Gac fruit extracts ameliorate proliferation and modulate angiogenic markers of human retinal pigment epithelial cells under high glucose conditions

ABSTRACT

Objective: To investigate the impact of the extracts of Gac fruit parts (peel, pulp, seed, and aril) on the cell viability and angiogenesis markers of human retinal pigment epithelial (ARPE- 19) cells under high glucose conditions. Methods: The effect of the extracts of Gac fruit peel, pulp, seed and aril on the ARPE-19 cells was determined using MTT viability assay, Trypan blue dye and morphological changes were observed using light microscopy. Enzyme-linked immunosorbent-based assay was performed to evaluate the effect of Gac fruit parts on the reactive oxygen species (ROS), vascular endothelial growth factor (VEGF) and pigmented epithelium-derived factor (PEDF) secretions. Results: High glucose (HG) at 30 mmol/L increased ARPE-19 cell viability and ROS and VEGF secretions. While, the exposure of ARPE- 19 cells in high glucose condition to Gac fruit extracts led to inhibition of cell viability, induced morphological changes, decreased ROS and VEGF secretions, and increased PEDF level. Gac pulp, seed, and aril at 1 000 μg/mL showed significant inhibition activities [(7.5 ± 5.1)%, (2.7 ± 0.5)%, (3.2 ± 1.1)%, respectively] against HG-induced ARPE-19 cell viability. The findings also demonstrated that Gac aril at 250 μg/mL significantly decreased ROS and VEGF levels [(40.6 ± 3.3) pg/mL, (107.4 ± 48.3) pg/mL, respectively] compared to ROS [(71.7 ± 2.9) pg/ mL] and VEGF [(606.9 ± 81.1) pg/mL] in HG untreated cells. Moreover, 250 μg/mL of Gac peel dramatically increased PEDF level [(18.2 ± 0.3) ng/mL] compared to that in HG untreated cells [(0.48 ± 0.39) ng/mL]. Conclusions: This study indicates that the extracts of Gac peel, pulp, seed and aril reduced cell viability, minimized ROS generations and showed angiogenic activities. Therefore, our findings open new insights into the potentiality of Gac fruit against HG-related diabetic retinopathy disease.

Keyword: Gac (Momordica cochinchinensis Spreng); High glucose; Angiogenesis; Human retinal pigment epithelial cells; Proliferative diabetic retinopathy