Effect of *Cinnamomum parthenoxylon* Against Dental Caries Bacteria

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ABSTRACT

Cinnamomum is a genus of aromatic plants belonging to Lauraceae family, and it includes aromatic plant species, *Cinnamomum parthenoxylon*. This plant is widely spread in the island of Borneo. In this study, leaves part of *Cinnamomun parthenoxylon* were collected from Botanical Garden of Mulawarman University, East Kalimantan. The essential oils were extracted from leaves using the steam distillation method. The oils were analyzed by gas chromatography mass spectroscopy (GC-MS) in order to determine the compounds. These oils were screened for antibacterial against *Streptococcus mutans* and *Streptococcus sobrinus* at level between 100 - 1 % using well diffusion method. Minimum inhibitory concentration (MIC) was determined. The antibiotic susceptibility test was performed against the test organisms by well diffusion method. The chemical and bioactivity profile of *Cinnamomun parthenoxylon* leaves oil were established to investigate its potential uses. The essential oil was evaluated for physical and chemical characteristic such as color, yield and refractive index. The results showed that *Cinnamomun parthenoxylon* oil was found effective against *Streptococcus mutans* and *Streptococcus sobrinus*.

INTRODUCTION

C. parthenoxylon, so far, only use by people its wood as a raw material for making boats and building houses, while the wood bark is used to eradicate ticks. Jia et al (2009) reported that the polyphenol content found in *C. parthenoxylon* stem extract has the ability to reduce glucose levels tested in diabetic mice. Chinese people use the stems, leaves, and fruit of *C. parthenoxylon* as traditional medicine (Traditional Chinese Medicine), among others, dysentery, rheumatism/rheumatoid arthritis, and pertussis (whooping cough) (Anonymous, 1977).

Currently the use of Cinnamomum or cinnamon is still limited to the bark of his wood, although the typical aroma of cinnamon can also be found in the leaves. On the basis of the above, it is necessary to research the materials other than bark of the *C. parthenoxylon* to find out the chemical content profile and its potential utilization as an antimicrobial.

METHODS

The essential oils obtained by steam distillation method, include collecting and preparing the sample, calculation of moisture factor, distillation with steam system, separation of pure oil.

The refractive indexes measuring use hand refractometer.

The compounds of oil were determined by gas chromatography mass spectroscopy (GC-MS) analysis.

The antibacterial assay using agar diffusion method replicates the experimental unit consisted of 2 times, which include sterilization process, making the nutrient agar medium, making the antibacterial suspensions, and antibacterial test.

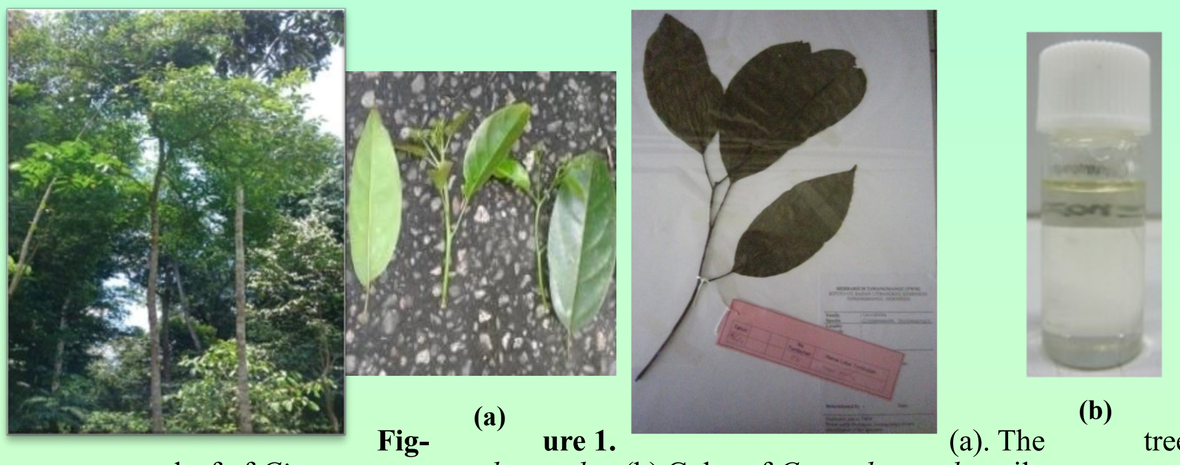

Figure 1. (a). The tree and leaf of *Cinnamomum parthenoxylon* (b) Color of *C. parthenoxylon* oil

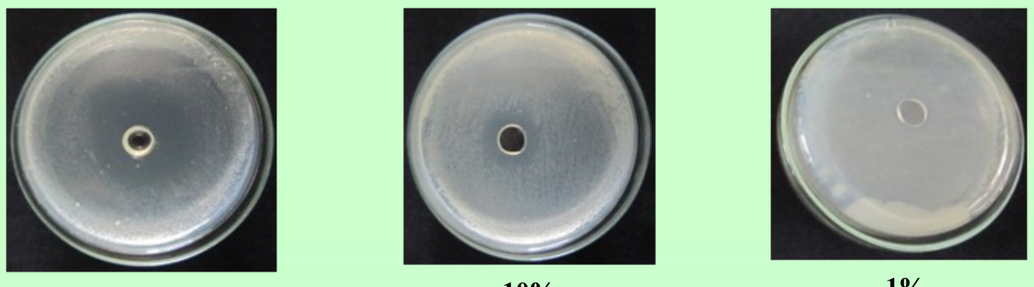

Figure 2. Anti- bacterial test on *Streptococcus mutans*

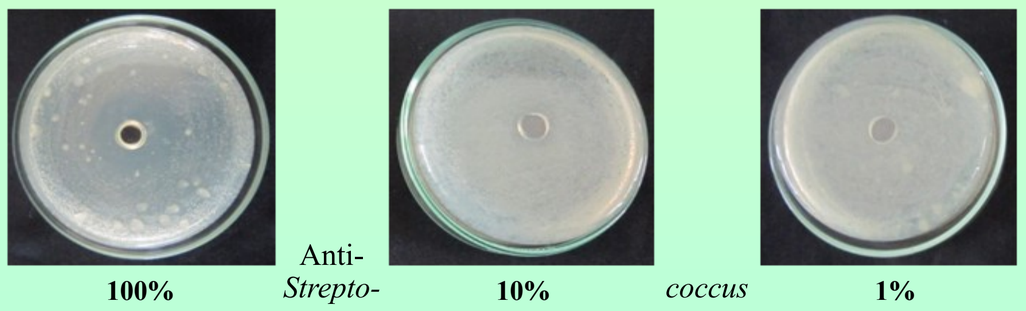

Figure 3. Anti- bacterial test on *Streptococcus sobrinus*

RESULTS AND DISCUSSION

Table 1. The plant species, family, yield oil and refractive index

Plant species	Family	Yield (%)	Colour	Refractive index
Cinnamomum parthenoxylon	Lauraceae	1.64	Pale Yellow	1.532

The steam distillation yielded clear and yellowish essential oils (showed in Figure 1) Refractive index of oil was found to be in 1.532. The result of the yields and refractive index is presented in Table 1. C. partyhenoxylon has rich in oil (1.64%).

Table 2. Antibacterial activity of pure essential oils against *S. mutans*

Microbes	Sample	Inhibition zones (mm)		
		100%	10%	1%
S. mutans	*C. parthenoxylon*	25.67 ± 0.33	10.56 ± 0.38	0.00 ± 0.00
	Chlorhexidine		15.11 ± 0.19	
	Activity index	1.69	0.69	0.00
	Chloramphenicol		29.67 ± 2.03	
	Activity index	0.87	0.36	0.00
S. sobrinus	*C. parthenoxylon*	18.22 ± 0.38	10.00 ± 0.33	0.00 ± 0.00
	Chlorhexidine		16.33 ± 0.33	
	Activity index	1.12	0.61	0.00
	Chloramphenicol		26.78 ± 2.52	
	Activity index	0.68	0.37	0.00

*Control positive in this study were Chlorhexidine and Chloramphenicol (10mg/ml)

Table 2 showed that the volatile oil of *C. parthenoxylon* could inhibited the growth of *S. mutans* and *S. sobrinus* until concentration of 10% which compared to Chlorhexidine and chloramphenicol, and the pure oil was susceptible against both of bacteria.

CONCLUSION

All assays have been investigated for the *C. parthenoxylon* oil. This study proved that the essential oils from leaves of *C. parthenoxylon* has potential to inhibited the growth of *S. mutans* and *S. sobrinus*.

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