

# **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 failed is bacterial resistance**
- ***Enterococcus faecalis (E faecalis)* identified 89,6% in root canal treatment failed**

- **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 mellifera* 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 etanol 70%
- *E faecalis* diluted 1 : 100 in Trypticase Soy Broth
- $1 \times 10^6$  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 isopropanolol in each well
- Read Optical Density with Elisa Reader.

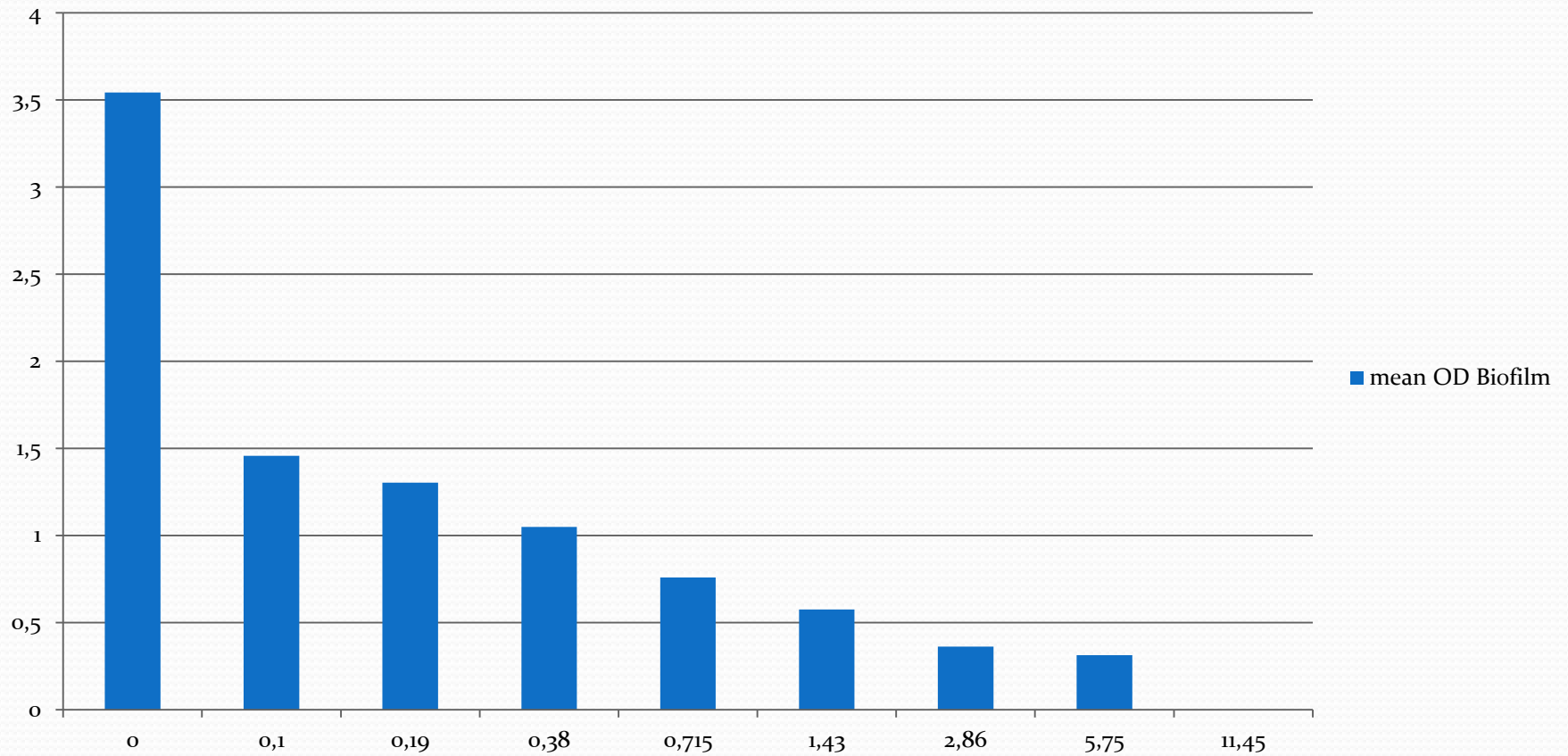
# Result

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

Extract Concentration	n	Mean OD	OD Concentration
0%	5	3,542	100%
0,10%	5	1,458	41,17%
0,19%	5	1,304	36,83%
0,38%	5	1,050	29,65%
0,715%	5	0,759	21,44%
1,43%	5	0,576	16,28%
2,86%	5	0,363	12,32%
5,75%	5	0,313	8,86%
11,45%	5	0	0

**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 pathogen bacteria can caused root canal treatment failed
- *E faecalis* prevalence in retreatment 89,6% and in primer infection 67,5%
- Propolis *Apis mellifera spp* from East Java contain tt-farnesol 1,03% and apigenin 5,12% caused destroyed *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 Glucosyltransferase (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**