PENGARUH PENAMBAHAN GLUKOMANAN PORANG (Amorphophallus oncophyllus) PADA MI KOMPOSIT DAN MI TERIGU
TERHADAP KADAR GLUKOSA DARAH DAN PROFIL LIPID TIKUS DIABETES
Elfitri Sarah Ardiyani, Prof. Dr. Ir. Eni Harmayani, M.Sc.; Prof. Dr. Lily Arsanti Lestari, S.T.P., M.P.
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ABSTRAK

Konsumsi serat pangan merupakan strategi optimal dalam pengelolaan diabetes mellitus tipe 2 (DM2). Glukomanan porang (GP) merupakan serat larut tinggi viskositas yang dapat membentuk *gel* sehingga berpotensi memperlambat penyerapan glukosa darah dan lipid. Studi penambahan GP pada mi komposit beras-tapioka bersama mi terigu serta potensi antidiabetiknya masih terbatas. Penelitian ini bertujuan untuk: 1) mengevaluasi kualitas pemasakan, tekstur, dan kadar serat pangan mi komposit beras-tapioka dan mi terigu dengan dan tanpa GP; 2) mengevaluasi berat badan, kadar glukosa darah, dan profil lipid tikus DM2 yang diberi mi komposit beras-tapioka dan mi terigu dengan dan tanpa GP; 3) mengevaluasi kadar insulin, HOMA-IR, dan HOMA-β tikus DM2 yang diberi mi komposit beras-tapioka dan mi terigu ı dan tanpa GP.

Sebelum uji *in vivo*, dilakuka kualitas pemasakan yang terdiri dari *optimal cooking time* (OCT)*, cooking loss,* dan *water absorption capacity* (WAC), tekstur (*hardness, springiness, adhesiveness,* dan *cohesiveness*), dan kadar serat pangan pada mi komposit beras-tapioka (BO), mi komposit beras-tapioka + GP (BG), mi terigu (TO), dan mi terigu + GP (TG). Uji *in vivo* melibatkan 42 ekor tikus Wistar yang dibagi acak ke dalam 7 kelompok (n=6): kontrol normal (TNO), kontrol diabetes (TDO), kontrol diabetes + metformin (TDM), diabetes + mi komposit beras-tapioka (TBO), diabetes + mie komposit beras-tapioka dengan PG (TBG), diabetes + mi terigu (TTO), dan diabetes + mi terigu dengan PG (TTG). Setelah aklimatisasi dan induksi DM2, tikus menjalani 28 hari intervensi. Berat badan (BB) diukur setiap minggu. Profil glukosa dan lipid dianalisis sebelum dan sesudah intervensi, serta analisis insulin, HOMA-IR, dan HOMA-β setelah intervensi.

Penambahan GP meningkatkan kadar serat pangan mi, *hardness*, serta menurunkan OCT dan *cooking loss* BG) secara signifikan, namun tidak pada WAC, *springiness*, *adhesiv* ın *cohesiveness*. Penambahan GP menurunkan kadar glukosa darah, trigliserida, kolesterol total, dan LDL, sekaligus meningkatkan BB, kadar HDL, dan insulin pada tikus diabetes. Kadar HOMA-IR pada TBG lebih rendah dibandingkan TTG, sedangkan HOMA-β pada TBG tertinggi dibandingkan kelompok DM2 lainnya. Aplikasi glukomanan porang pada mi komposit beras-tapioka, sebagai alternatif pangan lokal pengganti terigu, memiliki potensi sebagai pangan fungsional bagi penderita DM2.

Kata kunci: antidiabetik, glukomanan porang, mi, profil lipid

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ABSTRACT

Dietary fiber consumption is an optimal strategy in managing type 2 diabetes mellitus (DM2). Porang glucomannan (GP) is a high-viscosity soluble fiber that forms a gel, potentially slowing the absorption of blood glucose and lipids. Studies on the addition of GP to rice-tapioca composite noodles and wheat noodles and its antidiabetic potential are still limited. This study aimed to: 1) evaluate the cooking quality, texture, and dietary fiber content of rice-tapioca composite noodles and wheat noodles with and without GP; 2) evaluate the body weight, blood glucose levels, and lipid profiles of DM2 rats fed rice-tapioca composite noodles and wheat noodles with and without GP; 3) evaluate insulin levels, HOMA-IR, and HOMA-β in DM2 rats fed rice-tapioca composite noodles and wheat noodles with and without GP.

Prior to the in vivo test, cooking quality tests were conducted on the noodles used, which consisted of optimal cooking time (OCT), cooking loss, and water absorption capacity (WAC), texture (hardness, springiness, adhesiveness, and cohesiveness), and dietary fiber content in rice-tapioca composite noodles (BO), rice-tapioca composite noodles + GP (BG), wheat noodles (TO), and wheat noodles + GP (TG). The in vivo test involved 42 Wistar rats randomly divided into 7 groups (n=6): normal control (TNO), diabetic control (TDO), diabetic control + metformin (TDM), diabetic + rice-tapioca composite noodles (TBO), diabetic + rice-tapioca composite noodles with PG (TBG), diabetic + wheat noodles (TTO), and diabetic + wheat noodles with PG (TTG). After acclimatization and induction of DM2, the rats underwent 28 days of intervention. Body weight (BW) was measured weekly. Glucose and lipid profiles were analyzed before and after the intervention, as well as insulin, HOMA-IR, and HOMA-β analysis after the intervention.

The addition of GP significantly increased the dietary fiber content of noodles, increased their hardness, and reduced OCT and cooking loss (BG only), but not WAC, springiness, adhesiveness, and cohesiveness. GP addition reduced blood glucose, triglycerides, total cholesterol, and LDL levels, while increasing body weight, HDL cholesterol, and insulin levels in both TBG and TTG. HOMA-IR levels in TBG were lower than in TTG, while HOMA-β in TBG was higher compared to other DM2 groups. The application of GP in rice-tapioca composite noodles, as an alternative to wheat flour, has potential as a functional food for people with DM2.

Keywords: antidiabetic, glycaemic control, porang glucomannan, rice-tapioca composite noodles, lipid profile