

**SINTESIS FILM ALGINAT/PEKTIN TERIMOBILISASI  
1,10-FENANTROLIN UNTUK DETEKSI SECARA KOLORIMETRI  
ION Fe(II)**

Nindya Tri Muliawati  
17/418587/PPA/05371

**INTISARI**

Sintesis film alginat/pektin sebagai matriks imobilisasi 1,10-fenantrolin untuk deteksi kolorimetri ion Fe(II) telah dilakukan. Penelitian ini bertujuan untuk mempelajari pengembangan metode deteksi ion Fe(II) berbasis film matriks padat, menentukan kondisi optimum deteksi serta menguji kemampuan film alginat/pektin-fenantrolin sebagai detektor kolorimetri ion Fe(II) melalui berbagai parameter validasi metode.

Film alginat/pektin-fenantrolin dibuat dengan mencampurkan alginat dan pektin yang dilarutkan dalam akuades hingga homogen kemudian dipanaskan pada suhu 55 °C. Film alginat/pektin kemudian direndam dalam larutan CaCl<sub>2</sub> 2% dan 1,10-fenantrolin masing-masing selama 24 jam. Film yang dihasilkan kemudian dikeringkan dan dikarakterisasi menggunakan FTIR dan SEM. Penentuan kondisi optimum deteksi dan parameter validasi metode seperti linearitas, batas deteksi dan batas kuantisasi, presisi, selektivitas serta akurasi dilakukan dengan mengukur absorbansi film menggunakan Spektrofotometer UV-Vis.

Konsentrasi optimum larutan fenantrolin untuk imobilisasi pada film alginat/pektin sebesar 0,2% b/v dalam etanol. Pengukuran absorbansi film optimum dilakukan pada panjang gelombang 513 nm pada pH 2 selama 2 menit. Film memiliki selektivitas yang baik terhadap ion Fe(II) dengan keberadaan ion-ion logam interferen lain seperti Cu(II), Co(II), Zn(II), Ni(II), Pb(II), Ca(II) dan Mg(II). Linearitas film alginat/pektin-fenantrolin adalah 0,9997 dengan batas deteksi dan batas kuantisasi masing-masing sebesar 0,446 dan 1,350 mg L<sup>-1</sup>. Film sensor memiliki presisi dan akurasi yang cukup baik dengan nilai RSD di bawah 5% dan persen perolehan kembali sebesar 102-110%.

Kata kunci: film alginat/pektin, deteksi kolorimetri Fe(II), fenantrolin

**SYNTHESIS OF ALGINATE/PECTIN FILM IMMOBILIZED  
1,10-PHENANTHROLINE FOR COLORIMETRIC DETECTION OF  
Fe(II) ION**

Nindya Tri Muliawati  
17/418587/PPA/05371

**ABSTRACT**

Synthesis of alginate/pectin film as immobilization matrix of 1,10-phenanthroline for detection of colorimetry of Fe(II) ions has been conducted. The purpose of this study was to develop a detection method for Fe(II) ion based on solid matrix film, to determine the optimal detection conditions, and to examine the ability of alginate/pectin-phenanthroline film as Fe(II) ions colorimetric detector through various parameters for validation of the method.

The alginate/pectin-phenanthroline film was made by mixing alginate and pectin which was dissolved in distilled water until it was homogeneous then dried at 55 °C. The alginate/pectin film was then immersed in a solution of 2% CaCl<sub>2</sub> and 1,10-phenanthroline for 24 hours respectively. The resulted films were dried and characterized using FTIR and SEM. Determination of optimal conditions for detection and validation of method parameters such as linearity, limit of detection and limit of quantification, precision, selectivity and accuracy was carried out by measuring the absorbance of the film using a UV-Vis spectrophotometer.

The optimum concentration of phenanthroline which could be immobilized in alginate/pectin film was 0.2% w/v in ethanol. The optimum absorbance of the film was measured at 513 nm after detection for 2 minutes at pH 2. The film has good selectivity for Fe(II) ions in the presence of interference metals like Cu(II), Co(II), Zn(II), Ni(II), Pb(II), Ca(II) and Mg(II). The linearity of the alginate/pectin-phenanthroline film was 0.9997 with limit of detection and limit of quantification as low as 0.446 and 1.350 mg L<sup>-1</sup>, respectively. Film sensors have good precision and accuracy with relative standard deviation was less than 5% and recovery value between 102-110%.

Keywords: alginate/pectin film, colorimetric detection of Fe(II), phenanthroline