanya kesalahan dalam pengujian sehingga hasil pengujian tidak maksimal.

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## DAFTAR LAMPIRAN

### Lampiran 1. Perhitungan Angka Lempeng Total

#### A. Perhitungan Angka Lempeng Total Sampel A

##### 1. Replikasi 1

$$10^{-1} = 73$$

$$10^{-2} = 7$$

$$10^{-3} = 3$$

$$10^{-4} = 3$$

$$10^{-5} = 3$$

$$\begin{aligned} \text{Nilai ALT} &= \text{Jumlah Koloni} \times \frac{1}{\text{Pengenceran}} \\ &= 73 \times \frac{1}{10^1} = 7,3 \times 10^2 \text{ koloni/mg} \end{aligned}$$

##### 2. Replikasi 2

$$10^{-1} = 73$$

$$10^{-2} = 37$$

$$10^{-3} = 13$$

$$10^{-4} = 1$$

$$10^{-5} = 1$$

$$\begin{aligned} \text{Nilai ALT} &= \frac{\text{ALT Tinggi}}{\text{ALT Rendah}} = \\ &= \frac{3,7 \times 10^3}{1,0 \times 10^3} = 3,7 \end{aligned}$$

$$= 3,7 > 2 \text{ Diambil pengenceran terendah}$$

$$\text{ALT} = 1,0 \times 10^3 \text{ koloni/mg}$$

##### 3. Replikasi 3

$$10^{-1} = 4$$

$$10^{-2} = 2$$

$$10^{-3} = 2$$

$$10^{-4} = 1$$

$$10^{-5} = 1$$

$$\text{Nilai ALT} = \text{Jumlah Koloni} \times \frac{1}{\text{Pengenceran}}$$

$$= < 25 \times \frac{1}{10^1} = < 2,5 \times 10^2 \text{ koloni/gram}$$

## 4. Replikasi 4

$$10^{-1} = 16$$

$$10^{-2} = 3$$

$$10^{-3} = 3$$

$$10^{-4} = 0$$

$$10^{-5} = 0$$

$$\text{Nilai ALT} = \text{Jumlah Koloni} \times \frac{1}{\text{Pengenceran}}$$

$$= < 25 \times \frac{1}{10^1} = < 2,5 \times 10^2 \text{ koloni/gram}$$

## 5. Replikasi 5

$$10^{-1} = 16$$

$$10^{-2} = 12$$

$$10^{-3} = 10$$

$$10^{-4} = 7$$

$$10^{-5} = 0$$

$$\text{Nilai ALT} = \text{Jumlah Koloni} \times \frac{1}{\text{Pengenceran}}$$

$$= < 25 \times \frac{1}{10^1} = < 2,5 \times 10^2 \text{ koloni/gram}$$

**ALT rata – rata**

$$= \frac{7,3 \times 10^2 + 1,0 \times 10^3 + < 2,5 \times 10^2 + < 2,5 \times 10^2 + < 2,5 \times 10^2}{5}$$

$$= < 1,0 \times 10^3 \text{ koloni/mg}$$

**B. Perhitungan Angka Lempeng Total Sampel B**

## 1. Replikasi 1

$$10^{-1} = 32$$

$$10^{-2} = 9$$

$$10^{-3} = 4$$

$$10^{-4} = 1$$

$$10^{-5} = 1$$

$$\begin{aligned}\text{Nilai ALT} &= \text{Jumlah Koloni} \times \frac{1}{\text{Pengenceran}} \\ &= 32 \times \frac{1}{10^1} = 3,2 \times 10^2 \text{ koloni/mg}\end{aligned}$$

## 2. Replikasi 2

$$10^{-1} = 85$$

$$10^{-2} = 23$$

$$10^{-3} = 3$$

$$10^{-4} = 1$$

$$10^{-5} = 1$$

$$\begin{aligned}\text{Nilai ALT} &= \text{Jumlah Koloni} \times \frac{1}{\text{Pengenceran}} \\ &= 85 \times \frac{1}{10^1} = 1,0 \times 10^3 \text{ koloni/mg}\end{aligned}$$

## 3. Replikasi 3

$$10^{-1} = 108$$

$$10^{-2} = 47$$

$$10^{-3} = 7$$

$$10^{-4} = 5$$

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

$$\begin{aligned}\text{Nilai ALT} &= \frac{\text{ALT Tinggi}}{\text{ALT Rendah}} = \\ &= \frac{4,7 \times 10^3}{1,1 \times 10^3} = 4,7\end{aligned}$$

$$= 4,7 > 2 \text{ Diambil pengenceran terendah}$$

$$\text{ALT} = 1,1 \times 10^3 \text{ koloni/mg}$$

## 4. Replikasi 4

$$10^{-1} = 31$$

$$10^{-2} = 30$$

$$10^{-3} = 8$$

$$10^{-4} = 6$$

$$10^{-5} = 1$$

$$\text{Nilai ALT} = \frac{\text{ALT Tinggi}}{\text{ALT Rendah}} =$$

$$= \frac{3,0 \times 10^3}{0,3 \times 10^3} = 10$$

= 10 > 2 Diambil pengenceran terendah

$$\text{ALT} = 0,3 \times 10^3 \text{ koloni/mg}$$

5. Replikasi 3

$$10^{-1} = 21$$

$$10^{-2} = 16$$

$$10^{-3} = 11$$

$$10^{-4} = 5$$

$$10^{-5} = 3$$

$$\text{Nilai ALT} = \text{Jumlah Koloni} \times \frac{1}{\text{Pengenceran}}$$

$$= < 25 \times \frac{1}{10^1} = < 2,5 \times 10^2 \text{ koloni/mg}$$

**ALT rata – rata**

$$= \frac{3,2 \times 10^2 + 1,0 \times 10^3 + 1,1 \times 10^3 + 0,3 \times 10^3 + < 2,5 \times 10^2}{5}$$

$$= < 1,1 \times 10^3 \text{ koloni/mg}$$

**C. Perhitungan Angka Lempeng Total Sampel C**

1. Replikasi 1

$$10^{-1} = 3$$

$$10^{-2} = 2$$

$$10^{-3} = 1$$

$$10^{-4} = 0$$

$$10^{-5} = 0$$

$$\text{Nilai ALT} = \text{Jumlah Koloni} \times \frac{1}{\text{Pengenceran}}$$

$$= < 25 \times \frac{1}{10^1} = < 2,5 \times 10^2 \text{ koloni/mg}$$



## 2. Replikasi 2

$$10^{-1} = 3$$

$$10^{-2} = 2$$

$$10^{-3} = 1$$

$$10^{-4} = 0$$

$$10^{-5} = 0$$

$$\text{Nilai ALT} = \text{Jumlah Koloni} \times \frac{1}{\text{Pengenceran}}$$

$$= < 25 \times \frac{1}{10^1} = < 2,5 \times 10^2 \text{ koloni/mg}$$

## 3. Replikasi 3

$$10^{-1} = 31$$

$$10^{-2} = 4$$

$$10^{-3} = 3$$

$$10^{-4} = 1$$

$$10^{-5} = 1$$

$$\text{Nilai ALT} = \text{Jumlah Koloni} \times \frac{1}{\text{Pengenceran}}$$

$$= 31 \times \frac{1}{10^1} = 3,1 \times 10^2 \text{ koloni/mg}$$

## 4. Replikasi 4

$$10^{-1} = 3$$

$$10^{-2} = 3$$

$$10^{-3} = 1$$

$$10^{-4} = 1$$

$$10^{-5} = 0$$

$$\text{Nilai ALT} = \text{Jumlah Koloni} \times \frac{1}{\text{Pengenceran}}$$

$$= < 25 \times \frac{1}{10^1} = < 2,5 \times 10^2 \text{ koloni/mg}$$

## 5. Replikasi 5

$$10^{-1} = 313$$

$$10^{-2} = 67$$

$$10^{-3} = 43$$

$$10^{-4} = 2$$

$$10^{-5} = 0$$

$$\text{Nilai ALT} = \frac{\text{ALT Tinggi}}{\text{ALT Rendah}} =$$

$$= \frac{4,3 \times 10^4}{1,0 \times 10^4} = 4,3$$

$$= 4,3 > 2 \text{ Diambil pengenceran terendah}$$

$$\text{ALT} = 1,1 \times 10^4 \text{ koloni/mg}$$

**ALT rata – rata**

$$= \frac{< 2,5 \times 10^2 + < 2,5 \times 10^2 + 3,1 \times 10^2 + < 2,5 \times 10^2 + 1,1 \times 10^4}{5}$$

$$= < 1,1 \times 10^4 \text{ koloni/mg}$$

## Lampiran 2 : Perhitungan Nilai Cemar *Staphylococcus aureus*

### A. Perhitungan Cemar *Staphylococcus aureus* Sampel A

1. Replikasi 1

$$10^{-1} = 0$$

$$10^{-2} = 0$$

$$\text{Nilai ALT} = \text{Jumlah Koloni} \times \frac{1}{\text{Pengenceran}}$$

$$= < 1,0 \times 10^1 \text{ koloni/mg}$$

2. Replikasi 5

$$10^{-1} = 0$$

$$10^{-2} = 0$$

$$\text{Nilai ALT} = \text{Jumlah Koloni} \times \frac{1}{\text{Pengenceran}}$$

$$= < 1,0 \times 10^1 \text{ koloni/mg}$$

3. Replikasi 5

$$10^{-1} = 0$$

$$10^{-2} = 0$$

$$\text{Nilai ALT} = \text{Jumlah Koloni} \times \frac{1}{\text{Pengenceran}}$$

$$= < 1,0 \times 10^1 \text{ koloni/mg}$$

4. Replikasi 5

$$10^{-1} = 0$$

$$10^{-2} = 0$$

$$\text{Nilai ALT} = \text{Jumlah Koloni} \times \frac{1}{\text{Pengenceran}}$$

$$= < 1,0 \times 10^1 \text{ koloni/mg}$$

5. Replikasi 5

$$10^{-1} = 1$$

$$10^{-2} = 1$$

$$\text{Nilai ALT} = \text{Jumlah Koloni} \times \frac{1}{\text{Pengenceran}}$$

$$= < 25 \times \frac{1}{10^1} = < 2,5 \times 10^2 \text{ koloni/mg}$$

**ALT rata – rata**

$$= \frac{< 1,0 \times 10^1 + < 1,0 \times 10^1 + < 1,0 \times 10^1 + < 1,0 \times 10^1 + < 2,5 \times 10^2}{5}$$

$$= < 1,0 \times 10^1 \text{ koloni/mg}$$

**B. Perhitungan Cemar Staphylococcus aureus Sampel B**

## 1. Replikasi 1

$$10^{-1} = 23$$

$$10^{-2} = 1$$

$$\text{Nilai ALT} = \text{Jumlah Koloni} \times \frac{1}{\text{Pengenceran}}$$

$$= < 25 \times \frac{1}{10^1} = < 2,5 \times 10^2 \text{ koloni/mg}$$

## 2. Replikasi 2

$$10^{-1} = 1$$

$$10^{-2} = 0$$

$$\text{Nilai ALT} = \text{Jumlah Koloni} \times \frac{1}{\text{Pengenceran}}$$

$$= < 25 \times \frac{1}{10^1} = < 2,5 \times 10^2 \text{ koloni/mg}$$

## 3. Replikasi 3

$$10^{-1} = 7$$

$$10^{-2} = 2$$

$$\text{Nilai ALT} = \text{Jumlah Koloni} \times \frac{1}{\text{Pengenceran}}$$

$$= < 25 \times \frac{1}{10^1} = < 2,5 \times 10^2 \text{ koloni/mg}$$

## 4. Replikasi 4

$$10^{-1} = 7$$

$$10^{-2} = 3$$

$$\text{Nilai ALT} = \text{Jumlah Koloni} \times \frac{1}{\text{Pengenceran}}$$

$$= < 25 \times \frac{1}{10^1} = < 2,5 \times 10^2 \text{ koloni/mg}$$

## 5. Replikasi 5

$$10^{-1} = 95$$

$$10^{-2} = 31$$

$$\text{Nilai ALT} = \frac{\text{ALT Tinggi}}{\text{ALT Rendah}} =$$

$$= \frac{3,1 \times 10^3}{1,0 \times 10^3} = 3,1$$

$$= 3,1 > 2 \text{ Diambil pengenceran terendah}$$

$$\text{ALT} = 1,0 \times 10^3 \text{ koloni/mg}$$

**ALT rata – rata**

$$= \frac{< 2,5 \times 10^2 + < 2,5 \times 10^2 + < 2,5 \times 10^2 + < 2,5 \times 10^2 + 1,0 \times 10^3}{5}$$

$$= < 1,0 \times 10^3 \text{ koloni/mg}$$

**C. Perhitungan Cemar Staphylococcus aureus Sampel C**

## 1. Replikasi 1

$$10^{-1} = 0$$

$$10^{-2} = 0$$

$$\text{Nilai ALT} = \text{Jumlah Koloni} \times \frac{1}{\text{Pengenceran}}$$

$$= < 1,0 \times 10^1 \text{ koloni/mg}$$

## 2. Replikasi 2

$$10^{-1} = 0$$

$$10^{-2} = 0$$

$$\begin{aligned}\text{Nilai ALT} &= \text{Jumlah Koloni} \times \frac{1}{\text{Pengenceran}} \\ &= < 1,0 \times 10^1 \text{ koloni/mg}\end{aligned}$$

3. Replikasi 3

$$10^{-1} = 1$$

$$10^{-2} = 1$$

$$\begin{aligned}\text{Nilai ALT} &= \text{Jumlah Koloni} \times \frac{1}{\text{Pengenceran}} \\ &= < 25 \times \frac{1}{10^1} = < 2,5 \times 10^2 \text{ koloni/mg}\end{aligned}$$

4. Replikasi 4

$$10^{-1} = 1$$

$$10^{-2} = 0$$

$$\begin{aligned}\text{Nilai ALT} &= \text{Jumlah Koloni} \times \frac{1}{\text{Pengenceran}} \\ &= < 25 \times \frac{1}{10^1} = < 2,5 \times 10^2 \text{ koloni/mg}\end{aligned}$$

5. Replikasi 5

$$10^{-1} = 6$$

$$10^{-2} = 4$$

$$\begin{aligned}\text{Nilai ALT} &= \text{Jumlah Koloni} \times \frac{1}{\text{Pengenceran}} \\ &= < 25 \times \frac{1}{10^1} = < 2,5 \times 10^2 \text{ koloni/mg}\end{aligned}$$

**ALT rata – rata**

$$\begin{aligned}&= \frac{< 1,0 \times 10^1 + < 1,0 \times 10^1 + < 2,5 \times 10^2 + < 2,5 \times 10^2 + < 2,5 \times 10^2}{5} \\ &= < 2,5 \times 10^2 \text{ koloni/mg}\end{aligned}$$

### Lampiran 3 : Perhitungan Nilai Cemar *Enterobacteriaceae*

#### A. Perhitungan Cemar *Enterobacteriaceae* Sampel A

1. Replikasi 1

$$10^{-1} = 1$$

$$10^{-2} = 0$$

$$\text{Nilai ALT} = \text{Jumlah Koloni} \times \frac{1}{\text{Pengenceran}}$$

$$= < 1,0 \times 10^1 \text{ koloni/mg}$$

2. Replikasi 2

$$10^{-1} = 1$$

$$10^{-2} = 0$$

$$\text{Nilai ALT} = \text{Jumlah Koloni} \times \frac{1}{\text{Pengenceran}}$$

$$= < 1,0 \times 10^1 \text{ koloni/mg}$$

3. Replikasi 3

$$10^{-1} = 0$$

$$10^{-2} = 0$$

$$\text{Nilai ALT} = \text{Jumlah Koloni} \times \frac{1}{\text{Pengenceran}}$$

$$= < 1,0 \times 10^1 \text{ koloni/mg}$$

4. Replikasi 4

$$10^{-1} = 0$$

$$10^{-2} = 0$$

$$\text{Nilai ALT} = \text{Jumlah Koloni} \times \frac{1}{\text{Pengenceran}}$$

$$= < 1,0 \times 10^1 \text{ koloni/mg}$$

5. Replikasi 5

$$10^{-1} = 0$$

$$10^{-2} = 0$$

$$\text{Nilai ALT} = \text{Jumlah Koloni} \times \frac{1}{\text{Pengenceran}}$$

$$= < 1,0 \times 10^1 \text{ koloni/mg}$$

**ALT rata – rata**

$$= \frac{< 1,0 \times 10^1 + < 1,0 \times 10^1 + < 1,0 \times 10^1 + < 1,0 \times 10^1 + < 1,0 \times 10^1}{5}$$

$$= < 1,0 \times 10^1 \text{ koloni/mg}$$

**B. Perhitungan Cemar *Enterobacteriaceae* Sampel B**

## 1. Replikasi 1

$$10^{-1} = 17$$

$$10^{-2} = 7$$

$$\text{Nilai ALT} = \text{Jumlah Koloni} \times \frac{1}{\text{Pengenceran}}$$

$$= < 25 \times \frac{1}{10^1} = < 2,5 \times 10^2 \text{ koloni/mg}$$

## 2. Replikasi 2

$$10^{-1} = 19$$

$$10^{-2} = 9$$

$$\text{Nilai ALT} = \text{Jumlah Koloni} \times \frac{1}{\text{Pengenceran}}$$

$$= < 25 \times \frac{1}{10^1} = < 2,5 \times 10^2 \text{ koloni/mg}$$

## 3. Replikasi 3

$$10^{-1} = 21$$

$$10^{-2} = 7$$

$$\text{Nilai ALT} = \text{Jumlah Koloni} \times \frac{1}{\text{Pengenceran}}$$

$$= < 25 \times \frac{1}{10^1} = < 2,5 \times 10^2 \text{ koloni/mg}$$

## 4. Replikasi 4

$$10^{-1} = 46$$

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



$$\begin{aligned}\text{Nilai ALT} &= \text{Jumlah Koloni} \times \frac{1}{\text{Pengenceran}} \\ &= 46 \times \frac{1}{10^1} = 5,0 \times 10^2 \text{ koloni/mg}\end{aligned}$$

5. Replikasi 5

$$10^{-1} = 8$$

$$10^{-2} = 7$$

$$\begin{aligned}\text{Nilai ALT} &= \text{Jumlah Koloni} \times \frac{1}{\text{Pengenceran}} \\ &= < 25 \times \frac{1}{10^1} = < 2,5 \times 10^2 \text{ koloni/mg}\end{aligned}$$

**ALT rata – rata**

$$\begin{aligned}&= \frac{< 2,5 \times 10^2 + < 2,5 \times 10^2 + < 2,5 \times 10^2 + 5,0 \times 10^2 + < 2,5 \times 10^2}{5} \\ &= < 3,0 \times 10^2 \text{ koloni/mg}\end{aligned}$$

### C. Perhitungan Cemar *Enterobacteriaceae* Sampel C

1. Replikasi 1

$$10^{-1} = 0$$

$$10^{-2} = 0$$

$$\begin{aligned}\text{Nilai ALT} &= \text{Jumlah Koloni} \times \frac{1}{\text{Pengenceran}} \\ &= < 1,0 \times 10^1 \text{ koloni/mg}\end{aligned}$$

2. Replikasi 2

$$10^{-1} = 0$$

$$10^{-2} = 0$$

$$\begin{aligned}\text{Nilai ALT} &= \text{Jumlah Koloni} \times \frac{1}{\text{Pengenceran}} \\ &= < 1,0 \times 10^1 \text{ koloni/mg}\end{aligned}$$

3. Replikasi 3

$$10^{-1} = 0$$

$$10^{-2} = 0$$

$$\text{Nilai ALT} = \text{Jumlah Koloni} \times \frac{1}{\text{Pengenceran}}$$

$$= < 1,0 \times 10^1 \text{ koloni/mg}$$

4. Replikasi 4

$$10^{-1} = 2$$

$$10^{-2} = 0$$

$$\text{Nilai ALT} = \text{Jumlah Koloni} \times \frac{1}{\text{Pengenceran}}$$

$$= < 25 \times \frac{1}{10^1} = < 2,5 \times 10^2 \text{ koloni/mg}$$

5. Replikasi 5

$$10^{-1} = 1$$

$$10^{-2} = 0$$

$$\text{Nilai ALT} = \text{Jumlah Koloni} \times \frac{1}{\text{Pengenceran}}$$

$$= < 25 \times \frac{1}{10^1} = < 2,5 \times 10^2 \text{ koloni/mg}$$

**ALT rata – rata**

$$= \frac{< 1,0 \times 10^1 + < 1,0 \times 10^1 + < 1,0 \times 10^1 + < 2,5 \times 10^2 + < 2,5 \times 10^2}{5}$$

$$= < 2,5 \times 10^2 \text{ koloni/mg}$$

## Lampiran 4 : Dokumentasi Kegiatan

Gambar 1. Proses Pengujian Sampel A



Gambar 2. Proses Pengujian Sampel B



Gambar 3. Proses Pengujian Sampel C



Gambar 4. Proses Preparasi Sampel



Gambar 5. Pra Pengayaan *Salmonella* sp dengan Buffer Pepton Sampel A & B



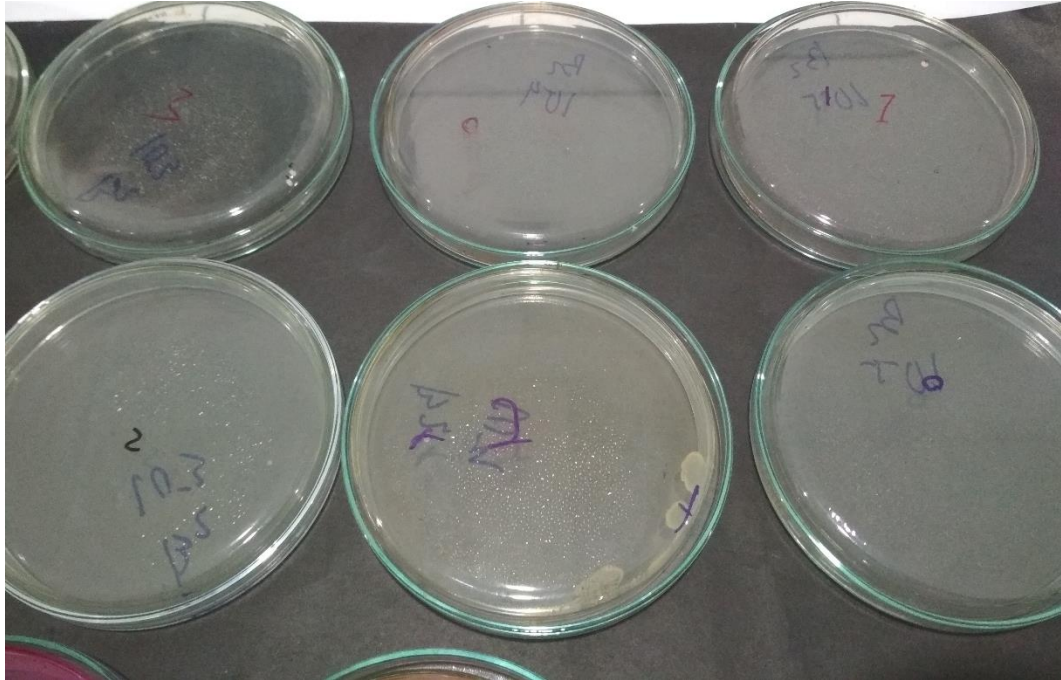
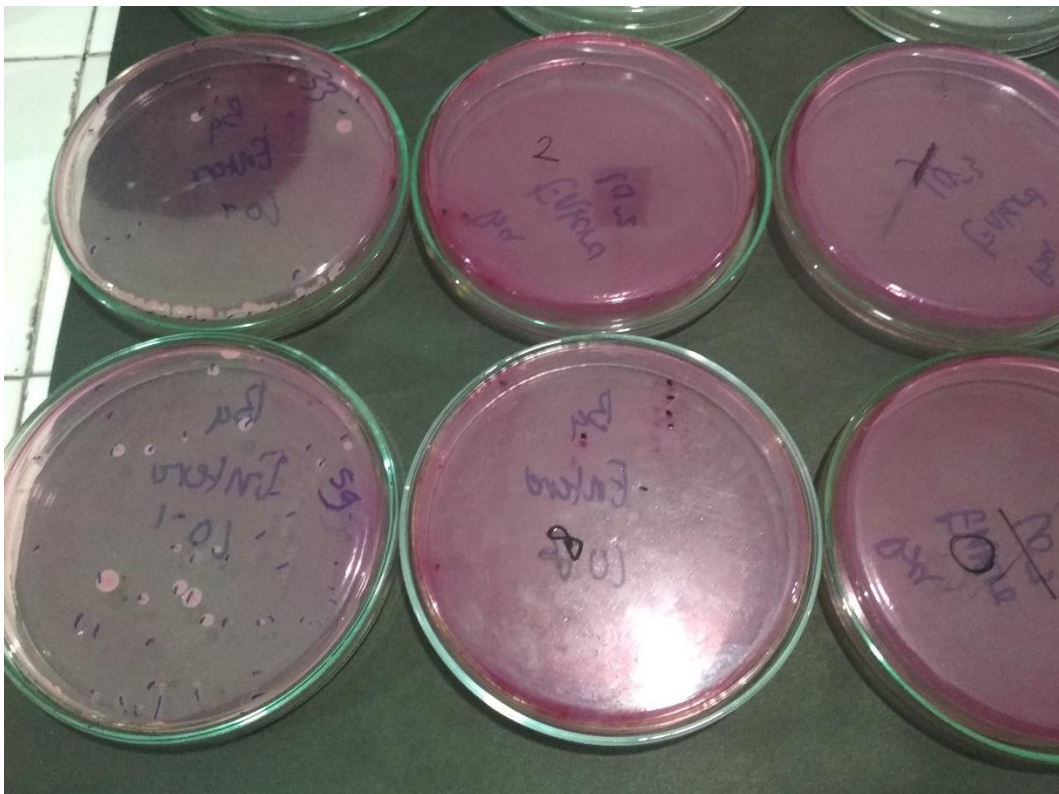
Gambar 6. Pra Pengayaan *Salmonella* sp dengan Buffer Pepton Sampel C



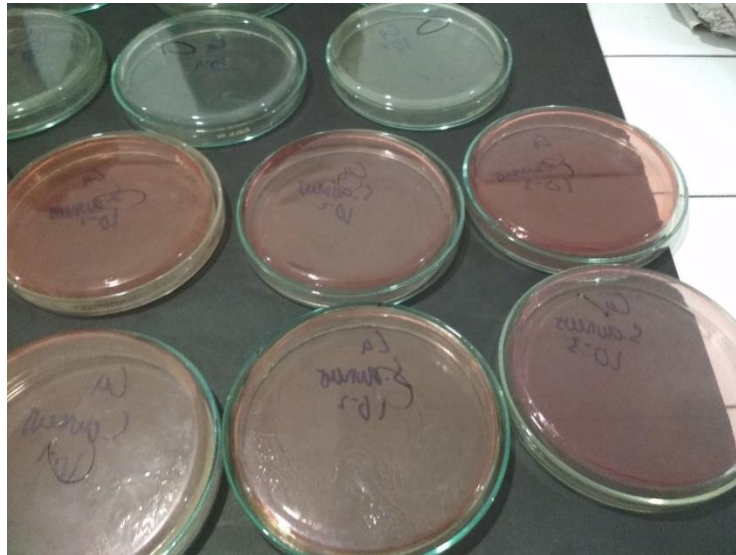
Gambar 7. Uji Katalase *Staphylococcus aureus*



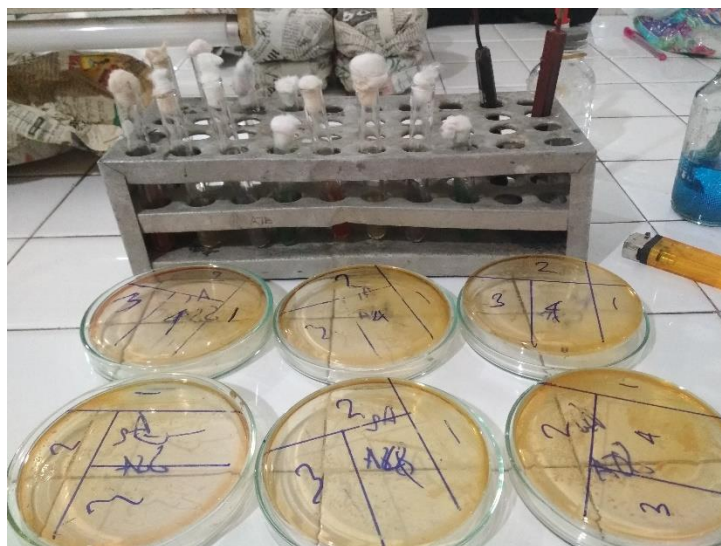
Gambar 8. Hasil ALT di media PCA

Gambar 9. Hasil *Enterobacteriaceae* di media EA

Gambar 10. Hasil *S aureus* di media MSA



Gambar 11. Hasil *Salmonella* sp di media SSA Sampel A

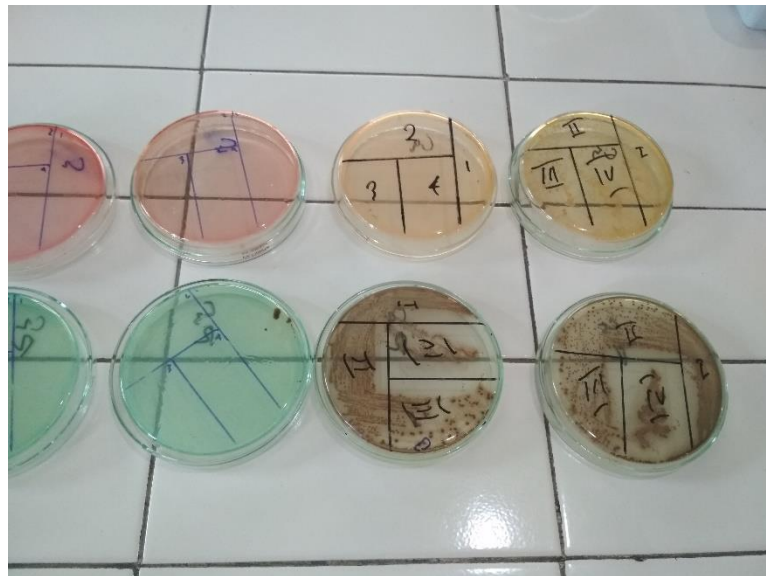




Gambar 11. Hasil *Salmonella* sp di media SSA Sampel B



Gambar 11. Hasil *Salmonella* sp di media SSA Sampel C



Gambar 11. Hasil Uji Biokimia *Salmonella sp* Sampel A

Gambar 11. Hasil Uji Biokimia *Salmonella sp* Sampel B



Gambar 12. Hasil Uji Biokimia *Salmonella sp* Sampel C



Gambar 13. Hasil Uji Biokimia *Enterobacteriaceae* Sampel A



Gambar 13. Hasil Uji Biokimia *Enterobacteriaceae* Sampel B





Gambar 13. Hasil Uji Biokimia *Enterobacteriaceae* Sampel C

