

ABSTRACT

INHIBITION ACTIVITIES OF BAY, PANDAN, AND CITRUS LEAVES AND THEIR COMBINATION AGAINST α -GLUCOSIDASE AND α -AMYLASE ENZYMES

By

Devi Sabarina

Diabetes mellitus is one of the common degenerative diseases continuing to increase in number of incidence. Refined carbohydrates have significant role in the disease development due to their ability to increase blood sugar. Therefore, limiting of sugar absorption through inhibition of carbohydrate digestion enzymes, such as α -glucosidase and α -amylase, will be effective strategy to modulate blood sugar level of diabetic patients. The study aimed to evaluate the inhibition effects of bay (*Eugenia polyantha*), pandan (*Pandanus amaryllifolius* Roxb.), citrus (*Citrus hystrix* D.C.) leaves and their combinations against α -glucosidase and α -amylase enzymes, and to find out the best combination between the leaves that have high abilities to inhibit the both enzymes. Moreover, due to the leaves are rich in polyphenol, the role of polyphenol compounds in enzyme inhibition was also elucidated. Three single leaves extracts and five of their combinations were applied to inhibit α -glucosidase hydrolising

p-nitrophenyl- *D*-glucopyranoside or α -amylase hydrolysing starch solution. All of the leaves and their combination had inhibition activities against α -glucosidase and α -amylase enzymes with levels of inhibition were between 20.14% to 35.30% for α -glucosidase and 17.63% to 26.04% for α -amylase. The role of polyphenol compounds on inhibition of the carbohydrate digestion enzymes was not observed.

Keywords: *bay leaf, pandan leaf, citrus leaf, anti-diabetic, starch hydrolysis, phenolic compound.*

ABSTRAK

AKTIVITAS PENGHAMBATAN ENZIM -GLUKOSIDASE DAN -AMILASE DARI EKSTRAK DAUN SALAM, DAUN PANDAN, DAUN JERUK PURUT DAN KOMBINASINYA

Oleh

Devi Sabarina

Diabetes mellitus adalah salah satu penyakit degeneratif yang umum terjadi dan terus meningkat. Olahan karbohidrat memiliki peran yang signifikan dalam perkembangan penyakit diabetes mellitus karena kemampuannya meningkatkan kadar gula darah. Oleh karena itu, menghambat penyerapan glukosa melalui penghambatan enzim pencernaan karbohidrat seperti -glukosidase dan -amilase akan menjadi strategi yang efektif dalam memodulasi kadar gula darah penderita diabetes. Penelitian ini bertujuan untuk mengetahui peran dari daun salam, daun pandan, daun jeruk dan kombinasinya dalam menghambat aktivitas enzim -glukosidase dan -amilase, dan mendapatkan kombinasi terbaik daun yang memiliki kemampuan tinggi dalam menghambat kedua enzim tersebut. Selain itu, daun kaya akan senyawa fenolik, peran dari senyawa fenolik dalam menghambat aktivitas enzim juga dipelajari. Ekstrak tiga daun tunggal dan lima kombinasi

digunakan untuk menghambat aktivitas enzim α -glukosidase dalam menghidrolisis *p-nitrophenyl- α -D-glukopyranosyde* atau α -amilase dalam menghidrolisis pati. Semua daun dan kombinasinya memiliki penghambatan terhadap aktivitas enzim α -glukosidase dan α -amilase dengan tingkat penghambatan berkisar 20,14%-35,30% pada enzim α -glukosidase dan 17,63%-26,04% pada enzim α -amilase. Peran senyawa fenolik dalam menghambat aktivitas enzim pencernaan karbohidrat tidak terlihat.

Kata kunci : *daun salam, daun pandan, daun jeruk, antidiabetes, hidrolisis pati, senyawa fenolik.*