

ABSTRACT

EFFECT OF CENTELLA ASIATICA (L.) URBAN EXTRACT ON THE EXPRESSION OF HEME OXYGENASE-1 GENE IN TYPE II DIABETES IN KIDNEY OF WISTAR RAT MODEL

Background. Uncontrolled diabetes mellitus or hyperglycemia may lead to diabetic nephropathy, which is a leading cause of end-stage renal disease. HMOX-1 is a heme-degrading enzyme which is used as the cell as the early defense against cellular stress and its expression is increased by 15-fold in states of hyperglycemia. *Centella asiatica* is a herb which has a long history as traditional remedy for various disease and its extract has also been studied extensively to observe its effects on kidney. However, studies about its effect towards HMOX-1 mRNA expression is limited.

Purpose. The aim of this study is too investigate the effect of extract of *Centella asiatica* (L.) urban to prevent the decrease of kidney HMOX-1 mRNA expression in Wistar rat with type II diabetes.

Methods. This research is conducted using 19 cDNA samples of kidney of Wistar rats which were obtained from the previous study. The group were divided into 6 groups, including non-diabetic group, untreated diabetic group as negative control, positive control group (diabetic nephropathy treated with captopril 50 mg/kgBW/day), and 3 treatment groups (diabetic nephropathy treated with *Centella asiatica* (L.) Urban extract 250, 500, 1.000 mg/kgBW/day, respectively). The level of kidney HMOX-1 mRNA expression was investigated using Reverse Transcription PCR and Electrophoresis.

Results. There is no significant difference in data between all groups, although there is still some trend. Lowest level of kidney HMOX-1 mRNA expression was seen in treatment group with *Centella asiatica* (L.) Urban extract dose of 500 mg/kgBW/day, and the highest level of kidney HMOX-1 mRNA expression was seen on treatment with Captopril.

Conclusion. *Centella asiatica* (L.) Urban extract administration may prevent the decrease of kidney HMOX-1 mRNA expression in Wistar rat with type II diabetes at the dose of 250 and 1.000 mg/kgBWday.

Keywords Diabetic nephropathy, HMOX-1, Type 2 Diabetes, *Centella asiatica*, Wistar rat.

INTISARI

EFEK EKSTRAK *Centella asiatica* (L.) TERHADAP EKSPRESI HEME OXYGENASE-1 MRNA PADA GINJAL MODEL DIABETES TIPE II TIKUS WISTAR

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Latar belakang: Diabetes mellitus yang tidak terkontrol atau hiperglikemia dapat menyebabkan diabetes nefropati. Heme oxygenase-1 (HMOX-1) adalah enzim yang digunakan oleh sel sebagai pertahanan awal terhadap stress selular dan meningkat sebanyak 15-kali pada keadaan hiperglikemia. *Centella asiatica* adalah herba yang dapat digunakan sebagai obat untuk memperbaiki kondisi diabetes nefropati. Namun, studi mengenai efek *Centella asiatica* terhadap ekspresi HMOX-1 mRNA masih terbatas.

Tujuan: Studi ini bertujuan untuk menyelidiki efek ekstrak *Centella asiatica* (L.) dalam mencegah penurunan ekspresi HMOX-1 mRNA pada ginjal model diabetes tipe II tikus Wistar

Metode: Studi ini menggunakan sampel mRNA dari ginjal Tikus Wistar dengan diabetes tipe II karena induksi Streptozotosin dan mendapatkan perlakuan berbeda dari penelitian sebelumnya. Terdapat enam grup yaitu grup non-diabetik, grup diabetes tanpa terapi, grup diabetes dengan terapi Captopril 50 mg/kgBB/hari, dan tiga kelompok terapi *Centella asiatica* (dosis 250, 500, 1.000 mg/kgBB/hari). Ekspresi HMOX-1 diukur dari hasil *Reverse Transcriptase-PCR* menggunakan perangkat lunak ImageJ.

Hasil: Tidak ditemukan perbedaan ekspresi mRNA HMOX-1 yang signifikan di antara semua kelompok ($p = 0,280$) walaupun masih ditemukan kecenderungan antar kelompok. Ekspresi mRNA HMOX-1 terendah ditemukan pada kelompok diabetes dengan terapi *Centella asiatica* dosis 500 mg/kgBB/hari dan ekspresi tertinggi ditemukan pada kelompok diabetes dengan terapi Captopril 50 mg/kgBB/hari.

Kesimpulan: Administrasi ekstrak *Centella asiatica* (L.) dapat mencegah penurunan ekspresi mRNA HMOX-1 pada ginjal model diabetes tipe II tikus pada dosis 250 dan 1.000 mg/kgBB/hari.

Kata kunci: Diabetes tipe II, Diabetes nefropati, Heme oxygenase-, *Centella asiatica*, tikus Wistar.