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Original Research Article

Computational assessment of antidiabetic potential of bioactive constituents of Euphorbia.

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INTRODUCTION

Type 2 Diabetes Mellitus (T2DM) is a common metabolic disease triggered by tissue resistance to insulin and improper insulin secretion. Currently recognized as the eighth most common cause of disability and death, diabetes is a serious globally health concern. Diabetes afflicted 830 million people in 2022, a substantial increase from the 200 million cases recorded in 1990. The prevalence of diabetes was 6.1% internationally in 2021, rising 90.5% from 3.2% in 1990. It is predicted to reach 9.8% by 2050, affecting 13.1 billion people [4-6]. With a male-to-female ratio of 1.14 in 2021, the incidence of diabetes was higher in men than in women worldwide, while regional variation was reported. [7] Researchers have looked into both pharmaceutical and non-pharmacological strategies to treat diabetes, but no drug has been proven to be absolutely safe. [8-10]

Abstract: About 2.8% of individuals worldwide struggle with diabetes mellitus (DM), a serious metabolic syndrome that is projected to rise to 4.4% by 2030. Biguanides, thiazolidinediones, α -glucosidase inhibitors, sulfonylureas, and non-sulfonylureas secretagogues belong to the class of medicines on the market that improve insulin sensitivity, secretion, complementing insulin, and boosting glucose uptake. The drugs that are now in use have been reported to have a number of unwanted effects, including hypothyroidism, weight gain, tachycardia, and hepatic failure. Medicinal plants have been used to treat a number of disorders, including diabetes mellitus. In comparison to synthetic medicines, herbal medications are safer, easier to obtain, have less adverse effects, and are more affordable. Euphorbia is a significant dicotyledon medicinal plant. Its phytoconstituents, which include flavanoids, terpenoids, and tannins, are used to treat a variety of conditions, including skin disorders, asthma, rhinitis, viral infections, and spasms. Although this plant has been shown to have in vivo hypoglycemic effects, the exact mechanism of action of its phytoconstituents is yet unknown and needs further research. For this reason, 25 known phytoconstituents of this plant were used in docking studies on the 3D structures of two proteins involved in type-2 diabetes, namely α -amylase and Peroxisome Proliferator-Activated Receptor gamma. The finding of the research is based on docking energies and the availability of significant amino acid interactions that offer insight into potential phytoconstituent mechanisms.

Keywords: Diabetes mellitus, Euphorbiaceae, flavanoids, tannins, docking.

Among non-pharmacological methods, regular exercise is often recommended to boost insulin sensitivity. [11-12] The main groups of medicines utilized in pharmacological approaches to treat diabetes include sulfonylureas, which increase the release of insulin from pancreatic islets; biguanides, which slow the production of glucose in the liver; peroxisome proliferator-activated receptor- γ (PPAR γ) agonists, which enhance the action of insulin; and α -glucosidase inhibitors, which delay the intestinal absorption of glucose. [13-15]. These categories of drugs possess problems such as weight gain, severe hypoglycemia, metabolic side effects, and other complications with target selectivity, permeability, and solubility. [16-17]. However, they can be taken alone or in combination with other hypoglycemic medications. Conventional therapies