LAMPIRAN
Lampiran 1 Uji proksimat kitosan komersil

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<th>% Kadar lemak</th>
<th>% Kadar air</th>
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Lampiran 2 Hasil analisis pH selama penyimpanan

a. pH pada penyimpanan hari ke-0

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b. pH pada penyimpanan hari ke-2

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<th>Standar deviasi</th>
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c. pH pada penyimpanan hari ke-4

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Lampiran 3 Hasil analisis kadar air selama penyimpanan

a. Kadar air pada lama penyimpanan hari ke-0

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<th>Rata-rata akhir</th>
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b. Kadar air pada lama penyimpanan hari ke-2

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c. Kadar air pada lama penyimpanan hari ke-4

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Lampiran 4 Hasil analisis kadar protein selama penyimpanan

a. Kadar protein pada lama penyimpanan hari ke-0

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### b. Kadar protein pada lama penyimpanan hari ke-2

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<th>% Nitrogen</th>
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c. Kadar protein pada lama penyimpanan hari ke-3

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Lampiran 5 Contoh perhitungan jumlah Total Plate Count (TPC)

Contoh perhitungan pada sampel daging pada hari ke-0

1. Berdasarkan data yang diperoleh, maka data yang diambil adalah :

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<tr>
<th>Ulangan</th>
<th>Duplo</th>
<th>Pengenceran</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>10&lt;sup&gt;-3&lt;/sup&gt;</td>
</tr>
<tr>
<td>1</td>
<td>1</td>
<td>159</td>
</tr>
<tr>
<td>2</td>
<td>2</td>
<td>145</td>
</tr>
<tr>
<td>2</td>
<td>1</td>
<td>139</td>
</tr>
<tr>
<td>2</td>
<td>2</td>
<td>141</td>
</tr>
</tbody>
</table>

2. Tahap pertama merata-ratakan duplo

<table>
<thead>
<tr>
<th>Ulangan</th>
<th>Pengenceran</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>10&lt;sup&gt;-3&lt;/sup&gt;</td>
</tr>
<tr>
<td>1</td>
<td>152</td>
</tr>
<tr>
<td>2</td>
<td>140</td>
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</table>

3. Merata-ratakan setiap pengenceran dan membagi pengenceran terbesar dengan sebelumnya

\[
\frac{(84,5 + 61) \times 10^{-3}}{2} : \frac{(152 + 140) \times 10^{-2}}{2} = 0,0498
\]

Hasil yang didapatkan < 2 sehingga yang dihitung adalah rata-rata

4. Merata-ratakan setiap ulangan

- Ulangan 1 = \[
\frac{(15,2 + 84,5) \times 10^{-3}}{2} = 49,85 \times 10^{-3}
\]

- Ulangan 2 = \[
\frac{(14,0 + 61) \times 10^{-3}}{2} = 37,5 \times 10^{-3}
\]

Rata-rata = \[(49,85 \times 10^{-3} + 37,5 \times 10^{-3})/2 = 4,4 \times 10^{-4}\]
Lampiran 6 Hasil analisis dan uji lanjut (Duncan) uji nilai pH, kadar protein dan kadar air daging sapi dengan perlakuan konsentrasi kitosan

1. pH (lama penyimpanan hari ke-0)
   a. Hasil analisis ragam ANOVA

<table>
<thead>
<tr>
<th>Sumber keragaman</th>
<th>Jumlah kuadrat</th>
<th>Derajat bebas (db)</th>
<th>Kuadrat tengah</th>
<th>F hitung</th>
<th>Signifikan</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perlakuan</td>
<td>0,79272500</td>
<td>3</td>
<td>0,26424167</td>
<td>3,19</td>
<td>0,0628</td>
</tr>
<tr>
<td>Galat</td>
<td>0,99405000</td>
<td>12</td>
<td>0,08283750</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>1,78677500</td>
<td>15</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

2. pH (lama penyimpanan hari ke-2)
   a. Hasil analisis ragam ANOVA

<table>
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<th>Sumber keragaman</th>
<th>Jumlah kuadrat</th>
<th>Derajat bebas (db)</th>
<th>Kuadrat tengah</th>
<th>F hitung</th>
<th>Signifikan</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perlakuan</td>
<td>0,14467500</td>
<td>3</td>
<td>0,04822500</td>
<td>8,47</td>
<td>0,0027</td>
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<tr>
<td>Galat</td>
<td>0,06830000</td>
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<td>0,00569167</td>
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<tr>
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3. pH (lama penyimpanan hari ke-4)
   a. Hasil analisis ragam ANOVA

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<th>Sumber keragaman</th>
<th>Jumlah kuadrat</th>
<th>Derajat bebas (db)</th>
<th>Kuadrat tengah</th>
<th>F hitung</th>
<th>Signifikan</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perlakuan</td>
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<td>3</td>
<td>0,13205625</td>
<td>73,11</td>
<td>0,0000</td>
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<tr>
<td>Galat</td>
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<td>0,00180625</td>
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<td>Total</td>
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</tbody>
</table>
b. Hasil uji lanjut Duncan

<table>
<thead>
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<th>Perlakuan</th>
<th>Rata-rata</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kitosan 0%/kontrol</td>
<td>5,45250a</td>
</tr>
<tr>
<td>Kitosan 1%</td>
<td>5,06000c</td>
</tr>
<tr>
<td>Kitosan 2%</td>
<td>5,27000b</td>
</tr>
<tr>
<td>Kitosan 3%</td>
<td>5,09000c</td>
</tr>
</tbody>
</table>

4. Kadar air (lama penyimpanan hari ke-0)

a. Hasil analisis ragam ANOVA

<table>
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<tr>
<th>Sumber keragaman</th>
<th>Jumlah kuadrat</th>
<th>Derajat bebas (db)</th>
<th>Kuadrat tengah</th>
<th>F hitung</th>
<th>Signifikan</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perlakuan</td>
<td>14,54656875</td>
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<td>0,0001</td>
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<td>0,23378958</td>
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b. Hasil uji lanjut Duncan

<table>
<thead>
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<th>Perlakuan</th>
<th>Rata-rata</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kitosan 0%/kontrol</td>
<td>75,7850c</td>
</tr>
<tr>
<td>Kitosan 1%</td>
<td>76,7750b</td>
</tr>
<tr>
<td>Kitosan 2%</td>
<td>77,9100a</td>
</tr>
<tr>
<td>Kitosan 3%</td>
<td>78,1775a</td>
</tr>
</tbody>
</table>
5. Kadar air (lama penyimpanan hari ke-2)
   a. Hasil analisis ragam ANOVA

<table>
<thead>
<tr>
<th>Sumber keragaman</th>
<th>Jumlah kuadrat</th>
<th>Derajat bebas (db)</th>
<th>Kuadrat tengah</th>
<th>F hitung</th>
<th>Signifikan</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perlakuan</td>
<td>20,10052500</td>
<td>3</td>
<td>6,70017500</td>
<td>9,38</td>
<td>0,0018</td>
</tr>
<tr>
<td>Galat</td>
<td>8,56925000</td>
<td>12</td>
<td>0,71410417</td>
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<td>Total</td>
<td>28,66977500</td>
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</table>

   b. Hasil Uji lanjut Duncan

<table>
<thead>
<tr>
<th>Perlakuan</th>
<th>Rata-rata</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kitosan 0%/kontrol</td>
<td>74,2350&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td>Kitosan 1%</td>
<td>76,3500&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td>Kitosan 2%</td>
<td>77,3125&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td>Kitosan 3%</td>
<td>76,2675&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
</tbody>
</table>

6. Kadar air (lama penyimpanan hari ke-4)
   a. Hasil analisis ragam ANOVA

<table>
<thead>
<tr>
<th>Sumber keragaman</th>
<th>Jumlah kuadrat</th>
<th>Derajat bebas (db)</th>
<th>Kuadrat tengah</th>
<th>F hitung</th>
<th>Signifikan</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perlakuan</td>
<td>27,58850000</td>
<td>3</td>
<td>9,19616667</td>
<td>8,21</td>
<td>0,0031</td>
</tr>
<tr>
<td>Galat</td>
<td>13,44820000</td>
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<td>1,12068333</td>
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<td>41,03670000</td>
<td>15</td>
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</tbody>
</table>
b. Hasil uji lanjut Duncan

<table>
<thead>
<tr>
<th>Perlakuan</th>
<th>Rata-rata</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kitosan 0%/kontrol</td>
<td>73,9600b</td>
</tr>
<tr>
<td>Kitosan 1%</td>
<td>76,9050a</td>
</tr>
<tr>
<td>Kitosan 2%</td>
<td>77,0150a</td>
</tr>
<tr>
<td>Kitosan 3%</td>
<td>74,8700b</td>
</tr>
</tbody>
</table>

7. Kadar protein (lama penyimpanan hari ke-0)

a. Hasil analisis ragam ANOVA

<table>
<thead>
<tr>
<th>Sumber keragaman</th>
<th>Jumlah kuadrat</th>
<th>Derajat bebas (db)</th>
<th>Kuadrat tengah</th>
<th>F hitung</th>
<th>Signifikan</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perlakuan</td>
<td>1,69436327</td>
<td>3</td>
<td>0,56478776</td>
<td>0,79</td>
<td>0,5574</td>
</tr>
<tr>
<td>Galat</td>
<td>2,84351945</td>
<td>4</td>
<td>0,71087986</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>4,53788272</td>
<td>7</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

8. Kadar protein (lama penyimpanan hari ke-2)

a. Hasil analisis ragam ANOVA

<table>
<thead>
<tr>
<th>Sumber keragaman</th>
<th>Jumlah kuadrat</th>
<th>Derajat bebas (db)</th>
<th>Kuadrat tengah</th>
<th>F hitung</th>
<th>Signifikan</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perlakuan</td>
<td>0,29555151</td>
<td>3</td>
<td>0,09851717</td>
<td>0,06</td>
<td>0,9799</td>
</tr>
<tr>
<td>Galat</td>
<td>6,95464753</td>
<td>4</td>
<td>1,73866188</td>
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<td></td>
</tr>
<tr>
<td>Total</td>
<td>7,25019905</td>
<td>7</td>
<td></td>
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</table>
9. Kadar protein (lama penyimpanan hari ke-4)

a. Hasil analisis ragam ANOVA

<table>
<thead>
<tr>
<th>Sumber keragaman</th>
<th>Jumlah kuadrat</th>
<th>Derajat bebas (db)</th>
<th>Kuadrat tengah</th>
<th>F hitung</th>
<th>Signifikan</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perlakuan</td>
<td>1,94587405</td>
<td>3</td>
<td>0,64862468</td>
<td>0,69</td>
<td>0,6055</td>
</tr>
<tr>
<td>Galat</td>
<td>3,77706719</td>
<td>4</td>
<td>0,94426680</td>
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<td></td>
</tr>
<tr>
<td>Total</td>
<td>5,72294124</td>
<td>7</td>
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</table>
Lampiran 7 Data mentah jumlah bakteri (TPC) pada daging sapi selama penyimpanan

a. TPC pada lama penyimpanan hari ke-0

<table>
<thead>
<tr>
<th>No</th>
<th>Kode perlakuan</th>
<th>Ulangan</th>
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<th>Pengenceran</th>
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<tbody>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>10^2</td>
</tr>
<tr>
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<td>Kontrol</td>
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<td>1</td>
<td>159</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2</td>
<td>2</td>
<td>145</td>
</tr>
<tr>
<td>2</td>
<td>1%</td>
<td>1</td>
<td>1</td>
<td>61</td>
</tr>
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</tr>
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<tr>
<td></td>
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<td>34</td>
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</table>
b. TPC pada lama penyimpanan hari ke-2

<table>
<thead>
<tr>
<th>No</th>
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<th>Ulangan</th>
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<th>Pengenceran</th>
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<tbody>
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<td></td>
<td></td>
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<td>213</td>
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<td>2</td>
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<td></td>
<td>1</td>
<td>1</td>
<td>TBUD</td>
</tr>
<tr>
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<td></td>
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<td>62</td>
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</table>
### c. TPC pada lama penyimpanan hari ke-4

<table>
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<th>Pengenceran</th>
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</thead>
<tbody>
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<td>$10^{-2}$</td>
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<td>Kontrol</td>
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<td>TBUD</td>
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<td>2</td>
<td>TBUD</td>
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<tr>
<td>2</td>
<td>1%</td>
<td>1</td>
<td>1</td>
<td>TBUD</td>
</tr>
<tr>
<td></td>
<td></td>
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<td>2</td>
<td>TBUD</td>
</tr>
<tr>
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<td>2%</td>
<td>1</td>
<td>1</td>
<td>TBUD</td>
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<td></td>
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<td>97</td>
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<td>78</td>
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</table>
Lampiran 8 Proses perendaman daging sapi dalam larutan kitosan
Lampiran 9 Proses analisis mikrostruktur *edible coating* dengan SEM
Lampiran 10 Spektograf infra merah kitosan
Lampiran 11 Bakso yang diberi perlakuan kitosan dan tanpa kitosan (Hadi 2008)

(A) Bakso dengan pelapisan kitosan

(B) Bakso tanpa pelapisan kitosan