

**SINTESIS SENYAWA TURUNAN
NITROVANILIN AZINA SEBAGAI KEMOSENSOR KOLORIMETRI
UNTUK DETEKSI ANION SULFIDA**

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INTISARI

Telah disintesis dan diuji senyawa nitrovanilin azina (**NA**) sebagai kemosensor kolorimetri anion berbahan dasar vanilin. Senyawa **NA** diperoleh melalui dua tahap reaksi. Vanilin dinitrasi menghasilkan 5-nitrovanilin (5-NV) dan dilanjutkan kondensasi *Schiff base* dengan hidrazin hidrat. Semua produk hasil sintesis dielusidasi menggunakan FT-IR, GC-MS, DI-MS, ^1H -NMR, dan ^{13}C -NMR. Uji aktivitas sebagai kemosensor kolorimetri dilakukan terhadap anion yaitu F^- , Cl^- , Br^- , I^- , S^{2-} , CN^- , AcO^- , HCO_3^- , H_2PO_4^- , N_3^- , NO_2^- , SCN^- , ClO_3^- , dan NO_3^- .

Hasil reaksi nitrasi terhadap vanilin dengan asam nitrat diperoleh rendemen sebesar 71,72%, sedang nitrovanilin azina (**NA**) diperoleh dengan rendemen sebesar 76,41%. Pendeteksian anion ditentukan berdasarkan studi spektrofotometer UV-Vis dan pengamatan secara mata telanjang. Hasil uji ionokromik sebagai sensor anion menunjukkan bahwa kemosensor **NA** hanya selektif terhadap anion sulfida (S^{2-}) dalam pelarut DMF:HBS (9:1, v/v, 10 mM, pH = 7,4) dari warna kuning muda menjadi hijau tua. Nilai limit deteksi (LOD) sulfida secara kolorimetri diperoleh sebesar $1,43 \times 10^{-5}$ M (14,3 μM), sedangkan model interaksi *host-guest* (**NA-S²⁻**) yang terjadi melalui deprotonasi pada gugus -OH dengan rasio 1:1.

Kata kunci: vanilin, 5-nitrovanilin, azina, kemosensor, kolorimetri, sulfida

SYNTHESIS OF NITROVANILLIN AZINE DERIVATIVE FROM VANILLIN AS COLORIMETRIC CHEMOSENSOR FOR THE DETECTION OF SULFIDE ANION

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ABSTRACT

The compound nitrovanillin azine (NA) has been synthesized and tested as an anion colorimetric chemosensor based on vanillin. The NA compound was obtained through a two-step reaction. Vanillin was nitrated to yield 5-nitrovanillin (5-NV) and followed by condensation of *Schiff base* reaction with hydrazine hydrate. All synthesized products were elucidated using FT-IR, GC-MS, DI-MS, ^1H -NMR, and ^{13}C -NMR. Activity tests as colorimetric sensors were carried out on the anions, i.e., F^- , Cl^- , Br^- , I^- , S^{2-} , CN^- , AcO^- , HCO_3^- , H_2PO_4^- , N_3^- , NO_2^- , SCN^- , ClO_3^- , and NO_3^- .

The nitration of vanillin using nitric acid was obtained in 71.72% yield, while nitrovanillin azine (NA) was yielded in 76.41%. The anions detection were determined based on UV-Vis spectrophotometer studies and observations with the naked eyes. The results of the ionochromic test as an anion sensor showed that chemosensor NA was only selective for sulfide anion (S^{2-}) in DMF:HBS (9:1, v/v, 10 mM, pH = 7.4) from light yellow to dark green. The detection of limit value (LOD) is obtained by colorimetric at a concentration of 1.43×10^{-5} M (14.3 μM), while the host-guest interaction model (NA- S^{2-}) occurs through deprotonation of the -OH group with a ratio of 1:1.

Keywords: vanillin, 5-nitrovanillin, azine, colorimetric, chemosensor, sulfide