ABSTRACT

Type 2 diabetes mellitus is characterized by high level of fasting blood glucose, fasting insulin and HOMA-IR values due insufficient insulin function and insulin resistance which associated by UCP2 gene. Rosella (*Hibiscus sabdariffa* Linn) can be used as a complementary drug to prevent T2DM complications. This study aimed to identify the effects of consuming Rosella capsule on fasting blood glucose, fasting insulin and HOMA-IR in T2DM patients with UCP2 polymorphism.

The study was a randomized clinical trial with intervention (placebo and Rosella) for 8 weeks. The sample consisted of 53 T2DM outpatients at the Health Office Yogyakarta City. Fasting blood glucose was measured through *Glucose oxidase-para amino phenazone* method, fasting insulin was measured by *Microparticle Immunoassay Enzyme*, HOMA-IR was calculated with HOMA Calculator 2.2.3 Version and polymorphism of UCP2 was measured by RFLP-PCR. Analysis of the influence of Rosella on fasting blood glucose, fasting insulin and HOMA-IR level in one group were tested with the Wilcoxon Signed Test and the effect between groups were tested through Mann Whitney U Test. Analysis of the influence of Rosella and polymorphism of the UCP2 gene interaction were tested using ANCOVA with a significance level of 95%.

The decreasing of fasting blood glucose on post-intervention in the Rosella group (-29,2±38,4 mg/dL) was lower than the control group (p=0,845), the highest of decreasing in fasting blood glucose levels was in the GA genotype in Rosella group. The increasing of insulin on post-intervention in the Rosella group (3,9± 0,4 μIU/mL) was greater than the control group (p=0,400), the highest increasing of fasting insulin was in the AA genotype in the Rosella group. The decreasing of HOMA-IR values on post-intervention in the Rosella group (-0,67±0,6) was greater than the control group (p=0,080), the highest decreasing of HOMA-IR values was in the genotype of GG in theRosella group.

Keywords: glucose, *Hibiscus sabdariffa* Linn, HOMA-IR, insulin, Rosella, type 2 diabetes, uncoupling protein 2

INTISARI

Diabetes Melitus Tipe 2 ditandai tingginya kadar glukosa darah puasa, insulin puasa dan nilai HOMA-IR akibat insufisiensi fungsi insulin dan resistensi insulin dikaitkan dengan gen *UCP2*. Rosella (*Hibiscus sabdariffa* Linn) dapat digunakan sebagai obat herbal komplementer DMT2 untuk pencegahan komplikasi. Penelitian ini melihat pengaruh pemberian Rosella terhadap kadar glukosa darah dan kadar insulin puasa serta nilai HOMA-IR pasien DMT2 dengan variasi genetik UCP2.

Desain penelitian menggunakan *randomized clinical trial* dengan 53 pasien DMT2 rawat jalan di 5 puskesmas Dinkes Kota DIY yang memenuhi kriteria inklusi dan eksklusi. Pemberian kapsul Rosella selama 8 minggu. Kadar glukosa darah puasa diukur menggunakan metode *Glucose Oxidase-Para Amino Phenazone*, kadar insulin puasa diukur dengan *Microparticle Immunoassay Enzyme*, nilai HOMA-IR ditetapkan dari kadar glukosa darah dan kadar insulin plasma, variasi genetik UCP2 diukur dengan *RFLP-PCR*. Analisis pengaruh Rosella terhadap kadar glukosa darah puasa, kadar insulin puasa dan nilai HOMA-IR pasien DMT2 dalam 1 kelompok menggunakan *Wilcoxon's Signed Rank Test* dan pengaruh antar kelompok menggunakan *Mann Whitney U-Test* serta analisis pengaruh Rosella dan variasi gen UCP2 menggunakan ANCOVA, dengan taraf signifikansi 95%.

Penurunan kadar glukosa darah puasa post intervensi pada kelompok Rosella (-29,2±38,4 mg/dL) lebih rendah dibandingkan kelompok kontrol (p=0,845), tertinggi pada pada genotip GA pada masing-masing kelompok. Peningkatan kadar insulin plasma post intervensi pada kelompok Rosella (3,9± 0,4 μIU/mL) lebih besar dibandingkan kelompok kontrol (p=0,400), tertinggi pada genotip AA pada kelompok Rosella. Penurunan nilai HOMA-IR post-intervensi pada kelompok Rosella (-0,67±0,6) lebih besar dibanding kelompok kontrol (p=0,080), tertinggi pada genotif GG pada kelompok Rosella.

Kata kunci: diabetes tipe 2, glukosa, *Hibiscus sabdariffa* Linn, HOMA-IR, insulin, Rosella, uncoupling protein 2