ABSTRAK

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

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Penggunaan *ciprofloxacin* sebagai antibiotik dapat menghasilkan residu di lingkungan, khususnya lingkungan perairan, yang menimbulkan dampak negatif bagi ekosistem. Teknik *Dispersive Solid Phase Extraction* dipilih sebagai teknik preparasi untuk monitoring residu *ciprofloxacin* di lingkungan. *Graphene oxide* digunakan sebagai adsorben dalam teknik *Dispersive Solid Phase Extraction*. *Graphene oxide* disintesis dari limbah kulit singkong yang memiliki kandungan karbon dan selulosa yang tinggi menggunakan Metode Hummers Termodifikasi. Karakterisasi *graphene oxide* dilakukan menggunakan instrumen *Fourier-Transform Infrared Spectroscopy*, *X-ray Diffraction*, dan *Scanning Electron Microscopy*. Optimasi menggunakan *Response Surface Method* dilakukan untuk memperoleh kondisi penyerapan *ciprofloxacin* optimum berdasarkan dosis adsorben, pH, konsentrasi *ciprofloxacin*, dan waktu kontak dengan menggunakan Desain Box Bhenken. Kondisi penyerapan dengan kondisi pH 4,8; waktu kontak 35 menit; konsentrasi *ciprofloxacin* 908 ppb dengan penggunaan *graphene oxide* sebesar 27,37 mg mampu menghasilkan daya adsorpsi sebesar 99,92%. Hal tersebut menunjukkan bahwa *graphene oxide* dari limbah kulit singkong dapat digunakan sebagai adsorben untuk antibiotik *ciprofloxacin* yang dapat diaplikasikan untuk monitoring residu antibiotik di lingkungan perairan dan air limbah, khususnya air limbah rumah sakit.

Kata kunci: antibiotik *ciprofloxacin*, desain *box bhenken, dispersive solid phase extraction, graphene oxide, response surface method*

ABSTRACT

OPTIMIZATION OF GRAPHENE OXIDE-BASED DISPERSIVE SOLID PHASE EXTRACTION FROM CASSAVA PEEL USING RESPONSE SURFACE METHODOLOGY FOR DETERMINING CIPROFLOXACIN ANTIBIOTIC RESIDUES

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The use of ciprofloxacin as an antibiotic can produce residues in the environment, especially aquatic environments, which have a negative impact on the ecosystem. The Dispersive Solid Phase Extraction Technique was chosen as a preparatory technique for monitoring ciprofloxacin residues in the environment. Graphene oxide is used as an adsorbent in Dispersive Solid-Phase Extraction Techniques. Graphene oxide is synthesized from cassava peel waste, which has a high carbon and cellulose content, using a Modified Hummers Method. The characterization of graphene oxide was carried out using Fourier Transform Infrared Spectroscopy, X-Ray Diffraction, and Scanning Electron Microscopy instruments. Optimization using The Response Surface Method was carried out to obtain optimum ciprofloxacin adsorption conditions based on adsorbent dose, pH, ciprofloxacin concentration, and contact time using the Bhenken Box Design. Adsorption conditions with a pH of 4,8; a contact time of 35 minutes; and a ciprofloxacin concentration of 908 ppb with the use of graphene oxide of 27.37 mg were able to produce an adsorption capacity of 99,92%. This shows that graphene oxide from cassava peel waste can be used as an adsorbent for the antibiotic ciprofloxacin, which can be applied to monitoring antibiotic residues in aquatic and wastewater environments, especially hospital waste water.

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