

ABSTRAK

Diabetes mellitus tipe 2 (DMT2) merupakan penyakit metabolik kronis yang ditandai oleh hiperglikemia akibat resistensi insulin dan gangguan fungsi sel beta pankreas. Peningkatan prevalensi DMT2 secara global maupun nasional mendorong pengembangan terapi alternatif berbasis bahan alam yang lebih aman, efektif, dan terjangkau. Herba seledri (*Apium graveolens* L.) diketahui mengandung berbagai senyawa bioaktif seperti flavonoid, asam fenolat, dan phthalida yang berpotensi memberikan efek antidiabetes melalui mekanisme antihiperglikemik, antioksidan, dan hipolipidemik. Penelitian ini bertujuan untuk menganalisis efektivitas ekstrak etanol herba seledri sebagai agen antidiabetes pada tikus putih Wistar jantan model DMT2 yang diinduksi streptozotocin-nikotinamid.

Penelitian ini merupakan penelitian eksperimental laboratorium menggunakan rancangan *post-test control group design*. Tikus dibagi menjadi enam kelompok, yaitu kontrol normal, kontrol negatif, kontrol positif metformin, serta kelompok perlakuan ekstrak etanol herba seledri dosis 100, 200, dan 400 mg/kgBB. Parameter yang diamati meliputi karakterisasi simplisia dan ekstrak, kadar glukosa darah puasa (KGDP), HbA1c, insulin serum, HOMA-IR, profil lipid, aktivitas superoxide dismutase (SOD), kadar malondialdehid (MDA), serta gambaran histopatologi pankreas dan ginjal. Analisis statistik dilakukan menggunakan One-way ANOVA dan uji lanjut Tukey HSD dengan tingkat kepercayaan 95%.

Hasil penelitian menunjukkan bahwa simplisia dan ekstrak etanol herba seledri memenuhi parameter standarisasi fisikokimia dan mengandung flavonoid, fenolik, tanin, alkaloid, saponin, terpenoid, serta steroid. Pemberian ekstrak etanol herba seledri menurunkan KGDP secara signifikan dengan pola dosis-respons. Dosis 400 mg/kgBB memberikan efek terbaik dengan penurunan KGDP sebesar 62,0%, tidak berbeda bermakna dibandingkan metformin (66,1%; $p > 0,05$). Ekstrak juga menurunkan HbA1c dari 9,6% menjadi 6,0%, meningkatkan insulin serum dari 3,2 menjadi 15,4 $\mu\text{IU/mL}$, serta memperbaiki sensitivitas insulin berdasarkan penurunan nilai HOMA-IR. Selain itu, ekstrak memperbaiki profil lipid melalui penurunan kolesterol total, trigliserida, dan LDL serta peningkatan HDL. Aktivitas antioksidan meningkat signifikan yang ditandai oleh peningkatan aktivitas SOD dan penurunan kadar MDA. Pemeriksaan histopatologi menunjukkan perbaikan struktur pulau Langerhans pankreas dan jaringan ginjal pada kelompok perlakuan, terutama dosis 400 mg/kgBB yang menunjukkan gambaran mendekati normal.

Berdasarkan hasil penelitian dapat disimpulkan bahwa ekstrak etanol herba seledri (*Apium graveolens* L.) memiliki aktivitas antidiabetes yang signifikan pada model DMT2 melalui mekanisme antihiperglikemik, peningkatan sensitivitas insulin, aktivitas antioksidan, perbaikan profil lipid, serta proteksi histopatologi pankreas dan ginjal. Dosis optimal yang memberikan efek paling efektif adalah 400 mg/kgBB dan efeknya sebanding dengan metformin sebagai kontrol positif.

Kata kunci: *Apium graveolens* L., diabetes mellitus tipe 2, ekstrak etanol, antihiperglikemik, antioksidan, histopatologi.

ABSTRACT

Diabetes mellitus Type 2 is a chronic metabolic disorder characterized by hyperglycemia resulting from insulin resistance and impaired pancreatic beta-cell function. The increasing global and national prevalence of DMT2 has encouraged the development of alternative therapies derived from natural products that are safer, more effective, and more affordable. Celery herb (*Apium graveolens* L.) is known to contain various bioactive compounds, including flavonoids, phenolic acids, and phthalides, which exhibit potential antidiabetic effects through antihyperglycemic, antioxidant, and hypolipidemic mechanisms. This study aimed to evaluate the effectiveness of ethanol extract of celery herb as an antidiabetic agent in streptozotocin–nicotinamide-induced male Wistar rats as a model of DMT2.

This study was an experimental laboratory study using a post-test control group design. The rats were divided into six groups: normal control, negative control, positive control (metformin), and treatment groups receiving ethanol extract of celery herb at doses of 100, 200, and 400 mg/kg body weight. The observed parameters included characterization of simplicia and extract, fasting blood glucose levels, HbA1c, serum insulin, HOMA-IR, lipid profile, superoxide dismutase (SOD) activity, malondialdehyde (MDA) levels, as well as pancreatic and renal histopathological features. Statistical analysis was performed using One-way ANOVA followed by Tukey HSD post hoc test with a 95% confidence level.

The results demonstrated that the simplicia and ethanol extract of celery herb fulfilled physicochemical standardization parameters and contained flavonoids, phenolics, tannins, alkaloids, saponins, terpenoids, and steroids. Administration of the ethanol extract significantly reduced fasting blood glucose levels in a dose-dependent manner. The dose of 400 mg/kg body weight exhibited the most effective result, reducing fasting blood glucose levels by 62.0%, which was not significantly different from metformin (66.1%; $p > 0.05$). The extract also reduced HbA1c levels from 9.6% to 6.0%, increased serum insulin levels from 3.2 to 15.4 $\mu\text{IU/mL}$, and improved insulin sensitivity as indicated by decreased HOMA-IR values. Furthermore, the extract improved lipid profiles by reducing total cholesterol, triglycerides, and LDL levels while increasing HDL levels. Antioxidant activity was significantly enhanced, as indicated by increased SOD activity and decreased MDA levels. Histopathological examination revealed improvement in the structure of pancreatic islets of Langerhans and renal tissues in the treatment groups, particularly at the dose of 400 mg/kg body weight, which demonstrated near-normal histological features.

In conclusion, ethanol extract of celery herb (*Apium graveolens* L.) exhibited significant antidiabetic activity in the T2DM model through antihyperglycemic effects, improvement of insulin sensitivity, antioxidant activity, lipid profile modulation, and protective effects on pancreatic and renal histopathology. The optimal effective dose was 400 mg/kg body weight, with effects comparable to metformin as the positive control.

Keywords: *Apium graveolens* L., diabetes mellitus type 2, ethanol extract, antihyperglycemic, antioxidant, histopathology.