

SINTESIS TURUNAN PIRAZOLA DARI KURKUMIN HASIL ISOLASI BUBUK KUNYIT ACEH DAN UJI AKTIVITASNYA SEBAGAI KEMOSENSOR FLUORESENS ION TIMBAL(II)

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INTISARI

Telah dilakukan penelitian tentang aktivitas kemosensor berfluoresensi pirazola turunan dari kurkumin terhadap logam Pb^{2+} . Penelitian ini bertujuan untuk mengisolasi kurkumin dari bubuk kunyit Aceh, melakukan sintesis turunan pirazola dari kurkumin, dan mengevaluasi aktivitas serta selektivitasnya sebagai kemosensor kation logam Pb^{2+} .

Penelitian ini diawali dengan melakukan ekstraksi kunyit melalui metode maserasi dengan pelarut etil asetat, hasil ekstraksi didefatasi dengan petroleum eter dan direkristalisasi menggunakan isopropil alkohol sehingga diperoleh kurkumin dengan kemurnian tinggi. Selanjutnya, kurkumin hasil isolasi direaksikan dengan 2-hidrazinopiridin menggunakan katalis asam asetat dan direfluks selama 6 jam untuk menghasilkan pirazola kurkumin. Elusidasi struktur terhadap produk hasil sintesis dilakukan dengan spektrometer FTIR, 1H -NMR dan ^{13}C -NMR. Produk hasil sintesis diuji kemampuan kemosensor fluoresensinya terhadap logam Pb^{2+} dengan menentukan LOD, LOQ, *quantum yield* dan interferensinya.

Hasil isolasi menghasilkan kurkumin berupa padatan kuning oranye dengan rendemen 1,78% dan kemurnian 96,2%. Reaksi siklokondensasi menghasilkan pirazola kurkumin berupa padatan hijau kekuningan dengan rendemen 98,18% dan titik leleh 101,1–103,4 °C. Uji aktivitas kemosensor terhadap senyawa pirazola kurkumin menghasilkan sistem deteksi *turn-on* pada logam Pb^{2+} dengan nilai LOD dan LOQ sebesar 0,3 μM dan 0,91 μM . Selain itu, diperoleh nilai *quantum yield* yang kecil yaitu 0,057 dan interferensi yang cukup signifikan sehingga membuat pirazola kurkumin kurang selektif terhadap logam Pb^{2+} .

Kata kunci: fluoresensi, kemosensor, kurkumin, pirazola, rekristalisasi.

SYNTHESIS OF PYRAZOLE DERIVATIVE FROM ISOLATED CURCUMIN OF ACEH TURMERIC POWDER AND ITS ACTIVITY ASSAY AS LEAD(II) ION FLUORESCENT CHEMOSENSOR

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ABSTRACT

A research study was conducted to investigate the fluorescing chemosensor activity of pyrazole derived from curcumin on Pb^{2+} ions. This study aims to extract curcumin from Aceh turmeric powder, synthesize pyrazole derivatives of curcumin, and evaluate its activity and selectivity as a chemosensor for Pb^{2+} ions.

This research was initiated by extracting turmeric powder using the maceration method with ethyl acetate, the extraction results were defatted using petroleum ether and recrystallized with isopropyl alcohol to obtain highly pure curcumin. Next, the isolated curcumin was reacted under reflux for 6 h with 2-hydrazinopyridine in the presence of acetic acid catalyst to yield pyrazoles. The structure of the synthesized product was analyzed using FTIR, 1H -NMR, and ^{13}C -NMR spectrometers. The synthesized products were further evaluated as chemosensors for Pb^{2+} metal ions by determining their limits of detection (LOD), limits of quantification (LOQ), quantum yield, and interferences.

The result showed that curcumin was obtained as a yellow-orange solid with a yield of 1.78% and a purity of 96.2%. The cyclocondensation reaction produced pyrazole curcumin in the form of a yellowish-green solid with a yield of 98.18% and m.p. of 101.1–103.4 °C. Chemosensor activity test on pyrazole curcumin resulted in a turn-on detection system for Pb^{2+} metal with LOD and LOQ values of 0.30 μM and 0.91 μM . Additionally, the quantum yield value was relatively low at 0.057, and significant interference was observed, indicating that pyrazole curcumin displayed limited selectivity for Pb^{2+} metal ions.

Keywords: chemosensor, curcumin, fluorescence, pyrazole, recrystallization.