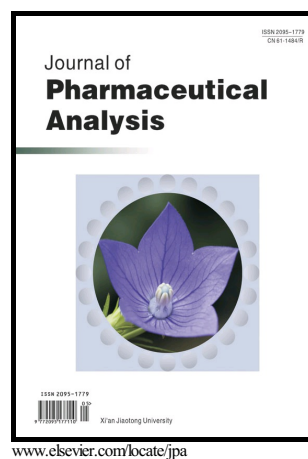


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Prabhu Srinivasan, Vijayakumar Subramaniyan, Swaminathan Kothandaraman, Manogar Palani



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**Anti-diabetic activity of quercetin extracted from *Phyllanthus emblica* L.
fruit: *In silico* and *in vivo* approaches**

**Prabhu Srinivasan^a, Vijayakumar Subramaniyan^{a*}, Swaminathan
Kothandaraman^b, Manogar Palani^a**

^aComputational Phytochemistry Lab PG and Research Department of Botany and Microbiology, A. V. V. M Sri Pushpam College (Autonomous), Poondi, Tamil Nadu, India.

^bDepartment of Physics, RKM Vivekananda College (Autonomous), Mylapore, Chennai-04. svijaya_kumar2579@rediffmail.com

Abstract

In this study, molecular interactions of the ligands, quercetin, gallic acid, and metformin, with various diabetes mellitus-related protein targets, such as glycogen phosphorylase and peroxisome proliferator-activated receptor gamma, were assessed. It was revealed that quercetin possesses good binding affinity to both targets. Quercetin is a major constituent of methanolic extracts of *Phyllanthus emblica* fruit. In the current study, we examined the antihyperglycemic effect of quercetin in streptozotocin (STZ)-induced diabetic rats. The isolated quercetin administered at a dose of 75 mg/kg body weight produced a maximum decrease of 14.78% in blood glucose levels in the diabetic rats after 7 days of treatment. Furthermore, quercetin doses of 50 and 75 mg/kg were shown to significantly improve the profiles of triglycerides, high-density lipoprotein, very-low-density lipoprotein, low-density lipoprotein, and total cholesterol at the end of the study in STZ-induced diabetic rats. The administration of quercetin (25, 50, and 75 mg/kg body weight) daily for 28 days in STZ-induced diabetic rats resulted in a significant decrease in blood glucose and urine sugar levels, with a considerable rise in plasma insulin and hemoglobin levels. Therefore, quercetin is a potential drug with antidiabetic and antihyperglycemic action mediated by changes in the levels of glucose, cholesterol, and triglycerides as indicated by *in silico* and *in vivo* studies.

Keywords: Anti-diabetic, Bioactive molecules, Glycogen phosphorylase, Molecular docking, Quercetin, Albino Wister male rats

1. Introduction

Diabetes mellitus (DM) is a metabolic disorder characterized by hyperglycemia resulting from defects in insulin action, insulin secretion from pancreatic beta cells, or a combination of both [1]. In addition, DM is a group of diseases characterized by chronic

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