

## Neuroprotective effects of 7-geranyloxy-cinnamic acid from *Melicope lunu-ankenda* leaves

### ABSTRACT

Neurodegenerative diseases (NDDs) are chronic conditions that have drawn robust interest from the scientific community. Phytotherapeutic agents are becoming an important source of chemicals for the treatment and management of NDDs. Various secondary metabolites have been isolated from *Melicope lunu-ankenda* plant leaves, including phenolic acid derivatives. However, their neuroprotective activity remains unclear. Thus, the aim of this study is to elucidate the *in vitro* neuroprotective activity of 7-geranyloxy-cinnamic acid isolated from *Melicope lunu-ankenda* leaves. The neuroprotective activity was evaluated in differentiated human neuroblastoma (SH-SY5Y) cells by monitoring cell viability using 3-(4,5-dimethylthiazol-2-yl)-2,5-diphenyltetrazolium bromide (MTT). Moreover, the potential to impair apoptosis in differentiated cells was investigated employing the Annexin V-FITC assay, acridine orange and propidium iodide (AO/PI) staining, and fluorescence microscopy. Morphological assessment and ultrastructural analysis were performed using scanning and transmission electron microscopy to evaluate the effect of 7-geranyloxy-cinnamic acid on surface morphology and internal features of the differentiated cells. Pre-treatment of neuronal cells with 7-geranyloxy-cinnamic acid significantly protected the differentiated SH-SY5Y cells against H<sub>2</sub>O<sub>2</sub>-induced apoptosis. Cytoskeleton and cytoplasmic inclusion were similarly protected by the 7-geranyloxy-cinnamic acid treatment. The present findings demonstrate the neuroprotective potential of 7-geranyloxy-cinnamic acid against H<sub>2</sub>O<sub>2</sub>-induced neurotoxicity in neuronal cells, which is an established hallmark of neuronal disorders.

**Keyword:** *Melicope lunu-ankenda*; 7-geranyloxy-cinnamic acid; Neuroprotection; Anti-apoptosis; Oxidative stress