

# Antidiabetic activity of *Abroma augustum* (L.) L.f. and *Cajanus cajan* (L.) Millsp. extracts benchmarked through phytochemicals, enzyme inhibition and glucose uptake assays

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The rising global burden of diabetes mellitus and the limitations of conventional therapies necessitate the exploration of safer, effective plant-based alternatives. Although *Abroma augustum* (L.) L.f. and *Cajanus cajan* (L.) Millsp. are traditionally used in Nagaland for diabetes management, scientific validation regarding their specific enzyme inhibition mechanisms and safety profiles remains limited. This study systematically evaluated their antidiabetic potential through phytochemical profiling, antioxidant activity, enzyme kinetics, and glucose uptake assays. Quantitative analysis revealed that 80% ethanol extracts were richer in bioactive constituents, particularly phenols and flavonoids, compared to aqueous extracts. *Cajanus cajan* consistently demonstrated superior antioxidant activity and potent, competitive inhibition of carbohydrate-hydrolyzing enzymes ( $\alpha$ -amylase and  $\alpha$ -glucosidase) compared to *A. augustum*. Furthermore, *C. cajan* exhibited significantly higher glucose uptake (147.75%) in HepG2 cells. Cytotoxicity assessment in VERO cells indicated that while *C. cajan* ( $IC_{50}$  139.98  $\mu$ g/mL) was relatively safe, *A. augustum* ( $IC_{50}$  115.79  $\mu$ g/mL) possessed higher cytotoxicity. These findings scientifically validate the antidiabetic potential of *A. augustum* and *C. cajan*, supporting their traditional use and warranting further investigation for antidiabetic drug development.

**Keywords:** Alpha-glucosidase, Cytotoxicity, Ethnobotany, Enzyme kinetics, HepG2 cells, Oxidative stress