

## INTISARI

Diabetes mellitus tipe 2 merupakan penyakit metabolik dengan prevalensi yang terus meningkat secara global, termasuk di Indonesia. *Neoagaro-oligosaccharides* (NAOS) adalah hasil hidrolisis agarosa dari alga merah yang diketahui memiliki aktivitas biologis seperti antidiabetes, antioksidan, antiinflamasi, antiobesitas, dan prebiotik. Penelitian ini bertujuan mengevaluasi pengaruh NAOS terhadap profil darah, kadar glukosa, ekspresi *INS*, ekspresi *GLUT2*, dan histopatologi pankreas mencit (*Mus musculus* Linnaeus 1758) model diabetes. Penelitian dilaksanakan pada Februari hingga Agustus 2025 di *Animal House*, Laboratorium Fisiologi Hewan, Laboratorium Biokimia, dan Fasilitas Penelitian Bersama (FALITMA) Fakultas Biologi Universitas Gadjah Mada. Sebanyak 30 ekor mencit jantan galur Balb/C dibagi menjadi 6 kelompok (n=5) meliputi mencit normal (K), mencit diabetes tanpa pengobatan (KN), mencit diabetes diberi metformin dosis 50 mg/kgbb (KP), serta mencit diabetes diberi NAOS dosis 100, 200, dan 400 mg/kgbb (P1, P2, P3). Diabetes diinduksi melalui pemberian *high fat diet* selama 14 hari diikuti injeksi streptozotisin. Metformin dan NAOS diberikan secara *oral* selama 28 hari. Parameter yang dianalisis meliputi profil darah, kadar glukosa, ekspresi *INS* dan *GLUT2* menggunakan RT-qPCR, serta histopatologi pankreas. Data dianalisis menggunakan uji *one-way ANOVA* dan uji lanjut *Duncan Multiple Range Test* ( $P \leq 0,05$ ). Hasil penelitian menunjukkan bahwa pemberian NAOS dapat memperbaiki profil darah, menurunkan kadar glukosa darah secara signifikan, meningkatkan ekspresi gen *INS*, dan memodulasi ekspresi *GLUT2* mendekati kondisi normal terutama pada dosis 200 mg/kgBB. Analisis histopatologi pankreas menunjukkan perbaikan struktur jaringan pankreas, ditandai peningkatan keliling dan jumlah sel pulau Langerhans. Dengan demikian, NAOS berpotensi dikembangkan sebagai agen antidiabetes berbasis bahan alam dan mendukung pemanfaatan sumber daya alam berkelanjutan.

**Kata kunci:** antidiabetes, *GLUT2*, histopatologi, *neoagaro-oligosaccharides*, streptozotisin

## **ABSTRACT**

*Type 2 diabetes mellitus is a metabolic disorder with a continuously increasing global prevalence, including in Indonesia. Neoagaro-oligosaccharides (NAOS), agarose hydrolysis products derived from red algae that exhibit various biological activities, including antidiabetic, antioxidant, anti-inflammatory, anti-obesity, and prebiotic effects. This study aimed to evaluate NAOS impact on blood profile, blood glucose levels, INS expression, GLUT2 expression, and pancreatic histopathology in a diabetic mice model (*Mus musculus Linnaeus 1758*). The study was conducted from February to August 2025 at the Animal House, Animal Physiology Laboratory, Biochemistry Laboratory, and FALITMA, Faculty of Biology, Universitas Gadjah Mada. A total of 30 male Balb/C mice were randomly assigned into six groups (n=5) including mice normal (K), diabetic control without treatment (KN), diabetic mice treated with metformin 50 mg/kgBW (KP), and diabetic mice treated with NAOS 100, 200, and 400 mg/kgBW (P1, P2, P3). Diabetes was induced by a high fat diet for 14 days followed by streptozotocin injection. Metformin and NAOS were administered orally for 28 days. Parameters analyzed included blood profile, glucose levels, INS and GLUT2 gene expression using RT-qPCR, and pancreatic histopathology. Data were analyzed using one-way ANOVA followed by Duncan's Multiple Range Test ( $P \leq 0.05$ ). The results demonstrated that NAOS significantly improved blood profiles, reduced glucose levels, increased INS expression, and modulated GLUT2 expression toward normal levels, particularly at a dose of 200 mg/kgBW. Histopathological analysis revealed improved pancreatic tissue structure, indicated by increased size and number of pancreatic islets. These findings indicate that NAOS has potential as a natural antidiabetic agent.*

**Keywords:** *antidiabetic, GLUT2, histopathology, neoagaro-oligosaccharides, streptozotocin*