

## SINTESIS EUGENOL EPOKSIDA DAN METIL EUGENOL EPOKSIDA SERTA UJI AKTIVITASNYA SEBAGAI ANTIMALARIA TERHADAP *Plasmodium falciparum* FCR-3

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### INTISARI

Penelitian dengan judul “Sintesis Eugenol Epoksida dan Metil Eugenol Epoksida serta Uji Aktivitasnya sebagai Antimalaria terhadap *Plasmodium falciparum* FCR-3” telah dilakukan. Tujuan dari penelitian ini adalah untuk mensintesis senyawa eugenol epoksida dan metil eugenol epoksida serta melakukan kajian aktivitas antimalariannya terhadap *Plasmodium falciparum* FCR-3.

Penelitian diawali dengan sintesis metil eugenol menggunakan eugenol dan metil iodida dengan basa NaOH. Mekanisme reaksi sintesis tersebut didasarkan pada sintesis eter Williamson. Sintesis metil eugenol dilakukan dengan metode refluks selama 4 jam. Selanjutnya, metil eugenol hasil sintesis diepoksidasi menggunakan m-CPBA. Metil eugenol direaksikan dengan m-CPBA menggunakan pelarut kloroform selama 8 jam pada suhu 40,0 °C, kemudian diaduk selama 16 jam pada suhu ruang. Produk samping dipisahkan dengan penambahan NaHCO<sub>3</sub> sehingga terjadi sistem reaksi 2 fasa. Eugenol epoksida juga disintesis dengan cara epoksidasi yang sama tetapi reaksi berjalan selama 4 jam pada suhu 40,0 °C. Metil eugenol epoksida dan eugenol epoksida hasil sintesis dikarakterisasi menggunakan FTIR, GC-MS, <sup>1</sup>H-NMR, dan <sup>13</sup>C-NMR, kemudian diuji aktivitas antimalariannya terhadap *Plasmodium falciparum* FCR-3.

Metil eugenol epoksida telah berhasil disintesis dengan persen hasil 78%, sedangkan eugenol epoksida diperoleh persen hasil 95%. Kedua senyawa tersebut diuji aktivitas antimalariannya terhadap *Plasmodium falciparum* FCR-3 secara *in vitro*. Metil eugenol epoksida memiliki aktivitas antimalaria golongan sedang dengan nilai IC<sub>50</sub> 29,40 µM, sedangkan eugenol epoksida memiliki aktivitas antimalaria golongan aktif dengan nilai IC<sub>50</sub> sebesar 16,85 µM.

Kata kunci: antimalaria, epoksida, eugenol, metil eugenol

## SYNTHESIS OF EUGENOL EPOXIDE AND METHYL EUGENOL EPOXIDE AND THEIR ACTIVITY ASSAY AS ANTIMALARIA AGAINST *Plasmodium falciparum* FCR-3

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### ABSTRACT

The research entitled "Synthesis of Eugenol Epoxide and Methyl Eugenol Epoxide and Their Activity Assay as Antimalaria against *Plasmodium falciparum* FCR-3" has been conducted. The purpose of this study is to synthesize eugenol epoxide and methyl eugenol epoxide compounds and study their antimalarial activity against *Plasmodium falciparum* FCR-3.

The study began with synthesis of methyl eugenol using eugenol and methyl iodide with NaOH base. The reaction mechanism of synthesis is based on the Williamson ether synthesis. The synthesis of methyl eugenol was carried out by the method of reflux for 4 hours. Then, methyl eugenol synthesized was epoxidized using m-CPBA. Methyl eugenol was reacted with m-CPBA with chloroform as solvent for 8 hours at 40.0 °C, then stirred for 16 hours at room temperature. The side products were separated by the addition of NaHCO<sub>3</sub> so that a 2-phase reaction system occurred. Eugenol epoxide was also synthesized by the same epoxidation method, but the reaction ran for 4 hours at 40.0 °C. Synthesized methyl eugenol epoxide and eugenol epoxide were characterized using FTIR, GC-MS, <sup>1</sup>H-NMR, and <sup>13</sup>C-NMR, then tested for their antimalarial activity against *Plasmodium falciparum* FCR-3.

The methyl eugenol epoxide was successfully synthesized in 78% yield while eugenol epoxide was obtained in 95% yield. Both compounds were tested for antimalarial activity against *Plasmodium falciparum* FCR-3 through In Vitro experiment. Methyl eugenol epoxide has moderate antimalarial activity with IC<sub>50</sub> value of 29.40 µM, while eugenol epoxide has active antimalarial activity with IC<sub>50</sub> value of 16.85 µM.

Keywords: antimalaria, epoxide, eugenol, methyl eugenol