

**SINTESIS TURUNAN KALKON DAN PIRAZOLINA
BERBAHAN DASAR 4-KLOROBENZALDEHIDA SERTA
UJI AKTIVITASNYA SEBAGAI ANTIMALARIA**

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INTISARI

Sintesis senyawa *E*-1-(4-aminofenil)-3-(4-klorofenil)-2-propen-1-on (kalkon **1**), *E*-3-(4-klorofenil)-1-(2,4-dimetoksifenil)-2-propen-1-on (kalkon **2**), *N*-fenil-3-(4-klorofenil)-5-(4-aminofenil)-2-pirazolina (*N*-fenilpirazolina) dan 5-(4-klorofenil)-3-(2,4-dimetoksifenil)-1H-pirazol (pirazol) telah dilakukan. Senyawa kalkon disintesis melalui reaksi kondensasi *Claisen-Schmidt*, sementara sintesis senyawa pirazolina dilakukan melalui reaksi siklokondensasi senyawa kalkon dengan suatu hidrazin.

Sintesis senyawa kalkon **1** dan **2** dilakukan dengan mereaksikan 4-klorobenzaldehida dan 4-aminoasetofenon atau 2,4-dimetoksiasetofenon dalam pelarut etanol menggunakan katalis KOH 40% dengan metode pengadukan. Tahap selanjutnya, sintesis *N*-fenilpirazolina dilakukan dengan mereaksikan kalkon **1** dan fenilhidrazin menggunakan katalis NaOH 40% pada suhu refluks selama 1 jam. Reaksi siklisasi terhadap kalkon **2** menggunakan hidrazin hidrat dilakukan dengan metode pengadukan selama 24 jam. Elusidasi struktur senyawa produk dilakukan menggunakan KLT, KLT *scanner*, FT-IR, GC-MS, ¹H- dan ¹³C-NMR. Produk hasil sintesis diuji aktivitasnya sebagai antimalaria dengan metode penghambatan polimerisasi hem.

Hasil sintesis senyawa kalkon **1**, **2**, *N*-fenilpirazolina diperoleh dengan rendemen berturut-turut sebesar 97, 94, dan 42%. Reaksi siklokondensasi antara kalkon **2** dan hidrazin hidrat menghasilkan pirazol dengan rendemen 95%. Hasil uji aktivitas antimalaria melalui penghambatan polimerisasi hem terhadap senyawa kalkon **1**, **2**, dan pirazol memberikan nilai IC₅₀ berturut-turut sebesar 26,50; 56,33; dan 113,56 mM. Hasil ini menunjukkan bahwa senyawa kalkon **1** dapat menghambat terjadinya polimerisasi hematin, sehingga berpotensi sebagai agen antimalaria.

Kata kunci: 4-klorobenzaldehida, antimalaria, kalkon, pirazolina, siklokondensasi

SYNTHESIS OF CHALCONE AND PYRAZOLINE DERIVATIVES FROM 4-CHLOROBENZALDEHYDE AND THEIR ACTIVITIES TEST AS ANTIMALARIA

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ABSTRACT

Synthesis of compound *E*-1-(4-aminophenyl)-3-(4-chlorophenyl)-2-propen-1-on (chalcone **1**), *E*-3-(4-chlorophenyl)-1-(2,4-dimethoxyphenyl)-2-propen-1-on (chalcone **2**), *N*-phenyl-3-(4-chlorophenyl)-5-(4-aminophenyl)-2-pyrazoline (*N*-phenylpyrazoline) and 5-(4-chlorophenyl)-3-(2,4-dimethoxyphenyl)-1H-pyrazole (pyrazole) have been carried out. Chalcone **1** and **2** were synthesized by *Claisen-Schmidt* condensation reaction, while the synthesis of pyrazoline compounds was done by cyclocondensation reaction of chalcone with hydrazine.

The synthesis of chalcone **1** and **2** was performed by reacting 4-chlorobenzaldehyde with 4-aminoacetophenone or 2,4-dimethoxyacetophenone in ethanol using 40% KOH as a catalyst. The next step was synthesis of *N*-phenylpyrazoline by mixing chalcone **1** and phenylhydrazine using 40% NaOH as a catalyst under reflux for 1 h. Cyclization reaction of chalcone **2** with hydrazine hydrate. was carried out by stirring method for 24 h. Structure elucidation of the products was performed using TLC, TLC scanner, FT-IR, GC-MS, ¹H-, and ¹³C-NMR. The synthesized products were tested for its activity as an antimalarial agent by the heme polymerization inhibition method.

The product of chalcone **1**, **2**, and *N*-phenylpyrazoline was yielded in 97, 94, and 42%, respectively, while cyclocondensation reaction of chalcone **2** with hydrazine hydrate produced pyrazole in 95% yield. The antimalarial activity test showed that inhibition of heme polymerization by chalcone **1**, **2**, and pyrazole give IC₅₀ values of 26.50; 56.33; and 113.56 mM, respectively. These results indicate that chalcone **1** could inhibit the hematin polymerization so that it has potential as an antimalarial agent.

Keywords: 4-chlorobenzaldehyde, antimalaria, chalcone, pyrazoline, cyclocondensation