PENGARUH PEMBERIAN *COOKIES* BEKATUL TERHADAP KADAR GLUKOSA DARAH, KADAR INSULIN, INDEKS HOMA-IR DAN HOMA-β PADA TIKUS PUTIH (*Rattus norvegicus*) *WISTAR* YANG DIINDUKSI STZ-NA (*Streptozotocin-Nicotinamide*)

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INTISARI

Diabetes melitus merupakan tipe diabetes yang paling umum terjadi, lebih dari 95% orang menderita diabetes tipe 2 (T2DM). Penderita T2DM memerlukan pengendalian glukosa darah yang baik untuk mencegah komplikasi melalui terapi nutrisi medis (TNM) atau manajemen diet. Diet tinggi serat dapat membantu mengendalikan glukosa darah dan pencegahan komplikasi pada penderita T2DM. Bekatul mengandung serat pangan yang tinggi. Serat pangan diketahui memiliki manfaat untuk penurunan glukosa darah dan perbaikan resistensi insulin. Beberapa hasil penelitian telah membuktikan bahwa bekatul juga memiliki efek sebagai antidiabetik dan antihiperglikemik. Bekatul tidak hanya dapat dimanfaatkan sebagai pakan ternak namun juga berpotensi sebagai pangan fungsional. Salah satu produk pangan fungsional adalah *cookies* yang diperkaya serat.

Penelitian ini bertujuan untuk mengetahui pengaruh pemberian *cookies* bekatul sebagai makanan selingan selama 21 hari terhadap kadar glukosa darah puasa (GDP), kadar insulin, HOMA-IR dan HOMA-β pada tikus *wistar* diabetes dengan induksi *Streptozotocin-Nicotinamide* (STZ-NA).

Cookies bekatul dianalisis komposisi kimia dan serat pangan. Uji *bioassay* dilakukan pada *cookies* bekatul terpilih, kemudian dievaluasi terhadap penurunan kadar gula darah, kadar insulin, HOMA IR, HOMA-β. Dalam uji *bioassay*, digunakan tikus *Wistar* jantan sebanyak 30 ekor umur 8 minggu dengan berat berkisar 170–200 g/ekor. Penelitian ini menggunakan metode *pretest-posttest control group design* terdiri dari kelompok kontrol, kelompok DM, kelompok perlakuan I diberikan *cookies* bekatul sebanyak 0,54 g/200 g BB tikus, kelompok perlakuan II diberikan *cookies* bekatul sebanyak 1,08 g/200 g BB tikus, dan kelompok perlakuan III diberikan *cookies* bekatul sebanyak 2,16 g/200 g BB tikus. Semua kelompok tikus diberikan pakan standar AIN93-M dan air minum secara *ad libitum*. *Cookies* bekatul diberikan secara *force feeding* menggunakan sonde lambung sebagai makanan selingan selama 21 hari.

Hasil penelitian menunjukkan penambahan 40% bekatul pada *cookies* bekatul memiliki kandungan serat larut sebesar 1,12% dan serat tidak larut 12,20%. Hasil *bioassay* menunjukkan kadar glukosa darah puasa (GDP) tikus kelompok perlakuan II (*cookies* bekatul 1,08 g/200g BB tikus) sebesar 99.29 mg/dL mengalami perubahan yang signifikan (GDP < 100 mg/dL), kenaikan kadar insulin sebesar 17,35%, penurunan resistensi insulin (HOMA-IR) <4 sebesar 3,73%, dan kenaikan regenerasi sel β-pankreas (HOMA-β) >150% sebesar 151,28%

Kata Kunci: *Cookies* bekatul, Diabetes Melitus, *Streptozotocin-Nicotinamide* Glukosa Darah, Kadar Insulin, HOMA-IR, HOMA-β.

The effect of feeding rice bran cookies on blood glucose, insulin level, HOMA-IR, and HOMA-β indexes in STZA-NA (Streptozotocin-Nicotinamide)-induced diabetic Wistar white rats (Rattus norvegicus)

ABSTRACT

Diabetes mellitus is the most common type of diabetes which is more than 95% of people suffer from type 2 diabetes (T2DM). Patients with T2DM require better blood glucose control to prevent complications through medical nutrition therapy (TNM) or dietary management. A high-fiber diet can help control blood glucose and prevent complications in people with T2DM. Rice bran contains high dietary fiber. Dietary fiber is known to have benefits for lowering blood glucose and improving insulin resistance. Several research results have proven that rice bran has antidiabetic and antihyperglycemic effects. Rice bran can not only be used as animal feed but also has the potential as a functional food. One of the functional food products is fiber-fortified cookies.

This study aimed to determine the effect of feeding rice bran cookies as a snack for 21 days on fasting blood glucose (GDP), insulin levels, HOMA-IR and HOMA-β in diabetic wistar rats with Streptozotocin-Nicotinamide induction.

Rice bran cookies were analyzed for chemical composition and dietary fiber. The bioassay test was carried out on selected bran cookies, then evaluated for a decrease in blood sugar levels, insulin levels, HOMA IR, and HOMA-β. In the bioassay test, 30 male Wistar rats aged around eight weeks were used with a weight ranging from 170–200 g/head. This study employed a pretest-posttest control group design, including a control group, DM group, treatment group I given rice bran cookies containing up to 0.54 g/200 g BW rats, and treatment group II has given rice bran cookies containing up to 1.08 g/200 g BW rats. The rats and treatment group III were given 2,16 g/200 g BW rats of rice bran cookies. All treatment groups were given AIN93-M standard feed and drinking water ad libitum. Rice bran cookies were force-feeding using a gastric probe as a snack for 21 days.

The results showed that the addition of 40% rice bran in rice bran cookies contained 1.12% soluble fiber and 12.20% insoluble fiber. The results of the bioassay showed that the fasting blood glucose (GDP) levels of rats in treatment group II (rice bran cookies cookies containing up to 1.08 g/200 g BW rats) was 99.29 mg/dL and experienced significant changes (GDP < 100 mg/dL) compared to the DM group. The increase in insulin levels in treatment group II was 17.35%, the decrease of insulin resistance in HOMA-IR was 3,73% (<4), and the increase of regeneration pancreatic β cell in HOMA-β in treatment group II was 151,28% (>150%).

Keywords : *Rice bran cookies, Diabetes Melitus, Streptozotocin-Nicotinamide, Blood Glucose, Insulin Level, HOMA-IR, HOMA-β*