

## Abstract

Skin aging is an inevitable process in which the skin declines in quality which can be affected by intrinsic and extrinsic factors. One of the important factors contributing to skin aging is the accumulation of ROS (Reactive Oxygen Species). The ROS model was often used to study the effect of compounds that could affect skin aging and the most commonly used ROS model is H<sub>2</sub>O<sub>2</sub>. Exposure to H<sub>2</sub>O<sub>2</sub> has been associated with the induction of aging markers, namely COX-2 and MMP-1, which promotes the formation of wrinkles, a prominent characteristic of premature aging. This can be prevented by applying aging treatment products. As the market for natural skincare products has been increasing, the present study aimed to assess the protective effect of *Litsea oppositifolia* stem extract in HaCaT cells as a natural source of antioxidants. The phytochemical screening, DPPH assay, cytoprotective study, and gene expression analysis for COX-2 and MMP-1 were performed. Through DPPH assay and phytochemical screenings, it was discovered that the extract contained phenolics, alkaloids, and flavonoids, which are the phytochemicals responsible for antioxidant properties in plants. Furthermore, an IC<sub>50</sub> value of 48.66 ppm was obtained from the DPPH assay, categorized as a good antioxidant. The protective ability was also assessed at the cellular and molecular level, where it was discovered through cytoprotective assay that the extract showed optimum protective effect at 12.5 ppm. The extract also downregulated the expression of MMP-1 and COX-2, which may be due to radical scavenging activity and activation of the intracellular antioxidant pathway. It can be concluded that the extract may serve as a good candidate for natural antioxidants, but further studies and adjustments should be performed.

**Keywords:** *Litsea oppositifolia*, H<sub>2</sub>O<sub>2</sub>, antioxidant, skin aging, COX-2, MMP-1