

Abstract

Reactive Oxygen Species (ROS) is a natural byproduct that plays many important roles for the body such as cell signaling, cell survival, and cell death. However, the accumulation of ROS can cause damage to the cell that leads to cell death and eventually to aging. To overcome that, various studies look for antioxidant substances, such as phenolic, flavonoids, and alkaloids. As the study of natural-based compounds as antioxidants becomes more important because of its safer characteristics, *Pogonatum neesii* might be a good candidate for the study due to the previous study which was shown to have no cytotoxic effects towards HaCaT cells. Since skin is generally one of the main organs exposed to the external factor, HaCaT has been widely used to study antioxidants activities. Hence, this study will investigate the radical scavenging abilities and the antioxidant properties of *Pogonatum neesii* under oxidative stress in oxidative stress-triggered HaCaT cells through gene expression analysis using *GPX1* and *SOD2* which are widely known to have radical neutralizing abilities. To examine and determine the best concentration of *Pogonatum neesii* extract for gene expression analysis, an MTS assay was performed and 50 ppm was determined to be the most suitable concentration for gene expression analysis. *Pogonatum neesii* has been shown to have a high phenolics and alkaloid content through quantitative screening and has a radical scavenging ability which has been tested using DPPH assay ($IC_{50} = 174.5$ ppm). The gene expression analysis shows that *Pogonatum neesii* extract is only able to increase *GPX1* expression but not *SOD2*. Thus, showing the potential of *Pogonatum neesii* as an antioxidant.

Keywords: Reactive Oxygen Species; Antioxidants; *Pogonatum neesii*; HaCaT cell