

## Therapeutic potentials of sungkai (*Peronema canescens* Jack.) an Indonesian luxurious woody plant

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### Abstract

In Indonesia sungkai plant (*Peronema canescens* Jack.) categorized as a luxurious timber because the wood is used for various purposes such as: for houses construction, interior finishes, furniture and decorative veneer. Besides being used for its wood, the sungkai plant is also used as a medicinal plant to treat several diseases such as: fever, ringworm, and toothache. In this article, several pharmacological research results that verify the claims of traditional communities about the medicinal properties of this plant are presented. The results of the existing research indicate that the sungkai plant has therapeutic potential.

**Keywords:** Sungkai plant; *Peronema canescens*; Antimalaria; Immunostimulatory

### 1. Introduction

In the midst of Covid-19 outbreak hit the globe in 2000, various rumors and fake news regarding causes, symptom, and treatment the disease flooded social media. This situation led people around the world, including Indonesia, panicked and scared. One of the rumors that circulated widely in Indonesia at that time was that Covid-19 could be cured by decoction of the plant leaves of sungkai (*Peronema canescens* Jack.). The rumors caused the demand for this plant leaves to increase. While in fact the authorities confirmed that the efficacy of sungkai leaves to prevent and treat Covid-19 had not been proven [1].

Despite the lack of evidence that the sungkai plant is efficacious in curing Covid-19, the use of this plant to treat disease has been passed down from generation to generation by the local community where this plant grows. In Kalimantan (Borneo), *P. canescens* one of plant species that is traditionally used by the local ethnic to treat malaria [2].

Although the benefits of the sungkai plant are not foreign to the people of Indonesia, especially the natives of Sumatra, Kalimantan, and Java, the world community may not be familiar with this plant, due to limited scientific publications. For this reason, this article presents the results of research on the benefits of the sungkai plant which have been published on several websites and scientific journals both nationally (Indonesia) and internationally.

### 2. Short description of *Peronema canescens*

Sungkai plant (*Peronema canescens* Jack.) which photo is presented in Figure 1, as described in in GBIF Secretariat website [3], is a woody plant that taxonomically classified as follows:

- Kingdom : Plantae

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- Division: Tracheophyta
- Class: Magnoliopsida
- Order: Lamiales
- Famili: Lamiaceae
- Genus: Peronema
- Spesies: Peronemacanescons Jack
- Spesies:Peronemaheterophyllum Miq.

*Peronema* is a monotypic genus that is native in Malay Peninsula, Sumatra, the Riau Archipelago, Java and Kalimantan. Although morphologically *Peronema* genus shows differences in leaf shape, stem diameter and plant height among plantlets originating from different provenances, RAPD analysis with PCR showed that all planting materials were genetically uniform [4].

*Peronema canescens* has several vernacular names: jatisabrang, jatilondo, kurus (Indonesia); sukai, cherek (Malaysia). This plant is categorized as a luxurious timber because the wood is used for various purposes such as: for pillars in houses, interior finishes, for making carts, bridges for light traffic, for furniture and cabinets as well as for decorative veneer. In traditional medicine, the sungkai plant leaves and barks is used to treat fever, ringworm, and toothache [5].

Sungkai plants have very good economic prospects if cultivated because they have the following characteristics: high growth potential (high survival rate) and short distance between trees for seeds or cuttings and the nursery so that the cost and risks of stressed propagules and the potential financial profit can be minimized [6].



**Figure 1** Photograph of Sungkai(*Peronemacanescons*Jack.)

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### 3. Therapeutic potentials of *Peronemacanescons*

#### 3.1. Antimalarial

The anti-malarial potential of sungkai plant has been revealed by Andriani et al. (2017) by conducting an *in vivo* experiment using mice (*Mus musculus*) infected with *Plasmodium berghei*. Mice that had been infected with *P. berghei* were then given n-hexane extract from sungkai leaves with different doses. After three days of incubation, parasitaemia was calculated and the result showed that the higher the dose of the extract, the less the number of parasites in the erythrocytes [7].

The other research on anti-malarial potential of sungkai plant was done by Swandiet al. (2018) by giving leaves extract of the plants grown in South Sumatra to the two *Plasmodiumfalciparum*strainsD10andFCR3wich were maintained *in vitro* in human eritrocytes cultures. After the parasite and extract were mixed an incubated for 72 h at 37°C, apparently, both Plasmodium strains experienced significant growth inhibition.In this experiment, the researchers tested three kinds of extracts at once, namely: acetone, ethanol, and water extracts.Among the three types of extract they used, the water extract showed the best result [8].

These findings are the verification that supported the claims of the local ethnic of Kalimantan and Sumatra that the decoction of the barks of the sungkai is indeed efficacious for treating malaria.

### 3.2. Antibacterial

The antibacterial activity of the phytochemical extracted from sungkai plant has been demonstrated by the following researchers. Ibrahim and Kuncoro (2012) found that methanolic leaves extract of sungkai plant significantly showed antibacterial effects against some pathogenic bacteria namely: *Staphylococcus mutans*, *S. aureus*, *Salmonella typhi*, and *Bacillus subtilis* [9]. Next, Kusriani *et al.* (2015) revealed that methanolic extract of barks and leaves extract of *Peronema canescens* significantly showed inhibitory effect against *S. aureus* ATCC 25923 and *Escherichia coli* ATCC 2592 [10]. Antibacterial activity of sungkai plant herbs against *E. coli* was also revealed by Fransisca *et al.* (2020) by using ethanolic leaves extract of the plant [11]. Next, using ethylacetate and n-hexane as extract solvents, Muharni *et al.* (2021) succeeded in confirming the antibacterial effect of sungkai leaf extract against *E. coli*, *S. aureus* and *S. typhi* [12].

### 3.3. Antidiabetic

The antidiabetic efficacy of the sungkai plant was revealed by Latief *et al.* (2021) in an experiment using alloxan-induced diabetic mice as test animals. The result showed the ethanol extract of sungkai leaves effective in reducing blood sugar levels, reducing urine volume, daily drinking, and body weight in diabetic mice. They assumed that the antidiabetic effect was caused by the secondary metabolites they obtained through phytochemical analysis, namely: phenol, flavonoids, tannins, alkaloids, and saponins [13]. However, this finding is not very convincing because previously Khattak *et al.* (2013) stated that the *in vitro* extract of sungkai plant leaves was not effective in stimulating glucose uptake in 3T3-L1 preadipocytes cells [14].

### 3.4. Anti-inflammatory

By treating carrageenan induced mice with ethanolic extract of sungkai plant leaves Latief *et al.* (2021) revealed that the exudates volume and inflammation rate in mice significantly reduced. In addition, the leaf extract of *Peronema canescens* significantly affect lymphocytes, stem neutrophils, and segment neutrophils [15]. Other researchers, using a method similar to this study, succeeded in confirming that the ethanol extract of sungkai leaves has anti-inflammatory properties because it has been shown to be effective in increasing the total leukocyte count of the tested mice [16].

### 3.5. Anticancer

The anticancer potential of *Peronema canescens* reported by Ibrahim *et al.* (2021) testing chloroform subfraction of the plant leaves on colon cancer HT-29 cells *in vitro*. The results showed that the plant leaf extract showed potential cytotoxic activity in human HT-29 cancer cells with an IC<sub>50</sub> value of 4.807 µg/ml [17]. Follow-up research conducted by this research team, by using the same type of extract against HT-29 and primary adenocarcinoma colon cancer confirmed that sungkai plant really has anticancer potential through cell cycle inhibition, induces apoptosis and necrosis cells [18].

### 3.6. Antihyperuricemia

Latief *et al.* (2020) treating potassium oxonate-induced hyperuricemic mice with ethanolic extract of sungkai plant leaves found that at a dose of 125-500 mg / Kg BW plant leaf extract of *Peronema canescens* significantly reduce uric acid levels in hyperuricemic mice [19].

### 3.7. Immunostimulatory properties

Immunostimulatory potential of plant leaf extract of *Peronema canescens* was reported by Rahman *et al.* (2021) by giving sungkai leaf infusion to mice found that the number of leukocytes of the mice increased significantly [20]. Next, by using carbon clearance method on mice, Jalius (2021) found that leaves extract of sungkai significantly increase phagocytic index of the macrophages [21]. While Dillasamola *et al.* (2021) revealed the immunostimulatory properties of this plant by conducting experiment using *in vitro* and *in vivo* methods. Extract of Sungkai was proven to increase the activity and phagocytic capacity of macrophages, total number of leukocytes, percentages of lymphocytes, decreasing segmental neutrophils and increasing cytokine levels, proinflammatory (TNF-α and IL-6) as well as safe and nontoxic to RAW 264.7 cells [22].

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## 4. Phytochemical content

There is still very rare literature that presents the results of both qualitative and quantitative analysis of chemical compounds contained in the Sungkai plant. Our internet search results only found three articles reporting the

phytochemical screening results of this plant extract. Fadlilaturrahmah et al, (2021) through qualitative analysis using the thin layer chromatography (CLT) method on the n-butanol extract of sungkai leaves succeeded in detecting the presence of phenolic compounds, tannins, alkaloids, steroids, saponins and flavonoids [23]. Furthermore, Pindan et al. (2021) using the DPPH method found groups of alkaloids, flavonoids, titerpenoids, steroids, phenolics, and saponins [24]. Next, Maigoda et al. (2022) using the Fourier transform infrared (FTIR) technique also only found groups of alkaloids, flavonoids, saponins, tannins, polyphenols, steroids [25].

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## 5. Conclusion

Sungkai plant (*Peronema canescens* Jack.) does have the potential to be used as medicinal ingredients of plant origin. However, more in-depth testing of the various properties and activities of the active ingredients of this plant is still needed. The known phytochemical content is still very general (group of compounds), there is no specific compound that has been successfully identified. Another thing that still needs to be researched is the safety of using this plant, is it really safe or are there side effects that need to be considered.

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## Compliance with ethical standards

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### Disclosure of conflict of interest

Author declared there is no competing interest.

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