

**SINTESIS FILM ALGINAT/PEKTIN TERIMOBILISASI  
1,5-DIFENILKARBAZIDA UNTUK PENENTUAN Cr(VI)  
SECARA KOLORIMETRI**

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**INTISARI**

Film alginat/pektin terimobilisasi 1,5-Difenilkarbazida (DPC) telah berhasil disintesis untuk penentuan Cr(VI) secara kolorimetri. Penelitian ini bertujuan untuk mendapatkan kondisi optimum penentuan Cr(VI) serta validitas metode menggunakan film alginat/pektin-DPC. Pengaruh logam interferen dipelajari untuk mengetahui selektivitas dari film alginat/pektin-DPC.

Sintesis film alginat/pektin dilakukan dengan melarutkan serbuk alginat dan pektin dalam akuades hingga homogen. Film yang terbentuk di taut-silang dengan larutan  $\text{CaCl}_2$ . Imobilisasi DPC ke dalam film alginat/pektin dilakukan dengan metode perendaman. Karakteristik film dianalisis menggunakan FTIR dan SEM. Kondisi optimum deteksi didapatkan dengan mengukur absorbansi film pada variasi konsentrasi DPC, CTAB (*Cetyl Trimethyl Ammonium Bromide*), pH dan waktu deteksi. Selektivitas film diuji dengan membandingkan absorbansi film terhadap larutan Cr(VI) sebelum dan setelah penambahan logam interferen.

Konsentrasi optimum DPC dan CTAB yang dapat terimobilisasi ke dalam film alginat/pektin dengan rasio 1:4 berturut-turut sebesar 0,3% dan 1%. Absorbansi film optimum diukur pada panjang gelombang 545 nm setelah proses deteksi selama 8 menit pada pH 5. Film alginat/pektin-DPC memiliki selektivitas yang baik terhadap Cr(VI) dengan adanya logam interferen Cu(II), Co(II), Zn(II), Ni(II), Fe(III), Pb(II) dan Cr(III) pada konsentrasi di bawah  $20 \text{ mg L}^{-1}$ . Linearitas film alginat/pektin-DPC adalah 0,9976 dengan batas deteksi dan batas kuantifikasi sebesar  $0,232 \text{ mg L}^{-1}$  dan  $0,772 \text{ mg L}^{-1}$ . Film alginat/pektin-DPC memiliki presisi dan akurasi yang baik dengan nilai  $\text{RSD} < 5\%$  dan hasil perolehan kembali Cr(VI) sebesar 90-108%.

**Kata Kunci:** DPC, film alginat/pektin, kolorimetri, Cr(VI)

**SYNTHESIS OF 1,5-DIPHENYLCARBAZIDE IMMOBILIZED  
ALGINATE/PECTIN FILMS FOR COLORIMETRIC  
DETERMINATION OF Cr(VI)**

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**ABSTRACT**

Alginate/pectin films immobilized 1,5-Diphenylcarbazide (DPC) have been synthesized for colorimetric determination of Cr(VI). The aims of this study were to obtain the optimum conditions of Cr(VI) determination and the validity of the method using alginate/pectin-DPC films. The influence of interference metals were studied to determine the selectivity of alginate/pectin-DPC films.

The synthesis of alginate/pectin films were carried out by dissolving alginate and pectin into distilled water until homogenous, then cross-linked with CaCl<sub>2</sub>. Immobilization of DPC to alginate/pectin films were done by immersion method. The characteristics of the films were analyzed using FTIR and SEM. The optimum conditions were determined by measuring the absorbance of the film at various pH, time of detection, DPC and CTAB concentrations. The selectivity of the film was determined by comparing the absorbance of the film to the solution of Cr(VI) before and after the addition of interference metal.

The optimum concentration of DPC and CTAB could be immobilized in alginate/pectin films in ratio 1:4 was 0.3% and 1%, respectively. The optimum absorbance of the films was measured at 545 nm after 8 minutes at pH 5. Alginate/pectin-DPC films have good selectivity for Cr(VI) in the presence of interference metals Cu(II), Co(II), Zn(II), Ni(II), Fe(III), Pb(II) and Cr(III) at concentrations less than 20 mg L<sup>-1</sup>. The linearity of the alginate/pectin-DPC films was 0.9976 with limit of detection and limit of quantification as low as 0.232 mg L<sup>-1</sup> and 0.772 mg L<sup>-1</sup>. Film sensors have good precision and accuracy with RSD<5% and recovery value between 90-108%.

**Keywords:** alginate/pectin films, DPC, colorimetry, Cr(VI)