

## ABSTRAK

### Edarni Zebua

**Latar Belakang:** Diabetes melitus tipe 2 (DMT2) merupakan penyakit metabolik yang memiliki dampak negatif dengan prevalensi yang terus meningkat di Indonesia. Penyakit ini ditandai dengan peningkatan kadar glukosa dalam darah yang disebabkan berbagai faktor biologis, seperti disfungsi sel  $\beta$  pankreas yang mensekresi insulin. Salah satu alternatif pengelolaan penyakit diabetes yang penting dilakukan dengan cara mengonsumsi pangan fungsional seperti kombucha yang kaya akan zat gizi dan asam organik. Secara umum kombucha terbuat dari teh hitam, namun peneliti melakukan inovasi pembuatan kombucha yang berbahan dasar temu mangga

**Tujuan :** Menganalisis aktivitas enzim  $\alpha$ -glukosidase, kadar vitamin C dan senyawa bioaktif pada kombucha yang terbuat dari temu mangga (*Curcuma mangga*).

**Metode:** Desain penelitian menggunakan metode eksperimental dengan rancangan acak lengkap (RAL) dengan 1 faktor yaitu lama fermentasi. Pengujian aktivitas inhibisi enzim  $\alpha$ -glukosidase dan kadar vitamin C dilakukan menggunakan spektrofotometri UV-Vis, pengujian senyawa bioaktif menggunakan LC-HRMS (*Liquid Chromatography High-Resolution Mass Spectrometry*). Hubungan antar kelompok aktivitas inhibisi enzim  $\alpha$ -glukosidase dan kadar vitamin C dianalisis dengan uji ANOVA (*Analysis of Variance*) dan dilanjutkan uji *Post Hoc Tukey* untuk menentukan kelompok mana yang berbeda.

**Hasil:** Terdapat perbedaan yang signifikan antara lama fermentasi dengan aktivitas inhibisi enzim  $\alpha$ -glukosidase ( $p=0,000$ ). Tidak terdapat perbedaan yang signifikan antara lama fermentasi dengan kadar vitamin C pada sampel kombucha temu mangga ( $p=0,537$ ). Fermentasi meningkatkan kandungan bioaktif dalam kombucha temu mangga sehingga dapat dijadikan sebagai pangan fungsional antidiabetes.

**Simpulan :** Terdapat perbedaan yang signifikan antara lama fermentasi dengan aktivitas inhibisi enzim  $\alpha$ -glukosidase, namun tidak terdapat perbedaan signifikan antara lama fermentasi dan kadar vitamin C, sedangkan fermentasi meningkatkan kandungan bioaktif dalam kombucha temu mangga.

**Kata kunci :** Diabetes Melitus, Kombucha, Temu Mangga, vitamin C, Enzim  $\alpha$ -glukosidase

## ABSTRACT

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**Background:** Type 2 diabetes mellitus (T2DM) is a metabolic disease that has negative impacts with a continuously increasing prevalence in Indonesia. This disease is characterized by an increase in blood glucose levels caused by various biological factors, such as dysfunction of the pancreatic  $\beta$  cells that secrete insulin. One of the important alternatives for managing diabetes is through the consumption of functional foods such as kombucha, which is rich in nutrients and organic acids. Generally, kombucha is made from black tea, but researchers have innovated the production of kombucha based on mango ginger.

**Objective:** To analyze the activity of the  $\alpha$ -glucosidase enzyme, vitamin C content, and bioactive compounds in kombucha made from mango ginger (*Curcuma mangga*).

**Method:** The research design uses an experimental method with a completely randomized design (CRD) with 1 factor, namely fermentation time. The testing of  $\alpha$ -glucosidase enzyme inhibition activity and vitamin C content was conducted using UV-Vis spectrophotometry, and the testing of bioactive compounds was performed using LC-HRMS (Liquid Chromatography High-Resolution Mass Spectrometry). Differences between groups in  $\alpha$ -glucosidase enzyme inhibition activity and vitamin C levels were analyzed using ANOVA (Analysis of Variance) and followed by the Post Hoc Tukey test to determine which groups were different.

**Results:** There is a significant difference between the fermentation duration and the activity of  $\alpha$ -glucosidase enzyme inhibition ( $p=0.000$ ). There is no significant difference between the fermentation duration and the vitamin C content in the mango ginger kombucha sample ( $p=0.537$ ). Fermentation increases the bioactive content in mango ginger kombucha, making it a potential functional food with antidiabetic.

**Conclusion:** There is a significant difference between the fermentation duration and the inhibition activity of the  $\alpha$ -glucosidase enzyme, but there is no significant difference between the fermentation duration and the vitamin C content. Meanwhile, fermentation increases the bioactive content in mango ginger kombucha.

**Keywords :** Diabetes Mellitus, Kombucha, Temu Mangga, Vitamin C,  $\alpha$ -Glucosidase Enzyme