



TOTAL FLAVONOID CONTENT AND ANTIBACTERIAL ACTIVITY OF SEMPUR (*Dillenia Suffruticosa*) LEAF INFUSION

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ABSTRACT

Sempur leaf (*Dillenia suffruticosa*) is a traditional medicine plant that contains flavonoids and is thought to be effective in treating gastrointestinal symptoms such as diarrhea. This research aims to evaluate the total flavonoid content of a sempur leaf infusion and assess its antibacterial effectiveness against two bacteria that cause gastroenteritis, namely *Escherichia coli* and *Salmonella typhi*. The infusion was carried out by heating the simplicial in distilled water for 15 minutes at 90 °C. The total flavonoid content was determined using UV-Vis Spectrophotometer with quercetin as the standard. Meanwhile, antibacterial activity was measured using the disc diffusion method with Ciprofloxacin as a positive control and distilled water as a negative control. The total flavonoid content of sempur leaf infusion was about 8.803 ± 0.6990 mgQE/g. In contrast, this sempur leaf infusion demonstrated no antibacterial activity against *E. coli* or *S. typhi*.

Keywords: antibacterial, *Dillenia suffruticosa*, flavonoid, infusion, leaf

INTRODUCTION

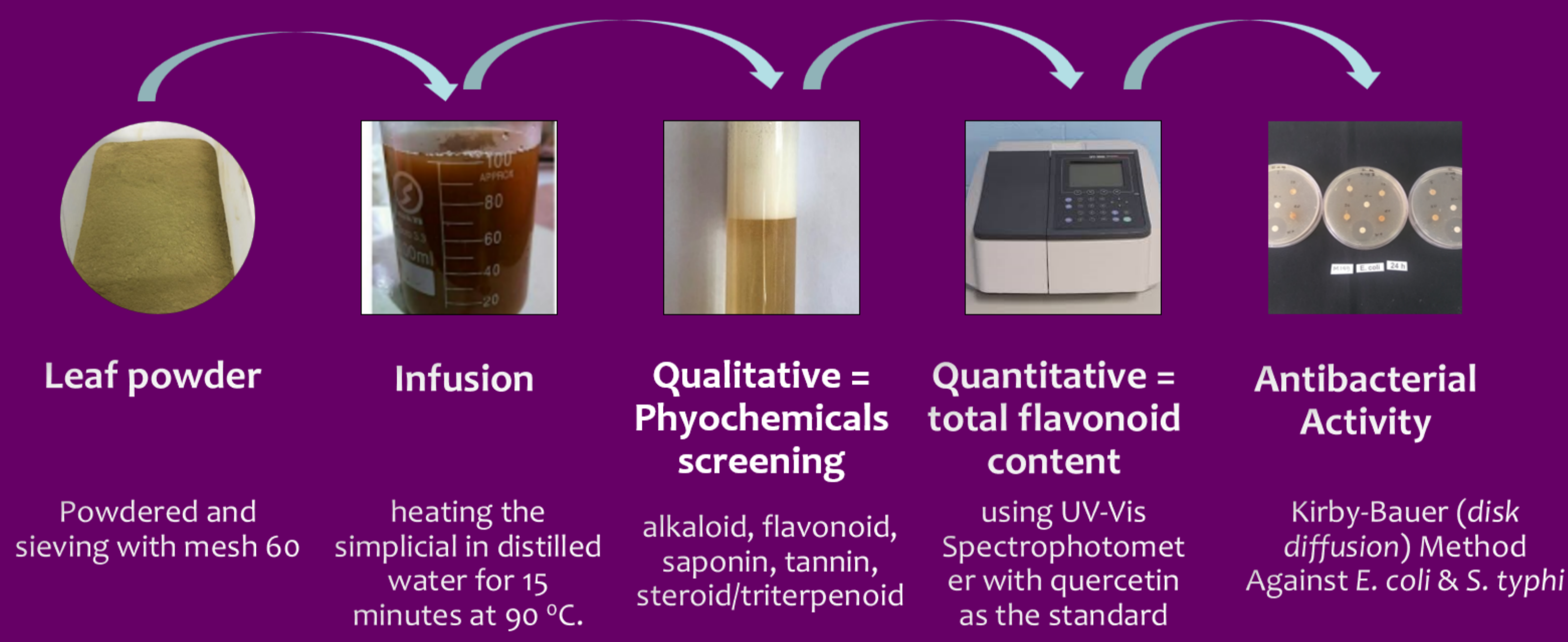
Dillenia suffruticosa, or known as sempur, is a native Asian plant that grows in tropical forests from Malaysia, Indonesia, Phillipines, and Brunei Darussalam [1]. Sempur plants in Indonesia can be found in Sumatra and Kalimantan (Borneo) Islands. People in Bangka-Belitung, Sumatra, usually used the boiled water of sempur leaves to treat diabetes mellitus [2]. Besides that, the local community also used boiled water of sempur leaves as an anti-diarrhea. Based on previous research, this ability was possible due to the flavonoid content of sempur leaves [3].

Based on the above information, this research aims to evaluate the total flavonoid content of a sempur leaf infusion and assess its antibacterial effectiveness against two bacteria that cause gastrointestinal illness, namely *Escherichia coli* and *Salmonella typhi*.

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RESEARCH METHODS



RESULTS & DISCUSSIONS

Table 1. Phytochemical Screening of Sempur Leaf Infusion

Chemical compounds	Results	Annotation
Flavonoid	Positive	Red solution formed
Tannin	Positive	A greenish black solution formed
alkaloid	Positive	Brown precipitate formed with Wagner's and white Precipitate with Mayer's
Saponin	Positive	Formed a stable foam after shaking
Steroid dan Triterpenoid	Negative	No color change formed

The TFC values were quite low as compared to the TFC values from methanol and aqueous extracts found by Yakop et al. [5], which were 4-6 times higher. This minor influence was most likely due to the infusion being carried out by heating the leaves at 90 °C. Flavonoids are thermolabile compounds, which means they easily evaporate when exposed to heat, so flavonoid levels during heating may decrease [4]. Based on this, cold extraction is recommended to retain the flavonoid levels of this plant.

Table 2. Total Flavonoid Content of Sempur Leaf Infusion

Replication	Absorbance (y)	TFC (mgQE/gDW)	Mean of TFC (mgQE/gDW)	Standard Deviation
1	0.466	8.650	8.803	0.6999
2	0.451	8.296		
3	0.508	9.646		

TFC: Total Flavonoid Content; QE: Quercetin Equivalent; DW: Dry Weight

Table 3. Antibacterial Activities of Sempur Leaf Infusion

Bacteria	Inhibition Zone (IZ) (mm)					
	Infuse Concentrations (%)				Control	
	5	10	20	40	Positive	Negative
<i>Escherichia coli</i>	(-)	(-)	(-)	(-)	31.60	(-)
<i>Salmonella typhi</i>	(-)	(-)	(-)	(-)	28.44	(-)

Positive control: Ciprofloxacin; Negative control: Aquadest; (-): no inhibition

The antibacterial test of sempur leaf infusion revealed that it had no antibacterial effect against the two bacteria. This result was consistent with our prior investigation which found no inhibition growth against *Staphylococcus aureus* nor *Shigella dysenteriae* [3].

The findings show that the in vitro test results do not correspond to the empirical conditions of people who use boiled water from sempur leaves to treat diarrhea. However, this study employed the highest concentration of 40%; nevertheless, this concentration may be rather low for the treatment dose, hence additional investigations with higher concentrations of up to 100% are required [3].

CONCLUSION

Sempur leaf infusion contains alkaloid, flavonoid, tannin, saponin compounds, with a total flavonoid content approximately 8.803 ± 0.6990 mgQE/g. In contrast, this sempur leaf infusion has no antibacterial activity against *E. coli* or *S. typhi*.

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