عنوان مقاله:

Mass transfer coefficient of ammonia in the air stripping process for municipal wastewater: An experimental study

محل انتشار:

فصلنامه پیشرفت ها در فناوری محیط زیست, دوره 7, شماره 4 (سال: 1400)

تعداد صفحات اصل مقاله: 16

نویسندگان:

Arezoo Zangeneh - *Department of Environmental Engineering, Ahvaz Branch, Islamic Azad University, Ahvaz, Iran*

Sima Sabzalipour - *Department of Environmental Engineering, Ahvaz Branch, Islamic Azad University, Ahvaz, Iran*

Afshin Takdastan - *Department of Environmental Engineering, Ahvaz Branch, Islamic Azad University, Ahvaz, Iran*

reza jalilzadeh yengejeh - *Department of Environmental Engineering, Ahvaz Branch, Islamic Azad University, Ahvaz, Iran*

Morteza Abdullatif Khafaie - *Department of Environmental Engineering, Ahvaz Branch, Islamic Azad University, Ahvaz, Iran*

خلاصه مقاله:

This study evaluated the effects of different operating conditions and the air-to-water ratio (G/L) on the kinetics and the mass transfer coefficient of ammonia (KL) in the air stripping method for removing ammonium ions (NH۴+) from wastewater with low concentrations in municipal wastewater treatment plants (WWTPs). The impact of operating conditions including the temperature, initial ammonium ion concentration, pH, and air-to-water ratio (G/L) of <۲۰۰۰:۱ (۶۰:۱، ۷۰:۱, and ۸۰:۱) on KL in the air stripping method was investigated using artificial wastewater at laboratory scale. The NH۴+ concentrations in the wastewater samples were determined with the Nesslerization method (the standard method for the examination of water and wastewater). According to the results, the minimum (۰.۰۵۲۸ h-۱) and maximum (۰.۶۴۸۲۵ h-۱) of KL were obtained within ۱ to ۴ h in the operating status that included an initial ammonium ion concentration of ۳۳.۶۳-۵۲.۸۱ mg/l, a temperature of ۳۴-۴۵.۷ °C, a pH of ۹.۴۸-۱۲.۲, and an air-to-water ratio of ۶۰:۱-۸۰:۱. A comparison of the results of three regression models showed that the air-to-water ratio was the most effective factor on KL. Furthermore, in Model ۳ (multivariate linear regression model/comparing four parameters), the effects of the air-to-water ratio, pH, and temperature increased, leading to the acceleration and conversion of ammonium ions (NH۴+) to a gaseous form (NH۳). Also, the initial NH۴+ concentration and pH in Model ۴ (multivariate linear regression model by subgroup) at a low (۶۰:۱) and high (۸۰:۱) G/L ratio were the most influential factors on KL, respectively. The results of this study revealed that the air-to-water ratio (۶۰:۱، ۷۰:۱, and ۸۰:۱) could be used successfully for the elimination of ammonium ions from municipal WWTPs, leading to lower energy costs for the required aeration in the air stripping method.

کلمات کلیدی:

Air stripping, Mass transfer coefficient, Ammonia, Air to water ratio, Municipal wastewater treatment plants

لینک ثابت مقاله در پایگاه سیویلیکا: