ABSTRAK BAHASA INDONESIA

Morbiditas dan mortalitas diabetes mellitus yang diakibatkan komplikasi makro-mikrovakular meningkat, sehingga terjadi penurunan kualitas hidup. Hyperglikemia diakibatkan sensitivitas dan sekresi insulin yang berkurang berdampak pankreotoksis (kerusakan *β-Langerhans* secara kualitatif dan kuantitatif) dan nephrotoksis (*glomeruomegali* dan penebalan *membrane basalis tubulus distalis et proximalis*) Penanganan jangka panjang berupa antidiabetes menimbulkan efek samping dan beban ekonomi.

Ekstrak etanol dan cairan coelomic *Eudrilus eugeniae* mengandung asam amino esensial dan nonessensial sebagai antidiabetes melalui peningkatan jumlah sel *β-langerhans* untuk memperbaiki kualitas insulin.

Penelitian ini bertujuan mengidentifikasi protein *Eudrilus eugeniae* sebagai antidiabetes dan pankreo-nephroprotector, menggunakan metode *true experimental pretest-posttest control group design* secara *invivo* dan *invitro*. *Rattus norvegicus* jantan diinduksi aloksan sebanyak 36 ekor dibagi 4 kelompok yaitu Acarbose 4,5mg/kgBB, aquabidest *ad libitum*, ekstrak maserasi etanol *Eudrilus eugeniae* 42,128 mg/kgBB dan kelompok ekstrak etanol disertai 1µ tetes cairan coelomic peroral. Keempat kelompok diukur kadar gula (*fasting* & *postprandial*) dan HBA_1C pada hari 0, 7, 14, 21, 28. Histopatologi pancreas dan ginjal diambil dari 4 ekor tikus yang dialokasikan untuk hari 0, 14, 21, 28. Identifikasi protein kualitatif dan kuantitatf cairan coelomic dan ekstrak etanol menggunakan biuret, ninhydrin, SDS page dan TLC. Mekanisme antidiabetes berdasarkan kemampuan antioksidan DPPH dan menginhibisi *α-glucosidase*. Analisa data homogen dengan *One-way ANOVA* dan *post-hoc Tukey HSD* dan yang tidak homogen dengan *post-hoc Games-Howell*.

Efektivitas antidiabetes *Eudrilus eugeniae* terindentifikasi protein berat molekul 20; 63, 35; < 17 kDa dan Rf 0,71 di ekstrak etanol, ditandai penurunan kadar gula darah fasting dan postprandial menunjukkan perbedaaan bermakna secara statistik (*One-way ANOVA* $p<0,005$) disertai perbaikan histopatologi pankreas (*Mitchel in Gufron* score-3 H-0 menjadi score-1 H-14) dan renal (Khalid's score-3 H-0 menjadi score-1 H-14). Cairan coelomic memiliki hubungan aktifitas dan efektivitas yang sangat kuat/poten dibandingkan ekstrak etanol dan hampir setara dengan acarbose sebagai antioksidan DPPH ($p<0,05$; %inhibisi; $R^2=0,9797$) maupun inhibisi *α-glucosidase* (1000ppm;

83,72%; IC_{50}=1,85).

Kata Kunci: *Eudrilus eugeniae*, ekstrak etanol, cairan coelomic, antidiabetes, antioksidan, inhibisi *α-glucosidase*.

ABSTRAK BAHASA INGGRIS

Diabetes mellitus complications, such as macro and microvascular issues, increase morbidity and mortality as well as reducing quality of life. Hyperglycemia arises from diminished insulin sensitivity and secretion, which damages pancreatic β-Langerhans cells and the kidneys. Long-term antidiabetic medications have side effects and economic implications.

The ethanol extract and coelomic fluid of Eudrilus eugeniae contain amino acids that may enhance insulin production by increasing the number of β-Langerhans cells. This study evaluates the potential of Eudrilus eugeniae protein as an antidiabetic and pancreo-nephroprotective agent using a true experimental pretest-posttest control group research design, including in vivo and in vitro.

Thirty-six male Rattus norvegicus were induced with alloxan and divided into four groups: one received acarbose (4.5 mg/kg BW), another received aquabidest, the third was given ethanol extract (42.128 mg/kg BW), and the fourth received ethanol extract with coelomic fluid, 1µl drops. Fasting and postprandial blood sugar levels, along with HbA_1c levels, were measured at various intervals. Histopathological examinations of the pancreas and kidneys were conducted at days 0, 14, 21, and 28. Protein identification in the extracts was performed using various biochemical methods. The antidiabetic mechanisms were assessed through DPPH antioxidant capacity and α-glucosidase inhibition, with homogenous data analyzed using One-way ANOVA and Tukey HSD post-hoc test, while non-homogenous data was analyzed with Games-Howell post-hoc test.

The antidiabetic efficacy of Eudrilus eugeniae was identified through a protein with a molecular weight of 20, 63, and 35 kDa, as well as one under 17 kDa, with an Rf of 0.71 in ethanol extract. The study showed a statistically significant reduction in both fasting and postprandial blood sugar levels (One-way ANOVA, $p<0.005$). Additionally, improvements were observed in pancreatic histopathology, with a decrease from a score of 3 at baseline to a score of 1 after treatment (Mitchel's score), and in renal histopathology, with a score change from 3 at baseline to 1 (Khalid's score).

The coelomic fluid demonstrated a potent activity compared to the ethanol extract and was almost equivalent to acarbose in its DPPH antioxidant efficacy ($p < 0.05$; % inhibition $R^2 = 0.9797$) and α-glucosidase inhibition (1000 ppm; 83.72%; $IC_{50} = 1.85$).

Keywords: Eudrilus eugeniae, ethanol extract, coelomic fluid, antidiabetic, antioxidant, α-

glucosidase inhibition.