

INTISARI

Diabetes melitus tipe II merupakan penyakit metabolik yang ditandai dengan hiperglikemia akibat resistensi insulin. Penggunaan bahan alami seperti daun sukun (*Artocarpus altilis*) yang kaya flavonoid berpotensi sebagai terapi alternatif untuk diabetes. Penelitian ini dilakukan untuk membandingkan efek teh dan kombucha daun sukun terhadap total fenolik, total flavonoid, aktivitas antioksidan, *in vitro* dan *in vivo* sebagai minuman untuk diabetes. Uji potensi antidiabetes *in vitro* yang dilakukan adalah menguji penghambatan terhadap enzim α -glukosidase. Sedangkan uji *in vivo* menggunakan tikus Wistar yang diinduksi STZ-NA, lalu diukur kadar glukosa darah, insulin, serta resistensi insulin pada model tikus diabetes. Teh herbal daun sukun memiliki pH $6,66 \pm 0,01$ dan total padatan terlarut $0,07 \pm 0,06$ °Brix, kombucha daun sukun memiliki pH $3,93 \pm 0,04$ dan total padatan terlarut $8,67 \pm 0,58$ °Brix dengan warna kombucha yang lebih terang. Hasil menunjukkan bahwa kombucha daun sukun memiliki kandungan total fenolik ($5,20 \pm 0,42$ μg GAE/mL) dan flavonoid ($1,99 \pm 0,11$ μg QE/mL) yang lebih tinggi dibandingkan teh daun sukun. Aktivitas antioksidan (DPPH dan ABTS) juga lebih tinggi pada kombucha, sedangkan teh daun sukun lebih efektif dalam menghambat enzim α -glukosidase ($49,45 \pm 0,17\%$). Secara *in vivo*, konsumsi teh dan kombucha daun sukun menurunkan kadar glukosa darah dan meningkatkan kadar insulin, dengan efek lebih signifikan pada kombucha. Kombucha juga lebih efektif dalam memperbaiki resistensi insulin (HOMA-IR) dan fungsi sel β pankreas (HOMA- β) serta berdasarkan histopatologi pankreas.

Kata kunci: Daun sukun, Tikus diabetes, Teh, Kombucha, Flavonoid, penghambat α -glukosidase, *in vivo*

ABSTRACT

Type II diabetes mellitus is a metabolic disease characterized by hyperglycemia due to insulin resistance. The use of natural ingredients, such as breadfruit leaves (*Artocarpus altilis*), which are rich in flavonoids, has the potential to serve as an alternative therapy for diabetes. This study was conducted to compare the effects of breadfruit leaf tea and kombucha on total phenolic content, total flavonoid content, antioxidant activity, as well as *in vitro* and *in vivo* evaluations as potential diabetic beverages. The *in vitro* anti-diabetic potential was assessed by evaluating the inhibition of the α -glucosidase enzyme. Meanwhile, the *in vivo* study was conducted using STZ-NA-induced Wistar rats, followed by measurements of blood glucose levels, insulin levels, and insulin resistance in a diabetic rat model. Breadfruit leaf herbal tea had a pH of $6,66 \pm 0,01$ and a total dissolved solid content of $0,07 \pm 0,6$ °Brix, while breadfruit leaf kombucha exhibited a pH of $3,93 \pm 0,04$ and a total dissolved solid content of $8,67 \pm 0,58$ °Brix, with kombucha displaying a lighter color. The results indicated that breadfruit leaf kombucha had a higher total phenolic content ($5,20 \pm 0,42$ $\mu\text{g GAE/mL}$) and flavonoid content ($1,99 \pm 0,11$ $\mu\text{g QE/mL}$) compared to breadfruit leaf tea. The antioxidant activity (DPPH and ABTS assays) was also higher in kombucha, while breadfruit leaf tea was more effective in inhibiting the α -glucosidase enzyme ($49,45 \pm 0,17\%$). In the *in vivo* study, the consumption of both breadfruit leaf tea and kombucha reduced blood glucose levels and increased insulin levels, with a more significant effect observed in the kombucha group. Additionally, kombucha was more effective in improving insulin resistance (HOMA-IR) and pancreatic β -cell function (HOMA- β), as well as enhancing pancreatic histopathology.

Keywords: Breadfruit leaf, Diabetic rats, Tea, Kombucha, Flavonoids, α -glucosidase inhibitors, *in vivo*