Abstract

Diabetic foot ulcers are the primary cause of death and hospitalization in diabetes patients, primarily because of impaired wound healing, manifested by the inhibition of keratinocyte proliferation due to excessive production of reactive oxygen species and oxidative stress. Most currently available treatments focus more only on treating the wounds and do not adequately address the oxidative stress caused by hyperglycemia, which might contribute to persistent wound chronicity, high recurrence rates, and complications. Therefore, this study utilizes *Moringa oleifera* (*M. oleifera*) leaves extract, known for its wound healing and antioxidant properties, to enhance wound healing while also counteracting oxidative stress in hyperglycemic HaCaT cells, modeling diabetic foot ulcers. The crude *M. oleifera* leaves extract gained in this study was as much as 16.68% w/w and had a total flavonoid content of 65.3238 ± 7.898 mg Quercetin Equivalent (QE)/gram of extract. The hyperglycemic HaCaT cells were induced by culturing them in 30 mM glucose-containing media for 72 hours, where it has the highest intracellular ROS production. Treating the hyperglycemic HaCaT cells with *M. oleifera* leaves extract was not cytotoxic at 12.5, 25, 50, 100, and 200 µg/ml. The extract effectively assisted wound healing in hyperglycemic HaCaT cells, especially at 12.5, 25, and 50 µg/ml, dose-dependently, and inhibited intracellular ROS production dose-dependently at 12.5, 25, 50, 100, and 200 µg/ml. Thus, the result of this study suggests the potential use of *M. oleifera* leaves extract in treating diabetic foot ulcers.

Keywords: diabetic foot ulcers, hyperglycemic keratinocytes, *M. oleifera* leaves extract, wound healing, antioxidant