# Modifikasi Material Berbasis Karbon dengan Nitrogen dari Limbah Masker Medis untuk Aplikasi Degradasi Obat Anti Inflamasi Non Steroid

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ABSTRACT

The increase in the amount of medical surgical mask waste over time is one of the impacts of the Covid19 pandemic which directly affects the environment. Medical masks have a main content of plastic compounds, so their presence in the environment adds to the problems related to plastics and microplastics. Most medical masks have antibacterial activity from the addition of several compounds with this ability. Generally, the antibacterial compounds added are nitrogen-rich compounds because they have amine and amide groups. The utilization of mask waste as a source of nitrogen enrichment in porous carbon materials is an alternative to medical mask waste management that is more environmentally friendly without causing secondary pollution. Porous carbon materials can be prepared from commonly carbon-rich biomass waste such as bagasse to produce materials with high adsorption capabilities. The performance, activity, and application of carbon materials can be improved and expanded by adding the active side of the photocatalyst. One of them is the nitrogen enrichment method on carbon material. The addition of medical mask waste to the carbonization process of biomass waste in one step is a green synthesis step because it does not involve the use of other chemicals as nitrogen sources. This research proposes three innovative ideas, namely a one-step chemical process for using medical mask waste in the production of N-rich carbon materials, introducing a chemical-free technique for the green synthesis of adsorbents and photocatalysts, and finding a technology for utilizing medical mask waste. Specifically, this research aims to develop nitrogen-modified carbon (NdC) materials with high adsorption ability on water permeation of heavy metals and efficient photocatalyst ability on degradation of non-steroidal anti-inflammatory drugs.
This research was conducted in the following stages: (1) carbonization of bagasse waste and mask waste, (2) activation of carbonized material, (3) optimization of synthesis parameters and characterization of synthesis results, (4) test of Cr metal ion adsorption activity, and (5) test of nitrogen-modified carbon material activity on the degradation of non-steroidal anti-inflammatory drug compounds. Characterization of the synthesized material was carried out with X-Ray Photoelectron Spectroscopy, ICP-MS and elemental analysis, X-Ray Diffraction, N2 Adsorption Desorption Analysis, Fourrier Transform Infrared Spectroscopy, Scanning Electron Microscopy, and UV/VIS Spectroscopy instruments. While the anti-inflammatory drug compounds studied in this research are diclofenac, ibuprofen, paracetamol, and naxprofen. The output of this research is in the form of one Scopus indexed international proceeding, one reputable international journal, and IPR in the form of a simple patent and the results of this research are targeted to reach TKT 4.

Kata Kunci: *Antiinflamasi Non Steroid, Karbon, adsorben, nitrogen enrichment, limbah masker*