

ABSTRAK

Kristianti, Hervinda Dita. 2015. *Efek Pemberian Sistem Hantaran Responsif Gula Darah Mikrogel Close Loop Ekstrak Binahong terhadap HOMA-IR Tikus Diabetes Mellitus Tipe 2*. Tugas Akhir, Program Studi Farmasi Fakultas Kedokteran Universitas Brawijaya. Pembimbing: (1) Dra. Diana Lyrawati, Apt. M.S., Ph.D. (2) Adeltrudis Adelsa D., S.Farm., M.Farm.Klin., Apt.

Terapi insulin dan antidiabetik oral pada diabetes mellitus saat ini tidak ada yang memiliki mekanisme umpan balik bila terjadi hipoglikemi (*open loop*). Pengobatan diabetes yang efektif mampu mengatur laju pelepasan obat sesuai dengan perubahan kadar gula tubuh (*close loop*). Penelitian ini bertujuan untuk mengetahui efek sistem hantaran responsif gula darah mikrogel *close loop* mengandung ekstrak binahong terhadap kadar gula darah dan serum insulin tikus jantan strain Wistar model diabetes mellitus tipe 2. Studi eksperimental menggunakan *post-test control group design* dan pemilihan sampel dilakukan secara acak. Tikus dibagi menjadi kelompok kontrol normal, kontrol DM tipe 2, dan kelompok perlakuan. Terapi diberikan pada tikus kelompok perlakuan berupa ekstrak binahong dosis 70 mg/kgbb (PA), mikrogel *close loop* tanpa ekstrak atau plasebo (PB), dan mikrogel *close loop* ekstrak binahong (PC). Dosis mikrogel disamakan dengan dosis ekstrak binahong. Profil glukosa darah selama 12 jam diamati pada hari ke 1, 7, dan 14 terapi. Kadar serum insulin tikus diukur saat setelah terapi menggunakan metode ELISA *for rat insulin*. Profil glukosa darah semua kelompok perlakuan (ekstrak binahong dan mikrogel *close loop*) mencapai kadar normal pada hari ke 14 terapi. Mikrogel *close loop* ekstrak binahong dapat menurunkan kadar serum insulin dan HOMA-IR lebih efektif dibanding ekstrak binahong dan plasebo, namun secara statistik tidak berbeda bermakna (insulin $p=0,136$ dan HOMA-IR $p=0,298$). Kesimpulan dari penelitian ini baik ekstrak binahong maupun mikrogel *close loop* binahong mampu menurunkan resistensi insulin dibanding kelompok kontrol.

Kata kunci: diabetes mellitus tipe 2, ekstrak binahong, mikrogel *close loop*, profil gula darah, kadar serum insulin

ABSTRACT

Kristianti, Hervinda Dita. 2015. *The Effect of Blood Sugar Responsive Delivery System of Microgel Close Loop Binahong Extract on HOMA-IR in Type 2 Diabetes Mellitus Rats*. Final Assignment, Pharmacy Program, Faculty of Medicine, Brawijaya University. Supervisors: (1) Dra. Diana Lyrawati, Apt. M.S., Ph.D. (2) Adeltrudis Adelsa D., S.Farm., M.Farm.Klin., Apt.

Insulin and oral antidiabetic therapy in diabetes mellitus currently has not a feedback mechanism in case of hypoglycemia (*open loop*). Effective diabetes treatment capable of regulating the rate of drug release in accordance with the change of body sugar levels (*close loop*). This study aims to determine the effect of blood sugar responsive delivery system microgel *close loop* containing binahong extract on blood sugar and insulin serum levels in male Wistar rat model of type 2 diabetes mellitus. Experimental studies using post-test control group design and sample selection is done randomly. Rats were divided into normal control group, type 2 diabetes control, and treatment group. Therapy was given to the treatment group in the form of binahong extract dose of 70 mg/kgBW/day (PA), microgel *close loop* without extract or placebo (PB), and microgel *close loop* binahong extract (PC). The dose of microgel comparable with the dose of binahong extract. Blood glucose profiles were observed for 12 hours on days 1, 7, and 14 of treatments. Insulin serum levels were measured after treatment using the ELISA method for rat insulin. Blood glucose profiles all treatment groups (extract binahong and micro gel close loop) reached normal levels on day 14 of therapy. Microgels *close loop* binahong extract reduced levels of insulin serum and HOMA-IR was more effective than binahong extract and placebo, but not statistically significant (insulin $p= 0.136$ and HOMA-IR $p= 0.298$). The conclusion from this study is either binahong extracts or mikrogel close loop binahong able to lower insulin resistance compared to control group.

Keywords: diabetes mellitus type 2, binahong extract, microgel close loop, blood glucose profile, insulin serum level