

In vitro evaluation of antidiabetic activity of *Evolvulus alsinoides* (L.) aqueous plant extract through yeast cell glucose uptake assay

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Introduction and Objectives: Diabetes mellitus is a globally prevalent metabolic disorder, demanding safe and cost-effective therapeutic strategies. Medicinal plants offer a promising avenue, particularly those traditionally used in holistic systems like Ayurveda. *Evolvulus alsinoides* (L.), a reputed herb in traditional medicine, is known for its neuroprotective and antioxidant properties. However, its antidiabetic potential, especially via aqueous extracts, remains scientifically underexplored. This study aims to investigate the in vitro antidiabetic activity of *E. alsinoides* (L.) using the yeast cell glucose uptake assay (GUA), a validated model for preliminary hypoglycemic screening.

Methods: Aqueous extract of *E. alsinoides* (L.) was prepared from aerial parts via maceration, and dilutions ranging from 2–1000 mg/mL were made. Commercial baker's yeast was repeatedly centrifuged ($3,000 \times g$, 5 min) in distilled water to obtain a clear 10% (v/v) suspension. Extract concentrations (1–5 mg/ mL) were incubated with glucose solutions (5, 10, and 25 mM) at 37 °C for 10 minutes, followed by the addition of yeast suspension. After 60 minutes of incubation at 37 °C, samples were centrifuged ($2,500 \times g$, 5 min), and the supernatant was analysed for residual glucose. Glucose concentration was determined using the glucose oxidase-peroxidase method, with absorbance measured at 540 nm. Metformin was used as a reference drug. All tests were done in triplicate, and the IC₅₀ values were calculated using *GraphPad Prism* software.

Results: The aqueous extract of *E. alsinoides* (L.) L. significantly enhanced glucose uptake by yeast cells in a dose-dependent manner across all tested glucose concentrations (5, 10, and 25 mM). Notably, the extract achieved maximum glucose uptake of 98.95% at 25 mM glucose concentration. The half-maximal inhibitory concentration (IC₅₀) values for the extract were determined to be 12.66 ± 0.05 mg/mL (5 mM glucose), 10.75 ± 0.03 mg/mL (10 mM glucose), and 6.78 ± 0.18 mg/mL (25 mM glucose), indicating superior efficacy compared to the standard antidiabetic drug metformin, which exhibited an IC₅₀ of 281.02 ± 15.19 mg/mL.

Conclusion: The aqueous extract of *E. alsinoides* significantly enhanced glucose uptake in yeast cells, showing dose-dependent activity with lower IC₅₀ values than metformin. The strongest effect was observed at 25 mM glucose, suggesting superior in vitro antidiabetic potential. These results highlight the extract's promise as a natural antidiabetic agent and support further pharmacological and clinical investigations to explore its therapeutic relevance in diabetes management.

Keywords: Antidiabetic, *Evolvulus alsinoides*, glucose cellular uptake assay

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