



Original Research Article

In silico investigation of phytoconstituents from *Euphorbia prostrata* for antidiabetic activity

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Name of Author:

Mahvish Jamal¹, Mhaveer Singh²

Affiliation: ¹School of Pharmaceutical Sciences, IFTM University, Moradabad-244102

²School of Pharmaceutical Sciences, IFTM University, Moradabad-244102

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INTRODUCTION

Tissue resistance to insulin and inappropriate insulin secretion are the main causes of type 2 diabetes mellitus (T2DM), a common metabolic illness. Diabetes is currently acknowledged as the eighth most common cause of death and disability, making it a major worldwide health concern. In 2022, 830 million individuals had diabetes, a significant rise from the 200 million cases reported in 1990. In 2021, the global prevalence of diabetes was 6.1%, up 90.5% from 3.2% in 1990. By 2050, it is expected to increase to 9.8%, impacting 13.1 billion people [4-6]. The incidence of diabetes was higher in males than in women globally in 2021, with a male-to-female ratio of 1.14, however regional variation was noted. [7] Although both pharmaceutical and non-pharmacological approaches to treating diabetes have been investigated, no medication has been shown to be completely safe. [8-10] Regular exercise is frequently advised as a non-pharmacological strategy to increase insulin sensitivity. [11-12] Sulfonylureas, which increase the release of insulin

Abstract: Globally, 2.8% of people suffer with diabetes mellitus (DM), a dangerous metabolic condition that is expected to increase to 4.4% by 2030. Biguanides, thiazolidinediones, α -glucosidase inhibitors, sulfonylureas, and non-sulfonylureas secretagogues are among the medications available that enhance insulin sensitivity, secretion, supplementing insulin, and increasing glucose absorption. Numerous adverse effects, including as hypothyroidism, weight gain, tachycardia, and hepatic failure, have been linked to the medications now in use. Diabetes mellitus is one of the many conditions that medicinal plants have been tried to cure. Herbal remedies are less harmful, more accessible, less expensive, and safer than synthetic ones. One important dicotyledon medicinal plant is *Euphorbia*. Numerous ailments, such as skin problems, asthma, rhinitis, viral infections, and spasms, are treated using its phytoconstituents, which include flavanoids, terpenoids, and tannins. Even though this plant has been demonstrated to have hypoglycemic effects in vivo, more research is necessary to determine the precise mechanism of action of its phytoconstituents. The 3D structures of two proteins involved in α -type-2 diabetes namely protein-tyrosine phosphatase 1B and α -Glucosidase were docked using 25 known phytoconstituents of this plant. The research's conclusion is based on docking energies and the presence of important amino acid interactions that provide information about possible phytoconstituent processes.

Keywords: Docking, Diabetes mellitus, Euphorbiaceae, Flavanoids, Tannins.

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 intestinal absorption of glucose, are the main classes of medications used in pharmacological approaches to treat diabetes. [13-15] Weight gain, severe hypoglycemia, metabolic side effects, and other issues with target selectivity, permeability, and solubility are among the issues associated with these drug categories. [16-17] They can, however, be taken either by themselves or in conjunction with other hypoglycemic drugs. Conventional treatments may cause dependence, side effects, and long-term harm. [18-20] Examining alternate treatments, such natural medicines, could help reduce these risks. Antioxidants are crucial for scavenging harmful free radicals and reducing oxidative stress. [21] Many research have connected oxidative stress to diabetes-related issues. [22-23] Elevated blood sugar levels increase the production of reactive oxygen and