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<th>No</th>
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<td>Irfan Mustofa, S.Si., M.Si</td>
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3. Pendanaan dan jangka waktu penelitian
   a. Jangka Waktu penelitian yang diusulkan: 1 (satu) tahun
   b. Biaya Total yang diusulkan: Rp 85.000.000,- (Sembilan puluh lima juta rupiah)
   c. Biaya yang disetujui tahun 2009: Rp 95.000.000,- (Sembilan puluh lima juta rupiah)

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Judul Penelitian: Peran Glucomannan Terhadap Kadar Gula Dan Ekspresi Gen Proinsulin Pada Tikus Diabetes: Kajian Nutrigenomik

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UNIVERSITAS BRAWIJAYA
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RINGKASAN

PENDAHULUAN

Nutrigenomik merupakan kajian studi baru tentang bagaimana makanan mempengaruhi ekspresi informasi genetik secara individual, atau komponen genetik yang dimiliki individu mempengaruhi metabolisme dan respon terhadap komposisi gizi atau bioaktiv dalam makanan. Komponen genetik secara individual mempunyai kemampuan yang bervariasi terhadap makanan dan kerentanan terhadap penyakit kronis seperti diabetes mellitus tipe 2 (DM tipe 2).


Penyakit DM tipe 2 dapat dikontrol dengan pengaturan diet yang dimonitor. Hubungan antara diet karbohidrat dengan DM tipe 2 cukup kompleks, sehingga banyak penelitian telah dilakukan untuk menentukan diet yang tepat untuk menurunkan glukosa darah. Salah satunya adalah diet serat tinggi yang bekerja lebih baik dalam mengontrol diabetes dibanding dengan diet lain yang direkomendasikan ADA (American Diabetes Association). Level insulin menurun 12% dan level glukosa menurun 10% pada pasien DM tipe 2 yang mengonsumsi diet yang berisi serat tinggi dibanding diet group lain.

Diet yang mengandung glucomannan dapat menunda rasa lapar dan meningkatkan secara gradual absorpsi diet gula sehingga berpengaruh mengurangi peningkatan level gula darah setelah makan. Pada studi lain, glucomannan 8-13g per 100g kalori per hari dapat menstabilkan gula darah individu dengan sindrom resisten insulin (syndrome-X). Tetapi konsentrasi glucomannan yang tinggi bisa menyebabkan menurunnya gula darah secara cepat dan menyebabkan hypoglicemia, kadar gula darah sangat rendah.


METODOLOGI

Tikus jantan strain Wistar umur lima bulan dengan berat 160g dibagi menjadi empat kelompok yaitu: (1) Kelompok kontrol yaitu tikus tidak mendapat perlakuan apapun, (2) Kelompok tiktus diabet yang tidak diberi ekstrak porang, (3) Kelompok tiktus normal diberi makan 0,12g/kg BB porang setiap hari selama 3 minggu, kemudian disuntik STZ, tikus yang positif diabet diberi perlakuan lagi dengan 0,12g/kg BB porang setiap hari selama 3 minggu lagi. (4) Sama dengan kelompok tiga tetapi dosis porang yang diberikan adalah 0,06g/kg BB. Masing-masing kelompok ada tiga ekor tikus yang diuji sebagai ulangan. Sebelum penyuntikan, tikus dicek kadar gula darah normalnya dengan stick glucometer, kemudian STZ 50mg/kg BB disuntikkan secara intraperitoneal sampai tikus positif DM, uji gula darah setelah 4 hari penyuntikan. Perlakuan untuk kelompok 3 dan 4, tepung porang dicekodan menggunakan spuit 1 ml dengan jarum modifikasi. Kadar porang 0,12g/kg berdasarkan hasil studi awal penelitian ini.

Pengamatan kerusakan maupun perbaikan dari sel-sel pankreas dan hepar dilakukan dengan pembuatan preparat parafin dan dilakukan pewarnaan hematoxylin-eosin dan imunohistokimia.
SUMMARY

Introduction

Nutrigenomics is a new study of how foods affect the expression of individual genetic information, or individual genetic components that affect metabolism and response to the composition or bioactive nutrients in foods. Individual genetic components have varying abilities to food and susceptibility to chronic diseases such as type 2 diabetes mellitus (DM type 2). Basically, the diabetes is a metabolic disorder caused by lack of the hormone insulin. The hormone insulin is produced by a group of pancreatic β-cells that are involved in glucose metabolism of body cells. Glucose in the patient’s body can not be absorbed and did not involved in cell metabolism. As a result, the patient will lack energy, so people easily get tired and weight continued to decline. Excess glucose is excreted through the kidneys and expelled with the urine.

Diabetes type 2 can be controlled with monitored diet. The relationship between dietary carbohydrates with diabetes type 2 is complex. Many research have been conducted to determine the proper diet to lowering blood glucose. One of them is a high-fiber diet that works better in controlling diabetes compared to other diets recommended by ADA (American Diabetes Association). Insulin levels decreased 12% and glucose levels decreased 10% in patients with diabetes type 2 who consumed a high-fiber diet than the other group. Diet containing glucomannan can delay hunger and gradually improve absorption of sugar so can reduce the increase of blood sugar levels after eating. In another study, glucomannan 8-13g per 100g calories per day could stabilize blood sugar level with insulin resistance syndrome (syndrome X). However, high concentrations of glucomannan can decrease blood sugar quickly and cause hypoglicemia.

Glucomannan is a fiber of konjac plant and porang (iles-iles, suweng). The nature of glucomannan is water insoluble and shaped like a gel. The body cannot absorb glucomannan, resulting in a large soft mass moves through the intestines and stimulates intestinal muscle contractions. Porang (Amorphophallus oncophillus) in East Java is a commodity exported to Japan for konyaku and shiratake base materials. Many research performed on glucomannan that related to controlling diabetes type 2, but there are no reports about the value of East Java porang as a high-fiber diet. It needs to be assessed for its effectiveness as high-fiber diet in reducing blood sugar levels and mRNA expression of pro-insulin gene in pancreatic and liver in rats with diabetes.

Methodology

Male rats of Wistar strain aged five months with a weight of 160g were divided into four groups: (1) The control group of rat do not receive any treatment, (2) diabetes rat group that was not fed porang extract, (3) The normal rat fed 0.12g/kg BW porang every day for 3 weeks, then injected with STZ, the diabetes positive rat were treated with 0.12 g/kg BW porang every day for 3 weeks. (4) Same with the third groups but the porang dose given is 0.06 g/kg BW. Each group consists of three rats as a repetition. Before injection, rats were checked for normal blood sugar levels by glucometer stick, then STZ 50mg/kg BW was injected intraperitoneally until the rats are diabetes positive, blood sugar tests performed four days after injection. Treatment for group 3 and 4, porang extract was fed using 1 ml syringes with modified needle.

Observations of damaged and repaired of cells of the pancreas and liver were prepared by making paraffin and performed hematoxylin-eosin staining and immunohistochemistry. Immunohistochemstry tinting using a primary antibody antibodies IRS 1 and PI3K. The percentage of cells that are damaged was compared to the normal of the two tissue in all normal rats, diabetes, and diabetes treatment.
DAFTAR PUSTAKA


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pada Seminar Nasional Biodiversitas di Unair, Surabaya.


Warning System dalam Blooming Mikroalga. Laporan Penelitian Kerjasama Perum Jasa Tirta I dengan Jurusan Biologi Fakultas MIPA Universitas Brawijaya Sertifikat No. ID03/0127


