

***Utilization of Bottom Ash from Paiton Coal-Fired Power Plant as Adsorbent in Bioethanol Purification Using the Taguchi Method***  
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***ABSTRACT***

*The development of the electricity industry in Indonesia is still heavily dependent on the production of bottom ash. This limbah is known as beracun and berbahaya (B3); however, it contains silica and alumina, which are zeolit penyusun components; therefore, it can be used as bottom ash adsorbent. The purpose of this study is to analyze the use of bottom ash as an adsorbent in the production of bioethanol and determine the optimal combination of perlakuan to obtain high-quality ethanol. The method used is the Taguchi method with three experimental factors: kind of perlakuan (activation with NaOH 1 M and non-activation), adsorben size (100 mesh and 200 mesh), and kalsinasi temperature (300°C and 500°C). The dehydration process is carried out using a dehydration column at an operational temperature of 70–78°C with a baku bioethanol technique of 96%. The study's findings indicate that suhu kalsinasi is the factor that has the most significant impact on the increase in ethanol concentration (peringkat 1 based on S/N ratio analysis), which is caused by the adsorbent size and type of activity. The best operational conditions for obtaining the best ethanol yield are achieved by combining kimia aktivasi (NaOH), adsorben ukuran 200 mesh, and kalsinasi suhu 500°C. Through this combination, the bioethanol yield is successfully increased to a final value of approximately 94.43%. Because of the greater capacity to penyerapan molekul air, the use of adsorben teraktivasi is also more effective in reducing the amount of adsorpsi compared to the absence of activation.*

***Keywords:*** *Bottom Ash, Bioetanol, Adsorben, Dehidrasi, Metode Taguchi*