Synthesis and antiplasmodial activity of 2-(4-methoxyphenyl)-4-phenyl-1,10-phenanthroline derivative compounds = Sintesis dan aktivitas antiplasmodium senyawa turunan 2-(4-metoksifenil)-4-fenil-1,10-fenantrolin

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Abstrak

Suatu metode sintesis yang unik telah digunakan dalam membuat senyawa turunan 2-(4-metoksifenil)-4-fenil-1,10-fenantrolin (5) dari 4-metoksibenzaldehida (1), asetofenon (2), dan 8-aminokuinolin (4) dengan reaksi kondensasi aldol dan reaksi siklisasi. Turunan-turunan senyawa tersebut diuji aktivitasnya melalui uji aktivitas antiplasmodial. Sintesis turunan senyawa 5 dilakukan dalam tiga tahap. Senyawa 3-(4-metoksifenil)-1-fenilpropenon3 disintesis melalui reaksi kondensasi aldol dari senyawa1 dan 2 dengan hasil 96,42%. Senyawa 5 disintesis melalui siklisasi senyawa 4 dan 3 dengan hasil 84,55%. Turunan senyawa 5 disintesis dari senyawa 5 menggunakan DMS dan DES yang direfluks berturut-turut selama 21 dan 22 jam untuk menghasilkan (1)-N-metil-9-(4-metoksifenil)-7-fenil-1,10-fenantrolinium sulfat (6) dan (1)-N-etil-9-(4-metoksifenil)-7-fenil-1,10-fenantrolinium sulfat (7) dengan rendemen hasil berturut-turut 91,42 dan 86,36%. Hasil uji in vitro aktivitas antiplasmodium dari turunan senyawa 5 (senyawa 6 dan 7) terhadap P.falciparum resistan klorokuin strain FCR3 menunjukkan bahwa senyawa 7 mempunyai aktivitas antimalaria lebih tinggi dari senyawa 5 and 6. Sedangkan, hasil uji in vitro aktivitas antiplasmodium terhadap P. falciparum sensitif klorokuin strain D10 menunjukkan bahwa senyawa6 mempunyai aktivitas antimalaria lebih tinggi dari senyawa 5 and 7.

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Abstract

A unique of synthetic methods was employed to prepare 2-(4 methoxyphenyl)-4-phenyl-1,10-phenanthroline (5) derivatives from 4-methoxy-benzaldehyde (1), acetophenone (2), and 8-aminoquinoline (4) with aldol condensation and cyclization reactions. The derivatives were tested through antiplasmodial test. The synthesis of derivatives compound 5 was conducted in three steps. The 3-(4-methoxyphenyl)-1 penylpropenone 3 was synthesized through aldol condensation of 1 and 2 which has a yield of 96.42%. The compound 5 was synthesized through cyclization of compound 4 and 3 with 84.55% yield. The derivative of compound 5 was synthesized from compound 5 using DMS and DES reagents which refluxed for 21 and 22 h, to produce (1)-N-methyl-9-(4-methoxyphenyl)-7-phenyl-1,10-phenanthrolinium sulfate (6) and (1)-N -ethyl-9-(4-methoxyphenyl)-7-phenyl-1,10-phenanthrolinium sulfate (7) with 91.42 and 86.36% yields, respectively.

Results of in vitro testing of antiplasmodial activity of compound 5 derivatives (i.e., compound 6 and 7) against chloroquine-resistant P. falciparum FCR3 strain showed that compound 7 had higher

antimalarial activity than compounds 5 and 6 .
Whereas, results of in vitro
testing against chloroquine-sensitive P.falciparum
D10 strain showed that compound 6
has higher antimalarial activity than compounds 5 and 7.