ABSTRAK

OPTIMASI *DISPERSIVE SOLID PHASE EXTRACTION* (DSPE) BERBASIS *GRAPHENE OXIDE MOLECULARLY IMPRINTED POLYMER* (GO-MIP) DARI BIOMASSA TERBARUKAN TONGKOL JAGUNG UNTUK PENENTUAN RESIDU ANTIBIOTIK *CEFADROXIL*

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Penentuan residu antibiotik dalam matriks kompleks memerlukan metode preparasi yang selektif dan sensitif. Penelitian ini bertujuan mengembangkan metode *Dispersive Solid Phase Extraction* (DSPE) menggunakan adsorben *Graphene Oxide–Molecularly Imprinted Polymer* (GO-MIP) berbasis biomassa tongkol jagung untuk analisis *cefadroxil* (CFD). GO disintesis dengan metode *Improved* Hummers dan dimodifikasi menjadi GO-MIP menggunakan MAA, EGDMA, dan APS. Hasil sintesis menunjukkan *yield* berturut-turut sebesar 64,70% (karbonisasi), 97,00% (*graphite*), 50,89% (GO), dan 86,69% (GO-MIP). Karakterisasi menggunakan FTIR, Raman, SEM-EDX, dan XRD menunjukkan keberhasilan pembentukan GO dan lapisan MIP. Kondisi optimum adsorpsi diperoleh pada pH 3 (81,37%), massa adsorben 20 mg (82,03%), dan waktu kontak 40 menit (87,51%). Analisis HPLC menggunakan sistem elusi isokratik dengan fase gerak buffer fosfat:asetonitril (85:15 v/v) pada 230 nm menunjukkan kinerja yang baik. Selektivitas GO-MIP terhadap CFD ditunjukkan oleh desorpsi 97,4%, sedangkan *ceftriaxone* menunjukkan desorpsi rendah (11,17%), mengindikasikan spesifisitas situs imprinting. Metode memiliki linearitas baik ($R^2 \geq 0{,}996$), dengan LOD 1,83 ppm dan LOQ 5,55 ppm. Adsorben GO-MIP berbasis tongkol jagung berpotensi sebagai material selektif dan berkelanjutan untuk pengembangan metode preparasi sampel berbasis DSPE dalam analisis CFD.

Kata kunci: Adsorpsi, *Cefadroxil*, DSPE, GO-MIP, HPLC, Tongkol Jagung

ABSTRACT

OPTIMIZATION OF DISPERSIVE SOLID PHASE EXTRACTION (DSPE) BASED ON GRAPHENE OXIDE MOLECULARLY IMPRINTED POLYMER (GO-MIP) DERIVED FROM RENEWABLE CORNCOB BIOMASS FOR THE DETERMINATION OF CEFADROXIL ANTIBIOTIC RESIDUES

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The determination of antibiotic residues in complex matrices requires selective and sensitive sample preparation methods. This study aimed to develop a Dispersive Solid Phase Extraction (DSPE) method using a Graphene Oxide–Molecularly Imprinted Polymer (GO-MIP) adsorbent derived from corn cob biomass for cefadroxil (CFD) analysis. GO was synthesized using the Improved Hummers method and subsequently modified into GO-MIP using MAA, EGDMA, and APS. The synthesis yields were 64.70% (carbonization), 97.00% (*graphite*), 50.89% (GO), and 86.69% (GO-MIP). Characterization by FTIR, Raman, SEM-EDX, and XRD confirmed the successful formation of GO and the MIP layer. The optimum adsorption conditions were obtained at pH 3 (81.37%), adsorbent mass of 20 mg (82.03%), and contact time of 40 minutes (87.51%). HPLC analysis using an isocratic elution system with a phosphate buffer : acetonitrile (85:15 v/v) mobile phase at 230 nm demonstrated good analytical performance. The selectivity of GO-MIP toward CFD was indicated by high desorption efficiency (97.4%), whereas ceftriaxone showed low desorption (11.17%), confirming the specificity of the imprinting sites. The method exhibited excellent linearity ($R^2 \geq 0.996$), with a LOD of 1.83 ppm and a LOQ of 5.55 ppm. The corn cob-based GO-MIP adsorbent shows strong potential as a selective and sustainable material for DSPE-based sample preparation in CFD analysis.

Keywords: Adsorption, Cefadroxil, Corncob Biomass, DSPE, GO-MIP, HPLC