



SINTESIS TURUNAN EUGENOL DAN UJI INHIBISINYA TERHADAP ALFA-AMILASE

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INTISARI

Senyawa 4-(2-bromopropil)-2-metoksifenol (turunan eugenol **A**), 4-(2-bromopropil)-1,2-dimetoksi benzena (turunan eugenol **B**), 4-(2-kloropropil)-2-metoksifenol (turunan eugenol **C**), dan 4-(2-kloropropil)-1,2-dimetoksi benzena (turunan eugenol **D**) telah berhasil disintesis. Sintesis turunan eugenol berlangsung melalui reaksi adisi Markovnikov dengan metode hidrobrominasi dan hidroklorinasi terhadap bahan dasar eugenol dan metileugenol masing-masing menggunakan HBr 47% dan HCl 37% yang dimediasi silika gel 60 dalam kondisi bebas pelarut organik pada suhu 5 °C selama 1 jam. Reaksi dilanjutkan dalam suhu ruang selama 288 jam, kemudian campuran diekstraksi dan dihilangkan asam halida yang masih tersisa dengan larutan NaHCO₃. Produk hasil sintesis dikarakterisasi menggunakan Kromatografi Lapis Tipis (KLT), *Gas Chromatography-Mass Spectrophotometer* (GC-MS), *Fourier Transform Infrared Spectrophotometer*, dan *Nuclear Magnetic Resonance* (NMR).

Hasil penelitian diperoleh turunan eugenol **A** berupa cairan berwarna coklat kehitaman, turunan eugenol **B** berupa cairan berwarna kecoklatan, turunan eugenol **C** berupa cairan berwarna coklat kehitaman, dan turunan eugenol **D** berupa cairan berwarna kecoklatan dengan masing-masing persen hasil 78,27%, 76,68%, 94,17%, dan 76,63%. Uji inhibisi senyawa turunan eugenol **A**, **B**, **C**, dan **D** terhadap α -amilase telah dilakukan. Senyawa turunan eugenol **A**, **B**, dan **C** berpotensi sebagai inhibitor α -amilase. Aktivitas inhibisi tertinggi ditemukan pada senyawa **A** dan **C** dengan inhibisi pada konsentrasi 10 mM masing-masing 99,91 dan 99,38%, sedangkan aktivitas inhibisi tertinggi senyawa **B** diketahui sebesar 99,94% pada konsentrasi 12,5 mM.

Kata kunci: eugenol, turunan, halogenasi, inhibisi, alfa-amilase



***SYNTHESIS OF EUGENOL DERIVATIVES AND
THEIR INHIBITION ASSAYS AGAINST ALPHA-AMYLASE***

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ABSTRACT

Compounds of 4-(2-bromopropyl)-2-methoxyphenol (derivative of eugenol **A**), 4-(2-bromopropyl)-1,2-dimethoxybenzene (derivative of eugenol **B**), 4-(2-chloropropyl)-2-methoxyphenol (derivative of eugenol **C**), and 4-(2-chloropropyl)-1,2-dimethoxybenzene (derivative of eugenol **D**) have been successfully synthesized. Synthesis of eugenol derivatives has been performed through the Markovnikov addition reaction with the hydrobromination and hydrochlorination of eugenol and methyl eugenol compounds using 47% HBr and 37% HCl mediated by silica gel 60 under organic solvent-free conditions at 5 °C for 1 hour. The reaction was continued at room temperature for 288 hours, then the mixture was extracted and removed halide acid residues with NaHCO₃ solution. Synthesized products were characterized using Thin Layer Chromatography (TLC), Gas Chromatography-Mass Spectrophotometer (GC-MS), Fourier Transform Infrared (FTIR) Spectrophotometer, and Nuclear Magnetic Resonance (NMR).

The results showed that the derivative of eugenol **A** obtained as a blackish-brown liquid, the derivative of eugenol **B** obtained as brown-colored liquid, the derivative of eugenol **C** obtained as blackish-brown liquid, and the derivative of eugenol **D** obtained as brownish-colored liquid with percent yield of 78.27%, 76.68%, 94.17%, and 76.63%, respectively. The result of the inhibition of eugenol **A**, **B**, **C**, and **D** derivatives against the α -amylase has been carried out. The derivatives of eugenol **A**, **B**, and **C** have the potential as an α -amylase inhibitor. The highest inhibitory activity at concentrations of 10 mM for compounds **A** and **C** were 99.91% and 99.38%, respectively, while the highest inhibitory activity of compound **B** is 99.94% at a concentration of 12.5 mM.

Keywords: eugenol, derivatives, halogenation, inhibition, alpha-amylase