

## **SINTESIS FILM PVA-KITOSAN TERIMOBILISASI DIMETILGLIOKSIM UNTUK DETEKSI KOLORIMETRI ION Ni(II) DALAM AIR**

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### **INTISARI**

Sintesis film PVA-kitosan sebagai matriks imobilisasi dimetilglioksim (DMG) untuk deteksi kolorimetri Ni(II) telah dilakukan. Penelitian ini bertujuan untuk mengembangkan film detektor Ni(II) berbasis matriks padat, mempelajari kondisi optimum *sensing* dan menentukan interferensi ion logam lain.

Film PVA-kitosan-DMG dibuat dengan mencampurkan larutan PVA dan kitosan perbandingan volume 6:4 kemudian dilakukan adsorpsi DMG dari larutan. Konsentrasi PVA, kitosan dan DMG yang digunakan masing-masing adalah 4, 2, dan 1% (b/v). Film yang dihasilkan dikarakterisasi menggunakan Spektrometer FTIR dan SEM. Hasil karakterisasi menunjukkan adanya interaksi antara PVA, kitosan, DMG, dan senyawa kompleks Ni(DMG)<sub>2</sub>.

Keberadaan Ni(II) dalam sampel di atas batas deteksi film ditandai dengan perubahan warna film dari kuning transparan menjadi merah muda sebagai hasil reaksi antara Ni(II) dengan DMG. Pengukuran absorbansi film dilakukan pada panjang gelombang 550 nm. Respon optimum film diperoleh setelah proses *sensing* 12 menit pada pH 7. Linieritas kurva kalibrasi diperoleh pada rentang 0-50 mg L<sup>-1</sup> dengan nilai R<sup>2</sup> sebesar 0,999, batas deteksi dan batas kuantifikasi sebesar 0,363 dan 1,21 mg L<sup>-1</sup>. Deteksi menggunakan film juga memiliki presisi dan akurasi yang cukup baik dengan nilai RSD < 5% dan nilai persen perolehan kembali 96-108%. Keberadaan Fe(III) dan Cu(II) dengan konsentrasi 2 dan 4 kali lebih tinggi dapat menurunkan absorbansi, sedangkan keberadaan Co(II) dan Cr(VI) dengan konsentrasi 2 dan 4 kali lebih tinggi dapat menaikkan absorbansi.

**Kata kunci:** deteksi kolorimetri Ni(II), DMG, film PVA-kitosan

## **SYNTHESIS OF DIMETHYLGLOXIME-IMMOBILIZED PVA-CHITOSAN FILM FOR COLORIMETRIC DETECTION OF Ni(II) IN AQUEOUS SOLUTION**

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### **ABSTRACT**

The PVA-chitosan film has been synthesized as a matrix for the immobilization of dimethylglyoxime (DMG) for colorimetric detection of Ni(II). The aims of this research were to develop a Ni(II) detector based on solid matrix film, to study optimum sensing condition and to determine the interference of other ions.

The film was prepared by mixing 4% (w/v) PVA solution and 2% (w/v) chitosan solution with a volume ratio of 6:4, then the films were immersed in a 1% (w/v) DMG solution. The resulted film was characterized by using FTIR spectrometer and Scanning Electron Microscope (SEM). The interaction between PVA, chitosan, DMG and Ni(DMG)<sub>2</sub> complex were observed using the FTIR spectra and SEM micrograph.

In the presence of Ni(II), the color of the film changed from transparent yellow into pink as a result of the reaction between Ni(II) with DMG. The absorbance measurement was carried out at a wavelength of 550 nm. The optimum response of the film was obtained at pH 7 for 12 minutes of sensing time. The linearity of the calibration curve was obtained in the concentration range of 0-50 mg L<sup>-1</sup>, with a coefficient correlation of 0.999, limit of detection and limit of quantification is 0.363 and 1.21 mg L<sup>-1</sup>, respectively. The film has good precision and accuracy with relative standard deviation was less than 5% and the % recovery value between 96-108%. The presence of Fe(III) and Cu(II) with concentrations of twice and four times higher than Ni(II) give result in absorbance decrease, whereas the presence of Co(II) and Cr(VI) with concentrations of twice and four times higher give an absorbance increase.

**Keywords:** colorimetric detection of Ni(II), DMG, PVA-chitosan film