

Chemical and sensory evaluation of *Terminalia Canescens* herbal infusion

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Client details

Bruno Dann and Marion Louise Manson

Twin Lakes Cultural Park

Cable Beach, Western Australia.

Objective

The objective of this project was to evaluate the chemical and sensory attributes of Jilungin (*Terminalia canescens*) infusion in comparison with commercial green tea (GT).

Samples

Jilungin (*Terminalia canescens*) leaves supplied by Bruno Dann, the Traditional Owner from Twin Lakes Cultural park in the Kimberley in Western Australia and commercial green tea (Product name: Traditional fresh green tea, Good Young Co. Ltd., Taiwan)

Methods

Preparation and extraction of infusion: Jilungin leaves were divided in to two parts: A) whole leaves (JW) and B) ground leaves (JG) (Figure1)

1. The preparation of green tea (GT) was followed as given on the commercial green tea package.
2. 1 g sample of Jilungin leaves (A & B) was extracted with 40 ml of boiled water for 5 min in duplicate. Extracts were decanted and residues were steeped again in 40 ml volume of boiling water.

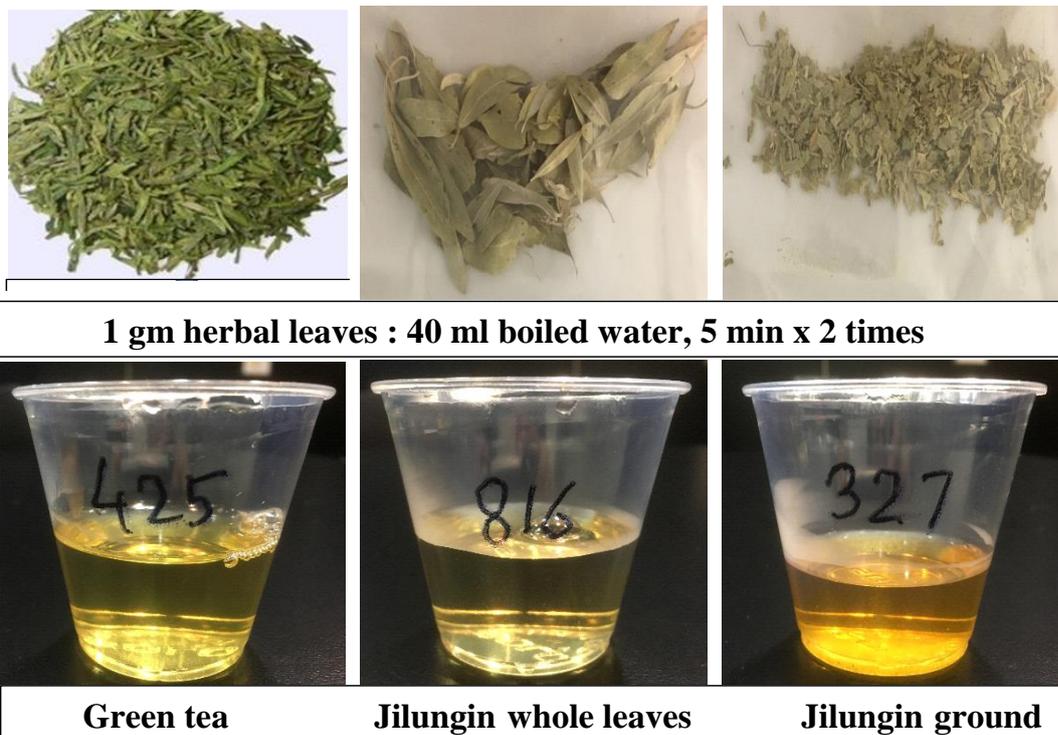


Figure 1: Schematic presentation of herbal infusion preparation

Determination of total phenolic content:

The total phenolic content in sample extracts was determined using Folin-Ciocalteu (FC) reagent assay method (Singleton and Rossi, 1965) and concentrations were expressed as mg gallic acid equivalents (GAE) per g Tea.

Determination of antioxidant activity:

Antioxidant activity of samples was determined as DPPH radical scavenging activity and the result were expressed in percentage inhibition of DPPH radical (Nirmal and Panichayupakaranant, 2015).

Percentage Inhibition of DPPH radical = $(1 - A_{\text{sample}}/A_{\text{control}}) \times 100$

Sensory analysis:

Sensory evaluation of Tea samples was conducted by using 9-point hedonic scale as mentioned by Adnan et al (2013) with slight modification. Ten well trained and regular consumers of tea were selected as participants for sensory evaluation. The participants were asked to evaluate each sample for sensory attributes like aroma, colour, flavour, taste and overall acceptability.

Results and Discussion

Total Phenolic content and antioxidant activity of tea samples:

The antioxidant activity of all samples correlates well with the total phenolic content (TPC) of the respective samples (Table 1). The TPC of herbal infusion shows that JG has higher values than JW and GT ($P < 0.05$). The higher TPC and antioxidant activity of JG showed that grinding of Jilungin leaves increases the surface area and facilitates the extraction of phenolic compounds into boiled water as compared to whole leaves ($P < 0.05$). The variation of TPC in different tea leaves could be attributed to different species, quality of leaf, and growing conditions. The antioxidant potential of herbal infusion is presented by the percentage discoloration of DPPH radical which is attributed to the hydrogen donating ability of test compounds.

Table 1: Total phenolic content and DPPH radical scavenging activity of Jilungin herbal infusion

Samples	Total phenolic content (mg GAE/ g sample)	% Inhibition per ml
GT	112.1 ^b ± 1.1	21,794 ^b ± 272
JW	27.7 ^c ± 0.6	5436 ^c ± 85
JG	139.0 ^a ± 1.2	28,152 ^a ± 817

Values represent mean ± standard deviation (n= 3)

GT=Green tea; JW= jilungin whole leaves; JG= jilungin ground leaves.

Likeness score:

Table 2 represent the likeness score of Jilungin herbal infusion compared to commercial green tea. The aroma and colour likeness score for all samples was comparable ($P > 0.05$). The images of green tea and Jilungin tea preparation is shown in figure 1. The flavour and overall acceptability score for GT and JW was comparable ($P > 0.05$). Quality and consumer acceptability of tea is affected by the content of catechins, caffeine, amino acids, theaflavons and other volatile components (Adnan et al. 2013).

Table 2: Likeness score of jilungin (*T. Canescens*) samples

Infusion	Sensory attributes				
	Aroma	Colour	Flavour	Taste	Overall
GT	6.8 ^a ± 1.3	6.7 ^a ± 1.0	6.9 ^a ± 1.1	7.0 ^a ± 1.0	7.0 ^a ± 1.0
JW	6.1 ^a ± 0.9	6.4 ^a ± 1.3	5.9 ^{ab} ± 1.1	5.5 ^b ± 1.0	6.0 ^{ab} ± 0.9

Mean ± SD (N=10). Mean with different superscript letters in columns are significantly different ($P \leq 0.05$).

GT=Green tea; JW= Jilungin whole leaves; JG= jilungin ground leaves.

Nine Point hedonic scale:

9 = Like extremely; 8 = Like very much; 7 = Like; 6 = Like slightly; 5 = Neither like nor dislike; 4= Dislike slightly; 3 = Dislike moderately; 2 = Dislike; 1 = Dislike extremely.

Recommendation:

This report is based on the sample supplied by the client, further analyses including; phytochemical profile, mineral and trace elements are recommended.

References:

- Adnan, M., Ahmad, A., Ahmed, A., Khalid, N., Hayat, I. and Ahmed, I. (2013) Chemical composition and sensory evaluation of tea (*Camellia sinensis*) commercialized in Pakistan. *Pakistan Journal of Botany*, 45: 901-907.
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- Singleton, V. L and Rossi, J. A Jr. (1965) Colorimetry of total phenolics with phosphomolybdic-phosphotungstic acid reagent. *American Society for Ecology and Viticulture*, 16, 144-158.