Pengolahan limbah cair laboratorium kimia dalam penurunan kadar organik serta logam berat Fe, Mn, Cr dengan metode koagulasi dan adsorpsi = Waste water liquid treatment of chemistry laboratory to decrease organic content and heavy metal Fe, Mn, Cr by coagulation and adsorption methods

Mia Azamia, author

Abstrak

Pencemaran lingkungan menyebabkan rusaknya lingkungan yang berdampak pada makhluk hidup di sekitarnya. Sumber pencemaran lingkungan diantaranya berasal dari industri, domestik, dan laboratorium. Tujuan penelitian ini adalah melakukan pengolahan limbah dengan metode koagulasi dan adsorpsi untuk menurunkan kadar organik serta logam berat Fe, Mn, Cr. Jenis koagulan yang digunakan: Tawas, PAC, Trimer 3626, dan Trimer 6784 menggunakan uji jar dalam metode koagulasi. Kondisi optimum yang diperoleh adalah konsentrasi koagulan trimer 6784 sebanyak 19,2 mg/100 mL sampel dengan kisaran pH 4-7 pada suhu ruang. Pengolahan limbah secara koagulasi dapat menurunkan TSS = 69,13 %, TDS = 46,95 %, DHL = 72,33 %, kekeruhan = 93,5 %, KMnO4 = 48,89 %, kadar organik (COD) = 7,4 %, dan kadar logam berat Fe = 85,53 %, Mn = 55,84 %, Cr = 43,07 %. Sedangkan, nilai pH menjadi tinggi dan nilai suhu tetap. Proses adsorpsi dengan karbon aktif dapat menurunkan kadar organik (COD) = 58,53 %, namun terjadi peningkatan kadar logam Fe = 3,95 %, logam Mn = 63,8 %, dan logam Cr = 7,5 %. Sedangkan, adsorpsi dengan zeolit dapat menurunkan kadar organik (COD) = 54,61 % serta logam Cr = 38,67 %, namun terjadi peningkatan kadar logam Fe = 1,22 % serta logam Mn = 11,02 %. Kadar organik setelah adsorpsi menurun 58,53 % dengan karbon aktif dan 54,61 % dengan zeolit, namun masih jauh di atas baku mutu limbah cair menurut KEP-51/MENLH/10/1995 tentang Baku Mutu Limbah Cair Bagi Kegiatan Industri.
.....Bad environment makes the environment damage which can effect to another live creatures in around. This phenomenon is sourced by waste water which from many places such as industry, domestic, and laboratory. The purpose of this research is to do waste water treatment by coagulation and adsorption method to decrease organic content and heavy metal Fe, Mn, Cr. Some kinds of coagulation materials are Tawas, PAC, Trimer 3626, and Trimer 6784. It is used by jar test instrument in coagulation method. The optimum condition which is appropriate with waste water chemistry laboratory is by increasing Trimer 6784 coagulation material?s concentration 19,2 mg/100 mL sample with range pH 4-7 in room temperature. Waste water treatment by coagulation method can decrease TSS = 69,13 %, TDS = 46,95 %, DHL = 72,33 %, turbidity = 93,5 %, KMnO4 = 48,89 %, organic content (COD) = 7,4 %, and heavy metals Fe = 85,53 %, Mn = 55,84 %, Cr = 43,07 %.. Besides, the value of pH become high and the temperature is constant. Adsorption process with active carbon can decrease (COD) = 58,53 %, but it can increase Fe = 3,95 %, Mn = 63,8 %, and Cr = 7,5 %. In the other hand, adsorption with zeolite can decrease (COD) = 54,61 % and Cr = 38,67 %, besides it can increase Fe = 1,22 % and Mn = 11,02 %. The organic content is also decrease after adsorption process 58,53 % with active carbon and 54,61 % with zeolite, but it is not too significant and still over from the standard quality waste water from KEP-51/MENLH/10/1995 about Standard Quality of Waste Water Liquid for Industry Activities.