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Malaysian Stingless Bee Honey Reduces Cytopathic Effect in Vero E6 Cells Infected with Wild-Type and Omicron SARS-CoV-2 Variants

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Abstract

The emergence of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) resulted in the global coronavirus disease 2019 pandemic. Continuous viral mutation and adaptation have led to the emergence of novel variants with enhanced transmissibility and greater immune escape capabilities. Stingless bee honey, also known as Kelulut honey, possesses various medicinal properties attributed to its wide range of bioactive compounds. Nevertheless, studies on the antiviral properties of Kelulut honey against SARS-CoV-2 remain scarce. This study aimed to screen the potential antiviral activity of Kelulut honey against SARS-CoV-2 using a cytopathic effect-based assay. Kelulut honey produced by *Heterotrigona itama* species, collected in Kuantan, Pahang, Malaysia, was evaluated for its ability to reduce SARS-CoV-2-induced cytopathic effects in Vero E6 cells infected with SARS-CoV-2 wild-type and Omicron variants. Kelulut honey reduced the cytopathic effect induced by the wild-type strain at 1- and 4-h pretreatment settings, with E_{max} values of $56.7 \pm 9.96\%$ and $40.9 \pm 11.6\%$, respectively. For the Omicron variant, the E_{max} values were $100 \pm 0\%$ and $92.7 \pm 4.44\%$ for 1- and 4-h pretreatment settings, respectively. In conclusion, Kelulut honey reduced SARS-CoV-2-induced cytopathic effects in Vero E6 cells, with greater effects observed against the Omicron variant. These findings support further investigation of the potential biological activity of Kelulut honey against SARS-CoV-2. Further studies employing direct viral quantification assays and in vivo validation are required to determine its effects on viral replication and evaluate its potential for future therapeutic development. © The Author(s) under exclusive licence to Sociedade Brasileira de Farmacognosia 2026.

Author keywords

ACE-2; COVID-19; CPE assay; Inhibition; Kelulut honey; Stingless bee honey

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