

ABSTRAK

Latar Belakang: Prevalensi sindrom metabolik meningkat secara global, termasuk di Indonesia. Sacha inchi (*Plukenetia volubilis* L.) merupakan kacang tropis yang kaya akan asam α -linolenat, serat, fitosterol, dan flavonoid yang berpotensi memperbaiki sindrom metabolik. Tempe, salah satu makanan tradisional asal Indonesia, mempunyai dampak positif dari proses fermentasi. Tempe sachu inchi merupakan pangan fungsional yang kaya akan asam lemak tak jenuh ganda.

Tujuan: Tujuan penelitian ini adalah untuk mengevaluasi dampak tempe sachu inchi terhadap TNF- α , penilaian model homeostatis untuk resistensi insulin (HOMA-IR), dan kadar gula darah puasa (GDP).

Metode: Tiga puluh enam ekor tikus wistar jantan dengan berat badan 150–200 g dibagi dan diacak menjadi 6 kelompok: 1) kontrol normal atau K0, 2) kontrol negatif atau K-, 3) kontrol positif atau K+ dengan simvastatin 0,18 mg/200g BB, 4) intervensi dengan 0,9 g sachu inchi tempe atau P1, 5) intervensi dengan 1,8 g sachu inchi tempe atau P2, dan 6) intervensi dengan 3,6 g sachu inchi tempe atau P3. Semua kelompok kecuali kontrol normal diberikan Diet Fruktosa Tinggi Lemak (HFFD) selama 2 minggu untuk menginduksi sindrom metabolik. Setelah sindrom metabolik berkembang, mereka diberi simvastatin/sachu inchi tempe selama 5 minggu. Glukosa darah puasa diukur dengan metode GOD-PAP. Kadar insulin dan TNF- α diukur pada akhir penelitian menggunakan ELISA melalui serum darah dan jaringan hati. HOMA-IR ditentukan dengan menggunakan perhitungan kadar insulin dan GDP.

Hasil: Hasil penelitian menunjukkan bahwa P1, P2, dan P3 mampu menurunkan kadar GDP, HOMA-IR, dan TNF- α secara signifikan ($p=0,000$). P3 yang mengandung tempe dengan dosis tertinggi mampu menurunkan GDP, HOMA-IR, dan TNF- α paling banyak, dengan kadar GDP (84.357 ± 3.833) mg/dl, HOMA-IR (3.323 ± 0.792), dan kadar TNF- α hati ($7,307\pm 0,289$) hal/ml.

Simpulan: Penelitian ini menunjukkan bahwa tempe sachu inchi dapat menurunkan kadar glukosa darah puasa, nilai HOMA-IR, dan kadar TNF- α pada tikus dengan sindrom metabolik.

Kata Kunci: sindrom metabolik, *Plukenetia volubilis* L., sachu inchi, tempe

ABSTRACT

Background: Metabolic syndrome is becoming more common globally, including in Indonesia. Sacha inchi (*Plukenetia volubilis L.*) is a tropical nut rich in α -linolenic acid, fiber, fitosterol, and flavonoids which have the potential to improve metabolic syndrome. Tempe, a traditional food from Indonesia has a positive impact from the fermentation process involved. Sacha inchi tempeh is a functional food rich in polyunsaturated fatty acids.

Objectives: The purpose of this study was to evaluate the impact of sacha inchi tempeh on TNF- α , homeostatic model assessment for insulin resistance (HOMA-IR), and fasting blood sugar (FBG) levels.

Methods: Thirty-six male Wistar rats weighing 150–200 g were divided and randomized into 6 groups: 1) normal control or K0, 2) negative control or K-, 3) positive control or K+ with 0.18 mg/200g BB of simvastatin, 4) intervention with 0.9 g sacha inchi tempeh or P1, 5) intervention with 1.8 g sacha inchi tempeh or P2, and 6) intervention with 3.6 g sacha inchi tempeh or P3. All groups except normal control were given High-Fat Fructose Diets (HFFD) for 2 weeks to induce metabolic syndrome. After metabolic syndrome had been developed, they were given simvastatin/sacha inchi tempeh for 5 weeks. Fasting blood glucose was measured with the GOD-PAP method. Insulin and TNF- α levels were measured at the end of the study using ELISA through blood serum and liver tissue, respectively. HOMA-IR was determined using the calculation of insulin and FBG levels.

Results: The results showed that P1, P2, and P3 could significantly decrease FBG, HOMA-IR, and TNF- α levels ($p=0.000$). P3 containing tempeh at the highest dose could reduce FBG, HOMA-IR, and TNF- α the most, with FBG levels (84.357 ± 3.833) mg/dl, HOMA-IR (3.323 ± 0.792), and hepatic TNF- α levels (7.307 ± 0.289) pg/ml.

Conclusion: This study showed that sacha inchi tempeh could reduce FBG, HOMA-IR value, and TNF- α levels in rats with metabolic syndrome.

Keywords: metabolic syndrome, *Plukenetia volubilis L.*, sacha inchi, tempeh

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