

POSTER PRESENTATIONS

ISOLATION, AMINO ACID COMPOSITION, AND HYPOGLYCEMIC ACTIVITY OF PROTEIN COMPONENTS FROM *Arundo donax* L.

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Diabetes mellitus is a prevalent metabolic disorder, and the search for safe natural hypoglycemic agents remains important; this study aimed to isolate and characterize the total protein fraction from the aerial parts of *Arundo donax* L., determine its amino acid composition, and evaluate its hypoglycemic activity and safety.

Total protein components were isolated from the aerial parts of *Arundo donax* L. by alkaline extraction followed by precipitation with ammonium sulfate, dialysis, and freeze-drying. Total protein content was determined by the Nessler method after mineralization using the Kjeldahl protein conversion factor. Amino acid composition was analyzed by high-performance liquid chromatography (HPLC) following acid hydrolysis. Structural characterization was performed using Fourier-transform infrared spectroscopy (FTIR) and SDS-PAGE electrophoresis. Hypoglycemic activity was evaluated in Wistar rats with glucose-induced hyperglycemia after intraperitoneal administration of the protein preparation at 50 and 100 mg/kg, using Glucare capsules as the reference; acute toxicity was assessed according to standard preclinical guidelines.

The aerial parts of *Arundo donax* contained 20.40% total protein. The developed isolation procedure yielded a stable lyophilized protein preparation with good water solubility. HPLC analysis demonstrated a complete profile of essential and non-essential amino acids with a total amino acid content of 826.56 mg/g. Arginine, leucine, cysteine, histidine, valine, glutamic acid, and aspartic acid were among the predominant amino acids. FTIR spectra confirmed the protein nature of the preparation through characteristic amide I and II absorption bands, whereas SDS-PAGE revealed two major protein fractions with molecular masses of approximately 16 and 30 kDa, indicating a relatively high degree of purification. In vivo studies demonstrated pronounced dose-dependent hypoglycemic activity. Following a single administration, blood glucose levels decreased by 30.4% at 50 mg/kg and 38.4% at 100 mg/kg, exceeding the effect of the reference preparation *Glucare* (27.5%). Repeated administration further enhanced the pharmacological response, reaching 41.9% reduction in blood glucose by day 7. Acute toxicity studies revealed no mortality or clinical signs of intoxication, and the LD₅₀ exceeded 5000 mg/kg, indicating very low toxicity of the protein preparation. The developed isolation technology provides a stable protein preparation from *Arundo donax* L. with a well-characterized amino acid composition, confirmed protein structure, and favorable molecular profile. The preparation demonstrated significant hypoglycemic activity superior to the reference drug under experimental conditions while exhibiting a high safety profile. These findings indicate that protein components of *Arundo donax* represent a promising natural source for the development of novel protein-based hypoglycemic pharmaceuticals and justify further preclinical and mechanistic investigations.