

The Potential of *Momordica charantia* L. Herbal Medicine as an Antidiabetic Agent Through Inhibition of DPP-IV Enzyme in Mice (*Mus musculus*) Galur BALB/c Induced by Alloxan as an Animal Model for Type II Diabetes Mellitus

By: Dzakiyah Ayu Rafifah and Ananda Zetty Zara Mujiono

Type 2 Diabetes Mellitus (T2DM) is caused by insulin dysfunction. One of the symptoms of T2DM is the decrease in insulin levels in the blood due to increased activity of the DPP-IV enzyme. Although this enzyme plays a vital role in glucose absorption by cells, it is required in small amounts. This enzyme has been widely studied in relation to diabetes mellitus, particularly regarding its catalytic function. However, there is limited research on its non-catalytic function related to the inflammatory mechanisms in diabetes mellitus. One of the traditional remedies for lowering blood sugar levels in diabetic patients is the consumption of bitter melon (*Momordica charantia*), which contains active antidiabetic compounds. This study aims to examine the effect of bitter melon on both the catalytic and non-catalytic activity of the DPP-IV enzyme in Type 2 diabetes mellitus. The research methods used include both in vivo and in silico approaches. The in vivo study was conducted on mice, which were divided into four groups: acarbose 13 mg/kg body weight (BW), aquades, 100 mg/kg BW bitter melon extract, and 500 mg/kg BW bitter melon extract. All mice received a single dose of alloxan induction and were treated for 14 days. The results showed that the consumption of 100 mg/kg BW bitter melon extract resulted in the most optimal reduction in blood glucose levels, with a blood glucose level of 71 mg/dL on day 14. The most significant reduction in DPP-IV activity was observed in the 100 mg/kg BW bitter melon extract group, with a T-DPP-IV cell population of 1.94%. In the in silico method, compounds were obtained from GC-MS testing, which produced 11 chromatogram peaks. After docking analysis, the lowest binding affinity and amino acid residues most similar to acarbose were found to be Methyl-9,12-octadecadienoic acid.

Keywords: Diabetes Mellitus, DPP-IV Enzyme, In silico, In vivo, Bitter Melon.