UNIVERSITI TEKNOLOGI MARA

IN VITRO MELANOGENESIS, ANTIOXIDANT AND CYTOTOXICITY ACTIVITIES OF *Peltophorum pterocarpum* LEAVES EXTRACTS

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ABSTRACT

Melanin is a protective pigment against cellular damage and skin cancer. Expansion in demand for skin whitening treatments that lower melanin levels therefore have become a worrying trend as it may compromise the skin barrier. *Peltophorum pterocarpum* has been used for centuries to treat skin problems due to its anti-oxidant and anti-microbial properties. However, the effects of *P. pterocarpum* extract on melanogenesis remain to be investigated. This study is aimed to examine the melanogenesis, anti-oxidant, and cytotoxicity activities of *P. pterocarpum* leaves extracts. A two-dimensional (2D) cell culture model was employed to demonstrate the efficacy of aqueous and ethanol of *P. pterocarpum* leaves extracts in promoting melanin synthesis. *In vitro* and cell-based detection of reactive oxygen species (ROS) were assessed using 2,2-diphenyl-1-picrylhydrazyl (DPPH) and 2',7'-dichlorodihydrofluorescein diacetate (DCFH-DA) assays. The cytotoxicity effects of *P. pterocarpum* extracts were determined by [3-(4, 5-dimethylthiazol-2-yl)-2, 5-diphenyltetrazolium bromide] (MTT) and Neutral Red Uptake (NRU) assays on human keratinocyte cell lines and BALB/c 3T3 mouse fibroblasts, respectively. The results showed that ethanol extract of *P. pterocarpum* significantly increased the melanin content while the aqueous extract inhibited melanin synthesis against B16-F1 melanoma cells. DPPH and DCFH-DA assays showed that the ethanol extract of *P. pterocarpum* had higher free radical scavenging activity than the aqueous extract. MTT cytotoxicity results demonstrated that the ethanol extract of *P. pterocarpum* did not exhibit any cytotoxic effects against UVB-irradiated (HaCaT) cells up till 2000 µg/mL, whereas the aqueous extract inhibited the viability of UVB-irradiated keratinocyte cells. The NRU cytotoxicity results demonstrated that the ethanol extracts of *P. pterocarpum* was not toxic against BALB/c 3T3 mouse fibroblast cells up to 1000 µg/mL. However, the aqueous extract of *P. pterocarpum* exhibited a reduction of viability to 50% against BALB/c 3T3 cells at 1000 µg/mL. The effect of *P. pterocarpum* leaves on melanogenesis and anti-oxidant activities were significantly influenced by the polarity of extraction solvents. Besides that, ethanol extract exhibits better inhibition of ROS production in HaCaT cells, which is in accordance with its anti-oxidant activities. However, the effect of both extracts on the viability of cells varies according to the cells that are used. Based on these results, it can be concluded that the ethanolic extract of *P. pterocarpum* can enhance the melanin production, is high in anti-oxidant activities and is not cytotoxic to HaCaT and BALB/c 3T3 cells, respectively. Hence, the potency of *P. pterocarpum* leaves ethanol extract renders as a highly potential therapeutic agent in the hypopigmentation diseases including the treatment of vitiligo.

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