ABSTRAK

OPTIMASI *DISPERSIVE SOLID PHASE EXTRACTION* (DSPE) BERBASIS *GRAPHENE OXIDE* DARI LIMBAH TONGKOL JAGUNG (*Zea mays* L.*)* UNTUK EKSTRAKSI ANTIBIOTIK *CIPROFLOXACIN* MENGGUNAKAN *RESPONSE SURFACE METHODOLOGY* (RSM)

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Penggunaan antibiotik yang berlebihan dapat menyebabkan kontaminasi lingkungan perairan, termasuk antibiotik *ciprofloxacin* yang banyak digunakan di Indonesia. Residu antibiotik *ciprofloxacin* jika dibiarkan akan menyebabkan dampak buruk bagi lingkungan. Pada penelitian ini digunakan teknik *Dispersive Solid Phase Extraction* (DSPE) dengan *graphene oxide* dari limbah tongkol jagung sebagai adsorben sebagai teknik preparasi untuk monitoring residu *ciprofloxacin* di lingkungan. Optimasi parameter DSPE dilakukan dengan menggunakan metode *Response Surface Methodology* (RSM) agar lebih efektif dalam memahami interaksi antar variable. Dalam penelitian ini, *graphene oxide* disintesis menggunakan metode *Hummers* termodifikasi dan dikarakterisasi menggunakan *Fourier-Transform Infrared Spectroscopy* (FTIR), *X-ray Diffraction* (XRD), dan *Scanning Electron Microscopy* (SEM). Optimasi kondisi penyerapan *ciprofloxacin* dilakukan berdasarkan faktor dosis adsorben, pH, konsentrasi *ciprofloxacin*, dan waktu kontak menggunakan desain Box-Behnken pada RSM. Kondisi optimum ditemukan pada massa adsorben 10,740 g, konsentrasi *ciprofloxacin* 727,925 ppb, pH 3,98, dan waktu kontak 44,852 menit, dengan persentase adsorpsi sebesar 99,26%. Sehingga penggunaan *graphene oxide* dari limbah tongkol jagung dapat digunakan sebagai adsorben antibiotic *ciprofloxacin*.

Kata kunci: *ciprofloxacin, graphene oxide, dispersive solid phase extraction, response surface method.*

ABSTRACT

OPTIMIZATION OF *GRAPHENE OXIDE*-BASED DISPERSIVE SOLID PHASE EXTRACTION (DSPE) FROM CORN COB WASTE (Zea mays L.) FOR EXTRACTION OF THE ANTIBIOTIC *CIPROFLOXACIN* USING RESPONSE SURFACE METHODOLOGY (RSM)

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Excessive use of antibiotics can lead to contamination of the aquatic environment, including the antibiotic *ciprofloxacin* which is widely used in Indonesia. *Ciprofloxacin* antibiotic residues, if left untreated, will have a negative impact on the environment. In this research, the Dispersive Solid Phase Extraction (DSPE) technique was used with *graphene oxide* from corncob waste as an adsorbent as a preparation technique for monitoring *ciprofloxacin* residues in the environment. Optimization of DSPE parameters was carried out using the Response Surface Methodology (RSM) method to be more effective in understanding interactions between variables. In this research, *graphene oxide* was synthesized using a modified Hummers method *and* characterized using Fourier-Transform Infrared Spectroscopy (FTIR), X-ray Diffraction (XRD), *and* Scanning Electron Microscopy (SEM). Optimization of *ciprofloxacin* absorption conditions was carried out based on the factors adsorbent dose, pH, *ciprofloxacin* concentration, *and* contact time using the Box-Behnken design in RSM. The optimum conditions were found at an adsorbent mass of 10.740 g, a *ciprofloxacin* concentration of 727.925 ppb, a pH of 3.98, *and* a contact time of 44.852 minutes, with an adsorption percentage of 99.26%. So the use of *graphene oxide* from corn cob waste can be used as an adsorbent for the antibiotic *ciprofloxacin*.

Keywords: *ciprofloxacin, graphene oxide, dispersive solid phase extraction, response surface method.*