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PRESCRIPTION

Latest news and updates from the Faculty of Pharmacy

IN THIS ISSUE

Malaysian Stingless Bee Propolis: Unearthing a Bioactive Treasure Trove

Stingless bees, part of the Meliponini tribe, offer a captivating glimpse into the diverse world of bees. Unlike their stinging relatives, these bees are characterized by their lack of a stinger and play an essential role in the pollination of native plants. With over 500 species documented globally, the Neotropical region emerges as a hotspot for their diversity1. Known locally as 'lebah kelulut' in Malaysia, these bees have gained recognition for their adept pollination of both wild flowering plants and cultivated crops, a role that underpins biodiversity conservation and food security. Malaysia hosts around 50 species of stingless bees, which has sparked growing interest in stingless beekeeping, also known as meliponiculture [2]. This practice offers significant ecological and economic benefits. Not only does meliponiculture promote habitat conservation, but it also allows beekeepers to engage in high-value honey production and obtain other hive products such as beebread and propolis.

Malaysian stingless bee propolis has emerged as a topic of significant interest due to its unique chemical composition and diverse biological properties. This resinous substance consists of a blend of plant resins, fragments of plant tissues, bee saliva, and wax [1]. Propolis serves multiple functions in the hive, including structural stability, defence against pathogens, and hive sanitation [3]. While the fundamental purpose of propolis remains consistent, its composition can significantly vary across bee species and geographical locations. Notably, several stingless bee species such as Heterotrigona itama, Geniotrigona thoracica, Tetragonula laeviceps, Lepidotrigona terminata and Tetrigona apicalis are commonly domesticated in the Malaysia's meliponiculture industry [4].

The chemical composition of Malaysian stingless bee propolis is highly variable, influenced by the species of bee, geographical area, the local flora, and environmental conditions. Key constituents typically include flavonoids, phenolic acids, terpenes, and aromatic acids. Analytical techniques such as Gas Chromatography-Mass Spectrometry (GC-MS) and High-Performance Liquid Chromatography (HPLC) have identified numerous bioactive compounds, including phenolic, terpenoids, steroids, sugar alcohol, and fatty acids [5],[6],[7]. The unique chemical profile translates to a diverse range of biological activities for Malaysian stingless bee propolis. It exhibits significant antibacterial activities against a broad spectrum of bacteria, including both gram-positive and gram-negative strains [8]. Its potency is particularly pronounced against gram-positive bacteria, largely due to the simpler cell wall structure featuring a thick peptidoglycan layer. Moreover, Malaysian stingless bee propolis is rich in antioxidants, which help neutralize free radicals and protect cells from oxidative stress [9]. This property is crucial for preventing chronic diseases and promoting overall health. Additionally, it has demonstrated potential anticancer properties by inhibiting cancer cell proliferation and inducing apoptosis [10].

In conclusion, the distinctive chemical composition and diverse biological activities of Malaysian stingless bee propolis present significant potential for various applications. Its robust antibacterial, antioxidant, and antiproliferative properties underscore its value as a bioactive compound in pharmaceuticals, nutraceuticals, and cosmeceuticals. Continued research and innovation in this domain are likely to reveal even more applications, enhancing its role in promoting human health and well-being through advanced therapeutic and preventive measures.

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Assoc. Prof. Dr. Rozaini Mohd Zohdi earned her PhD in Anatomy from Universiti Putra Malaysia in 2010. She began her career as a research officer at Malaysia Nuclear Agency before transitioning to an academic role at Universiti Teknologi MARA, Puncak Alam Campus. Her research explores the fascinating world of natural products, with a special focus on those derived from bees. She has made significant contributions to the field, including a notable book chapter on their therapeutic potential and several related articles. Dr. Rozaini's expertise extends to tissue regeneration, diabetic wound management, metabolic disorders, obesity, and malaria. As a research fellow at the Atta-ur-Rahman Institute for Natural Product Discovery, she conducts in vitro and animal studies to uncover the mechanisms behind the therapeutic effects of natural products.

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Questions

Let's dive deeper into the article and evaluate your comprehension. We have three questions for you here.

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