

## **SINTESIS VANILIN-AZINA (VA) SEBAGAI KEMOSENSOR KOLORIMETRI ANION SULFIDA**

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### **INTISARI**

Senyawa turunan azina, 4,4'-((1*E*,1'*E*)-hydrazine-1,2-diylidenebis(methanelylidene))bis(2-methoxyphenol) atau vanilin-azina (**VA**) telah disintesis dari bahan dasar vanilin dan diuji sebagai kemosensor kolorimetri anion untuk beberapa anion  $S^{2-}$ ,  $CN^-$ ,  $F^-$ ,  $Cl^-$ ,  $Br^-$ ,  $I^-$ ,  $N_3^-$ ,  $CH_3COO^-$ , dan  $NO_3^-$ . Aplikasi senyawa kemosensor **VA** dilakukan dengan analisis sampel air dan pada *paper strips*. Senyawa **VA** dengan rendemen 86% diperoleh dari reaksi kondensasi vanilin dengan hidrazin hidrat pada perbandingan mol 2:1. Reaksi dilakukan selama 24 jam pada suhu ruang. Struktur senyawa hasil sintesis **VA** dielusidasi menggunakan spektrofotometer FTIR, GC-MS,  $^1H$  NMR dan  $^{13}C$  NMR.

Uji senyawa kemosensor **VA** dilakukan dengan menambahkan larutan anion ke dalam larutan senyawa **VA** dengan pelarut DMF: HEPES *Buffer Solution* (HBS) (9:1, v/v, 10 mM, pH=7,4). Hasil uji menunjukkan bahwa senyawa **VA** selektif terhadap anion  $S^{2-}$  yang diikuti perubahan warna larutan **VA** dari tidak berwarna menjadi biru muda. Senyawa **VA** mampu mendeksi anion  $S^{2-}$  dalam waktu kurang dari 1 menit. Senyawa **VA** mempunyai nilai limit deteksi (LOD) sebesar  $5,4 \times 10^{-4}$  M. Penggunaan kemosensor **VA** untuk analisis kuantitatif pada sampel air kran mampu mendeteksi anion  $S^{2-}$  dengan % *recovery* yang tinggi, sedangkan *paper strips* mampu mendeteksi anion  $S^{2-}$  dengan perubahan warna putih menjadi kuning.

Kata kunci: Kemosensor, kolorimetri, vanilin, vanilin-azina, sulfida

## **SYNTHESIS OF VANILLIN-AZINE (VA) AS COLORIMETRIC CHEMOSENSOR OF SULFIDE ANION**

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### **ABSTRACT**

An azine derivative of 4,4'-((1*E*,1'*E*)-hydrazine-1,2-diylidenebis (methanelylidene))bis(2-methoxyphenol) or vanillin-azine (**VA**) has been synthesized from vanillin and tested as anion colorimetric chemosensors for several anions of  $S^{2-}$ ,  $CN^-$ ,  $F^-$ ,  $Cl^-$ ,  $Br^-$ ,  $I^-$ ,  $N_3^-$ ,  $CH_3COO^-$ , and  $NO_3^-$ . The application of **VA** chemosensor compounds was carried out by analyzing water samples and on paper strips. The **VA** compound with a yield of 86% was obtained from the condensation reaction of vanillin with hydrazine hydrate at a mole ratio of 2:1. The reaction was carried out for 24 hours at room temperature. The **VA** structure was elucidated using FTIR, GC-MS,  $^1H$  NMR, and  $^{13}C$  NMR spectrophotometers.

Test of **VA** compound as a colorimetric chemosensor was carried out by adding a solution of several anions into the **VA** solution in DMF:HEPES Buffer Solutions (HBS) solvent (9:1, v/v, 10 mM, pH=7.4). The test results showed that the **VA** compound was selective for the  $S^{2-}$  anion followed by a color change of the **VA** solution from colorless to light blue. The **VA** compound can detect  $S^{2-}$  anions in less than 1 minute. The **VA** chemosensor has a detection limit value (LOD) of  $5.4 \times 10^{-4}$  M. The use of **VA** chemosensor for quantitative analysis on tap water samples can detect  $S^{2-}$  anions with high recovery while paper strips can detect  $S^{2-}$  anions with a color change from white to yellow.

**Keywords:** Chemosensor, colorimetry, vanillin, vanillin-azine, sulfide