Harvested locations influence the total phenolic content, antioxidant levels, cytotoxic, and anti-inflammatory activities of stingless bee honey

ABSTRACT

Kelulut honey (KH) is a natural product-derived food produced by stingless bees of Trigona or Meliponine species. Several studies have shown that the geographical origin of honey significantly affects its pharmacological properties. Thus, this study aims to characterise the pharmacological properties of KH harvested from different geographical locations. The total phenolic content (TPC), antioxidant levels, cytotoxic, and anti-inflammatory activities of pure KH harvested from three different locations (Sarawak, Pahang and Selangor) were compared. Among the samples, KH harvested from Selangor exhibited the highest TPC, antioxidant levels, and cytotoxic activity against MDA-MB-231 and MCF-7 cells, followed by KH harvested from Sarawak and Pahang. The IC50 of MCF-7 cells treated with KH harvested from Selangor was at least 2-fold lower than the IC50 of MDA-MB-231 cells, suggesting that KH is more cytotoxic to oestrogen receptor (ER)- and progesterone receptor (PR)-positive (MCF-7) compared to triple-negative (MDA-MB-231) breast cancer cells. Two non-cytotoxic concentrations (1% and 0.5%; v/v) were selected for the anti-inflammatory assay using lipopolysaccharide (LPS)-induced RAW 264.7 cells. KH harvested from Selangor and Pahang (at a concentration of 1%; v/v) significantly inhibited nitric oxide (NO) production in LPS-induced RAW 264.7 cells compared to control cells. These findings provide evidence that the geographical origin of KH may indeed influence its pharmacological properties. Our data suggest that KH harvested from Selangor has a better quality compared to KH harvested from Pahang and Sarawak based on its high TPC, antioxidant levels and anti-inflammatory activity. Furthermore, it exhibits in vitro anticancer potential in breast cancer cell lines.