Adsorpsi senyawa parasetamol dengan Powdered Activated Carbon (PAC) dan berbagai jenis adsorben = Adsorption of paracetamol by Powdered Activated Carbon (PAC) and various types of adsorbent

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Abstrak

Emerging contaminants (ECs) merupakan polutan yang menjadi sedang menjadi perhatian. Parasetamol merupakan salah satu emerging contaminant yang dapat menyebabkan pencemaran di badan air serta memiliki toksisitas yang dapat mempengaruhi kesehatan dan lingkungan. Adsorpsi merupakan alternatif metode penyisihan ECs yang menjanjikan karena cukup efisien, hemat biaya, dan mudah untuk dioperasikan. Penelitian ini dilakukan untuk membandingkan efektivitas proses adsorpsi senyawa parasetamol dengan berbagai jenis adsorben, mengevaluasi pengaruh parameter operasional pH terhadap efektivitas proses adsorpsi, dan mengevaluasi potensi penggunaan kembali adsorben. Kuantifikasi parasetamol dilakukan dengan COD metode spektrofotometri dan metode separasi solid-liquid yang digunakan adalah metode separasi dengan syringe filter. Penyisihan parasetamol menggunakan berbagai adsorben, yaitu powdered activated carbon (PAC), zeolit alam, fly ash, lumpur alum nonaktivasi, lumpur terkalsinasi, dan lumpur teraktivasi asam. Analisis proses adsorpsi parasetamol dengan adsorben PAC dilakukan berdasarkan pengaruh konsentrasi adsorben, konsentrasi polutan dan pH. Berdasarkan hasil penelitian, PAC efektif menghilangkan parasetamol dengan efisiensi penyisihan COD sebesar 70,30%. Sedangkan adsorben lainnya kurang efektif karena efisiensi penyisihan COD bernilai negatif. Adsorpsi dengan PAC efektif menyisihkan parasetamol pada pH netral dan asam. Adsorben PAC memiliki potensi penggunaan kembali sebanyak dua kali dengan nilai efisiensi penyisihan >40%.
.....Emerging contaminants (ECs) is a pollutant that is becoming a concern. Paracetamol is an emerging contaminant which can cause pollution in the body of water as well as have toxicity that can affect health and environment. Adsorption is an alternative method of ECs removal which is quite promising because it is highly-efficient, cost effective, and easy to operate. This study was conducted to compare the effectiveness of paracetamol adsorption process by various types of adsorbents, evaluate the effect of pH operational parameters on the effectiveness of the adsorption process, and evaluate the potential reuse of adsorbents. Quantification of paracetamol was carried out by COD spectrophotometric method and the solid-liquid separation method used was the separation method with a syringe filter. Removal of paracetamol used various adsorbents, namely powdered activated carbon (PAC), natural zeolite, fly ash, alum sludge, calcined sludge, and acid activated sludge. Analysis of the paracetamol adsorption process with PAC adsorbent was carried out based on the effect of the concentration of the adsorbent, the concentration of pollutants and pH. Based on the results of the study, PAC effectively removes paracetamol with COD removal efficiency of 70.30%. While other adsorbents are less effective because the efficiency of COD removal is negative. Adsorption with PAC effectively removes paracetamol at neutral and acidic pH. PAC adsorbent has a potential for reuse as much as one time with the allowance efficiency value > 40%.