Pharmacological assessments of different fractions of *Paspalidium flavidum* via *in vitro*, *in vivo,* and in-silico studies.

Abstract

Retrieving bioactive compounds from plants to treat diseases and evaluation of therapeutic potential of the plant have always been a classic research method. *Paspalidium flavidum*, a member of the Poaceae family, is traditionally used in various parts of Asia for the treatment of multiple diseases. Although previous studies have reported several pharmacological activities of its crude extracts, a comprehensive investigation of its bioactive constituents from different fractions and mechanism-based pharmacological potential remains limited. Therefore, This study aims to explore the pharmacological potential of different solvent fractions of *Paspalidium flavidum* using an integrated approach combining in-vitro, in-vivo, and in-silico methods. The crude methanolic extract will be fractionated into hexane, chloroform, ethyl acetate, and aqueous fractions using the Kupchan partitioning method. These fractions will be evaluated for antioxidant activity (DPPH, total antioxidant capacity, and FRAP assays), cytotoxicity using the brine shrimp lethality test, and glucose uptake potential. Based on in-vitro results, the most active fractions will be selected for in-vivo evaluation of analgesic, anti-inflammatory, and glucose uptake activities using Swiss albino mice models, including hot plate, tail immersion, tail flick, acetic acid-induced writhing, carrageenan-induced paw edema. Statistical analysis will be carried out using appropriate methods, with results expressed as mean ± SEM, and significance determined using ANOVA at $p < 0.05$. A GC-MS analysis will be done to identify the compounds in different fractions. Subsequently, an in-silico study will help to identify the molecular mechanism and the most active compound behind the promising pharmacological activity of the plant which involves molecular docking, and ADME analysis of the bioactive compounds to find their drug-likeliness. The outcome of this study may help establish scientific evidence for the medicinal use of *P. flavidum* and identify new lead compounds, and possible molecular mechanism behind pharmacological activity for further research.