ABSTRAK

OPTIMASI *DISPERSIVE SOLID PHASE EXTRACTION* BERBASIS *GRAPHENE OXIDE* DARI AMPAS TEBU MENGGUNAKAN *RESPONSE SURFACE METHODOLOGY* UNTUK PENENTUAN RESIDU ANTIBIOTIK *CIPROFLOXACIN*

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Meningkatnya penggunaan *Ciprofloxacin* (CIP) sebagai antibiotik telah menjadi masalah serius karena dapat menghasilkan residu di lingkungan, khususnya lingkungan perairan. Pada penelitian ini digunakan teknik *Dispersive Solid Phase Extraction* (DSPE) menggunakan adsorben *Graphene Oxide* (GO) dari ampas tebu sebagai teknik preparasi awal dalam monitoring residu CIP di lingkungan. Pembuatan GO dilakukan dengan menggunakan metode *single step*. Karakterisasi GO dilakukan menggunakan *Fourier-Transform Infrared* (FTIR), *X-Ray Diffraction* (XRD), dan *Scanning Electron Microscopy-Energy Dispersive X-Ray* (SEM-EDX). Optimasi menggunakan *Response Surface Methodology* (RSM) dilakukan untuk memperoleh kondisi penyerapan CIP optimum berdasarkan pH, massa adsorben, dan waktu kontak dengan menggunakan *Box-Bhenken Design* (BBD). Hasil menunjukkan kondisi adsorpsi optimum tercapai pada pH 3,16; massa adsorben 43 mg; dan waktu kontak 29,93 menit dengan persentase adsorpsi CIP sebesar 88,39%. Validasi optimasi menunjukkan hasil yang baik dengan nilai persentase *error* sebesar 0,02%, sehingga kesesuaian model baik dan dapat diterapkan secara akurat. Hal tersebut menunjukkan bahwa GO dari ampas tebu dapat digunakan sebagai adsorben alternatif yang efektif pada teknik DSPE dalam lingkungan.

Kata kunci: *dispersive solid phase extraction*, antibiotik *cipofloxacin*, *graphene oxide*, ampas tebu, *box bhenken design, response surface method*

ABSTRACT

OPTIMIZATION DISPERSIVE SOLID PHASE EXTRACTION BASED GRAPHENE OXIDE FROM SUGARCANE BAGASSE USING RESPONSE SURFACE METHODOLOGY FOR DETERMINING CIPROFLOXACIN ANTIBIOTICS RESIDUE

By

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The increasing use of Ciprofloxacin (CIP) as an antibiotic has become a serious problem because it can produce residues in the environment, especially aquatic environments. This study used the dispersive solid phase extraction (DSPE) technique using graphene oxide (GO) adsorbent from sugarcane bagasse for the initial preparation technique in monitoring CIP residues in the environment. GO was made using a single step method. GO characterization was carried out using fourier-transform infrared (FTIR), x-ray diffraction (XRD), and Scanning Electron Microscopy-Energy Dispersive X-Ray (SEM-EDX). Optimization using response surface methodology (RSM) was carried out to obtain optimum CIP absorption conditions based on pH, adsorbent mass, and contact time using the bhenken box design (BBD). The results showed optimum conditions at pH 3.16; adsorbent mass 43 mg; and contact time 29.93 minutes with a CIP adsorption percentage of 88.39%. Optimization validation showed good results with a percentage error value of 0.02%, so that the model suitability is good and can be applied accurately. This shows that GO from sugarcane bagasse can be used as an effective alternative adsorbent in the DSPE technique in the environment.

Keywords: dispersive solid phase extraction, ciprofloxacin antibiotic, graphene oxide, baggase, bhenken box design, response surface method