

α -Amylase Inhibitory Activity of Fractions Separated from The Seed Extract of *Syzygium cumini* (L.) Skeels

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Diabetes mellitus (DM) ranks a world-wide metabolic disorder in which chronic hyperglycemia arises due to insulin dysfunction. *Syzygium cumini*, a plant with medicinal properties and a tradition of being used for diabetes in Sri Lanka, was then confirmed to have antidiabetic potential. This study aims to isolate, and separate bioactive compounds from the seed ethanolic extract of *Syzygium cumini* (L.) Skeels and to evaluate their potential α -amylase inhibitory activity. Seeds of *Syzygium cumini* Skeels were extracted to ethanol by sonication at 40 °C for 2 hours. Then the extract was subjected to chromatographic separation using silica gel (230-400 mesh) as the stationary phase. Gradient elution was carried out using 30 ml of hexane:ethylacetate solvent system in ratios of (9:1), (8:2), (7:3), (6:4), (5:5), (4:6), (3:7), (2:8), and (1:9). Each fraction was analyzed by thin layer chromatography (TLC) and fractions with similar TLC profiles were combined. Spot visualization of TLC was done under a 365 nm UV lamp, and according to the TLC results, six individual spots were identified. Six isolated fractions were further purified using the preparative TLC method.

The bioactivities of isolates were assessed through *in-vitro* α -amylase bioassay, each at a concentration of 1 mg/ml. Six isolates showed significant α -amylase inhibitory activity, out of which two have shown inhibition percentage (88.45% and 87.54%) comparable to that of a standard drug acarbose (91.83%). These findings suggest that these bioactive constituents may be responsible for the antidiabetic potential of *S. cumini* and thus should receive further investigation for any potential therapeutic use. This research highlights the significance of medicinal plants as a source of natural enzyme inhibitors, thereby providing a foundation for the development of plant-based antidiabetic agents. Further studies should focus on further purification, on structural elucidation, mechanism of action studies, and *in-vivo* validation of these bioactive compounds to facilitate their potential pharmaceutical application.

Keywords:

Diabetes mellitus, *Syzygium cumini*, column chromatography, *in-vitro* α -amylase bioassay