

ABSTRAK

Dipeptidil Peptidase IV (DPP-IV) merupakan serine aminopeptidase yang menjadi salah satu target terapi diabetes melitus tipe 2 (DMT2) karena berperan dalam sekresi hormon inkretin dan homeostasis glukosa. Penghambatan pada DPP-IV dapat memperlambat degradasi hormon inkretin, sehingga memberikan efek antidiabetik pada penderita diabetes. Obat golongan inhibitor DPP-IV dalam bentuk komersial menyebabkan harga obat yang tinggi. Salah satu solusi yang dapat ditempuh adalah pengembangan senyawa alam yang berpotensi sebagai inhibitor DPP-IV. Beberapa senyawa alam, dengan salah satunya adalah resveratrol, telah dilaporkan memiliki aktivitas penghambatan pada DPP-IV yang dilihat dari nilai IC_{50} . Penelitian ini bertujuan untuk mengetahui kemampuan resveratrol dalam menstabilkan struktur enzim DPP-IV, sehingga berpeluang menjadi salah satu ligan referensi dalam pengembangan obat DMT2 berbahan alam. Kemampuan penghambatan resveratrol terhadap DPP-IV akan diamati secara *in silico* melalui simulasi dinamika molekul menggunakan YASARA-Structure. Jenis penelitian ini termasuk dalam jenis penelitian teoretis deskriptif eksploratif dimana parameter kestabilan DPP-IV dilihat dari nilai *Root Mean Square Deviation* (RMSD) atom-atom *backbone* (Bb) DPP-IV $\leq 2\text{\AA}$. Hasil dari penelitian ini menunjukkan bahwa resveratrol memiliki aktivitas inhibisi terhadap enzim DPP-IV melalui penstabilan struktur enzim dengan nilai ΔRMSD Bb enzim DPP-IV sebesar $1,159\text{\AA}$.

Kata kunci: Diabetes melitus tipe 2 (DMT2), Dipeptidil peptidase IV (DPP-IV), Resveratrol, Dinamika molekul

ABSTRACT

Dipeptidyl Peptidase IV (DPP-IV) is a serine aminopeptidase which is one of the therapeutic targets for type 2 diabetes mellitus (DMT2) because it plays a role in incretin hormone secretion and glucose homeostasis. Inhibition of DPP-IV can slow down the degradation of incretin hormones, thus providing an antidiabetic effect in diabetics. DPP-IV inhibitor class drugs in commercial form cause high drug prices. One solution that can be taken is the development of natural compounds that have the potential as DPP-IV inhibitors. Several natural compounds, one of which is resveratrol, have been reported to have inhibitory activity on DPP-IV as seen from the IC50 value. This study aims to determine the ability of resveratrol in stabilizing the structure of the DPP-IV enzyme, so that it has the opportunity to become one of the reference ligands in the development of natural-based DMT2 drugs. The inhibitory ability of resveratrol against DPP-IV will be observed in silico through molecular dynamics simulation using YASARA-Structure. This type of research is included in the type of exploratory descriptive theoretical research where the stability parameter of DPP-IV is seen from the value of Root Mean Square Deviation (RMSD) of backbone atoms (Bb) of DPP-IV $\leq 2\text{\AA}$. The results of this study indicate that resveratrol has inhibitory activity against the DPP-IV enzyme through stabilizing the enzyme structure with a $\Delta\text{RMSD Bb}$ value of 1.159\AA .

Keywords: *Diabetes mellitus type 2 (DMT2), Dipeptidyl peptidase IV (DPP-IV), Resveratrol, Molecular dynamics*