

***In vitro* antidiabetic activity of the leaf extract of *Dillenia retusa* Thunb.**

W. W. Y. A. Jayawardhana, M. J. Gunaratna\*

Department of Chemistry, Faculty of Science, University of Kelaniya.

\* medhagunaratna@kln.ac.lk

*Dillenia retusa* Thunb. (Dilleniaceae) is an endemic Sri Lankan medicinal plant traditionally used to treat various ailments, including fever, nervous system disorders, oral diseases, anorexia, excessive thirst, dysentery, cough, burning sensations, and to promote hair health. Several species of the genus *Dillenia* have been reported in Sri Lankan traditional medicine for the management of diabetes mellitus. However, the antidiabetic potential of *D. retusa* has not been scientifically investigated. In the present study, sequential leaf extracts and bioassay-guided chromatographic fractions of the *D. retusa* Thunb ethanolic leaf extract were evaluated for antidiabetic activity using  $\alpha$ -amylase and  $\alpha$ -glucosidase inhibition and enhancement of cellular glucose uptake in a yeast-based model system. Mature fresh leaves were collected from Gampaha District, Sri Lanka, and authenticated. Dried leaves were subjected to sequential solvent extraction with n-hexane (yield: 5.9% w/w) followed by absolute ethanol (yield: 18.06% w/w). The crude ethanol extract was further fractionated by silica gel column chromatography using gradient elution with n-hexane: ethyl acetate (20:1 followed by 9:1) as the mobile phase. Fractions exhibiting similar TLC profiles were pooled, yielding six major combined

fractions with R<sub>f</sub> ranges: F<sub>1</sub> (0.82 – 0.92), F<sub>2</sub> (0.75 – 0.85), F<sub>3</sub> (0.68 – 0.78), F<sub>4</sub> (0.58 – 0.72), F<sub>5</sub> (0.52 – 0.65), and F<sub>6</sub> (0.42 – 0.58). In the  $\alpha$ -amylase inhibition assay using the starch-iodine colorimetric method, fraction F<sub>1</sub> showed the strongest activity, with an IC<sub>50</sub> of 0.012 ± 0.006 µg/mL, surpassing acarbose. In the  $\alpha$ -glucosidase inhibition assay using p-nitrophenyl- $\alpha$ -D-glucopyranoside as substrate, F<sub>1</sub> again exhibited the most potent activity, with an IC<sub>50</sub> of 0.327 ± 0.02 µg/mL, exceeding the standard control. In the yeast-based glucose uptake assay performed at 5, 10, and 25 mM glucose concentrations, the extracts significantly enhanced glucose uptake, with effects comparable to or greater than metformin across all conditions. These findings highlight the potential of *D. retusa* leaves as a promising candidate for natural product-based antidiabetic drug discovery, warranting further *in vivo* studies and the isolation of bioactive compounds.

**Keywords:**

*Dillenia retusa* Thunb,  $\alpha$ -amylase inhibition,  $\alpha$ -glucosidase inhibition, glucose uptake, antidiabetic.