

INTISARI

Pengaruh Diet Serat Pangan Tepung Komposit Terhadap Kadar Glukosa Darah Dan Ekspresi Gen *Glp-1*, *Insr*, Dan *Glut-2* Pada Tikus Diabetes

Diabetes merupakan masalah kesehatan yang saat ini menjadi isu penting di dunia kesehatan. Diabetes dapat dipengaruhi oleh kondisi lingkungan, obesitas, faktor genetik, dan asupan makanan. Serat pangan merupakan bagian dari tumbuhan yang dapat dikonsumsi dan tersusun oleh karbohidrat yang memiliki sifat resistan terhadap proses pencernaan dan penyerapan di usus serta mengalami fermentasi di usus besar. Beberapa manfaat serat pangan yaitu mengontrol berat badan, mereduksi difusi glukosa darah, memperpanjang waktu absorpsi karbohidrat, dan peningkatan sensitifitas insulin. Serat pangan berpengaruh pada beberapa ekspresi gen yang terkait dengan metabolisme glukosa misalnya *Glucose Transporter Tipe-2 (GLUT-2)*, *Glukagon Like Factor-1 (GLP-1)*, dan *Insulin reseptor (Insr)*. Tujuan dari penelitian ini menganalisis sifat fisik dan kimiawi tepung komposit, mempelajari pengaruh diet serat pangan tepung komposit pada kadar glukosa darah dan ekspresi gen pada tikus diabetes. Hasil penelitian ini adalah tepung komposit memiliki kadar air 6,77-6,87%, kadar protein 3,95-4,83%, kadar karbohidrat 74-77%, kadar serat 2,26-3,2%, swelling power 9,59-10,11, dan expanding capability 1,57-1,59. Pemberian diet serat pangan tepung komposit mampu menurunkan kadar glukosa darah secara signifikan, yakni sekitar 122mg/dL. Gen *GLP-1* mengalami upregulasi pada kedua kelompok perlakuan yaitu sebanyak 0,61 kali dan 0,80 kali dari perlakuan normal. Gen *GLUT-2* mengalami upregulasi sebanyak 1,08 kali dan 1,49 kali dari perlakuan normal, sedangkan gen *Insr* juga mengalami peningkatan ekspresi sebanyak 1,03 kali dan 1,78 kali dari perlakuan normal.

Kata kunci: diabetes, serat pangan, tepung komposit, kadar glukosa darah, ekspresi gen

Effect of Composite Flour Fiber Diet on Blood Glucose Levels and *GLP-1*, *Insr*, and *GLUT-2* Gene Expression in Diabetic Rats

Abstract

Diabetes is a health problem that is currently an important issue in the world of health. Diabetes can be affected by environmental conditions, obesity, genetic factors, and food intake. Dietary fiber is a part of plants that can be consumed and is composed of carbohydrates that are resistant to the process of digestion and absorption in the intestines and undergo fermentation in the colon. Some of the benefits of dietary fiber are controlling weight, reducing blood glucose diffusion, prolongs the absorption time of carbohydrates, and increases insulin sensitivity. Dietary fiber has an effect on the expression of several genes related to glucose metabolism such as *Glucose Transporter Type-2 (GLUT-2)*, *Glucagon Like Factor-1 (GLP-1)*, and Insulin receptor (*Insr*). The purpose of this study was to analyze the physical and chemical properties of composite flour, to study the effect of dietary fiber composite flour on blood glucose levels and gene expression in diabetic rats. The results of this study were that composite flour had a moisture content of 6,77-6,87 %, a protein content of 3,95-4,83 %, a carbohydrate content of 74-77%, a fiber content of 2,26-3,2%, a swelling power of 9,59-10,11 g/g, and an expanding capability of 1,57-1,59 g/ml. Giving a dietary fiber of composite flour can significantly reduce blood glucose levels, which is around 122 mg/dL. The *GLP-1* gene was upregulated in both treatment groups, which was 0.61 times and 0.80 times from normal treatment. The *GLUT-2* gene was upregulated by 1.08 times and 1.49 times from normal treatment, while the *Insr* gene also experienced an increase in expression by 1.03 times and 1.78 times from normal treatment.

Key words: diabetes, dietary fiber, composite flour, blood glucose levels, gene expression