# INTISARI

Prevalensi diabetes melitus terus meningkat tiap tahun sehingga diperlukan penemuan obat baru yang poten sebagai alternatif tata laksana terapi. Senyawa analog kurkumin A126, A144, B103, B126 dan B154 memiliki potensi sebagai obat antidiabetes. Namun ketersediaan dan nilai ekonomis bahan baku dalam sintesis A126, A144, B103, B126 dan B154 masih menjadi permasalahan. Tujuan dari penelitian ini adalah untuk mendapatkan sintesis A126, A144, B103, B126 dan B154 yang optimal dan megevaluasi potensinya sebagai antidiabetes.

Sintesis A126, A144, B103, B126 dan B154 dilakukan dengan bantuan reaktor gelombang mikro. Optimasi dilakukan dengan *Response Surface Model Box- Behnken Design* (RSM BBD) pada variabel waktu (17 – 26 menit), suhu (75 – 85 °C), dan volume pelarut asam asetat glasial (0 – 1 mL). Hasil optimal dievaluasi berdasarkan respon rendemen senyawa. Konfirmasi senyawa hasil sintesis meliputi titik lebur, densitometri, dan elusidasi struktur. Senyawa A126, A144, B103, B126 dan B154 dibuat dalam seri konsentrasi dan diuji aktivitasnya sebagai antidiabetes secara *in vitro* dengan model uji *S. cerevisiae* murni dan teknis pada dua konsentrasi larutan glukosa (10 dan 25 mM). Uji ini dilakukan untuk melihat respon % kapasitas penyerapan glukosa dengan kontrol positif metformin.

Hasil penelitian menunjukkan bahwa senyawa A126, A144, B103, B126 dan B154 dapat disintesis dengan bantuan reaktor gelombang mikro yang masing masing memberikan hasil optimal pada waktu 26, 26, 25, 23, 26 menit; suhu 75, 85, 83; 84, 85 °C; dan volume asam asetat glasial 0,54; 0,59; 0,02; 0,33; 0 mL. Rendemen relatif optimal secara berturut-turut 73,11%, 78,02%, 48,30%, 64,42%, dan 57,50%. Hasil uji aktivitas antidiabetes terhadap *S. cerevisiae* menunjukkan bahwa *S. cerevisiae* murni dan teknis dapat digunakan sebagai model uji antidiabetes dan keduanya tidak berbeda signifikan ($p$>0,05), % kapasitas penyerapan glukosa pada konsentrasi 10 mM lebih besar dibanding 25 mM ($p$<0,05). Senyawa A126, A144, B103, B126 dan B154 dapat meningkatkan % kapasitas penyerapan glukosa pada *S. cerevisiae* lebih baik dibandingkan metformin dengan persentase terbaik berurut 27,24% (RG25), 56,70% (RG10), 42,46% (MG10), 25,80% (MG10), dan 32,41% (MG10). Senyawa dengan aktivitas antidiabetes paling baik pada kelompok G10 adalah A144, sedangkan G25 yaitu A126.

**Kata kunci :** *Analog kurkumin, gelombang mikro, S. cerevisiae, in vitro, antidiabetes*

# ABSTRACT

The prevalence of diabetes mellitus continues to increase every year, resulting in the discovery of new drugs that have potential as alternative therapeutic treatments. The curcumin analogue compounds A126, A144, B103, B126 and B154 have potential as antidiabetic drugs. However, the availability and economic value of raw materials in the synthesis of A126, A144, B103, B126 and B154 is still a problem. The aim of this research is to obtain optimal synthesis of A126, A144, B103, B126 and B154 and evaluate their potential as antidiabetics.

The synthesis of A126, A144, B103, B126 and B154 was carried out with the help of a microwave reactor. Optimization was carried out using the Response Surface Model Box-Behnken Design (RSM BBD) for the variables time (17 – 26 minutes), temperature (75 – 85 °C), and volume of glacial acetic acid as a solvent (0 – 1 mL). Optimal results were evaluated based on the relative yield as a response of the compound. Confirmation of the synthesized compound includes melting point, densitometry, and elucidation of structure. Compounds A126, A144, B103, B126 and B154 were prepared in a series of concentrations and tested for antidiabetic activity in vitro with pure and technical *S. cerevisiae* test models at two concentrations of glucose (10 and 25 mM). This test was carried out to see the % glucose absorption capacity with the positive control metformin.

The research results showed that compounds A126, A144, B103, B126 and B154 could be synthesized with the help of a microwave reactor, each of which gave optimal results at 26, 26, 25, 23, 26 minutes; temperature 75, 85, 83; 84, 85 °C; and the volume of glacial acetic acid 0.54; 0.59; 0.02; 0.33; 0 mL. The optimal relative yield percentages were 73.11%, 78.02%, 48.30%, 64.42%, and 57.50%. The results of the antidiabetic activity test against *S. cerevisiae* show that pure and technical *S. cerevisiae* can be used as an antidiabetic test model and the two are not significantly different ($p$>0.05), % glucose absorption capacity at a 10 mM is greater than 25 mM ($p$ <0.05). Compounds A126, A144, B103, B126 and B154 can increase the % glucose absorption capacity in *S. cerevisiae* better than metformin with the best percentages being 27.24% (RG25), 56.70% (RG10), 42.46% (MG10), 25.80% (MG10), and 32.41% (MG10). The compound with the best antidiabetic activity in the G10 group is A144, while G25 is A126.

***Keywords***: *Curcumin analog, microwave, S. cerevisiae, in vitro, antidiabet*