

Abstract 34 – Paper ID: 051**Traditional Knowledge-Based Evaluation of *Tupistra nutans* for Its Therapeutic Potential and Phytochemical Resources**

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Abstract

Tupistra nutans, locally known as Nakima in the Sikkim Himalaya region, is an economically and medicinally important plant of the Eastern Himalayas. It is traditionally used to manage blood sugar and has antioxidant properties. Diabetes Mellitus (DM) is a global health concern, and inhibiting carbohydrate-hydrolyzing enzymes, α -amylase and α -glucosidase, is a key therapeutic strategy for managing postprandial hyperglycemia. This study aimed to scientifically validate the antidiabetic and antioxidant potential of a crude extract of *Tupistra nutans* and to profile its bioactive constituents using LC-MS. The extract was prepared using a suitable hydroalcoholic solvent (ethanol:water 1:1) and subsequently evaluated in vitro for enzyme inhibitory effects on α -amylase and α -glucosidase. The inhibitory concentration (IC₅₀) values were determined and compared with those of the standard antidiabetic drug, acarbose. Furthermore, the antioxidant capacity was evaluated using DPPH, and *Tupistra nutans* extract exhibited significant ($p < 0.05$), dose-dependent inhibitory activity against both α -amylase and α -glucosidase, which is crucial for mitigating oxidative stress associated with diabetes complications. LC-MS analysis was performed to identify the phytochemical compounds responsible for these bioactivities. The chromatographic profile revealed the presence of several key secondary metabolites, confirming the extract's rich phytochemical profile and correlating specific compounds with the observed enzyme inhibition and antioxidant effects. In conclusion, the findings support the traditional use of *Tupistra nutans* as a natural antidiabetic agent, primarily through dual inhibition of α -amylase and α -glucosidase, coupled with its powerful antioxidant capacity. The LC-MS profile provides a foundation for isolating and characterizing the most potent bioactive compounds for future development as natural therapeutic agents for diabetes management.

Keywords: *Tupistra nutans*, Diabetes Mellitus, Postprandial hyperglycemia, α -amylase, α -glucosidase, LC-MS