

ABSTRACT

Exposure to ultraviolet (UV) radiation from the sun can elicit both positive and negative effects on the skin. Among the three types of UV radiation, UVB (280-315 nm) is particularly detrimental, causing sunburns, skin cancer, and premature aging. Furthermore, UV exposure induces the generation of reactive oxygen species (ROS), which the skin recognizes as external ROS. This study investigates the antioxidant capacity of green tea extract (GTE) and oat extract (OE) in combating UVB radiation, aiming to evaluate their synergistic cytoprotective effects on HaCaT cells. The antioxidant activities were evaluated through the DPPH assay, revealing that GTE exhibited a lower IC_{50} value ($42.37 \text{ ppm} \pm 6.486$) compared to the standard ascorbic acid (AA) ($125.5 \text{ ppm} \pm 6.566$), while OE showed a higher IC_{50} of $214.3 \text{ ppm} \pm 1.181$. Importantly, neither extract demonstrated toxicity towards HaCaT cells. The cytoprotective assay demonstrated that the combination of GTE and OE exhibited synergistic cytoprotective activity against UVB radiation on HaCaT cells, starting at a concentration of 500 ppm GTE and 500 ppm OE, with the highest observed cytoprotective effect resulting from the combination of 1000 ppm GTE and 500 ppm OE. Simultaneously, a synergistic decreasing cytoprotective effect was observed at the combination of 500 ppm GTE and 125 ppm OE. Therefore, it is substantiated that GTE and OE exhibit antioxidant activity and collaborative cytoprotective capabilities, albeit to a lesser extent in comparison to AA.

Keywords: UVB radiation, antioxidant, green tea extract, oat extract, cytoprotective