

**EFFECT OF MENTAWAI TARO (*Colocasia esculenta* L., Araceae) CORM ON
BLOOD SUGAR AND HISTOPATHOLOGY OF PANCREAS IN
ALLOXAN-INDUCED DIABETIC MICE**

UNDERGRADUATE THESIS

BY:



BIOLOGY DEPARTMENT

FACULTY OF MATHEMATICS AND NATURAL SCIENCE

ANDALAS UNIVERSITY

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ABSTRACT

Diabetes mellitus (DM) is a metabolic disease characterized by chronic hyperglycemia, which is a high level of sugar in the blood for a long time caused by the inability of body cells to metabolize carbohydrates properly. This study aims to reveal the effect of Mentawai taro (*Colocasia esculenta* L.) corm as a food preparation that can stabilize blood sugar profile and protect pancreatic beta cell damage due to alloxan-induced diabetes mellitus. This study was conducted experimentally from March 2023 to June 2023 using a completely randomized design (CRD) with five treatments and five replicates. Mice were treated with normal feed (RatBio) and normal feed subsumed with Mentawai taro preparations in the form of flour, fiber and starch (25%) for 4 weeks continuously. Furthermore, blood sugar profile, glucose tolerance and insulin were measured and pancreatic histology was observed microscopically. The results showed that the administration of Mentawai taro corm preparations, especially 25% Mentawai taro fiber, was able to lower blood sugar levels to normal conditions, improve tolerance to glucose and insulin and reduce structural damage to the pancreas of alloxan-induced mice. The conclusion of this study is that the administration of 25% fiber of Mentawai taro corm could effectively reduce random blood sugar levels, while the whole flour, fiber and starch of Mentawai taro corm could effectively reduce fasting blood sugar levels and insulin intolerance, and the fiber and whole flour could effectively reduce glucose intolerance in alloxan-induced diabetes mellitus mice. The fiber of Mentawai taro corm could improve the histopathological alterations in the islet of Langerhans including an increase of islet area and total number of islet cells, while the whole flour, fiber and starch could effectively reduce the number of degenerated islet cells.

Keywords: Alloxan, *Colocasia esculenta* L., Pancreatic Histology, Blood Sugar Level, Glucose and Insulin Tolerance



ABSTRAK

Diabetes mellitus (DM) merupakan penyakit metabolic yang ditandai dengan hiperglikemia kronik, yaitu tingginya kadar gula di dalam darah dalam waktu yang lama yang disebabkan oleh ketidakmampuan sel-sel tubuh untuk memetabolisme karbohidrat dengan baik. Penelitian ini bertujuan untuk mengungkap efek umbi talas Mentawai (*Colocasia esculenta* L.) sebagai sediaan pangan yang dapat menstabilkan profil gula darah dan memproteksi kerusakan sel beta pankreas akibat diabetes mellitus yang diinduksi aloksan. Penelitian ini telah dilakukan secara eksperimen dari bulan Maret 2023 sampai Juni 2023 menggunakan Rancangan Acak Lengkap (RAL) dengan lima perlakuan lima ulangan. Mencit diberi perlakuan berupa pakan normal (RatBio) dan pakan normal yang disubsitusikan dengan sediaan talas Mentawai berupa tepung, serat dan pati (25%) selama 4 minggu secara kontinyu. Selanjutnya, profil gula darah, toleransi glukosa dan insulin diukur dan histologi pankreas diamati secara mikroskopis. Hasil penelitian menunjukkan bahwa pemberian sediaan umbi talas Mentawai terutama serat talas Mentawai 25% mampu menurunkan kadar gula darah ke kondisi normal, memperbaiki toleransi terhadap glukosa dan insulin dan mengurangi kerusakan struktural pada pankreas mencit yang diinduksi aloksan. Kesimpulan dari penelitian ini adalah pemberian 25% serat umbi talas Mentawai dapat secara efektif menurunkan kadar gula darah acak, sedangkan tepung utuh, serat dan pati umbi talas Mentawai dapat secara efektif menurunkan kadar gula darah puasa dan intoleransi insulin, serta serat dan tepung utuh dapat secara efektif menurunkan intoleransi glukosa pada mencit diabetes melitus yang diinduksi aloksan. Serat umbi talas Mentawai dapat memperbaiki perubahan histopatologi pada pulau Langerhans termasuk peningkatan luas pulau dan jumlah sel pulau, sedangkan tepung utuh, serat dan pati secara efektif dapat mengurangi jumlah sel pulau yang mengalami degenerasi.

Kata kunci: Aloksan, *Colocasia esculenta* L., Histologi Pankreas, Kadar Gula Darah, Toleransi Glukosa dan Insulin