Minimum Bactericidal Concentration of East Java Propolis Extract to Biofilm of *Enterococcus faecalis*

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- Endodontic root canal treatment, performed in inflammation pulp or dental pulp necrosis

- One cause of root canal treatment failure is bacterial resistance

- *Enterococcus faecalis (E faecalis)* identified 89.6% in root canal treatment failure
Sterilization and Irrigation of the root canals are bacteria elimination stages of root canal treatment, but the materials do not killing *E faecalis* so *E faecalis* can survive to cause periapical disease

*E faecalis*, facultative anaerobe Gram Positive bacteria often in root canal treatment, prevalence 30-90% case. *E faecalis*, resistant in intracanal medicamen to create biofilm
Biofilm, are defined as polysaccharide matrix enclosed bacterial population’s adherent each other and or to surfaces or interfaces.

Biofilm resist to microbial agent than plankton cell form.

Biofilm formed in root canal caused by entranced planktonic microorganism into root canals.
• Propolis is complex mixture made from plant-derived and bee released compounds

• The proportion of the various substances is variable and dependent upon the place and time collection. East Java propolis from *Apis melifera* spp, domination in cotton silk tree (*Ceiba Pelandra L*)
Propolis Containing apigenin and tt-Farnesol appear more dramatic effect on the biomass and total amount polysacharides of *S. mutans*. 

The main propolis contain is flavonoid have anti bacterial, anti tunggal, antiviral, anti inflammatory.

Propolis has found to very effective against Gram positive bacteria.
Herbal medicine alternative minimize sintetic and chemical materials, cheaper and maximize the nature potential

Back to nature, the alternative material propolis have mechanism for inhibiting growth and development of bacterial *E faecalis* biofilm
Purpose of this research

- To measure Minimum Bacterial Concentration of East Java Propolis Extract to Biofilm E faecalis (Minimum Biofilm Eradication Concentration/MBEC)
Materials and methods

- Raw East Java Propolis maserated with ethanol 70%
- *E. faecalis* diluted 1:100 in Trypticase Soy Broth
- 1 x 10^6 bacterial/ml put in 96 well plate
- Propolis extract 11.45%, 5.75%, 2.86%, 1.43%, 0.715%, 0.38%, 0.19%, 0.10% and 0% as positive control add in each microtiter
- Painted biofilm in well with crystal violet
- Add 0.2 ml isopropanol in each well
- Read Optical Density with Elisa Reader.
Result

- Tabel 1: Hasil Pengukuran LISA Reader OD biofilm bakteri *E. faecalis*

<table>
<thead>
<tr>
<th>Extract Concentration</th>
<th>n</th>
<th>Mean OD</th>
<th>OD Concentration</th>
</tr>
</thead>
<tbody>
<tr>
<td>0%</td>
<td>5</td>
<td>3.542</td>
<td>100%</td>
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<tr>
<td>0.10%</td>
<td>5</td>
<td>1.458</td>
<td>41.17%</td>
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<td>0.19%</td>
<td>5</td>
<td>1.304</td>
<td>36.83%</td>
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<tr>
<td>0.38%</td>
<td>5</td>
<td>1.050</td>
<td>29.65%</td>
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<tr>
<td>0.715%</td>
<td>5</td>
<td>0.759</td>
<td>21.44%</td>
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<tr>
<td>1.43%</td>
<td>5</td>
<td>0.576</td>
<td>16.28%</td>
</tr>
<tr>
<td>2.86%</td>
<td>5</td>
<td>0.363</td>
<td>12.32%</td>
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<tr>
<td>5.75%</td>
<td>5</td>
<td>0.313</td>
<td>8.86%</td>
</tr>
<tr>
<td>11.45%</td>
<td>5</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

Analisis with one way Anova and LSD significant with P< 0.05
Mean OD Biofilm

Picture 1: Elisa reader OD Biofilm
Discussion

- *E. faecalis* is a pathogen bacteria that can cause root canal treatment failure.

- *E. faecalis* prevalence in retreatment is 89.6% and in primary infection is 67.5%.

- Propolis *Apis melifera* spp from East Java contains tt-farnesol 1.03% and apigenin 5.12% which caused the destruction of *E. faecalis* biofilm.
tt-Farnesol, a natural sesquiterpene alcohol displayed inhibition *E faecalis* growth by disrupting the bacterial membrane may effect glucan synthesis.

Apigenin is naturally occurring, non-mutagenic, non-toxic bioflavonoid found in vegetables and fruit.

Apigenin is potent inhibitor of Glucosyltranferase (GTF).

The glucan synthesized by GTF are of central importance in expression of virulence by *E faecalis*.
• Glucan-rich plaque matrix appear to increase porosity (Kao et al, 2003).

• Synthesis of alkali-soluble glucans, apigenin and tt-farnesol have significant impact the further development and accumulation of *E faecalis* biofilm
Conclusion

- In concentration of 11.45% of East Java Propolis Extract can Eradicated *E faecalis* biofilm.
Thanks you